MERC Consultants
environmental and conservation services

Natura Impact Statement

Saoirse Wave Energy Project Site Investigations

Document control			
Document reference: NIS_11042025			
Version	Date	Issue	Author
Final	11/04/2025	0.4	[redacted]

List of Tables

List of Figures

1. Introduction

Saoirse Wave Energy Limited is seeking a Marine Usage Licence (MUL) to undertake marine site investigations off the Clare coast (Figure 1) to progress the Saoirse Wave Energy project. The site investigation works, which constitute the proposed project, include geophysical, geotechnical, metocean, archaeological and environmental surveys which are required to facilitate the future design of the wave energy site, define the location of the array site, export cable corridor and landfall location options; and support the project planning application.

A report providing Supporting Information for screening for Appropriate Assessment (SISAA) for the proposed project was prepared (MERC, 2025) to assist the Competent Authority, in undertaking a screening exercise for Appropriate Assessment (AA). The SISAA concluded that "*the proposed project may give rise to significant effects on the conservation objectives a number of European sites without mitigation"*. Accordingly, it concluded that Appropriate Assessment of the proposed project was required.

Based on the SISAA, this report represents a Natura Impact Statement (NIS) for the proposed project.

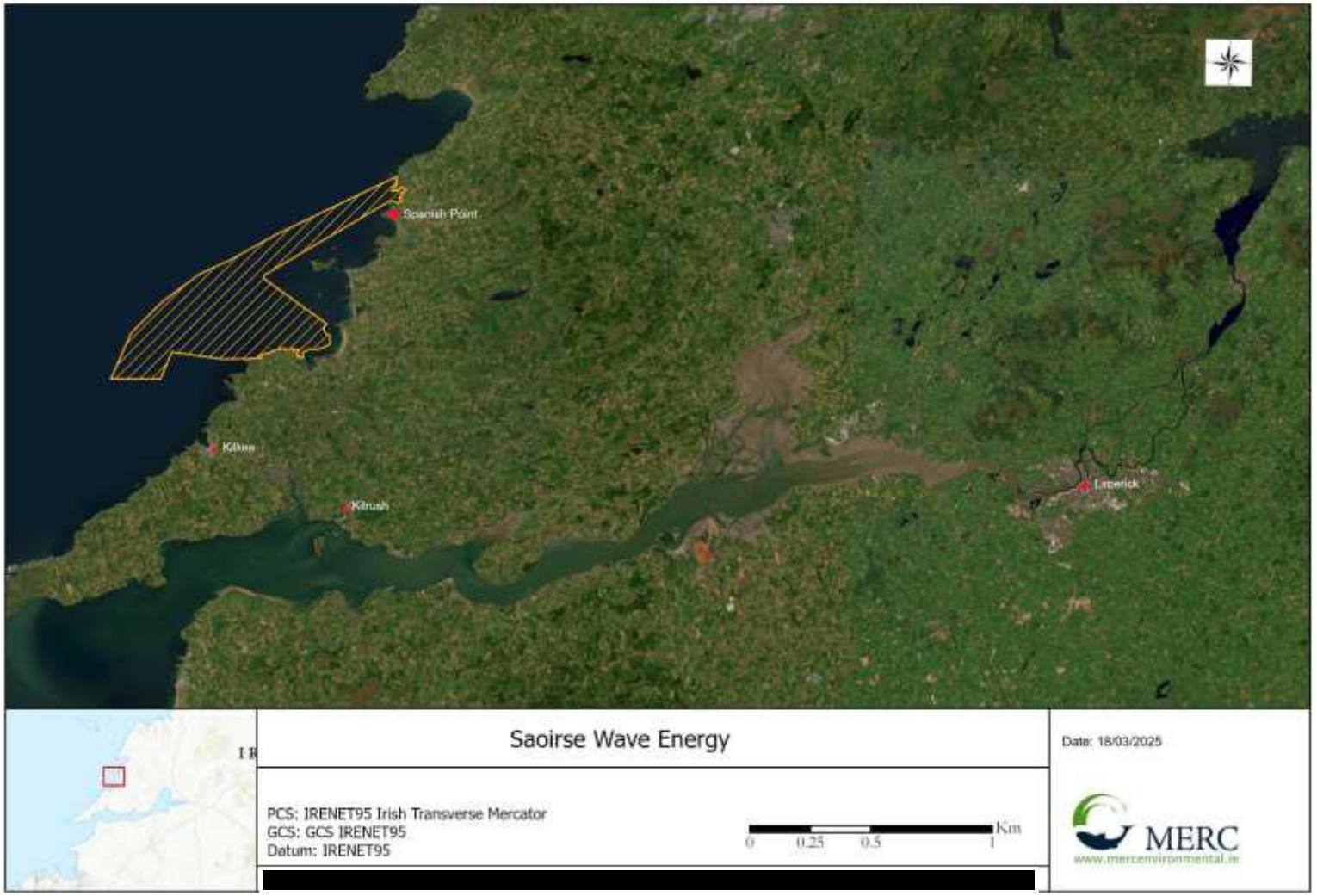

Figure 1. MUL application area.

2. Statement of authority

This report was prepared by [redacted] and [redacted] of MERC Consultants. MERC are a specialist marine ecological survey and consultancy firm. Core staff have more than 60 years of combined experience and specialist knowledge in relation to Irish marine habitats and species in addition to the assessment and management of conservation interests. MERC have been responsible for conducting national surveillance monitoring of EU Annex I marine habitats for compliance under Article 17 of the EU Habitats Directive since 2015. In this context MERC have also been responsible for the assessment and reporting of marine Annex I habitats and the preparation of Article 17 and overarching site monitoring reports. MERC are currently engaged in conducting surveys and preparing the relevant reports for the current (2022-2025) monitoring cycle. Between 2005 and 2010 MERC conducted the survey, monitoring and assessment of sensitive subtidal habitats in Ireland to inform the conservation objective setting for Irish marine SACs.

[redacted]**MCIEEM** is a professional marine ecologist with a wide range of experience in the field of conservation biology, marine habitat mapping and ecology. She completed a M.Sc. in ecology and taxonomy at Trinity College Dublin in 1989 and a Ph.D. in taxonomy also at Trinity College Dublin in 2001. She is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). For the last 20 years she has specialised in the ecology of marine ecosystems. She has specialised in the assessment of benthic habitats with a focus on intertidal and subtidal reef habitats and sensitive seabed species and habitats. Over the last 20 years she has conducted extensive marine monitoring surveys and assessments of EU Habitats Directive marine Annex I habitats and their associated species within European sites in Ireland to assist Ireland in complying with monitoring obligations under the EU Habitats Directive.

[redacted]**MCIEEM** is a professional marine ecologist with a wide range of experience in the ecology, survey, and monitoring of marine habitats and species in Ireland. He completed a Diploma in Science at Galway Regional Technical College in 1987 and a B.Sc. in Biological Sciences at Plymouth University in 1989. He has extensive experience in the monitoring of benthic habitats and species in Ireland and was lead scientist for the mapping of sensitive subtidal species across a range of European sites in Ireland from 2005 to 2010. Over the last 30 years he has also specialised in the ecology of marine fish, and in this regard, provides expertise and review services with respect to assessment of anthropogenic impacts on shellfish, pelagic and demersal species. In this regard he has acted as a lead auditor for the Aquaculture Stewardship Council (ASC) and Marine Stewardship Council (MSC).

3. Proposed survey activities

3.1. Overview

Saoirse Wave Energy Ltd. is planning geophysical, geotechnical, metocean, archaeological and environmental surveys to provide the required information to establish the future design and operation of the wave energy demonstration site. The proposed survey area which corresponds to the MUL application area, is 114.57 km^2. It encompasses an area extending from Freagh point County Clare, south to Ballard Bay and out to a maximum distance of 10km from shore (Figure 1).

It is intended that surveys will commence in the spring of 2025 with a staged programme of investigations over the subsequent four years (2026, 2027, 2028, 2029), capitalising on suitable weather windows over the total period of five years. A high level programme, including indicative numbers of samples, durations and timings is outlined in Table 1 and described in section 4.2.

Table 1. Proposed Survey activity and estimated time and duration

Activity	Equipment	Timing and duration
Geophysical surveys	Multibeam echosounder (MBES) with acoustic backscatter; Side scan sonar (SSS). Magnetometer. Gradiometer. Sub-bottom profiler (SBP); Ultra-high resolution Seismic (UHRS). Potentially a sparker (single and multi-channel) and mini-air gun. USBL system.	Initial reconnaissance geophysical surveys in spring - summer 2025 (with support from the National Marine Survey Programme). Subject to grant of MUL licence. Detailed surveys in summer of 2026. Total duration of up to 6 months (weather permitting).
Geotechnical surveys	Up to 30nr. boreholes to depths of up to 50m below seabed (BSB) in subtidal areas; Up to 40nr. cone penetration tests (CPTs) in subtidal areas; and Up to 40nr. vibrocores in subtidal areas. Up to 5nr. trial pits at proposed landfall locations	Reconnaissance geotechnical campaign in summer 2026. Potentially a refined detailed survey in summer of 2027. 15 - 25 hours of drilling time in any one location. CPT - 30min – 2 hours in any one location. Vibrocores 30mins-2 hours in any one location. Trial pits – 30mins-2 hours in any one location. Total duration of up to 6 months (weather permitting). The exact locations of boreholes, vibrocores and CPTs will be informed by the data derived from the geophysical surveys and cannot be confirmed at this stage. However, it is considered likely that they will be spread across the entire area of the

Activity	Equipment	Timing and duration
		MUL where suitable bathymetry is present.
Benthic ecology survey	Benthic grab sampling (up to 50 sampling locations). Camera and video sampling (up to 50 sampling locations). Video transects over potential Annex I habitats and protected features e.g. reef habitats (If required; number of locations to be confirmed by geophysical survey results). Diving activities may be applied for inspection and sampling in areas with restricted access. Intertidal walkover surveys to record biotopes and species present.	Subject to availability of geophysical survey results. A part of summer survey 2026 campaign. Up to 3 hours at any one location. Total duration of up to 3 weeks (weather permitting). The exact locations of grab stations will be informed by the data derived from the geophysical surveys and cannot be confirmed at this stage. However, it is considered likely that they will be spread evenly across the entire area of the MUL where suitable soft sediments are present.
Metocean	Up to 2 Acoustic Doppler Current Profilers (ADCPs) are likely to be deployed on the seafloor in a trawl resistant mooring frame. Up to 2 waverider buoys are likely to be deployed with a mooring system. Up to 2 LiDAR buoys with a mooring system may be also deployed.	Maximum 36 months.
Marine mammal acoustic monitoring	Up to 4 acoustic monitoring devices (i.e. CPoDs and/or AMAR) are likely to be deployed across the site at any one time. Assume deployment of up to six deployments of CPoDs/AMAR devices, as contingency for lost equipment, at the same locations as the original deployments.	Up to 2 years of monitoring.
Intertidal ecology surveys	Walkover surveys to map intertidal habitats and species. Likely to include transects, quadrats and core sampling (e.g. hand coring). Up to 12 sampling locations per landfall considered.	1-2 days per landfall. Summer 2025 (weather and tide permitting).
Offshore bat surveys	Offshore bat surveys may be considered for the project.	To be confirmed.

Activity	Equipment	Timing and duration
Water Quality	Sample collection may be undertaken with a rosette of water bottles and in situ sampling (i.e. with CTD probe)	There may be maximum of 20 nr. water quality sampling locations within the MUL Licence Area. As a part of summer survey 2026 campaign.
Archaeological Survey	Underwater Archaeology Intertidal archaeology	Identification and assessment of metallic and other targets recorded during the magnetometer survey (as part of the geophysical survey specification above). This will be conducted in advance of geotechnical survey to inform the UXO and archaeological risk assessment. Undertaken as part of geophysical survey (2025/2026). Intertidal archaeological survey is also considered to be carried out during summer 2025.

3.2. Survey vessel

For the geophysical, environmental, and possibly geotechnical (CPTs and vibrocore) surveys it is proposed to use the Irish multi-purpose marine research vessel, the *RV Tom Crean,* (Figure 2) or similar vessels available at time of survey mobilisation. For follow-on geotechnical surveys, it is proposed to use vessels similar to Fugro Voyager and Fugro Aran 120 and a Jack Up Barge as shown in Figure 3 to Figure 5.

Fugro Voyager is an example of typical, purpose built offshore geotechnical vessel. The vessel has been specifically designed for operating in water depths up to 3,000m metres for both drilling and seabed sampling and in situ testing. The vessel has a twin tower type drilling derrick over a central moonpool.

Fugro Aran 120 is an example of Jack Up Barge, designated for acquisition of sub-seabed data using borehole, vibrocore and cone penetration techniques in nearshore area.

For follow-on nearshore geophysical, geotechnical, and environmental surveys smaller vessels are likely to be employed.

Uncrewed surface vehicle (USV) and/or autonomous surface vehicle (ASV) may also be used for the provision of geophysical survey.

The RV Tom Crean was commissioned in 2022 and was designed as a silent research vessel, in order to meet the stringent criteria of the ICES 209 noise standard for fisheries research. The vessel technical specification is outlined in Table 2.

A suitable support vessel will be contracted to enable to deployment and recovery of any metocean survey equipment throughout the project duration. A suitable small to medium sized multicat support vessel with an appropriately rated crane or A-frame system would be required for the tow-out, deployment and mooring, and recovery operations. A vessel such as the AMS Retriever (as shown in Figure 5) or similar would be required for these operations.

Other vessels supporting project works, have yet to be identified, as their availability will be subject to grant of MUL licence.

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended, including the requirements of MARPOL. In addition, all vessels will adhere to published guidelines and best working practices such as the National Maritime Oil/HNS Spill Contingency Plan (NMOSCP), Marine Pollution Contingency Plan (MPCP), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations. Vessels shall have a Health, Safety and Environmental Managements system which should conform to the requirements of the latest International Maritime Organization (IMO), Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in.

The vessels to be considered for the provision of survey works will be represented by small and medium size vessels. Acoustic broadband source pressure levels with smaller vessels (<50 m) having

source pressure levels 160-175 dB (re 1µPa at 1m) and medium size vessel (50-100 m) 165-180 dB (re 1µPa at 1m) (DECC, 2011). The survey works will be undertaken from vessels in accordance with the relevant guidelines required to manage the risk to marine mammals from man-made sound sources in Irish waters.

Figure 2. RV Tom Crean

Figure 3. Typical Offshore geotechnical drill survey vessel - Fugro Voyager

Figure 4.Typical Jack Up Barge – Fugro Aran 120

Figure 5. Typical vessel for metocean deployment and recovery – AMS Retriever

Table 2. RV Tom Crean: Vessel specifications

Vessel size	
Vessel length	52.8m
Beam	14m
Draught	5.2m (maximum)
Tonnage (GRT)	1935 Tonnes
Main diesel generators	
Make	Mitsubishi
Type	S16R-(Z3) MPTAW
Number and power	2 x ~1437kW
Speed	1500 rpm
Mounting	Double resilient
Exhaust silencers	SCR system with 45dB(A) attenuation
Auxiliary diesel generators	
Make	Scania
Type	DI 13-91 M
Power	426 kWm
Speed	1500 rpm
Mounting	Resilient
Exhaust silencers	At least 25 dB(A)
Propulsion motor	
Make	Indar
Type	Squirrel cage – Induction motor IMU-710-X/8
Power	2000 kW at 179rpm
Rated frequency	12.6 Hz

3.3. Equipment description and specifications

A suite of instruments will be used for the site investigation survey as detailed in Table 1.

Geophysical survey equipment will include a multibeam echosounder, sub bottom profiler and side scan sonar. A sparker system and, if further penetration is required, an air gun source may also be required. The type of geophysical survey equipment to be used will be determined by a number of factors including:

- Depth of interest below seafloor.
- Nature of shallow rock that is likely to be encountered.
- Desired resolution of the data that are to be used for mapping the shallow materials.

Geotechnical survey equipment to test the nature of, and/or retrieve samples on or below the seafloor will also be required. This to include vibrocore, borehole or cone penetration testing (CPT). Trial pits possibly to be collected in the intertidal zone as well.

A number of other instruments, such as a magnetometer, ADCPs, wave rider and LiDAR buoys and a maximum of 4 no. CPoDs, which are considered passive devices in terms of noise generation, will also be deployed.

Deployment of a Day or Hammon grab will be required to collect sediment samples to inform the benthic ecology of the MUL application area.

The indicative specifications of proposed equipment required to undertake the geophysical, geotechnical, metocean and environmental surveys is listed in Table 3 and described below.

Table 3. Indicative specifications of proposed survey equipment

Equipment	**Example Model**	**Deployment**	**Company**	**Sound Pressure Level re 1 µPA in water @ 1m from source**
Geophysical equipment				
Multibeam Echo sounder	EM2040 (200,300 & 400kHz)	Retractable hull mount	Konsberg Maritime	210dB
Side scan Sonar	4205 sidescan (300 to 900 kHz)	Towed system	Edgetech	228dB
Sub-bottom Profiler	Knudsen 3250 CHIRP (3.5-12kHz)	Vessel mount	Knudsen	223dB
Sparker	Dura-speak seismic sound source (300Hz to 1.2kHz)	Towed system	Subsea Technologies	226dB
Mini air-gun	Mini G Gun (10 and 500 Hz)	Vessel mount	Sercel	230dB
ultra-short baseline (USBL) system	e.g. Kongsberg HiPAP (Typically 20 to 50 kH)z	Equipment mounted	Konsberg	207dB

Geotechnical equipment				
Vibrocorer	HPC (high performance corer), o similar	From vessel	Fugro or similar	145-190dB
Cone penetration testing	Fugro Seascalf, G-Tec GT25 or similar	From vessel	Fugro or similar	118-145dB
Borehole testing	Geobor S or similar	From vessel	Fugro or similar	145-190dB
Trial Pitting	Tracked excavator	Tracked within foreshore area where access is possible	Fugro or similar	N/A
Passive recording equipment				
Magnetometer/ gradiometer	TBC	Towed	TBC	N/A
Wave rider	DWR-MkIII	Anchored	Datawell	N/A
CPoDs/Autonomous Marine Acoustic Recorder (AMAR)	AMAR G4	Anchored	Jasco	N/A
Acoustic Doppler Current Profiler (ADCP)	Sentinel V (300 – 1000Hz)	Static on seabed	Teledyne marine	N/A
Floating LiDAR buoy	EOLOS FLS200	Anchored	EOLOS	N/A
Benthic sampling and survey equipment				
Day Grab	N/A	Overboard	N/A	N/A
Hammon Grab	N/A	Overboard	N/A	N/A
Drop down camera	N/A	Overboard	N/A	N/A
Diver surveys	N/A	Overboard	N/A	N/A

*Note: Where the exact model to be used is yet To Be Confirmed (TBC) a worst case scenario has been used to determine the upper level sound pressure possible. In some cases the equipment type and model is indicative only, exact equipment to be specified by the contractor but the examples provided are consisted standard and any variations will be minor.

3.3.1 Geophysical survey equipment

Multibeam echosounder

A multibeam echosounder (MBES) is a type of sonar frequently used to map bathymetry. It operates by emitting an acoustic wave in a fan shape beneath the point of its transceiver attached to the hull of the vessel. The time it takes for the sound waves to bounce off the seabed and return to the transceiver is used to calculate the water depth within the arc of the fan. The proposed MBES operates at a sound pressure level of 210 dB re 1µPa at 1m with a peak frequency between 200-400 kHz.

Side scan sonar

Side scan Sonar (SSS) is another device that transmits sound pulses that provide the information required to map the seabed. It differs from MBES in that SSS has a finer beam width and smaller footprint to MBES and therefore higher resolution. It is towed behind the vessel very close to the seabed and emits fan-shaped acoustic pulses directed down toward the seafloor which are recorded as a series of cross-tracks. The sound frequencies used by side-scan sonar range from 100 to 1000kHz; higher frequencies yielding better resolution but less range.

Sub-bottom profiler

A Sub-bottom profiler employs an acoustic signal, to provide the information required to identify and measure marine sediment layers that exist below the sediment/water interface. The proposed equipment comprises a Knudsen Chirp system which transmit a sweep of frequencies (e.g. 2-10 kHz) in a single pulse. Depending on the profile of the seabed (rock, sand, mud etc.) and level of compaction, the energy reflected back can be related to the sub-bottom composition.

Sparker system and hydrophone array

A sparker is a device used for sub-seabed investigations where deeper acoustic penetration is required. It is generally more powerful than a Sub-bottom profiler and used to explore very coarse/compacted sea beds. The sound source is generated by an electrical arc that creates a bubble. As it collapses the bubble produces a broad band (500 Hz – 4 kHz) omnidirectional pulse which penetrates a few hundred meters into the subsurface. Hydrophone arrays towed near the acoustic source receive the returning signals.

Mini airgun

A mini airgun emits a blast of compressed air resulting in an acoustic signal consisting of an initial high-amplitude pressure pulse followed by a decaying series of "bubble pulses" formed by oscillations of the resulting air bubble.

USBL system

A USBL system provide a method of positional fixing underwater. It consists of a transceiver, which is mounted on a pole under the survey vessel, and a transponder deployed on the seafloor or on the subsea instrument being used. An acoustic pulse is transmitted by the transceiver, and the pulse detected by the transponder is retuned. The time between the initial acoustic pulse and the reply is then measured by the USBL system and is analysed to allow the position to be calculated.

3.3.2 Metocean and other passive equipment

ADCP

An ADCP is a hydroacoustic current meter used to measure water current velocities over a depth range using the doppler effect of sound waves scattered back from particles within the water column. In the present case ADCPs potentially operating in the range of 300 – 1000Hz will be used. The instrument emits "pings" of sound at a sampling rate of 1-minute average every 10 minutes.

The ADCP is contained within a trawl resistant bottom mount frame *circa* 1.8m x 1.3m x 0.6m with a weight of approximately 300kg. The frame is attached to a ground line, a clump weight and to an acoustic release system carrying a rope retrieval system. The frame also houses a recovery line attached to a small rigid buoy which is held in place by an acoustic release, which releases the buoy on command from a deck unit.

Also housed within the frame is lead ballast to secure the frame to the seabed. Additional instrumentation to collect salinity and temperature data may also be contained within the frame. An acoustic pinger is also mounted on the frame to aid in the recovery of the frame in the event of the

acoustic release not firing. The frame is deployed with a grapple hook and floating nylon line to serve as a backup means of recovery.

The specifications of the ADCP and installation vessel will be confirmed by award of the tender contract. A vessel will be employed for the installation, service, and recovery of this equipment. The details of the contracted vessel will become available on award of the tender contract.

Floating LiDAR buoy

Floating LiDAR buoys may be deployed to measure the wind resource and wind speeds, understand the wave hight, heave and direction, measure current profiles to understand met conditions within MUL licence area. Deployment of buoy will include anchoring. Up to 2 LiDAR buoys may be deployed for a period of between 12 to 24 months.

The specifications of the floating LiDAR buoy, the associated mooring type, and an installation vessel will be confirmed by award of the tender contract. An installation vessel will be employed for the installation, service, and recovery of this equipment. The details of the contracted vessel will become available on award of the tender contract.

Waverider buoy

Waverider buoys may be deployed to measure wave hights and direction to support a detailed design of the project within MUL Licence area. They will be attached to a seabed with suitable mooring. Up to 2 waverider buoys may be deployed to gather wave data. The specifications of the waverider buoy, the associated mooring type, and an installation vessel will be confirmed by award of the tender contract. An installation vessel will be employed for the installation, service, and recovery of this equipment. The details of the contracted vessel will become available on award of the tender contract.

Magnetometer/Gradiometer

A magnetometer is a passive instrument that measures the Earth's magnetic field allowing magnetic anomalies to be measured. It is towed behind the survey vessel where it samples background magnetism. When the magnetometer detects an anomaly, such as ferrous objects such as fragments of a ship hull or a geological formation of basalt. This is detected as a change to the background magnetic field. This tool can detect artifacts above or below the seabed.

Gradiometer surveys are carried out using a similar methodology but with the use of two separate magnetometer sensors towed in a paired configuration. Gradiometer surveys measure the gradient of the magnetic field, allowing for a more precise measurements of magnetic variations. The use of

magnetometer or gradiometer survey arrays will be determined following further site-specific assessments to ensure the most appropriate methodology.

3.3.3 Benthic sampling equipment

Seabed imagery

Underwater camera systems or Remotely Operated Vehicles (ROVs) may be used for visual inspection of the existing environmental conditions within MUL area. Dropdown video surveys using a overboard camera may be conducted to record the subtidal habitat especially in areas where hard strata (subtidal reef) are indicated (based on bathymetry) to be present. High quality video recordings and stills will be collected for further analysis and confirmation of suitable conditions for further intrusive activities e.g. benthic sampling or geotechnical works.

Day or Hammon grab

A Day grab is an instrument used for sampling soft seabed sediments. When deployed overboard it is lowered on a winch to the seabed where the jaws open to take a small (approx. 15L) sample of the surface sediment (top 20cm). A Hammon grab is a very similar type of sampler, but the jaw mechanism is slightly different which allows it to sample coarser sediments (e.g. gravel and shelly sediments). The samples retained can then be analysed to obtain an overview of the sediment fauna, and particle size. Both samplers are routinely used for surveillance monitoring to support a number of EU Directives such as the Habitats Directive and Water Framework Directive. Day or Hammon grabs do not introduce noise into the underwater environment other than that produced from a slight impact with the grab making contact with the seabed.

Intertidal coring and walkover surveys

For intertidal sediment assessment a 0.01m^2 hand core taken to a depth of 20cm for benthic faunal analysis will be used. Additional surveys of intertidal hard strata may also be carried out by conducting walk over surveys of the relevant hard strata to record biotopes and species present.

Diver surveys

Diver surveys, using SCUBA, may also be conducted in areas of hard strata. Both surveys are considered to be non-intrusive as they do not make contact with the seabed.

3.3.4 Geotechnical survey equipment

The aim of the geotechnical survey is to provide sufficient geotechnical data to allow the characterisation of the sub-seabed strata. As such vibrocoring, seabed CPT and borehole testing will be conducted at the number of locations spread throughout the MUL application area. The geotechnical survey will be undertaken from a dedicated geotechnical vessel as described in section 4.2. Drilling, resulting from geotechnical surveys, is acknowledged to produce moderate levels of continuous omnidirectional sound at low frequency (several tens of Hz to several thousand Hz and up to c.10 kHz). Source sound pressure levels have generally been reported to lie within the 145-190 dB re: 1 µPa range (NPWS, 2014).

Boreholes

Up to 30 bore holes with a diameter of up to 102mm and a depth of up to 50m below the seabed will be carried out. To facilitate this, a drill head is lowered to the seabed from the vessel via a drill string and stabilised using a seabed frame. The drill head penetrates the seabed via rotation of the drill string and the application of a downward pressure. Soils and rock samples are then retrieved for laboratory testing via the drill string. Borehole drilling may be combined with *in-situ* testing such as cone penetration testing or down the hole testing at some investigative locations.

Indicative Equipment: Drilling equipment used will follow the ISO and API technical specifications for drilling equipment. Indicative equipment to be used would be traditional API drill string or a triple core barrel system (e.g., Geobor 'S') or similar.

Cone penetration testing

Up to 40 CPT with a Diameter: 50-62mm and a depth of up to 30m below the seabed will be carried out. This will be carried out *in situ* on the seabed via a frame or by deck-push CPT from the vessel via a moon pool.

Indicative Equipment: Fugro Seascalf, G-Tec GT25 or similar. For landfall investigation within the intertidal zone, a tracked borehole / CPT rig and ancillary equipment would be used.

Vibrocoring

Up to 40 Vibrocore samples will be taken to a depth of 6m. A gravity or piston core will be used to collect the samples. These devices are typically deployed from a crane on the vessel.

Indicative Equipment: Fugro HPC (high performance corer) & OSIL Vibro-Corer or similar.

Trial pitting

Up to 5 trial pit excavation locations will be carried within the intertidal or foreshore areas where access is possible. These excavations will be carried out using a tracked excavator to excavate a pit approximately 1m wide, 3m long and up to 4m deep depending on the ground conditions. Trial pit excavations will be used to visually inspect the ground conditions, collect samples and carry out insitu testing such as shear vane testing and plate bearing testing. Completion of a trial pit excavation will take up to two hours each and all excavations will be back filled with the excavated materials in the order in which they were excavated. Trial pit excavation is not carried out within the water body, with all works carried out above the water line or within tidal windows.

4. Receiving environment

The MUL application area, within which surveys will take place, is 114.57 km^2. It encompasses an area extending from Freagh Point, south to Ballard Bay, County Clare out to a maximum distance of 10km from shore.

There is no spatial overlap between the MUL area and any Special Area of Conservation (SAC). EMODnet broad-scale seabed habitat mapping (EUSeaMap, 2021), shows the MUL area to be comprised of a range of different sediment types including circalittoral fine sand or circalittoral muddy sand, circalittoral rock and other hard substrata, deep circalittoral coarse sediment, deep circalittoral mixed sediments, deep circalittoral sand and unspecified infralittoral sediments.

There is a spatial overlap between the proposed MUL area and Mid-Clare Coast Special Protection Area (SPA). In addition, the MUL area is likely to provide foraging habitat for seabird species connected to more distant SPAs, within foraging range. Aerial surveys for seabirds and marine mammals, which included the MUL area, conducted to support this project (Intertek, 2022 and 2023) indicated that the site is used by a number of seabird species, with wide foraging ranges. These aerial surveys also indicated that the MUL area is used by a number of cetaceans, with large ocean ranges.

The MUL area and surrounding waters also provides foraging habitat for Grey seal (*Halichoerus grypus*) and Harbour seal (*Phoca vitulina*) with the potential to be connected to more distant European sites.

While there are no records for Otter (*Lutra lutra*) within the MUL area, records for otter occur in adjacent terrestrial areas along the Clare coast. Therefore it is considered that this species is likely to use the intertidal and nearshore (<300m) in the areas of Doughmore Bay and Doonbeg Bay, within the MUL area, where freshwater enters the marine areas within these bays.

5. Methods

5.1. Guidelines and legislation

This report has been prepared, *inter alia*, with reference to the following European Directives, national legislation and guidance on the appropriate assessment of projects and plans with regard to the implementation of the provisions of Article 6(3) and (4) of the EU Habitats Directive 92/43/EEC.

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. Official Journal of the European Communities.
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version).
- European Communities (Birds and Natural Habitats) Regulations 2011. SI No. 477 of 2011.
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Commission 2018. 7621 final. Office for Official Publications of the European Communities, Luxembourg.
- Assessment of plans and projects significantly affecting Natura 2000 sites; Methodological Guidance on the provisions of Articles 6(3) and (4) of the Habits Directive 92/43/EEC. European Commission, 2002;
- Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. Office of the Planning Regulator. March 2021.
- Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and the Gaeltacht, 2014.
- Relevant case law.

6. Supporting Information for Screening for Appropriate Assessment

A SISAA report was prepared (MERC, 2025) to assist the Competent Authority, in undertaking a screening exercise for Appropriate Assessment (AA). The SISAA concluded that "*the proposed project may give rise to significant effects on the conservation objectives a number of European sites without mitigation"*. Accordingly, it concluded that Appropriate Assessment of the proposed project was required.

All European sites that were screened in for appropriate assessment, together with their qualifying interests (QIs) are given in Table 4. SACs are shown in Figure 6 and Figure 7 and SPAs are shown in Figure 9.

Additional sites within the UK, "screened in" as they are within a Management Unit for a qualifying cetacean, are given in Table 5 and shown in Figure 8.

Table 4. All European sites screened in.

Site code	Site name
1021	Carrowmore Point to Spanish Island SAC
2264	Kilkee Reef SAC
90	Glengarriff Harbour and Woodland SAC

101	Roaringwater Bay and Islands SAC
133	Donegal Bay (Murvagh) SAC
147	Horn Head and Rinclevan SAC
190	Slieve Tooey/Tormore Island/Loughros Beg Bay SAC
191	St. John's Point SAC
197	West of Ardara/Maas Road SAC
204	Lambay Island SAC
241	Lough Swilly SAC
268	Galway Bay Complex SAC
278	Inishbofin and Inishshark SAC
328	Slyne Head Islands SAC
343	Castlemaine Harbour SAC
428	Lough Melvin SAC
458	Killala Bay/Moy Estuary SAC
495	Duvillaun Islands SAC
507	Inishkea Islands SAC
622	Ballysadare Bay SAC
627	Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
707	Saltee Islands SAC
764	Hook Head SAC
781	Slaney River Valley SAC
1141	Gweedore Bay and Islands SAC
1482	Clew Bay Complex SAC
2034	Connemara Bog Complex SAC
2074	Slyne Head Peninsula SAC
2111	Kilkieran Bay and Islands SAC
2158	Kenmare River SAC
2165	Lower River Shannon SAC
2172	Blasket Islands SAC
2269	Carnsore Point SAC
2283	Rutland Island and Sound SAC
2953	Blackwater Bank SAC
2998	West Connaught coast SAC
3000	Rockabill to Dalkey Island SAC
3015	Codling Fault Zone SAC
2500077	Baie du Mont Saint-Michel SAC
2500079	Chausey SAC
2500084	Récifs et landes de la Hague SAC
2502018	Banc et récifs de Surtainville SAC

2502019	Anse de Vauville SAC
5300008	Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay SAC
5300009	Côte de Granit rose-Sept-Iles SAC
5300012	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SAC
5300015	Baie de Morlaix SAC
5300017	Abers - Côte des légendes SAC
5300018	Ouessant-Molène SAC
5300061	Estuaire de la Rance SAC
5300066	Baie de Saint- Brieuc SAC
5302006	Côtes de Crozon SAC
5302007	Chaussée de Sein SAC
5302015	Mers Celtiques - Talus du golfe de Gascogne SAC
5302016	Récifs du talus du golfe de Gascogne SAC
2502022	Nord Bretagne DH SAC
004182	Mid-Clare Coast SPA
004005	Cliffs of Moher SPA
004119	Loop Head SPA
004152	Inishmore SPA
004154	Iveragh Peninsula SPA
004008	Blasket Islands SPA
004136	Clare Island SPA
004007	Skelligs SPA
004021	Old Head of Kinsale SPA
004192	Helvick Head to Ballyquin SPA
004066	The Bull And The Cow Rocks SPA
004002	Saltees Islands SPA
004189	Kerry Head SPA
004153	Dingle Peninsula SPA
004144	High Island, Inishshark and Davillaun SPA
004003	Puffin Island SPA
004175	Deenish Island and Scariff Island SPA
004155	Beara Peninsula SPA
004111	Duvillaun Islands SPA
004150	West Donegal Coast SPA
004069	Lambay Island SPA
004194	Horn Head to Fanad Head SPA
004073	Tory Island SPA
004077	River Shannon and River Fergus Estuaries SPA
004177	Bills Rocks SPA

004237	Seas of Wexford SPA
004236	North-West Irish Sea SPA

Table 5. UK sites outside of the Natura 2000 network "Screened in".

Site code	Site name
UK0030399	North Channel SAC
UK0016618	Strangford Lough
UK0016612	Murlough
UK0030398	North Anglesey Marine/Gogledd Môn Forol Side Code
UK0030397	West Wales Marine/Gorllewin Cymru Forol U
UK0030396	Bristol Channel Approaches/Dynesfeydd Môr Hafren

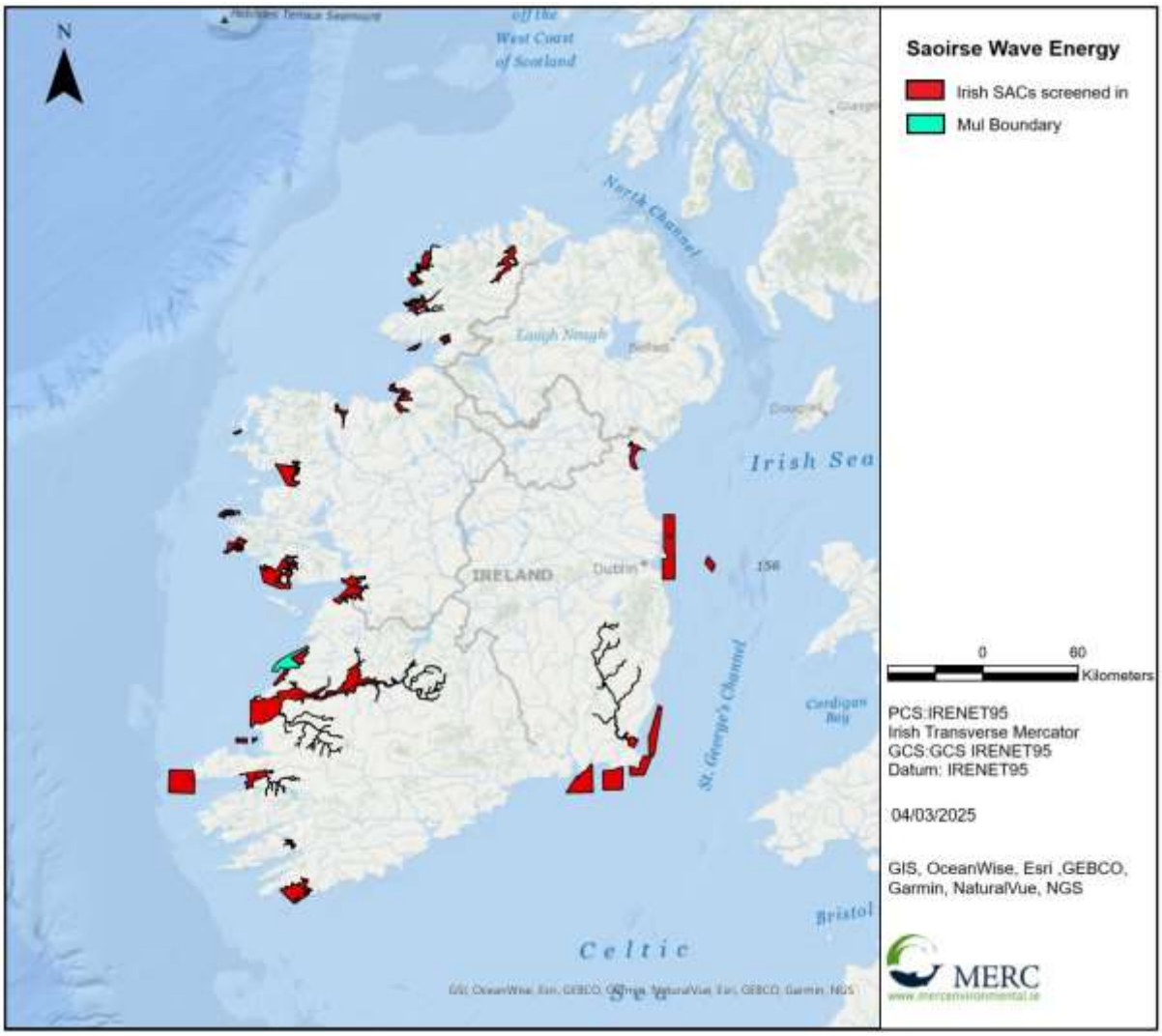

Figure 6. Irish SACs screened in

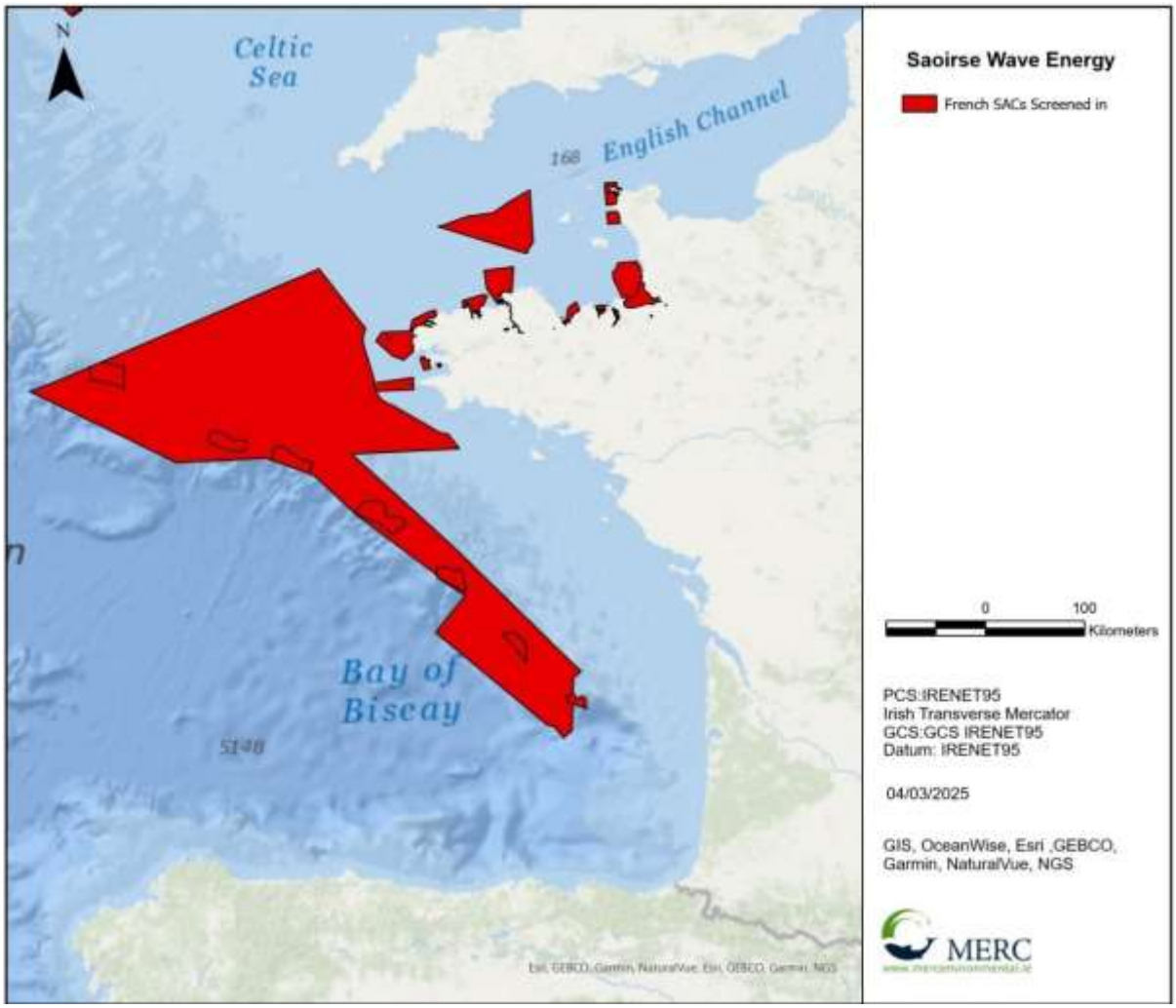

Figure 7. French SACs screened in

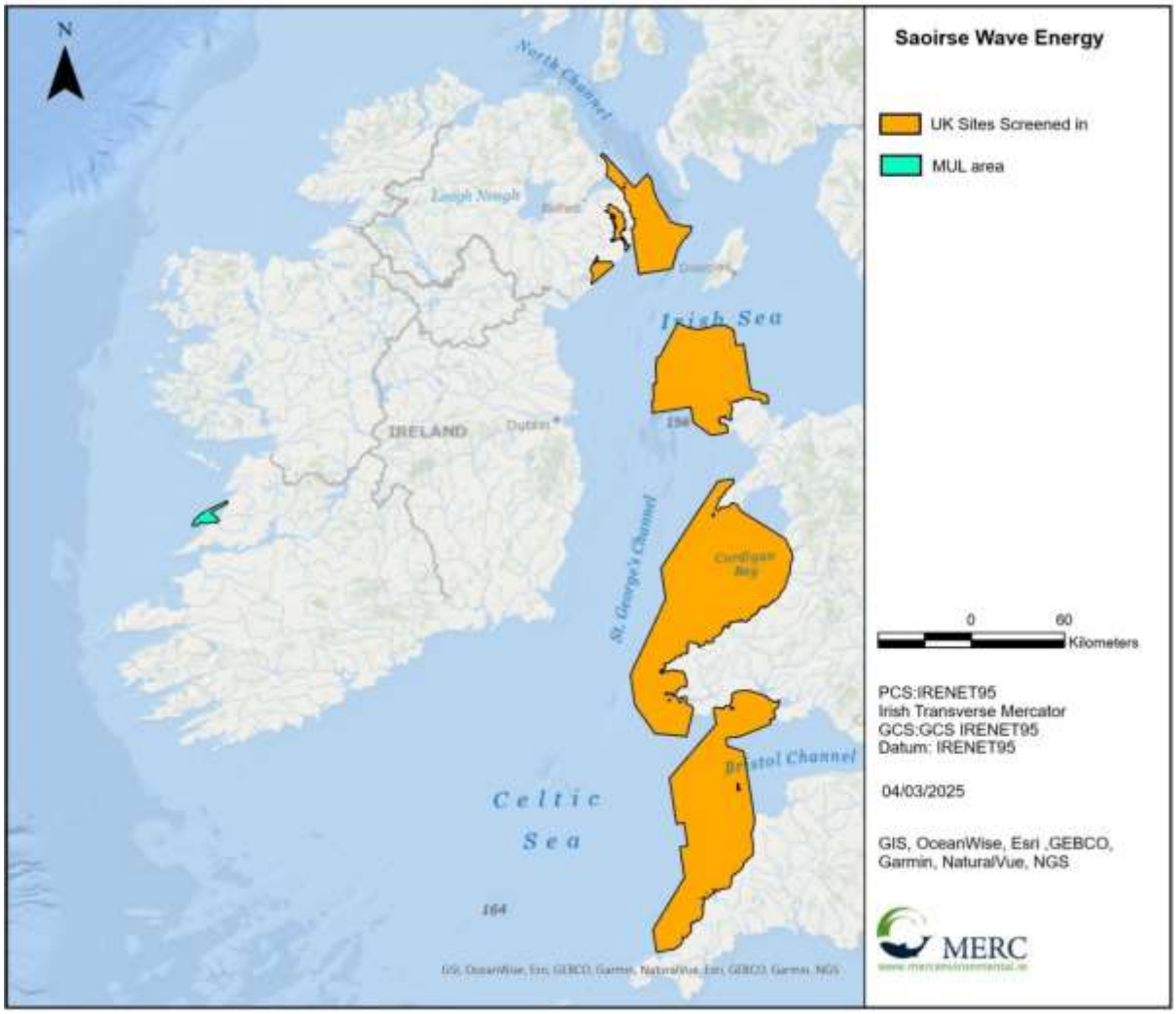

Figure 8. UK sites screened in

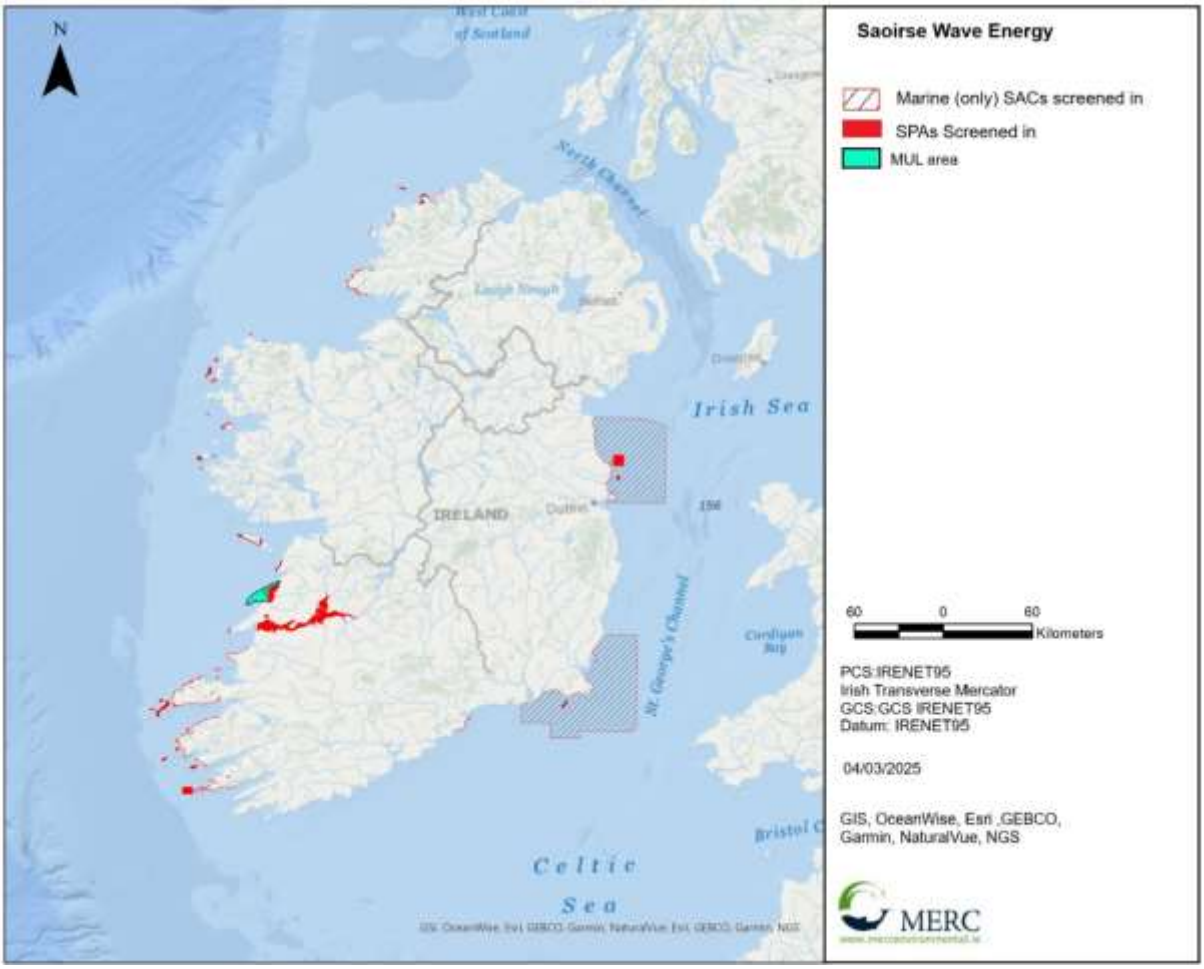

Figure 9. SPAs screened in

7. Impact assessment

The SISAA identified the following as having the potential for likely significant effects.

- Disturbance, harm or injury from underwater noise with the potential for possible temporal impacts on Marine Mammals and Birds.
- Injury or harm to marine mammals as a result of collision with the survey vessel
- Disturbance & displacement by underwater noise with the potential for possible temporal impacts on Birds.
- Disturbance & displacement of benthic invertebrates and birds in intertidal areas as a result of sediment sampling.
- Pollution resulting in harm to benthic habitats, marine mammals, birds and fish as a result of the accidental spillage of hydrocarbons from vessels.
- Potential for in-combination effects related to 2 projects and 3 plans.

This section identifies and considers potential impacts; direct and indirect, on **the conservation status of the QIs and SCIs for all sites within the ZoI by reference to their defined attributes, measures and targets as set out by NPWS in the relevant site specific Conservation objectives for each site.**

7.1. Review of sources of impact

Noise disturbance and displacement

Vessels produce what is referred to as non-pulse (non-impulsive) sounds with acoustic characteristics represented by single or multiple discrete sound events within 24 hrs with a continuous sound event without a rapid pulse rise time. MBES SSS, SBP, USBL, sparkers and airguns all produce pulsed (impulsive) sounds. Sound waves, from such sources, dissipate through the water with distance from the source. While local oceanographic conditions affect the path of the sound and its transmission.

Marine mammal sensory systems are adapted to life in the water or, in the case of seals, both in water and on land. Marine mammals rely on sound to navigate, to communicate with one another and to sense and interpret their surroundings. Behavioural responses of marine mammals to a sound are known to be strongly influenced by the context of the event and individual factors such as the animal's experience, motivation, conditioning and activity (Nowacek *et al*, 2007, Southall *et al*, 2007, 2019, Wartzok, *et al* 2003 and NOAA, 2024). Healthy new-born and younger animals may have the greatest hearing sensitivity while individual hearing ability declines progressively with age and prior exposure to harmful sound levels, disease, etc. Such features and variability may also require consideration in the case-specific assessment of impact on marine mammals from introduced sound sources (NPWS 2014).

Fish are susceptible to underwater noise due to anthropogenic sources, which have been shown to cause widespread effects on fish. It has the potential to alter an individual's physiology, causing stress, and shifts in hearing thresholds in a number of species (Smith *et al*., 2004; Wysocki *et al*., 2006). While exposure to very intense sounds (e.g. seismic guns) may result in mortal injuries, less intense sounds that are detectable by fishes may affect their behaviour, causing them to move away from their migration routes or leave favoured habitats (Normandeau Associates, Inc., 2012). Hearing range and

sensitivity varies considerably among fish species depending on the hearing mechanism of the species e.g. whether a swim bladder is involved in the hearing mechanism or not. Furthermore, within that class, some species with a swim bladder are sound pressure-sensitive at higher frequencies while others having a swim bladder are not e.g. Atlantic salmon (Hawkins, 1978).

The U.S. National Marine Fisheries Service (NMFS, 2018), as well as other agencies, currently uses 150 dB re 1 µPa (rms) as the sound pressure level that may result in onset of behavioural effects (Caltrans, 2015). Sound pressure above the 150 dB_{rms} level are expected to cause temporary changes in behaviour and these might include startle responses, feeding disruption, area avoidance, etc. Popper *et al* (2014).

Popper *et al* (2014) gives guidelines for estimating the effects of continuous noise sources on a range of potential injuries and behavioural responses in fish. Table 6 provides the guidelines for fish such as Atlantic salmon.

Table 6. Recommended guidelines for fish from shipping and other continuous sources.

Fish type	**Mortality and potential mortal injury**	**Recoverable injury**	**TTS**	**Masking**	**Behaviour**
Swim bladder not involved in hearing (particle motion detection) e.g. Atlantic salmon	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Relative risk given has high, moderate or low relative to distance from the sound source. N = near, I = Intermediate, F = Far					

Seabirds: The impacts of underwater noise on diving seabirds are poorly understood and there is a paucity of data on the potential effects of underwater noise on diving seabirds. Recent reviews (e.g. Hartley Anderson Limited. 2020, Harding, 2022) have noted that evidence of harm to diving seabirds as a result of underwater noise is limited, but some studies have shown behavioural effects in diving seabirds. Research suggests (Yelverton *et al*. 1973, Cooper 1982, Stemp 1985, Danil & St Leger 2011) that likely impacts would be confined to an areas within very close proximity of very high-amplitude low-frequency underwater noise (10's of metres) to the sound source. These studies relate to the use of explosives and there is a paucity of data on the effects of other forms of acoustic instrumentation including multibeam and mini-airguns.

Very high-amplitude low-frequency underwater noise may result in acute trauma to diving birds, with several studies reporting mortality of diving birds in close proximity (i.e. tens of metres) to underwater explosions (Yelverton *et al*. 1973, Stemp 1985 and Danil K and St. Leger JA. 2011). Some studies (Cooper J. 1982) reported mortality in Penguins resulting from blasting, but details of the nature of the noise sources and distance to the species are lacking. Others (Danil K and St. Leger JA. 2011) reported mortality in diving seabirds associated with underwater detonation exercises. However, again the distance and profile of the blast is not documented. (Stemp, 1985) reported no significant difference in the abundance of thick-billed murre (Brünnich's guillemot) during seismic surveys using explosives

and air guns) over 3 years. Stemp (1985) reported some mortality of birds in close proximity to explosive charges (up to 11 meters), but none associated with airguns.

Otter (*Lutra lutra*) hearing is not adapted to water and functional hearing in otters in water is poorly known. Voight *et al* 2019 reported that their hearing range in air is within the range of 200 Hz to 32 kHz, with lowest thresholds around 4 kHz. Stepien (2020) reported behaviour changes in *lutra lutra* underwater at frequencies of both 1Khz and 14KHz,

Collision risk

The risk of collision causing injury to marine mammals is a directly related to the speed and size of the vessel. A vessel poses a higher risk when traveling at a higher speed, because higher speeds result in a stronger impact (i.e., higher force) and increase the risk of serious blunt force trauma (Wang *et al*., 2007). Smaller vessels, generally capable of higher speeds, also represent a collision risk. However, Wang *et al* note that according to impact and momentum physics, speed is more important than ship size in determining a lethal injury.

Sediment disturbance and displacement

Benthic habitats and their associated species can be impacted by direct physical damage and/or sediment mobilisation. The extent to which sediments will mobilise is dependent on the nature of the sediment (coarse sediments settle out rapidly following disturbance), the exposure of the site (sediments in exposed sites will frequently be subject to natural disturbance due to wave action), the tidal regime of the area (tide swept sediments are generally devoid of “fines”). The impact of sediment mobilisation on benthic habitats and their constituent species is dependent on the sensitivity of those species to burial and smothering resulting from sediment mobilisation and transport. The species found in exposed sediments are generally robust specialists capable of withstanding disturbance and smothering. The impacts of physical disturbance on the species associated with highly exposed coarse sediments are generally low and greatest in areas of low natural disturbance where the species present are less well adapted to withstand physical stress.

On the other hand, the epifaunal species associated with geogenic and biogenic reef habitat, while able to withstand natural exposure from wave and swell action, are generally sensitive to abrasion and damage.

7.2. Assessment of Impact

An assessment of impact on the QIs and SCIs of all European sites within the ZoI is provided below and summarised in Table 14.

Vessel disturbance and vessel noise

Vessel activity from fishing and recreational craft is a common feature of the area within and surrounding the MUL area. The noise levels contributed by the survey vessels would be well below the background level of underwater noise in this area and marine mammals and fish would be habituated to such levels of noise.

Disturbance due to the presence of the vessel would not significantly contribute to the overall vessel traffic in this area which marine mammals and fish would be habituated to. While disturbance to grey or harbour seal haul out sites may occur should the vessel be close to (<1km) of haul-out sites, there are no haul out sites for either species within close proximity to the MUL area. The nearest haul out site for grey seal is over 76km away, within Syne Head Islands SAC and the nearest designated haul out site for harbour seal is over 36km away, within Galway Bay Complex SAC.

There are no sites designated for Harbour porpoise within 40km of the proposed MUL area. Harbour porpoise will also be habituated to vessel traffic in this area. Therefore, vessel disturbance impacts on this species within their site are not considered possible.

Bottlenose dolphin forms a QI for the Lower River Shannon SAC which is located 19km south of the MUL area. These species are very well habituated to vessel traffic and disturbance related impacts due to vessel presence are not considered possible.

Disturbance to seabirds, should they be foraging in the area at the same time as the proposed survey, would not be above background vessel levels and therefore no potential for significant effects is possible.

Conclusion: Vessel related disturbance and noise to fish, seabirds and marine mammals within or associated with any European site is not considered possible.

Acoustic surveys noise

Marine mammals

Depending on the exposure levels from underwater noise, auditory injury to marine mammals can occur. This may result in temporary loss in hearing sensitivity, known as Temporary Threshold Shift (TTS) or more permanent damage, known as Permanent Threshold Shift (PTS). The potential for auditory injury is related to the noise frequency relative to the hearing bandwidth of the marine mammal and is also influenced by the duration of exposure. The level of impact on an individual is a function of the Sound Exposure Level (SEL) that an individual receives as a result of underwater noise.

Table 7 details the various functional groups relative to hearing for the majority of cetaceans encountered in Irish waters.

Table 7. Cetacean functional groups relative to hearing at different sound frequencies

Low frequency 7 Hz-22 kHz	**Mid-frequency** 150 Hz-160 kHz	**High frequency** 200 Hz–180 kHz
Baleen whales	Most toothed whales, dolphins	Certain toothed whales, porpoise
Species- Ireland Humpback whale Blue whale Fin whale Sei whale Minke whale	**Species– Ireland** Sperm whale Killer whale Long-finned pilot whale Beaked whale species Dolphin species	**Species– Ireland** Pygmy sperm whale Harbour porpoise

After: DAHG (2014). Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.

Southall *et al* (2007) described the sound pressure levels associated with the various functional groups described in Table 7 above, to include pinnipeds. Southall *et al*, (2019) has recategorised these functional hearing groups and proposed revised criteria for the onset of TTS and PTS (see Table 8).

Table 8. Sound pressure levels associated with TTS and PTS (Southhall *et al* (2019)

Functional group	**Impulsive**		**Non-impulsive**
	Unweighted SPLpeak(dB re 1 µPa)	Weighted SELcum (dB re 1 µPa)	Un-weighted SELcum (dB re 1 µPa)
	TTS		
Low frequency cetaceans	219	183	199
High frequency cetaceans	220	185	198
Very High frequency cetaceans	202	155	173
Pinnipeds (in water)	218	185	201
	PTS		
Low frequency cetaceans	213	168	179
High frequency cetaceans	224	170	178
Very High frequency cetaceans	196	140	153
Pinnipeds (in water)	212	170	181

The marine Institute commissioned a noise modelling and environmental risk assessment (Thomsen *et al*, 2023) for the use of a sparker and mini-air gun of the same, or similar, specification to that proposed for the Saoirse wave energy project, on cetacean species. The results of the study (Table 9) demonstrated that the use of the proposed sparker would have a limited area of impact on minke whales, and therefore other marine mammals with a functional hearing range that includes all or part of the frequency range emitted by the sparker (e.g. other baleen whale species, Bottlenose dolphin and Harbour porpoise). The results of the study also demonstrated that the impact distance from source would be a maximum of 1.1km relative to a behavioural response and 0.9km relative to cumulative TTS.

With regard to the use of the mini-airgun, the results (Table 10) demonstrated that area of impact would increase to 1.9km relative to behavioural response and 2.9km relative to cumulative TTS with an impact area of 19.7km.

The proposed use of MBES, SSS, SBP and USBL will emit noise at the levels given in Table 3.

Based the indicated sound pressure levels that will result from these instruments it can be assumed, taking a worst-case scenario, that the area of impact will be similar or less than that for the sparker or mini-air gun. Beyond which distance it would not be of a level considered to have an impact on any cetacean species.

Table 9. Threshold distances and impact areas obtained for the minke whale, resulting from operation of sparker in the study area. (from Thomsen *et al*, 2023).

Impact on minke whales when the sparker is on operation

Noise effect	Average distance all transects [km]	Max. distance [km]	Impact area [km²]
Behavioural response	0.9	1.1	2.7
TTS single strike	0.1	0.1	0.03
TTS cumulative	0.9	1.1	2.5
PTS single strike	0.1	0.1	0.03
PTS cumulative	0.2	0.2	0.12

Table 10. Threshold distances and impact areas obtained for the minke whale, resulting from operation of mini airgun in the study area. (from Thomsen *et al*, 2023).

Impact on minke whales when the mini airgun is on operation			
Noise effect	**Average distance all transects [km]**	**Max. distance [km]**	**Impact area [km²]**
Behavioural response	1.4	1.9	6.3
TTS single strike	0.1	0.1	0.03
TTS cumulative	2.5	2.9	19.7
PTS single strike	0.1	0.1	0.03
PTS cumulative	0.3	0.3	0.3

Taking a worst-case scenario for the use of the mini air-gun, the mini-air gun has the potential to lead to TTS over a distance of 2.9km from source. TTS has the potential to lead to disturbance and injury to an animal. With regard to PTS, the data indicates a potential range of 0.3km for cumulative PTS.

Harbour porpoise (*Phocoena phocena*) breeds annually in Ireland, predominantly during the months of May-September. The principal calving period in Irish waters is thought to occur in the months of May and June although it may extend throughout the summer months and early autumn. Mating commonly occurs several weeks after the calving season.

The nearest site designated for Harbour porpoise (Kilkieran Bay and Islands SAC) is 40km from the MUL area. While it is recognised that harbour porpoise associated with Kilkieran Bay and Islands SAC may use the MUL area for foraging, noise related impacts leading to disturbance to harbour porpoise would not be significant due to the large area of available foraging habitat and distance of Kilkieran Bay and Islands SAC (40km) from the proposed survey area. While use of the mini-air gun has the potential to lead to TTS over a distance of 2.9km from source, it is considered that, due to the distance of Kilkieran Bay and Islands SAC from the proposed survey area, noise related barriers would not result in impacts to the targets set for the conservation objectives for this species within the site. The source path receptor link being considered too weak for any potential for impact.

As such, impacts on harbour porpoise associated with more distant European sites are similarly considered highly unlikely.

Bottlenose Dolphin (*Tursiops truncatus*) breeds annually in Irish waters. The main calving season is concentrated on the summer and early autumn months of May to September with calves depending on their mothers for 1-2 years. The species forms a QI for Lower River Shannon SAC. Evidence shows that there is seasonal migration out of the estuary during the winter and that the that Lower River

Shannon SAC does not cover the entire home range of this population (Ingram *et al*., 2001). For this reason it is considered that noise inducing acoustic surveys may have the potential to impact the conservation objectives for this species relative to the access to suitable habitat attribute for this species.

Conclusion: While impacts on the conservation objectives of harbour porpoise are considered highly unlikely, mitigation to avoid impacts have been proposed to align with MARA policy for these species.

Impacts on the conservation objective attribute "habitat area: critical use" for Bottlenose dolphin within the Lower River Shannon are considered possible as this species is known to forage at the mount of the Shannon which is within close proximity (< 20km) from the proposed project site. Therefore mitigation to avoid impacts on this species have been proposed.

Pinnipeds: The nearest site designated for grey seal is 76km away from the MUL area and 36km for harbour seal.

While it is recognised that individuals of both of these species associated with either of these sites may use the MUL area for foraging, noise related impacts leading to behavioural/foraging disturbance to grey seal within these SACs are not considered possible due to the distance of the proposed survey and its ZoI relative to underwater noise and the large area of available foraging habitat. While use of the mini-air gun has the potential to lead to TTS over a distance of 2.9km from source and 0.3km for cumulative PTS, it is considered that, due to the distance of Slyne Head Islands SAC (76km) and Galway Bay Complex SAC (36km) from the proposed survey area, no noise related barriers would result that could impact the targets set for the conservation objectives for these species within the site. The source path receptor link being considered too weak for any potential for impact.

As such, impacts on grey or harbour seal associated with more distant European sites are similarly not considered possible.

Conclusion: While impacts on the conservation objectives for grey seal and harbour seal are considered highly unlikely, mitigation to avoid impacts have been proposed to align with MARA policy for these species.

Fish

To better inform the potential for noise associated impacts on fish as a result of the use of a sparker and mini air-gun, a noise modelling report was commissioned by the Marine Institute in 2023. This report (Thomsen *et al*, 2023), focused on Atlantic herring (*Clupea harengus*) in order to provide representative data on the possible effects on fishes where the swim bladder is involved in hearing (primarily pressure detection). As such, Atlantic Herring is being used as a proxy for Atlantic Salmon as both species have swim bladders and it is considered that Atlantic Salmon they would be likely to have a similar behaviour response.

With regard to Atlantic Herring, the noise modelling and environmental risk assessment indicated that the use of the sparker would result in a distance of impact of 1.0km, relative to behavioural response from source, with a cumulative PTS of only 0.1km (Table 11). While the use of the mini air-gun (Table

12) would result in a far greater area of impact with regard to a behavioural response distance (13.6km) but with the same cumulative PTS of 0.1km.

Table 11. Threshold distances and impact areas obtained for the Atlantic herring, resulting from operation of the sparker in the study area.

Impact on herring when the sparker is on operation			
Noise effect	**Average distance all transects [km]**	**Max. distance [km]**	**Impact area [km²]**
Behavioural response	0.8	1.0	2.2
TTS single strike	0.1	0.1	0.03
TTS cumulative	0.1	0.1	0.03
PTS single strike	0.1	0.1	0.03
PTS cumulative	0.1	0.1	0.03

Table 12. Threshold distances and impact areas obtained for the Atlantic herring, resulting from operation of the mini air-gun in the study area.

Impact on herring when the mini airgun is on operation			
Noise effect	**Average distance all transects [km]**	**Max. distance [km]**	**Impact area [km²]**
Behavioural response	12.1	13.6	460.5
TTS single strike	0.1	0.1	0.03
TTS cumulative	0.6	0.7	1.1
PTS single strike	0.1	0.1	0.03
PTS cumulative	0.1	0.1	0.03

Atlantic Herring is being used as a proxy for Atlantic Salmon as both species have swim bladders and it is considered that Atlantic Salmon they would be likely to have a similar behaviour response. The Lower River Shannon SAC is designated for Atlantic salmon within the ZoI of the proposed project.

Depending on the time of year, inward migrating salmon returning to their natal rivers will have entered the river once suitable conditions allow. Where conditions are not suitable for upstream migration, they are generally understood to congregate along the coast, frequently in estuaries and nearby sea areas awaiting favourable conditions. Inbound fish are generally not foraging during this time and while the migration path would likely include some of the area where the proposed survey work is due to be caried out, it is highly unlikely that adult (returning) salmon will be impacted by the proposed acoustic survey work due to limited spatial and temporal overlap considering both the modelled zone of influence for all acoustic devices together with the present level of knowledge in relation to salmon migration paths.

With respect to outbound salmon smolts, the same logic is applied – Irish salmon are known to swim generally northwards once they have entered the sea as Atlantic salmon feeding grounds are known to be located along oceanic polar fronts close to Greenland, Iceland and the Faeroe Islands. For

outward migrating fish, studies (Rikardsen, *et al*. 2021) have shown movements are most likely in a northerly direction along the Atlantic seaboard. It is likely that fish from rivers along the west coast, as well as possibly out migrating smolts from French and Spanish catchments, may pass through the area of the proposed surveys. However, spatial and temporal overlap between proposed survey work and smolt migration are considered highly unlikely to impact Atlantic salmon smolts due to limited spatial and temporal overlap, taking account of the modelled zone of influence for all acoustic devices and available (published) knowledge in relation to salmon migration paths.

Sea lamprey possess neither swim bladders nor lateral lines and functional hearing in sea lamprey is poorly understood. However, one available published study in the literature suggests that sea lamprey can detect frequencies in the range of 50–300 Hz (Mickle *et al*, 2018). In this study, sea lamprey detected tones of 50–300 Hz with equal sensitivity but did not detect sounds above 300 Hz.

Sea lamprey at sea is highly mobile, spending their adult life attached to a host species as a parasitic organism. They are known to prefer shallow coastal waters, where they may attach to host fish species. They are a common and frequently recorded ecto-parasite on basking shark *Cetorhinus maximus*.

The Lower River Shannon is the nearest site designated for this species to the MUL area. Some spatial and/or temporal overlap between migrating sea lamprey and the proposed survey may occur. However, considering the lack of a swim bladder, available knowledge in relation to sound detection ability together with habitat preferences, life history and behaviour, risks to both lamprey are highly unlikely to be significant for this species, particularly factoring in the limited spatial and temporal aspects of the survey.

Conclusion: Impacts on the conservation objectives of Atlantic salmon within any European site are considered highly unlikely.

Impacts on the conservation objectives of Lamprey in any European site are considered highly unlikely.

Otters

Otter hearing is not adapted for life underwater however, one study did record behavioural responses in otters in experimental trails. While otters utilise the marine environment for foraging, they would not be impacted by the proposed project as they are known to forage close inshore, generally less than 100m. Although records for otter 2-300m from shore have been recorded in the UK this is considered to be an unusual occurrence. The nearest site designated for otter to the MUL area is the Lower River Shannon SAC, 20km to the south. Therefore, Otter are considered to be outside of the ZoI of the proposed project.

Conclusion: Impacts on the conservation objectives of otter in any European site are considered highly unlikely.

Birds

It is recognised that diving birds can be sensitive to disturbance from underwater noise and fatalities can occur at close distance. However, flushing disturbance can be expected to displace these diving seabirds from close proximity to the survey vessel and any towed equipment, thereby limiting their

exposure to the highest sound pressures generated. The likelihood of these birds being in the vicinity of a noise generating operation is low due to the surface activity associated with such operations disturbing the birds prior to commencement of the underwater noise. There is a low likelihood of interaction between the sound source and diving birds due to the relatively short exposure time, the temporary nature of the survey work, the mobile nature of the birds and the displacement of most diving species due to flushing disturbance. Therefore, it is considered that underwater noise would be unlikely to have a significant effect on diving seabirds in the vicinity of the survey area.

Temporary displacement of birds due to vessel presence is discussed in section 7.2 and is considered to be insignificant.

Conclusion: Impacts on the conservation objectives of birds which form a SCI for any European site are considered highly unlikely.

Collision risk

The larger vessels working in the area will be moving at very low speeds (< 5kn) or stationary. While smaller vessels, capable of operating at higher speeds will also be operating in the area, their size is considered too small to represent a collision risk with the potential to lead to injury or harm. Therefore the risk of collision is considered too low to lead to injury or harm to marine mammals.

Conclusion: Impacts on the conservation objectives of marine mammals which form a QI for any European are considered to be high unlikely.

Disturbance & displacement: Intertidal Benthic invertebrates and birds

Benthic habitats: The use of direct sampling methods i.e. the use of a Day grab or Hammon grab will be limited to soft sediments (day grab) and coarse sediments (Hammon grab). The foot print of both grabs is extremely small (0.5m^2) and the penetration depth very low (approx. 20cm). Both samplers are designed for collecting sediment types of varying degrees of coarseness. They are not designed for and therefore, will not be deployed on, reef habitats.

The subtidal sediment habitat within the area of the proposed survey area, where the grab samplers will be deployed, is comprised of sands, coarse sediments and mixed sediment. The habitat in this area is considered to represent an exposed environment comprised of robust specialists capable of withstanding disturbance and smothering. Any disturbance caused by grab sampling would be undetectable within days. Benthic species damage would be negligible due to the scale of sampling and would not have the potential to significantly impact the community types present. There are no species communities recorded for this area that are known to be sensitive to physical damage/abrasion or disturbance.

Conclusion: Impacts on benthic species or communities are not considered highly unlikely.

Birds: The nearest SPA to the MUL area is mid-Clare Coast SPA. This site is designated for a range of wintering waterbirds. It is considered that intertidal survey work may lead to disturbance and temporary displacement to this species, should intertidal survey work be conducted during the wintering season when birds are foraging.

Conclusion: Disturbance to wintering waterbirds may occur if survey work in intertidal foraging areas takes place during the winter season (September to March).

Pollution: Accidental spillage of hydrocarbons from vessels.

The larger survey vessels proposed for this project (e.g. Tom Crean or similar) are covered by MARPOL regulations. The MARPOL Convention is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The Convention includes regulations aimed at preventing and minimizing pollution from ships – both accidental pollution and that from routine operations - and currently includes six technical Annexes. Special Areas with strict controls on operational discharges are included in most Annexes.

Additional smaller vessel may also be used for survey operations. Some of these may not be covered by MARPOL regulations. These vessels have the potential to lead to localised impacts on marine species and avifauna resulting from accidental spillage of hydrocarbons. While due to the size of these vessels the use of hydrocarbons is relatively low, the potential for localised impacts on the marine environment exists if not managed correctly. The extent of dispersal of hydrocarbons in marine waters is governed by a number of factors including spreading, drifting, evaporation, dissolution, photolysis, biodegradation and formation of both oil-in-water and water-in-oil emulsions. Diesel and petrol are light, refined petroleum products with a relatively narrow boiling range, meaning that, when spilled on water, most of the oil will evaporate or naturally disperse within a few days or less. Diesel oil is readily and completely degraded by naturally occurring microbes, under time frames of one to two months. Diesel spills can affect marine mammals and birds by direct contact (NOAA, no published date). The area of impact of accidental fuel spills will be depended on the volume spilled, weather and dispersion conditions.

Conclusion: The accidental spillage of hydrocarbons from small inshore vessels may result in adverse effects to marine mammals and birds.

8. Potential for in-combination effects

Two projects (Table 13) and three plans were identified in the SISAA which were considered to have the potential for in-combination effects. Both projects (MUL240033 and ABP 321697) relate to a project with the potential to introduce noise and or disturbance to the marine environment within the ZoI of the proposed project. The three identified plans promote sustainable development in the maritime environment and particularly Ireland's Climate Action Plan's renewable electricity target of 80% of energy generated from renewable electricity sources by 2030. Following an examination of the actions set in these plans no potential for in-combination effects have been identified.

Conclusion: The introduction of underwater noise and/or disturbance as a result of 2 additional project has the potential to lead to in-combination effects. Therefore, mitigation has been proposed to avoid adverse effects on the Conservation objectives of European sites.

Table 13. Additional projects within or adjacent to ZoI.

Application licence no.	Applicant	Distance from the MUL Area	Proposed Activity	Date submitted	Potential for cumulative effect
MUL240033	Uisce Éireann	Within	Survey to support a strategic modelling study of water currents. Including deployment of ADCPs, CTD measurements and bathymetric surveys (MBES & SBES)	19/12/2024	Potential for noise inducing activities (MBES surveys)
ABP 321697	Fuinneamh Sceirde Teo.	Within	30 no. Offshore Wind Turbine generators with gravity based fixed-bottom foundations & all associated work	17/1/2025	Potential for noise inducing activities (Geophysical, geotechnical, benthic, unexploded ordnance & metocean investigations

9. Summary of potential for impact on the QIs or SCIs of European sites

Table 14 and Table 15 presents a summary of the potential for impact on the QIs or SCIs of all European screened in following further assessment of the relevant QIs and SCIs for each site alone and in-combination with other projects and plans.

Table 14. Summary of impact assessment alone and in-combination with other projects and plans

European site	**DISTANCE KM***	**Qualifying interests**	**Assessment of impact.** QIs in red are considered to have potential for impact
Carrowmore Point to Spanish Point and Islands SAC	0.15	Reefs [1170] Coastal lagoons [1150] Perennial vegetation of stony banks [1220] Petrifying springs with tufa formation (Cratoneurion) [7220]	No sampling will take place within reef habitats. All deployment of equipment and collection of benthic samples will take place on soft sediment out of necessity of the nature of the sampling and suitable sediment requirement for deployment of ADCPs and CPoDs and/or AMAR. There is no SPR link to the coastal and terrestrial Annex I habitats within this site. Lough Donnell, the coastal lagoon habitat [1150] is located 2.3km, at its nearest point, from the MUL area and is protected by a sandy beach to the west. Pockets of the coastal habitat Perennial vegetation of stony banks [1120] are located 2km, at their nearest distance, above the HWM outside of the ZoI. Habitat 1120 is a terrestrial habitat outside of the ZoI.
Kilkee Reef SAC	0.19	Large shallow inlets and bays [1160] Reefs [1170] Submerged or partially submerged sea caves [8330]	No sampling will take place within reef or submerged or partially submerged sea caves habitats. All deployment of equipment and collection of benthic samples will take place on soft sediment out of necessity of the nature of the

			sampling and suitable sediment requirement for deployment of ADCPs and CPoDs and/or AMAR. No impacts on sediment communities (within the Large Shallow inlet and Bay habitat) have been identified.
Glengarriff Harbour and Woodlands SAC	205	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *Geomalacus maculosus* (Kerry Slug) [1024] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355]	**No.** Terrestrial habitats or species outside of the ZoI.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Roaringwater Bay and Islands SAC	200	Large shallow inlets and bays [1160] Reefs [1170] Submerged or partially submerged sea caves [8330]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030] *Lutra lutra* (Otter) [1355]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phocoena phocoena (Harbour Porpoise) [1351] *Halichoerus grypus (Grey Seal) [1364]*	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Donegal Bay (Murvagh) SAC	310	Mudflats and sandflats not covered by seawater at low tide [1140]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) [2170] Humid dune slacks [2190]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Horn Head and Rinclevan SAC	350	*Halichoerus grypus* (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Slieve Tooey/Tormore Island/Loughros Beg Bay SAC	284	*Halichoerus grypus* (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
St John's Point SAC	288	Large shallow inlets and bays [1160] Reefs [1170] Submerged or partially submerged sea caves [8330]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] Alkaline fens [7230] Limestone pavements [8240] *Euphydryas aurinia* (Marsh Fritillary) [1065]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Tursiops truncatus (Common Bottlenose Dolphin) [1349]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
West of Ardara/Maas Road SAC	315	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Annual vegetation of drift lines [1210] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with *Empetrum nigrum* [2140] Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150] Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the Rhynchosporion [7150] Alkaline fens [7230]	**No.** Terrestrial, freshwater and/or coastal habitats or species outside of the ZoI.

		Vertigo geyeri (Geyer's Whorl Snail) [1013]] *Euphydryas aurinia* (Marsh Fritillary) [1065] *Lutra lutra* (Otter) [1355] *Petalophyllum ralfsii* (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	
		Salmo salar (Salmon) [1106]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Lambay Island SAC	587	Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Phocoena phocoena (Harbour Porpoise) [1351] *Halichoerus grypus* (Grey Seal) [1364] *Phoca vitulina* (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Lough Swilly SAC	396	Estuaries [1130]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Coastal lagoons [1150] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] *Lutra lutra* (Otter) [1355]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phocoena phocoena (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Galway Bay Complex SAC	36	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Coastal lagoons [1150] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Turloughs [3180] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.

		orchid sites) [6210] Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae [7210] Alkaline fens [7230] Limestone pavements [8240] *Lutra lutra* (Otter) [1355]	
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Inishbofin and Inishshark SAC	98	Coastal lagoons [1150] Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Halichoerus grypus (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Slyne Head Islands SAC	76	Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Tursiops truncatus (Common Bottlenose Dolphin) [1349] *Halichoerus grypus* (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Castlemaine Harbour SAC	122	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410]	**No.** Terrestrial and/or coastal habitats outside of the ZoI.

		Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) [2170] Humid dune slacks [2190] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *Petalophyllum ralfsii* (Petalwort) [1395]	
		Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Lutra lutra (Otter) [1355]	**No**. The SPR link for Otter is considered too weak due to the distance of this site from the proposed project site.
Lough Melvin SAC	298	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]	**No.** Terrestrial and/or coastal habitats outside of the ZoI.
		Salmo salar (Salmon) [1106]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Lutra lutra (Otter) [1355]	**No**. The SPR link for Otter is considered too weak due to the distance of this site from the proposed project site
Killala Bay/Moy Estuary SAC	250	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link

			is considered too weak to lead to any effects on the Annex I marine habitats.
		Annual vegetation of drift lines [1210] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Petromyzon marinus (Sea Lamprey) [1095]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Duvillaun Islands SAC	152	*Tursiops truncatus (Common Bottlenose Dolphin) [1349]* *Halichoerus grypus (Grey Seal) [1364]*	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Inishkea Islads SAC	154	*Machairs (* in Ireland) [21A0]* *Petalophyllum ralfsii (Petalwort) [1395]*	**No.** Terrestrial habitat or species outside of the ZoI.
		Halichoerus grypus (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Ballysadare Bay SAC	273	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	271	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Embryonic shifting dunes [2110]Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Petrifying springs with tufa formation (Cratoneurion) [7220] *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014*]*	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Saltee Islands SAC	412	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] Submerged or partially submerged sea caves [8330]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	**No.** Coastal habitats or species outside of the ZoI.
		Halichoerus grypus (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Hook Head SAC	390	Large shallow inlets and bays [1160] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	**No.** Coastal habitats or species outside of the ZoI.
		Tursiops truncatus (Common Bottlenose Dolphin) [1349] *Phocoena phocoena* (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Slaney River Valley SAC	460	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *Margaritifera margaritifera (*Freshwater Pearl Mussel) [1029] *Lampetra planeri* (Brook Lamprey) [1096]	**No.** Terrestrial and/or coastal habitats or freshwater species outside of the ZoI.
		Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103]	**No.** Mobile species but SPR link too weak due to the distance to this site.

		Salmo salar (Salmon) [1106] *Lutra lutra* (Otter) [1355]	
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Gweedore Bay and Islands SAC	310	Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Coastal lagoons [1150] Perennial vegetation of stony banks [1220]Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with Empetrum nigrum [2140]Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150] Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] European dry heaths [4030] Alpine and Boreal heaths [4060] *Juniperus communis* formations on heaths or calcareous grasslands [5130] *Euphydryas aurinia* (Marsh Fritillary) [1065] *Lutra lutra* (Otter) [1355]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.

		Petalophyllum ralfsii (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833]	
		Phocoena phocoena (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Clew Bay Complex SAC	215	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Coastal lagoons [1150] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] *Lutra lutra* (Otter) [1355]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts..
Connemara Bog Complex SAC	58	Coastal lagoons [1150] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Oligotrophic to mesotrophic standing waters with vegetation	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.

		of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] Natural dystrophic lakes and ponds [3160] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] Blanket bogs (* if active bog) [7130] Transition mires and quaking bogs [7140] Depressions on peat substrates of the Rhynchosporion [7150] Alkaline fens [7230] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] *Euphydryas aurinia* (Marsh Fritillary) [1065] *Najas flexilis* (Slender Naiad) [1833]	
		Salmo salar (Salmon) [1106]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Lutra lutra (Otter) [1355]	**No**. The SPR link for Otter is considered too weak due to the distance of this site from the proposed project site
Slyne Head Peninsula SAC	74	Large shallow inlets and bays [1160] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Coastal lagoons [1150] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.

		Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Machairs (* in Ireland) [21A0] Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] European dry heaths [4030] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Alkaline fens [7230] *Petalophyllum ralfsii* (Petalwort) [1395] *Najas flexilis* (Slender Naiad) [1833]	
		Tursiops truncatus (Common Bottlenose Dolphin) [1349]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Kilkieran Bay and Islands SAC	40	Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Coastal lagoons [1150] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] *Lutra lutra* (Otter) [1355] *Najas flexilis* (Slender Naiad) [1833]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phocoena phocoena (Harbour Porpoise) [1351] *Phoca vitulina* (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Kenmare River SAC	131	Large shallow inlets and bays [1160] Reefs [1170] Submerged or partially submerged sea caves [8330]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] European dry heaths [4030] *Juniperus communis* formations on heaths or calcareous grasslands [5130] Calaminarian grasslands of the Violetalia calaminariae [6130] *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]	**No.** Terrestrial habitats or species outside of the ZoI.

		Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] *Lutra lutra* (Otter) [1355]	
		Phocoena phocoena (Harbour Porpoise) [1351] *Phoca vitulina* (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Lower River Shannon SAC	19	Sandbanks which are slightly covered by sea water all the tim[[1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Coastal lagoons [1150] Perennial vegetation of stony banks [1220 Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (Juncetalia maritimi) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	**No.** Terrestrial and/or coastal habitats outside of the ZoI.
		Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] *Lampetra planeri* (Brook Lamprey) [1096] *Lutra lutra* (Otter) [1355]	The SPR link to species upstream of a hydrological gradient i.e. Brook Lamprey and Freshwater Pearl Mussel is considered too weak for any impacys on these species.

			The SPR link for Otter is considered too weak due to the distance of this site from the proposed project site.
		Petromyzon marinus (Sea Lamprey) [1095] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106]	**No.** Freshwater species assessed as having no potential for impact. See section 6.2.
		Tursiops truncatus (Common Bottlenose Dolphin) [1349]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Blasket Islands SAC	82	Reefs [1170] Submerged or partially submerged sea caves [8330]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	**No.** Terrestrial habitats or species outside of the ZoI.
		Phocoena phocoena (Harbour Porpoise) [1351] *Halichoerus grypus* (Grey Seal) [1364]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
West Connaught Coast SAC	81	*Tursiops truncatus* (Common Bottlenose Dolphin) [1349] *Phocoena phocoena* (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Carnsore Point SAC	430	Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Phocoena phocoena (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Rutland Island and Sound SAC	305	Large shallow inlets and bays [1160] Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.

		Coastal lagoons [1150] Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190]	**No.** Terrestrial and/or coastal habitats or species outside of the ZoI.
		Phoca vitulina (Harbour Seal) [1365]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Blackwater Bank SAC	450	Sandbanks which are slightly covered by sea water all the tim [1110]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Phocoena phocoena (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Rockabill to Dalkey Islands SAC	562	Reefs [1170]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Phocoena phocoena (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts due to in-combination effects.
Codling Fault Zone SAC	575	Submarine structures made by leaking gases [1180]	**No.** Due to the type of works proposed and extremely limited scale of any identified impacts, together with the distance to this SAC, the SPR link is considered too weak to lead to any effects on the Annex I marine habitats.
		Phocoena phocoena (Harbour Porpoise) [1351]	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.

European sites outside of Ireland designated for mobile marine mammals			
Récifs et landes de la Hague SAC		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Anse de Vauville SAC		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Banc et récifs de Surtainville SAC		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Chausey [Site code FR2500079]		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Baie du Mont Saint-Michel		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Estuaire de la Rance SAC		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Baie de Saint- Brieuc		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Côte de Granit rose-Sept-Iles		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Baie de Morlaix SAC		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Abers - Côte des légendes		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Ouessant-Molène		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Côtes de Crozon		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Chaussée de Sein		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Mers Celtiques - Talus du golfe de Gascogne		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.

Récifs du talus du golfe de Gascogne		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Nord Bretagne DH		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
North Channel SAC UK0030399		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
UK sites outside of the Natura 2000 network Screened in as they are within a MU for a qualifying cetacean species			
Strangford Lough UK0016618		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Murlough UK0016612		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
North Anglesey Marine/Gogledd Môn Forol Side Code UK0030398		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
West Wales Marine/Gorllewin Cymru Forol UK0030397		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.
Bristol Channel Approaches/Dynesfeydd Môr Hafren UK0030396		Harbour porpoise (*Phocoena phocoena*)	**Yes.** Mobile species within the ZoI. Potential for noise related impacts.

Table 15. Special Conservation Interests for SPAs screened in.

SPA	**Distance (Km) ***	**Qualifying interest**	**Assessment of impact.** SCIs in red are considered to have potential for impact
Mid-Clare Coast SPA	Overlapping	Cormorant (*Phalacrocorax carbo*) [A017]	Cormorant is a SCI for this site. The breeding Cormorant of this SPA use the MUL area as a foraging resource.
		Barnacle Goose (*Branta leucopsis*) [A045] Ringed Plover (*Charadrius hiaticula*) [A137] Sanderling (*Calidris alba*) [A144] Purple Sandpiper (*Calidris maritima*) [A148] Dunlin (*Calidris alpina*) [A149] Turnstone (*Calidris alpina*) [A169] Wetland and Waterbirds [A999]	**Yes:** There is potential for disturbance related impacts to these species should they be present during intertidal survey work.
Cliffs of Moher SPA	6	Fulmar (*Fulmarus glacialis*) [A009] Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	**Yes.** Seabirds associated with this SPA are within foraging range of the proposed project site and may use the marine waters within the MUL area for foraging during the breeding season. Potential for noise related impacts.
		Chough (Pyrrhocorax pyrrhocorax) [A346]	Coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Loop Head SPA	18	Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season.
Inishmore SPA	26	Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199] Arctic Tern (*Sterna paradisaea*) [A194]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

		Little Tern (*Sterna albifrons*) [A195]	Seabird outside of foraging range of the proposed project site.
Iveragh Peninsula SPA	76	Fulmar (*Fulmarus glacialis*) [A009] Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Peregrine (Falco peregrinus) [A103] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Blasket Islands SPA	83	Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Storm Petrel (*Hydrobates pelagicus*) [A014] Lesser Black-backed Gull (*Larus fuscus*) [A183] Kittiwake (*Fulmarus glacialis*) [A188] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Shag (*Phalacrocorax aristotelis*) [A018] Herring Gull (*Larus argentatus*) [A184] Arctic Tern (*Sterna paradisaea*) [A194] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Seabird outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Clare Island SPA	108	Fulmar (*Fulmarus glacialis*) [A009] Kittiwake (*Fulmarus glacialis*) [A188]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Razorbill (*Alca torda*) [A200] Guillemot (*Uria aalge*) [A199] Common Gull (*Larus canus*) [A182] Shag (*Phalacrocorax aristotelis*) [A018] Chough (*Pyrrhocorax pyrrhocorax*) [A346	Seabird outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Skelligs SPA	116	Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Storm Petrel (*Hydrobates pelagicus*) [A014] Gannet (*Morus bassanus*) [A016] Kittiwake (*Fulmarus glacialis*) [A188]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

		Guillemot (*Uria aalge*) [A199] Puffin (*Fratercula arctica*) [A204]	Seabird outside of foraging range of the proposed project site
Old Head of Kinsale SPA	142	Kittiwake (*Fulmarus glacialis*) [A188]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Guillemot (*Uria aalge*) [A199]	Seabird outside of foraging range of the proposed project site
Helvick Head to Ballyquin SPA	151	Kittiwake (*Fulmarus glacialis*) [A188]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Cormorant (*Phalacrocorax carbo*) [A017] Peregrine (Falco peregrinus) [A103] Herring Gull (*Larus argentatus*) [A184] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Seabirds outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
The Bull And The Cow Rocks SPA	128	Storm Petrel (*Hydrobates pelagicus*) [A014] Gannet (*Morus bassanus*) [A016]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Puffin (*Fratercula arctica*) [A204]	Seabird outside of foraging range of the proposed project site.
Saltees Islands SPA	208	Fulmar (*Fulmarus glacialis*) [A009] Gannet (*Morus bassanus*) [A016]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Seabirds outside of foraging range of the proposed project site.

Kerry Head SPA	28	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Dingle Peninsula SPA	51	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Peregrine (Falco peregrinus) [A103] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Coastal species with a terrestrial diet outside of the ZoI of the proposed project.
High Island, Inishshark and Davillaun SPA	90	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Barnacle Goose (*Branta leucopsis*) [A045] Arctic Tern (*Sterna paradisaea*) [A194]	Seabirds outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Puffin Island SPA	107	Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Lesser Black-backed Gull (*Larus fuscus*) [A183] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Seabirds outside of foraging range of the proposed project site.
Deenish Island and Scariff Island SPA	113	Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Lesser Black-backed Gull (*Larus fuscus*) [A183] Arctic Tern (*Sterna paradisaea*) [A194]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

Beara Peninsula SPA	116	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Duvillaun Islands SPA	141	Fulmar (*Fulmarus glacialis*) [A009] Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Barnacle Goose (*Branta leucopsis*) [A045]	Coastal species with a terrestrial diet outside of the ZoI of the proposed project.
West Donegal Coast SPA	254	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Peregrine (Falco peregrinus) [A103] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Fulmarus glacialis*) [A188] Razorbill (*Alca torda*) [A200] Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Seabirds outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Lambay Island SPA	237	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

		Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Greylag Goose (Anser anser) [A043] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Seabirds outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Horn Head to Fanad Head SPA	271	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Barnacle Goose (*Branta leucopsis*) [A045] Peregrine (Falco peregrinus) [A103] Kittiwake (*Fulmarus glacialis*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Chough (*Pyrrhocorax pyrrhocorax*) [A346] Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	Seabirds outside of foraging range of the proposed project site and/or coastal species with a terrestrial diet outside of the ZoI of the proposed project.
Tory Island SPA	276	Fulmar (*Fulmarus glacialis*) [A009]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Corncrake (*Crex crex*) [A122] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Seabirds outside of foraging range of the proposed project site and/or terrestrial species.

River Shannon and River Fergus Estuaries SPA	8	Cormorant (*Phalacrocorax carbo*) [A017] Whooper Swan (*Cygnus cygnus*) [A038] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Tanas penelope*) [A050] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Scaup (*Aythya marila*) [A062] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Greenshank (*Tringa nebularia*) [A164] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999]	Waders or wintering waterbirds or habitat outside of the ZoI
Bills Rocks SPA	121	Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Puffin (*Fratercula arctica*) [A204]	Seabird outside of foraging range of the proposed project site.

Seas of Wexford SPA	184	Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013] Gannet (*Morus bassanus*) [A016]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
		Red-throated Diver (*Gavia stellata*) [A001] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Common Scoter (Melanitta nigra) [A065] Mediterranean Gull (*Larus melanocephalus*) [A176] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Fulmarus glacialis*) [A188] Sandwich Tern (*Sterna sandvicensis*) [A191] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Seabird outside of foraging range of the proposed project site.
North-West Irish Sea SPA	226	Fulmar (*Fulmarus glacialis*) [A009] Manx Shearwater (*Puffinus puffinus*) [A013]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

		Red-throated Diver (Gavia stellata) [A001] Great Northern Diver (Gavia immer) [A003] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Common Scoter (Melanitta nigra) [A065] Little Gull (Larus minutus) [A177] Black-headed Gull (Chroicocephalus ridibundus) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Great Black-backed Gull (Larus marinus) [A187] Kittiwake (*Fulmarus glacialis*) [A188] Roseate Tern (Sterna dougallii) [A192] Common Tern (Sterna hirundo) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204]	Seabird outside of foraging range of the proposed project site.
Magharee Islands SPA	44	Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season.
		Shag (*Phalacrocorax aristotelis*) [A018] Barnacle Goose (*Branta leucopsis*) [A045] Common Gull (*Larus canus*) [A182] Common Tern (Sterna hirundo) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195]	Seabird outside of foraging range of the proposed project site.
Inishglora and Inishkeeragh SPA	160	Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

		Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Barnacle Goose (*Branta leucopsis*) [A045] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Arctic Tern (*Sterna paradisaea*) [A194]	Seabird outside of foraging range of the proposed project site.
Illanmaster SPA	161	Storm Petrel (*Hydrobates pelagicus*) [A014]	**Yes.** Species associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.
Stags of Broad Haven SPA	166	Storm Petrel (*Hydrobates pelagicus*) [A014] Leach's Storm-petrel (Oceanodroma leucorhoa) [A015]	**Yes.** Seabirds associated with this SPA within foraging range of the proposed project site and may use the marine waters within the MUL for foraging during the breeding season. Potential for noise related impacts.

10. Mitigation measures

Measures to mitigate the identified potential for adverse effects summarised in Table 15 are detailed in section 9.1 to 9.5 below.

10.1. Mitigation measure: Bottlenose dolphin and Harbour porpoise

To minimise the potential for adverse effects on marine mammals as a result of underwater noise from the acoustic survey equipment, together with, potential additional noise sources associated with other projects (in-combination effects) the mitigation proposed below will be implemented.

Surveys, which include the use of acoustic equipment, should be scheduled to avoid overlap, within a radius of 5km, of the additional two projects identified as having the potential to introduce similar noise inducing effects.

DAHG (2014) provides guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. This document provides guidance and mitigation measures to address key potential sources of anthropogenic sound that may impact negatively on marine mammals in Irish waters. The guidance set out in DAHG (2014), related to geophysical acoustic surveys (seismic, multibeam and single beam surveys) and geotechnical surveys (CPT, boreholes, vibrocores) should be fully implemented as detailed below.

1. A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events using standardised data forms.
2. Acoustic surveying using the geophysical and geotechnical survey equipment specified for this project shall not commence if marine mammals are detected within a 500m radial distance of the sound source intended for use, i.e., within the Monitored Zone.

<u>Pre-Start Monitoring</u>

Sound-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.

An agreed and clear on-site communication signal must be used between the MMO and the Works Superintendent as to whether the relevant activity may or may not proceed, or resume following a break (see below). It shall only proceed on positive confirmation with the MMO.

The MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO.

This prescribed Pre-Start Monitoring shall subsequently be followed by a Ramp-Up Procedure which should include continued monitoring by the MMO.

Ramp-Up Procedure

In commencing an acoustic survey operation using the above equipment, the following Ramp-up Procedure (i.e., "soft-start") must be used, including during any testing of acoustic sources, where the output peak sound pressure level from any source exceeds 170 dB re: 1µPa @1m:

(a) Where it is possible according to the operational parameters of the equipment

concerned, the device's acoustic energy output shall commence from a lower energy start-up (i.e., a peak sound pressure level not exceeding 170 dB re: 1µPa @1m) and thereafter be allowed to gradually build up to the necessary maximum output over a period of 20 minutes.

(b) This controlled build-up of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period.

(c) Where the acoustic output measures outlined in steps (a) and (b) are not possible according to the operational parameters of any such equipment, the device shall be switched "on" and "off" in a consistent sequential manner over a period of 20 minutes prior to commencement of the full necessary output.

In all cases where a Ramp-Up Procedure is employed the delay between the end of ramp-up and the necessary full output must be minimised to prevent unnecessary high-level sound introduction into the environment.

Once the Ramp-Up Procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500m radial distance of the sound source, i.e., within the Monitored Zone.

Breaks in sound output

If there is a break in sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down, survey line or station change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken.

Similarly, if there is a break in drilling sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down, survey line or station change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken.

For higher output survey operations which have the potential to produce injurious levels of underwater sound (see sections 2.4, 3.2) as informed by the associated risk assessment, there is likely to be a regulatory requirement to adopt a shorter 5-10 minute break limit after which period all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) shall recommence as for start-up.

Reporting

Full reporting on MMO operations and mitigation undertaken must be provided to the Regulatory Authority as outlined in Appendix 6 of DAHG(2014).

10.2. Mitigation measure: Grey seal and Harbour seal,

In line with the guidance to manage the risk to marine mammals from underwater noise (DAHG, 2014), the mitigation measures proposed in section 9.1 for Cetacean species are also proposed for grey and harbour seal.

10.3. Mitigation measure: Seabirds

To minimise the potential for in-combination effects related to underwater noise disturbance on the breeding seabirds associated with SPAs, the mitigation detailed below is proposed.

- Survey operations will be scheduled to avoid overlap, within a radius of 5km, with the additional two projects identified as having the potential to introduce similar noise inducing effects.

10.4. Mitigation measures: Wintering waterbirds

Intertidal surveys in sediment habitats should be avoided during the wintering season (October to March) if wintering waterbirds are using the intertidal area for foraging.

10.5. Mitigation: Accidental spillage of hydrocarbons

To minimise the potential for adverse impacts resulting from the accidental spillage of hydrocarbons it is recommended that small vessels operating have an oil pollution emergency plan.

This plan should specify:

- Information on the location and detail of spill response resources on-board;
- Information on crew training in relation to oil pollution response;
- How crew will interface with other site investigation operators, where applicable.

11. Transboundary effects

Transboundary effects relate to the likelihood of significant effects on a site which is part of the Natura 2000 network but lies outside Republic of Ireland national boundaries. Since 1 January 2021 nature conservation areas in the UK (including Northern Ireland) are no longer part of the Natura 2000 network (OPR, 2021).

The ZoI of the proposed project has been estimated and all European sites with the potential for project related impacts have been assessed, including *ex-situ* effects. Provided the mitigation proposed is implemented there will be no transboundary effects..

12. Natura Impact Statement Conclusion

This assessment is based on complete, precise and definitive findings in the light of the best scientific knowledge. It objectively concludes that provided the mitigation measures described in this document are fully implemented, **no adverse effects on the integrity** of any European site will occur.

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