INIS EALGA MARINE ENERGY PARK LIMITED

Foreshore License Application for Site Investigations at Ini Ealga - Clonard and Ballymacoda

Environmental Supporting Information

P2369_R5337_Rev0 | July 2021

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Environmental Supporting Information

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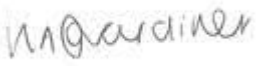	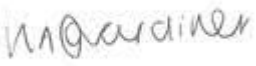
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1. INTRODUCTION

1.1 Introduction

Inis Ealga Marine Energy Park (IEMEP) Ltd, a subsidiary project company of DP Energy Ireland (DPEI), is investigating the feasibility of developing an offshore floating wind farm off the south coast of Ireland, the IEMEP. IEMEP is a key part of a wider strategic development of a portfolio of wind (and wave) sites that DPEI is planning. The intention is that the offshore wind farm development would be linked by cables, with one export cable to shore.

IEMEP Ltd submitted a Foreshore License Application (FLA) (Reference: FS006859) for the proposed turbine area (Array Investigation Area) and export cable corridors to the Department of Housing, Local Government and Heritage (DoHLGH) in October 2019. Public consultation was conducted on FLA FS006859 between 11 March 2020 and 4th June 2020. The FLA is currently awaiting a licence decision from the Department of Housing, Local Government and Heritage (DoHLGH).

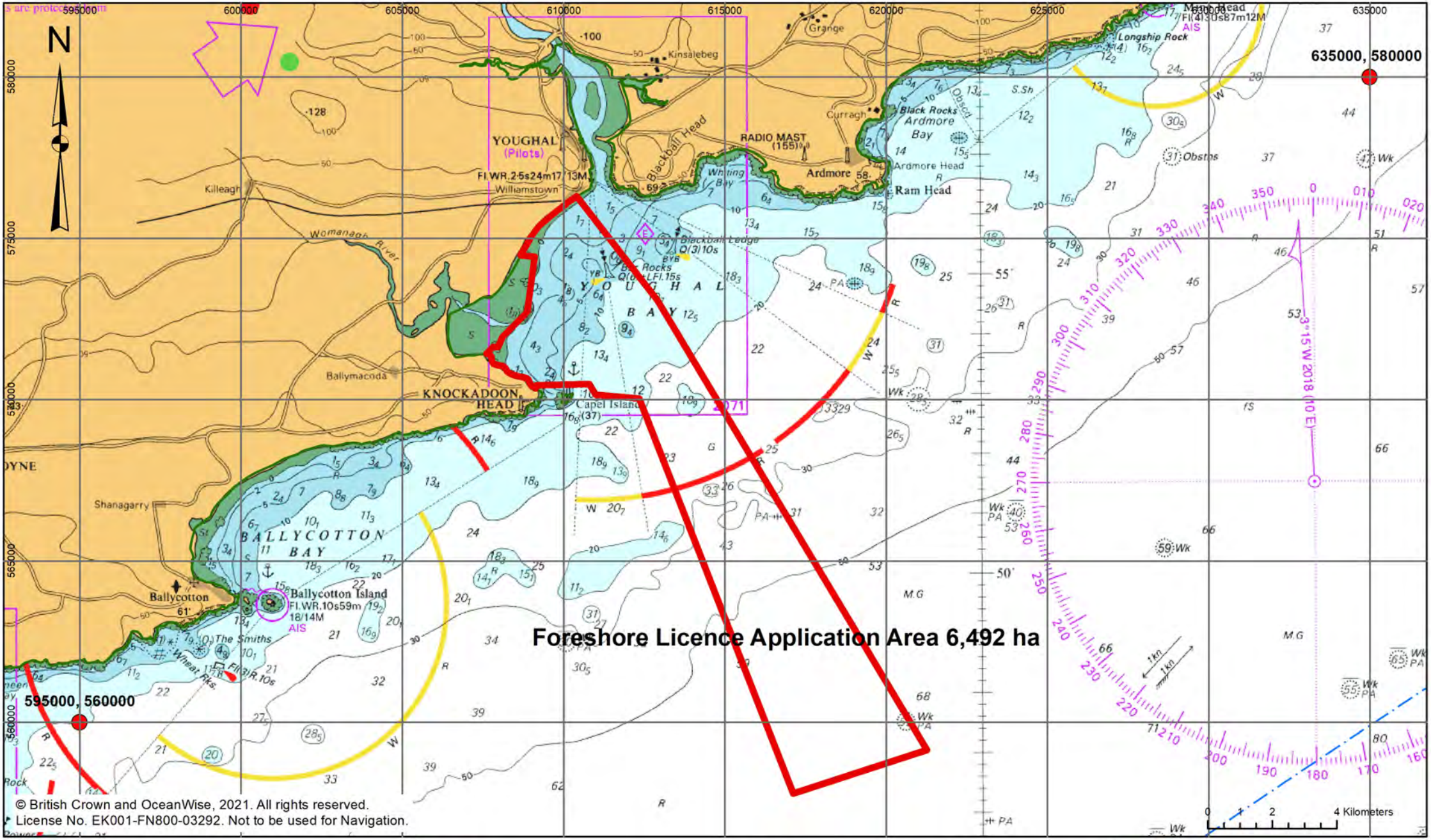
This subsequent and separate application for Foreshore Licence for site investigation works is for an additional potential export cable corridor connecting the Array Investigation Area with a landfall between Clonard and Ballymacoda, Co. Cork. Foreshore Licence Map 1 (Figure 1-1) shows the extent of the Ballymacoda/Clonard investigation area which lies within the 12 nautical mile (NM) limit (i.e. state foreshore). This Foreshore Licence Application Area (FLAA) covers 6,492 hectares (ha). Figure 1-1 (Map 1) shows the FLAA in relation to the area covered by FLA FS006859. Where appropriate this FLA has taken note of comments received during the consultation on FS006859.

This cable corridor has been identified for site investigation due to the precedence established by the Celtic Interconnector development (ABP consent application ref. A04.310798) and feedback to DPEI from stakeholders requesting greater consideration of those areas already under development for other projects such as the Celtic Interconnector.

IEMEP Ltd intends to carry out site investigations within this new investigation area for suitability for cable routing and other electrical infrastructure associated with IEMEP. The results of these surveys will also provide baseline data for environmental appraisal, Environmental Impact Assessment Report (EIAR) and subsequent Environmental Impact Assessment by the Competent Authority.

The FLAA lays just on the boundary of the Ballymacoda Bay (SPA) (site code: IE004023) and is located within 15km of seven other European Sites. As the project is not directly connected with or necessary to the management of the European Sites, it is regarded as necessary that the project should be subject to the Appropriate Assessment (AA) process. Screening for AA has been completed by the Applicant in support of this process, please see Appendix A.

A Foreshore Licence is sought solely for the proposed site investigation works which will be temporary and short-term. Undertaking the site investigation works does not guarantee that an offshore wind farm and associated infrastructure will be developed at this site. The construction of a windfarm will be subject to a full Environmental Impact Assessment (EIA) as per EU Directive 2011/92/EU. As part of the EIA process, the construction phase of the project will be subject to Screening, Scoping and Consultation.



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area
Foreshore Licence Map 1

I002IE

Legend

- Foreshore Licence Application Area
- Mean High Water Mark
- Irish Territorial Sea 12nm Limit
- ITM Grid Coordinate Intersect

Ver	Date	Drawn by	Checked	Approved
V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

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1.2 Aim of this Report

This document has been prepared to provide information to support the determination of a Foreshore Licence. This document provides a high-level characterisation of the environmental baseline within the FLAA and surrounding area and identifies any potential environmental sensitivities in the region. In order to determine any potential environmental effects, a significance assessment in accordance with the Environment Protection Agency (EPA) Ireland (2017) definitions of significance has been carried out.

Screening for AA has been completed (Appendix A) to inform the AA process in determining whether the proposed site investigations, both alone and in combination with other plans or projects, are likely to have a significant effect on any European Site.

This document provides the following:

- Description of the proposed site investigations (Section 1.6)
- Environmental baseline and appraisal of environmental sensitivities in the region (Section 2)
- Assessment of potential effects of the proposed site investigations including any proposed mitigation to reduce the significance of effects (Section 3)
- Screening for AA (Appendix A)
- Extract from 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters: Section 4.3.4' (Appendix B)

1.3 Project Overview

The proposed site investigations (geophysical (including archaeology and benthic), geotechnical, environmental surveys (including intertidal, birds and marine mammals) and wind resource monitoring and metocean survey, will enable:

- Detailed mapping of nearshore shallow geological and seabed character;
- Reconnaissance level mapping of seabed relief and features (e.g. archaeology);
- Greater understanding of wind resource and metocean conditions;
- Greater understanding of bird, marine mammal and reptile distribution and abundance; and
- Baseline environmental mapping (i.e. habitats and species).
- The knowledge gained from the proposed site investigation would be used to minimise uncertainty in ground conditions at an early design stage and optimise cable routing if this cable corridor is brought forward to the later stage of the design process.

Depending on the results of the proposed site investigations, other consents, permissions and licences required to develop, install, operate and ultimately decommission an export cable and offshore substation(s) associated with an offshore wind energy project may be sought at a future date. Data acquired during the proposed site investigations would be used to inform design of the project as well as to inform environmental appraisals carried out in support of any consent application by providing information on the baseline environment and allowing impacts to be predicted, and subsequently appropriate mitigation to be developed as applicable. The results of the proposed site investigations may also be used at a later date to provide a baseline against which to monitor post construction effects of construction, operation and decommissioning.

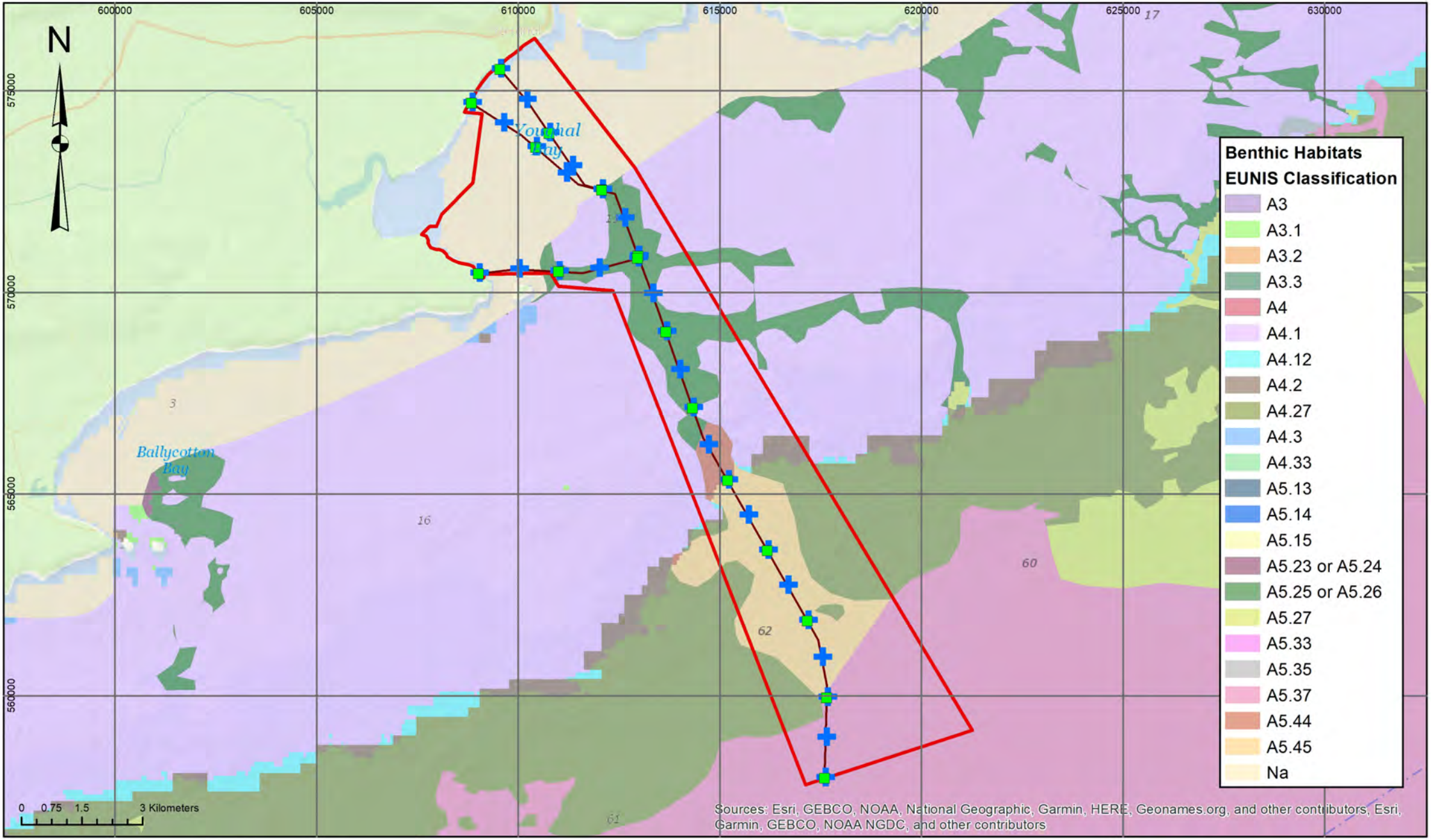
1.4 Description of the Proposed Site Investigation Works

This section provides a high-level overview of the proposed site investigations. Full details on the scope of the proposed site investigations is provided within the Scope of Survey Works document submitted in support of this FLA. The intention is to commence the proposed site investigations as soon as feasible following award of a Foreshore Licence, taking into consideration any proposed mitigation requirements. The survey works will most likely be carried out between the months of April and October, preferably in 2022 following award of the Foreshore licence and subject to weather conditions and vessel availability. The exact mobilisation dates for the site investigation activities will not be known until a Foreshore Licence has been secured and the process of procuring the contractor is complete. While a multi-year licence is sought, most survey activities will only occur over a period of weeks, with the exception of the metocean devices (ADCPs and Wave Buoys) which would be deployed for longer. The time spent at each individual location will be a maximum of hours for other site investigation activities such as boreholes, Cone Penetrometer Tests (CPTs), Vibrocores (VC), gravity coring, grab sampling etc.

The following surveys works are planned:

- **Geophysical survey (including Archaeology and Benthic):** Spring/Summer 2022 (approximately 3month window nominally Mid-April to Mid-July), in association with the benthic sampling programme. Techniques include: Multibeam Echo Sounder (MBES), Side Scan Sonar (SSS), Sub-Bottom Profiler (SBP), Magnetometer survey.
- **Geotechnical survey:** Option for preliminary survey summer in Year 2 or 3 (2-month window nominally August to September) and main survey Spring/Summer in Year 4 (4-month window). Techniques include: approximately 30 no. VC, approximately 30 no. CPTs, approximately 2 no. Boreholes.
- **Wind Resource Monitoring:** Start Summer Year 1 for a likely minimum of 12 months and a likely maximum of 36 months. Techniques include: 2 no. Acoustic Doppler Current Profilers (ADCP) and 2 no. Waverider buoys.
- **Metocean Survey:** Current resource monitoring – Start Summer Year 1 for a period of 6 months.
- **Environmental surveys and Intertidal:** Spring /Summer Year 2. Techniques include: approximately 30 no. Grab stations (three grabs at each station), drop-down camera (DDC) and video transects (VT), intertidal floral and fauna transects using quadrats and core sampling.
- **Birds & Marine Mammal:** Year 2 - seasonal. Techniques may include: Boat based survey including towed hydrophonic acoustic array. Potential deployment of Passive Acoustic Monitor(s) (PAM). Potential deployment of Static Acoustic Monitor(s) (PAM). Scope to be determined following engagement with statutory and non-statutory stakeholders on Year 2 of survey effort pending results from Year 1 of aerial bird and marine mammal survey effort

Indicative locations of geotechnical and grab sample stations are provided in Figure 1-2 (Map 15). However, at the time of the FLA submission, it is not known where the landfall and potential export cable will be located. To be judicious, it has been assumed that the geotechnical and geophysical surveys will be conducted across the whole of the FLAA.



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 15

Indicative Sample Locations

Legend

- Foreshore Licence Application Area
- Indicative Grab Locations
- Indicative CPT & VC Locations
- Indicative Cable Routes
- Irish Territorial Sea 12nm Limit

Data Source: EMODnet, DCCAE

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Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

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2. ENVIRONMENTAL SENSITIVITIES

An understanding of the potential effects of an operation on the environment requires a clear understanding of the present state of the environmental baseline. For the purposes of this report, this section focuses on the environmental receptors which have the potential to be affected by the proposed site investigations.

The description of the environment is based on publicly available data sources, as referenced in the text.

2.1 Protected Sites

In accordance with the provisions of Article 6(3) of the EC Habitats Directive (92/43/EEC) transposed into Irish statute by the European Communities (Birds and Natural Habitats) Regulations 2011, SI 477/2011, Screening for AA (Stage 1) has been conducted and is presented Appendix A.

European Sites (Special Areas of Conservation [SACs] and Special Protection Areas [SPAs]) within 15km of the FLAA are shown on Figure 2-1 (Map 7) and are listed in Table 2-1. Only SACs with marine components have been screened for AA.

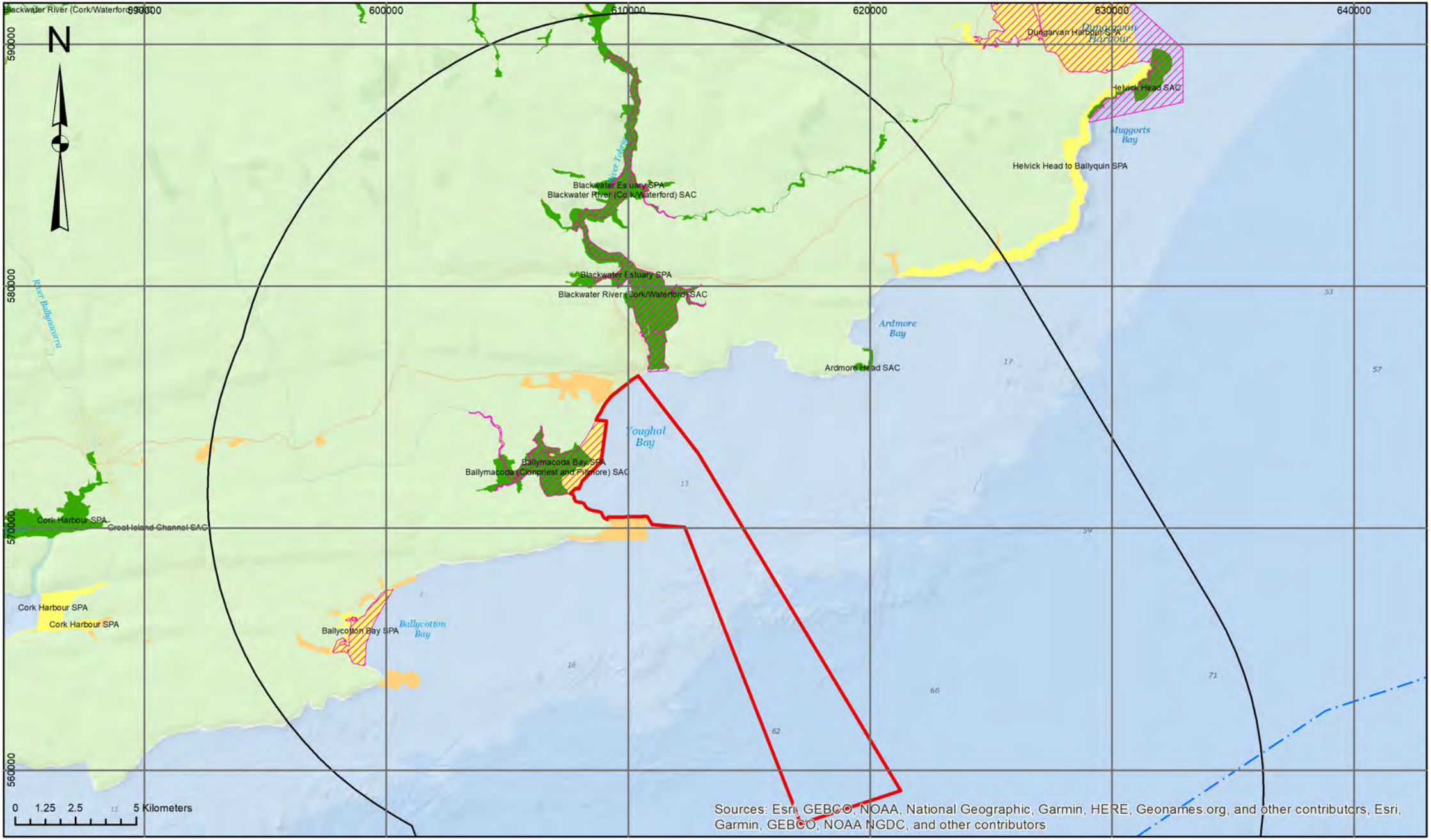
Table 2-1 European Sites within 15km

Designation	Site Code & Name	Site Code
SAC	Ardmore Head	002123
SPA	Ballycotton Bay	004022
SPA	Ballymacoda Bay	004023
SAC	Ballymacoda (Clonpriest and Pillmore)	000077
SPA	Blackwater Estuary	004028
SAC	Blackwater River (Cork/Waterford)	002170
SPA	Helvick Head to Ballyquin	004192

European Sites which are outside the 15km of the FLAA, but which are within 15km of the IEMEP FLAA are listed in Table 2-2. The European Sites which have a marine component have been screened for AA to ensure that the potential for intra-project cumulative effects have been appropriately assessed.

Table 2-2 European Sites within 15km of the IEMEP

Designation	Site Code & Name	Site Code
SAC	Comeragh Mountains	001952
SAC	Glendine Wood	002324
SAC	Helvick Head	000665
SPA	Sovereign Islands	004124
SPA	Cork Harbour	004030
SPA	Dungarvan Harbour	004032
SPA	Mid-Waterford Coast	IE004193
SPA	Sovereign Islands	IE004124



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 7

Protected Areas

Legend

- Foreshore Licence Application Area
- Foreshore Licence Application Area 15km Buffer
- Fisheries Natura Declaration
- SAC
- SPA
- NHA
- pNHA
- Irish Territorial Sea 12nm Limit

Data Source: NPWS

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Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

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2.2 Intertidal and Benthic Communities

Intertidal and benthic ecology comprises the habitats and species (flora and fauna) present in, on or closely associated with the seabed. A high-level assessment of the key sensitive intertidal and benthic habitats and species within the FLAA has been made by reviewing:

- European Marine Observation Data Network (EMODnet) Seabed Habitats project (www.emodnet-seabedhabitats.eu) - EUSeaMap broad-scale predictive mapping based on physical hydrographic information within different habitats areas and water depths
- European Nature Information System (EUNIS) marine habitat classification 2019 (https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification) – The classification provides habitat identification and descriptions of the biological zones and substrate types.

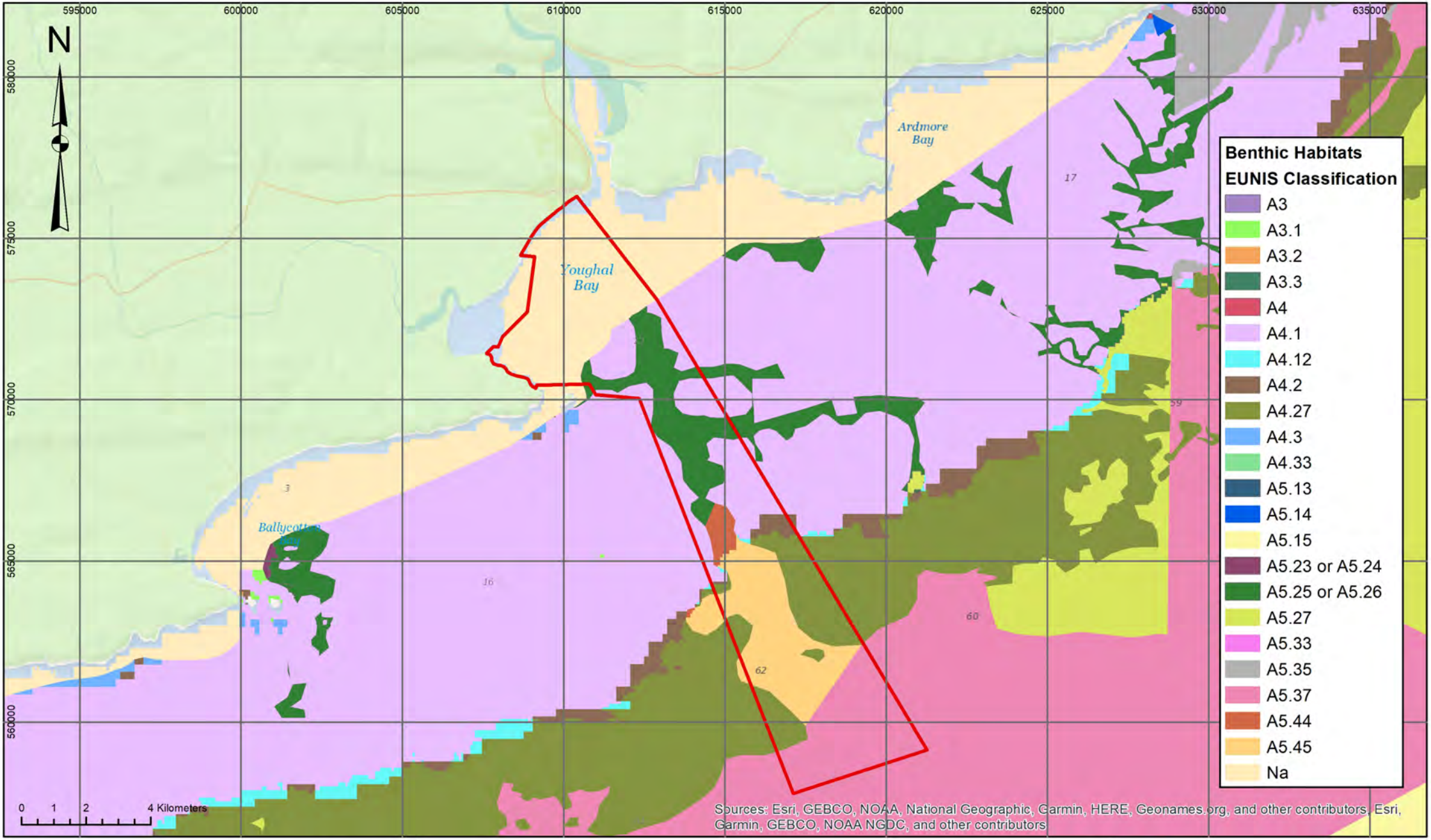
This data is predictive rather than definitive, however it does provide some indication to the types of benthic habitats that may be found within the FLAA. The habitats identified within the investigation site, along with their EUNIS code, are listed in Table 2-3 and shown in Figure 2-2 (Map 9) below. Omitted from the table are areas which intersect the FLAA but do not have a EUNIS code or descriptor at present, these are; Infralittoral seabed, low energy infralittoral seabed, moderate energy infralittoral seabed, high energy circalittoral and infralittoral seabed.

The seabed sediments within the FLAA are heterogeneous. In the most offshore section of the FLAA, the seabed is dominated by deep circalittoral mud (A5.37), offshore circalittoral habitats consisting of slightly muddy mixed gravelly sand, stones and shell (A5.45) and Faunal communities on deep moderate energy circalittoral rock (A4.27). Towards the nearshore area the seabed is dominated by a strip of Atlantic and Mediterranean high energy circalittoral rock (A4.1) which runs parallel to the shore. Within this area of rock is a channel of seabed which is dominated by circalittoral fine sand or circalittoral muddy sand (A5.25 or A5.26). The most nearshore area of the FLAA is dominated by high energy infralittoral seabed. Habitats A5.37, A5.45 and A5.25 or A5.26 are likely to be characterised by polychaetes, bivalves and echinoderms. The large area of circalittoral rock running parallel to the shore (A4.1), is likely to be dominated by sponges, hydroids and barnacles.

Table 2-3 Habitats present within the FLAA

EUNIS code	EUNIS name	Typical fauna
A4.1	Atlantic and Mediterranean high energy circalittoral rock	Occurs on extremely wave-exposed to exposed circalittoral bedrock and boulders subject to tidal streams ranging from strong to very strong. Typically found in tidal straits and narrows. The high energy levels found within this habitat complex are reflected in the fauna recorded. Sponges such as *Pachymatisma johnstonia*, *Halichondria panicea*, *Esperiopsis fucorum* and *Myxilla incrustans* may all be recorded. Characteristic of this habitat complex is the dense 'carpet' of the hydroid *Tubularia indivisa*. The barnacle *Balanus crenatus* is recorded in high abundance on the rocky substrata. On rocky outcrops, *Alcyonium digitatum* is often present. In EUSeaMap broad-scale predictive mapping this habitat is classified as 'circalittoral rock and biogenic reef'. It is therefore possible that EC Habitats Directive Annex listed habitat biogenic reef may be observed in these areas.
A4.2	Atlantic and Mediterranean moderate energy circalittoral rock	Mainly occurs on exposed to moderately wave-exposed circalittoral bedrock and boulders, subject to moderately strong and weak tidal streams. This habitat type contains a broad range of biological subtypes, from echinoderms and crustose communities (A4.21) to Sabellaria reefs (A4.22) and circalittoral mussel beds (A4.24). It is therefore possible that EC Habitats Directive Annex listed habitat biogenic reef may be observed in these areas.
A4.12	Sponge communities on deep circalittoral	Occurs on deep (commonly below 30m depth), wave-exposed circalittoral rock subject to negligible tidal streams. The sponge component of this biotope is the most striking feature. *Phakellia ventilabrum*, *Axinella infundibuliformis*, *Axinella dissimilis* and *Stelligera stuposa* dominate. Other sponge species frequently found

EUNIS code	EUNIS name	Typical fauna
		on exposed rocky coasts are also present in low to moderate abundance. These include *Cliona celata*, *Polymastia boletiformis*, *Haliclona viscosa*, *Pachymatisma johnstonia*, *Dysidea fragilis*, *Suberites carnosus*, *Stelligera rigida*, *Hemimycale columella* and *Tethya aurantium*.
A4.27	Faunal communities on deep moderate energy circalittoral rock	These communities populate hard substrata with low hydrodynamics and strong sedimentation.
A5.25 or A5.26	Circalittoral fine sand or Circalittoral muddy sand	A5.25 - Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15-20 m. The habitat may also extend offshore and is characterised by a wide range of echinoderms (in some areas including the sea urchin (*Echinocyamus pusillus*), polychaetes and bivalves. This habitat is generally more stable than shallower, infralittoral sands and consequently supports a more diverse community. A5.26 - Circalittoral non-cohesive muddy sands with the silt content of the substratum typically ranging from 5% to 20%. This habitat is generally found in water depths of over 15-20m and supports animal-dominated communities characterised by a wide variety of polychaetes, bivalves such as *Abra alba* and *Nucula nitidosa*, and echinoderms such as *Amphiura spp* and *Ophiura spp*., and *Astropecten irregularis*. These circalittoral habitats tend to be more stable than their infralittoral counterparts and as such support a richer infaunal community.
A5.37	Deep circalittoral mud	In mud and cohesive sandy mud in the offshore circalittoral zone, typically below 50-70 m, a variety of faunal communities may develop, depending upon the level of silt/clay and organic matter in the sediment. Communities are typically dominated by polychaetes but often with high numbers of bivalves such as *Thyasira* spp., echinoderms and foraminifera.
A5.44	Circalittoral mixed sediments	Mixed (heterogeneous) sediment habitats in the circalittoral zone (generally below 15-20 m) including well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in or lying upon mud, sand or gravel. Due to the variable nature of the seabed a variety of communities can develop which are often very diverse. A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones such as *Cerianthus lloydii* are often present in such habitat and the presence of hard substrata (shells and stones) on the surface enables epifaunal species to become established, particularly hydroids such as *Nemertesia* spp and *Hydrallmania falcata*. The combination of epifauna and infauna can lead to species rich communities. Coarser mixed sediment communities may show a strong resemblance, in terms of infauna, to biotopes within the A5.1. However, infaunal data for this habitat type is limited to that described under the biotope A5.443, and so are not representative of the infaunal component of this habitat type.
A5.45	Deep circalittoral mixed sediments	Offshore (deep) circalittoral habitats with slightly muddy mixed gravelly sand and stones or shell. This habitat may cover large areas of the offshore continental shelf although there is relatively little data available. Such habitats are often highly diverse with a high number of infaunal polychaete and bivalve species. Animal communities in this habitat are closely related to offshore gravels and coarse sands and in some areas populations of the horse mussel *Modiolus modiolus* may develop in these habitats.



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 9

Benthic Habitats

Legend

- Foreshore Licence Application Area
- Irish Territorial Sea 12nm Limit

Data Source: EMODnet, DCCAE

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V1	18/05/2021	AM	EW	SDP

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2.3 Fish and Shellfish

Offshore gravelly sediments on the shelf in the Celtic Sea are dominated by elasmobranchs (rays, skates and sharks), gurnards, cod, large whiting and a few flatfish species. Soft muddy sediments have higher numbers of gadoids (e.g. cod, hake and their relatives) and lower densities of plaice and dab than found in shallower sandy areas. The distributions of pelagic species such as mackerel, horse mackerel and herring within Irish waters is largely dependent on the season, as species migrate between spawning and feeding grounds (DCCAE 2015).

Fish communities present within coastal areas include juvenile flatfish and sandeel over sandy sediments, with seasonal influxes of sprat, herring, juvenile gadoids and mullet. Rocky shore fish assemblages are diverse and dominated by small species such as wrasses, gobies and blennies, as well as juvenile pollock and saithe (DCCAE 2015).

The FLAA is within the identified spawning and nursery grounds for eight species of fish (Figure 2-3, Map 10). A summary of the spawning and nursery periods for seven of these commercially important fish species is outlined in Table 2-4. The FLAA is a primary spawning ground for Atlantic cod (*Gadus morhua*), Atlantic herring, whiting, European hake and haddock (see Table 2-4 and Figure 2-3 Map 10 below). Megrim spawn between January and early March (Robson 2004).

The EC Habitats Directive Annex II listed species, sea lamprey, river lamprey, brook lamprey, twaite shad and Atlantic salmon are listed as Qualifying Interests of the Blackwater River (Cork/Waterford) SAC which is 0.50km from the FLAA. All of these (except for brook lamprey) are migratory species that may be found in the FLAA at certain times of the year:

- Sea lamprey – late April to early June
- River lamprey – September to June
- Twaite shad – year round and migrate into rivers from April-July
- Atlantic salmon – May to June and autumn months.

Brook lamprey do not migrate to the sea and therefore will not be observed in the FLAA. Twaite shad are the only fish from the above list known to be sensitive to underwater noise from geophysical survey. As part of the clupeidea family (along with Atlantic herring), they are considered a high sensitivity hearing species because they have a specialisation of the auditory apparatus where the swim bladder and inner ear are intimately connected. Clupeids are able to detect frequencies to over 3kHz; with optimum sensitivity between 300Hz-1kHz (Nedwell et al. 2007). Species, such as Atlantic salmon and sea and river lamprey have a lower sensitivity to sound as their swim bladder is located far from the ear (Popper et al 2004). Therefore, these species will only be sensitive to sound sources with a rapid pressure change, i.e. unexploded ordnance detonation, which is not being proposed during the site investigation works.

Important Norway lobster (Nephrops norvegicus) grounds occur on soft muddy sediments within the Celtic Sea. Brown, or edible, crabs are distributed throughout the continental shelf area to the north and west of Ireland and the rocky areas of the Irish and Celtic Sea. Populations of scallops and queen scallops may also occur in areas of gravelly sediments (DCENR 2015). Fisheries data from the Marine Management Organisation (MMO) and Scientific, Technical and Economic Committee for Fisheries (STECF) fisheries (landings and activity) has found that the area is important for lobster, Nephrops, crabs, scallops, razor clams and whelks (STECF 2018 and MMO 2018).

Table 2-4 Summary of spawning and nursery periods for commercially important fish species within the FLAA

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Atlantic cod (S)(N)	SN	S*N	S*N	SN	N	N						
European hake (N)	N	N	N	N	N	N	N	N				
Atlantic Herring (S)	S	S	S									
Atlantic mackerel (N)			N	N	N	N	N	N	N			
Whiting (S) (N)		SN	SN	SN	SN	SN	N	N				
Haddock (S) (N)		SN	SN	SN	SN	N	N					
Horse Mackerel (N)			N	N	N	N	N	N	N	N		

S = Spawning, N = Nursery, SN = Spawning and Nursery, Blank = No Data, *peak spawning.

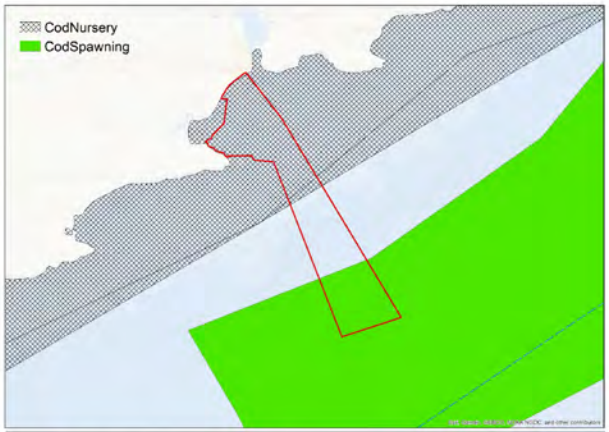
Grey shading indicates likely survey period.

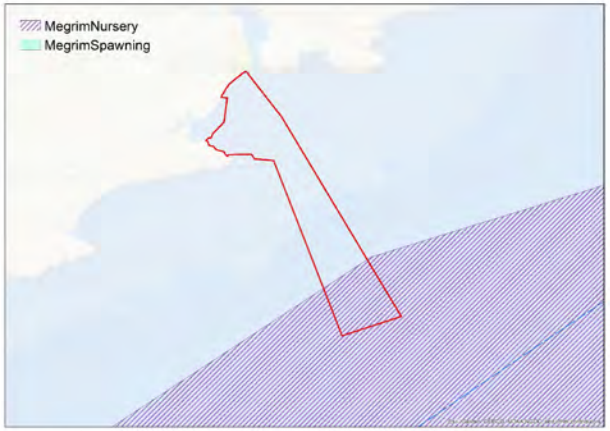
Source: Coull *et al*. 1998; Ellis *et al*. 2012

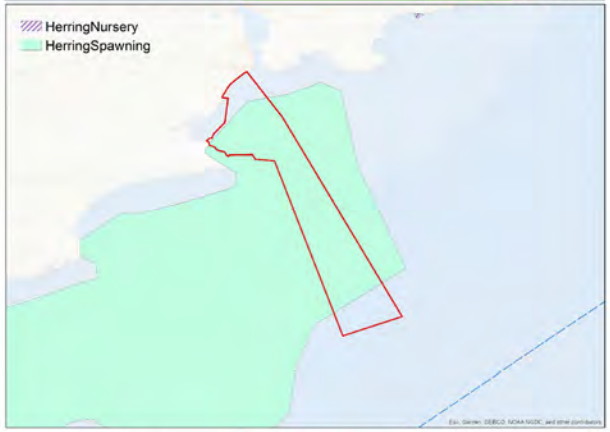
There are three licensed aquaculture sites, harvesting oysters and clams, within close proximity to the FLAA (Figure 2-4, Map 11), namely:

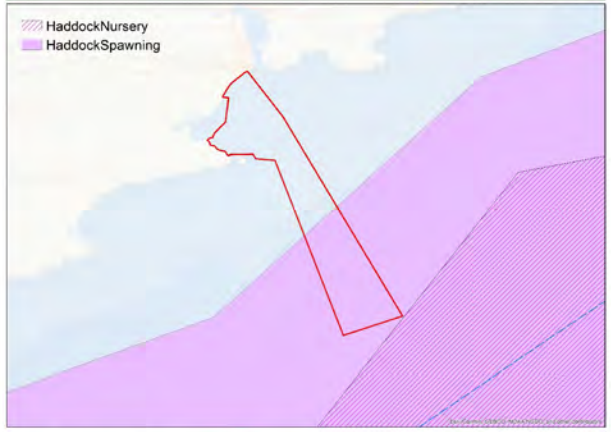
- T05/491A Ballymacoda Bay – Distance from FLAA: 0km
- T05/395 Ballymacoda Bay - Distance from FLAA: 0.14km
- T05-482A Ballymacoda – Distance from FLAA: 0.4km.

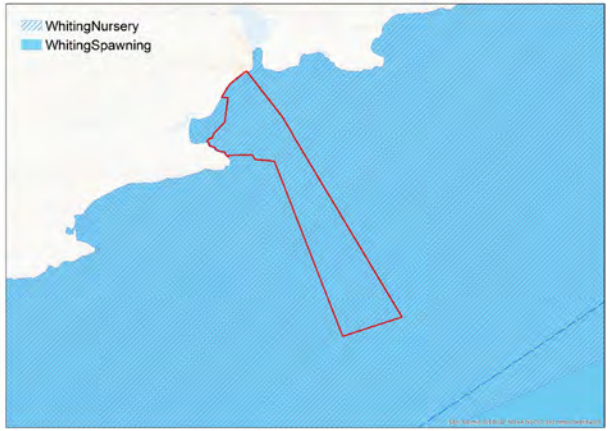
The FLAA is located within the Ballymacoda designated shellfish waters, an important area for oysters and clams. The total area designated is 0.84km^2 and it overlaps with the FLAA for approximately 0.108 km^2 (DHLGH 2021) (Figure 2-5, Map 8).

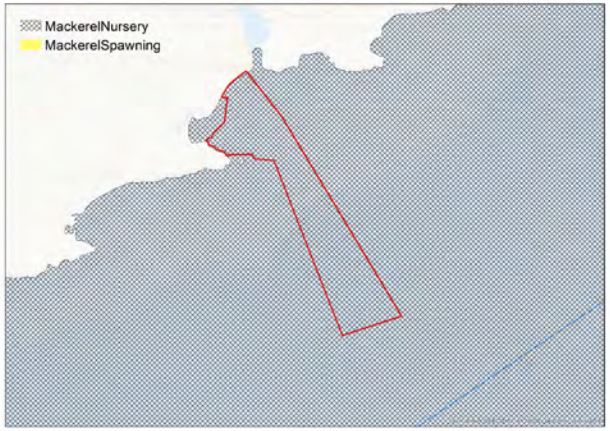


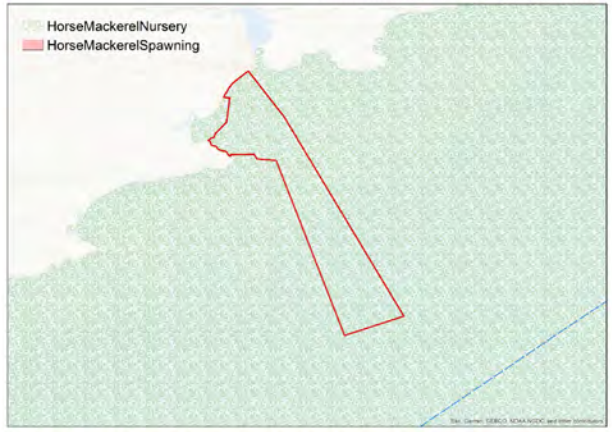












Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 10

Fish Spawning and Nursery

Legend

Foreshore Licence Application Area

Irish Territorial Sea 12nm Limit

Data from the Species distribution Sea Fisheries theme accessed through Ireland's Marine Atlas at http://atlas.marine.ie/, 09/08/2019.

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap Contributors, and the GIS User Community

Ver	Date	Drawn by	Checked	Approved
V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIAFishSpawningNursery_V1.0_20210518 Size A3

Scale: 1:150,000 Printed @ A3

Coordinate System: IRENET95 Irish Transverse Mercator
Projection: Transverse Mercator

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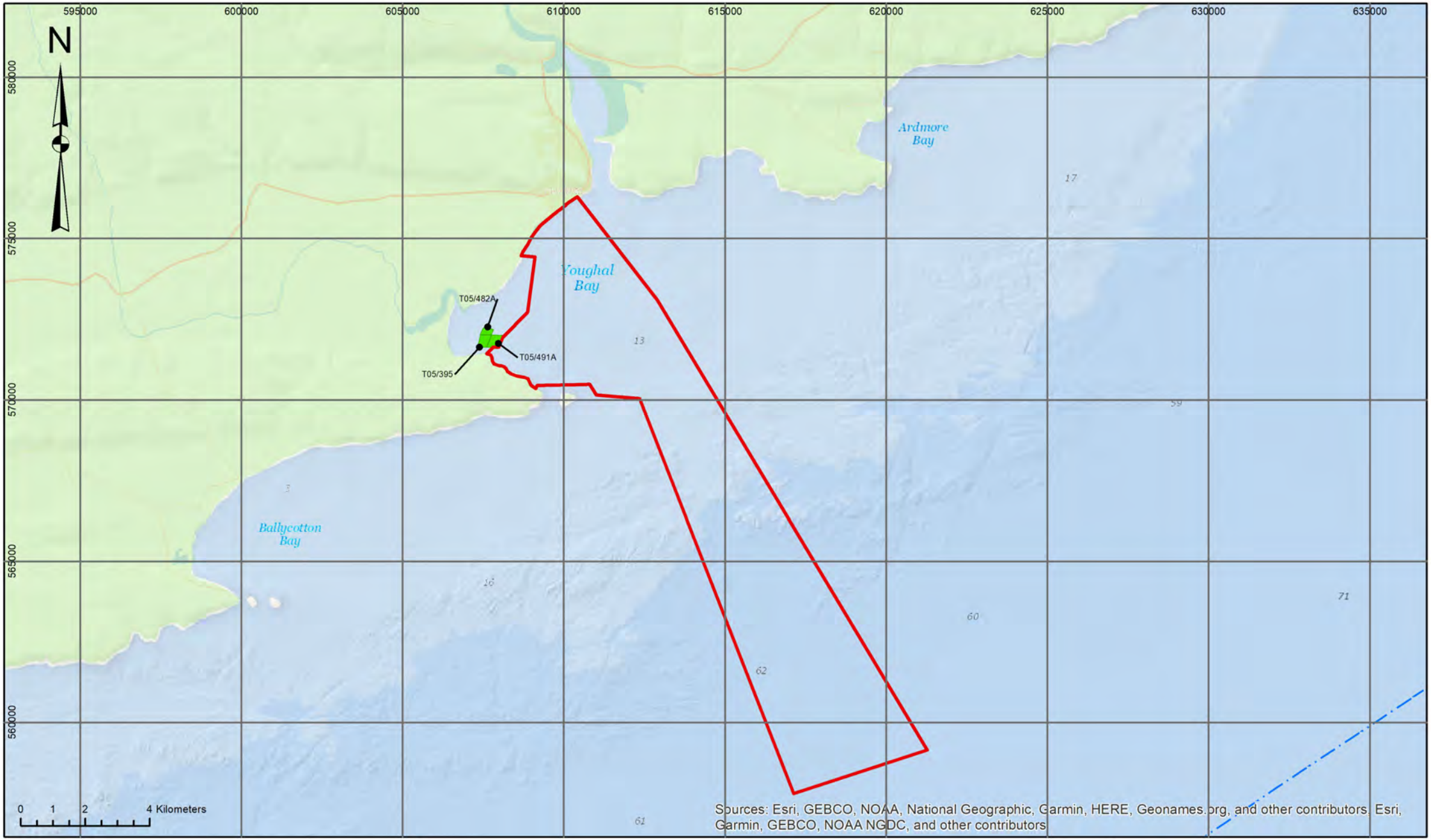

Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 11

Aquaculture

Legend

- Foreshore Licence Application Area
- Aquaculture
- Irish Territorial Sea 12nm Limit

Data Source: data.gov.uk

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V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIAAquaculture_V1.0_20210518 | Size A3

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Coordinate System: IRENET95 Irish Transverse Mercator
Projection: Transverse Mercator

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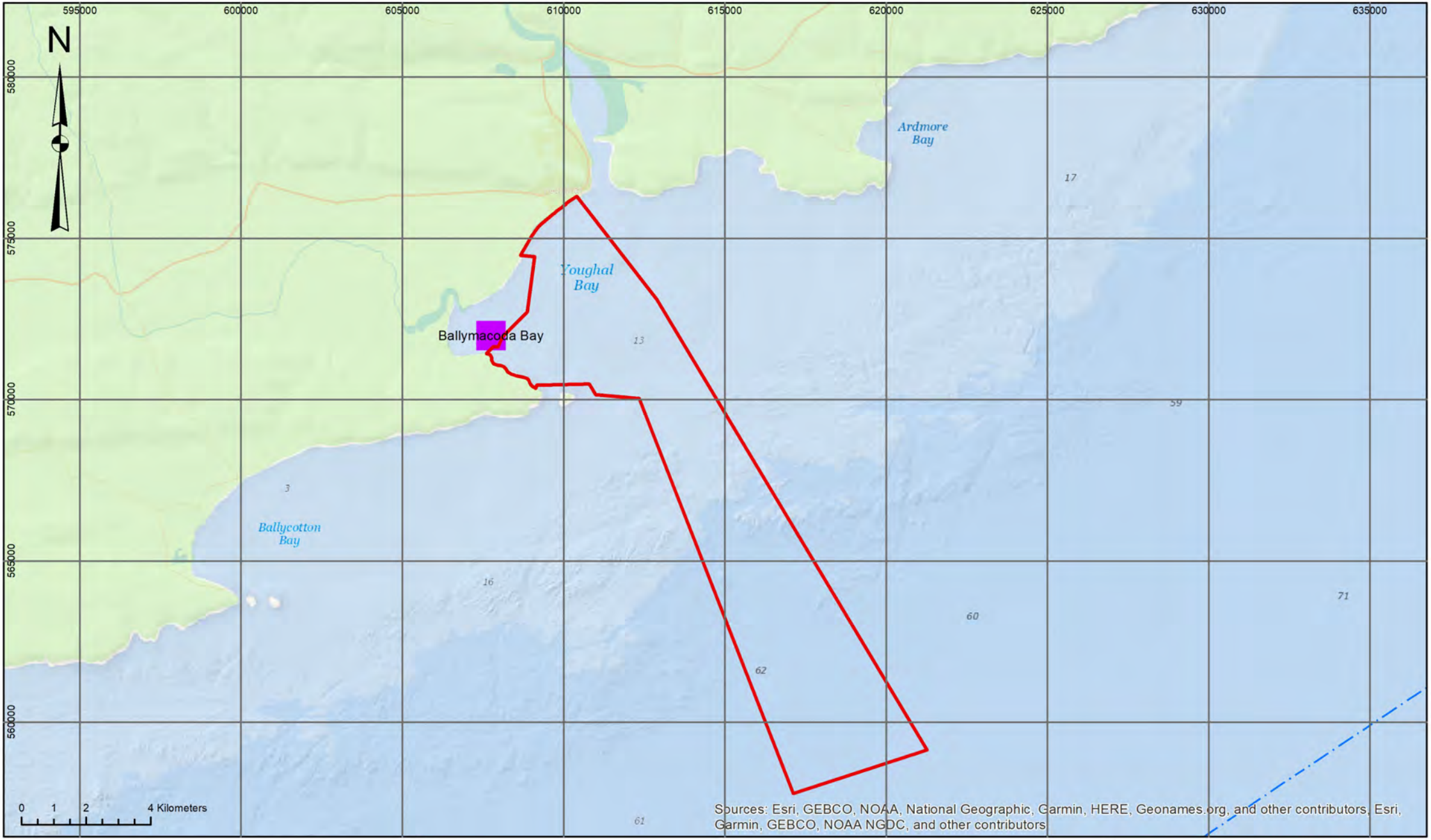

Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 8

Designated Shellfish Water

Legend

- Foreshore Licence Application Area
- SWD_Shellfish_Waters
- Irish Territorial Sea 12nm Limit

Data Source: DHPLG, OSI, DCCAE

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V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIASWDShellfishWater_V1.0_20210518 | Size A3

Scale: 1:150,000 Printed @ A3

Coordinate System: IRENET95 Irish Transverse Mercator
Projection: Transverse Mercator

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2.4 Birds

The coastal sea cliffs, estuaries and offshore islands of Ireland are host to nationally and internationally important bird species, with many areas designated as SPAs.

At least 45 species of seabird (including divers and grebes) have been recorded during at-sea surveys in Irish waters, of which 23 species regularly breed around Ireland (Pollock et al 2008, Mackey et al 2004). In addition, a further 59 species of waterfowl and wader regularly occur at coastal sites such as estuaries around Ireland; including 5 grebe species, 2 heron species, 26 species of wildfowl and 26 wader species (Crowe 2005). Some of these species are migratory and are present only during migration periods in spring and autumn; others come to Ireland to breed or to spend the winter, while some are resident all year round.

Part of the FLAA lies within the Capel Island and Knockadoon Nature Reserve. This Nature Reserve covers an area of 130ha, which includes the Knockadoon headland, the opposite island, and the intervening sea area. The site attracts chough, an Annex 1 species, to feed during autumn and winter months, whilst overhead and on the cliffs, peregrine may be seen (ECE 2021, Birdwatch Ireland 2021). On Capel Island a colony of breeding cormorants can be found (Birdwatch Ireland 2021).

The FLAA lies within or near the following SPAs, designated for breeding and over-wintering bird species:

- Ballycotton Bay SPA (site code 004022)
- Ballymacoda Bay SPA (site code 004023)
- Blackwater Estuary SPA (site code 004028)
- Helvick Head to Ballyquin SPA (site code 004192)

Further details on these sites are provided in Appendix A – Screening for AA.

2.5 Marine Mammals

Marine mammals present in the FLAA are cetaceans (whales, dolphins and porpoises) and pinnipeds (seals), with European otter possibly present in the nearshore area.

Of the 24 species of cetacean recorded in Irish waters, approximately 12 of these have been recorded off the south-east coast and may be present in the FLAA at least on a seasonal basis. These species are listed in Table 2-5. It is unlikely that deep water species such as the blue whale and long-finned pilot whale will be present, due to water depths.

The Irish Whale and Dolphin Group (IWDG) website (http://www.iwdg.ie/) was used to determine the number of whales and dolphin sightings within County Cork and County Waterford (Table 2-5). From this data, the most commonly sighted species was the short-beaked common dolphin, with pods of up to 2000 individuals sighted, although these sightings were from Toe Head, on the southern Atlantic Coast. Other commonly sighted species include, harbour porpoise, bottlenose dolphin, Risso's dolphin, minke whale, humpback whale and the fin whale.

Most cetaceans are wide-ranging, and individuals encountered within Irish waters form part of a much larger biological population whose range extends into adjacent jurisdictions. As a result, management units (MUs) have been outlined for seven of the common regularly occurring species following advice from the Sea Mammals Research Unit (DECC 2016) and the International Council for the Exploration of the Sea (ICES). These provide an indication of the spatial scales at which impacts of anthropogenic activities should be taken into consideration. The relevant MUs are listed in Table 2-5.

Table 2-5 Cetacean species whose distribution includes the FLAA

Species	Frequency of sightings*	IWDG sightings (approx.) (May 2020 –May 2021)**	Estimation of density (animals/km^2) ***	Applicable MU****	Abundance of animals in MU****
Toothed whales (odontocetes)					
Harbour porpoise (*Phocoena phocoena*)	Common from June through the autumn/winter. Peak period in August.	277 sightings; All year, May – May (includes recordings of "dolphins species possibly harbour porpoise") Largest Pod sighting max 32 individuals. Recorded in December	0.118-0.239	Celtic and Irish Seas	47,229
Short-beaked common dolphin (*Delphinus delphis*)	Peak period is spring and summer and winter peak on the south coast associated with prey items.	>10,000 sightings; All year, May – May (Including recordings of "common or striped dolphin") Largest Pod sighting max 2000 individuals. Recorded in September (2020)	0.374	Celtic & Greater North Seas	56,556
Bottlenose dolphin (*Tursiops truncatus*)	Common year round but most frequent in summer.	146 sightings; June-May Largest Pod sighting max 30 individuals. Recorded in August	0.008 - 0.06	Offshore Channel and SW England	4,856
Risso's dolphin (*Grampus griseus*)	Peak period in April - Sept	118 sightings; June-April Largest Pod sighting max 25 individuals. Recorded in June	0.031	Celtic & Greater North Seas	No data available
White-beaked dolphin (*Lagenorhynchus albirostris*	Irregular in Irish Sea. More regular in late summer – autumn.	No sightings	No data available	Celtic & Greater North Seas	15,895
Long-finned pilot whale (*Globicephala melas*)	Most frequent between April and September	No sightings	No data available	N/A	No data available
Killer whale (*Orcinus orca*)	Occasional sightings in Irish Sea waters.	No sightings	No data available	N/A	No data available
Baleen whales (mysticetes)					
Minke whale (*Balaenoptera acutorostrata)*	Peak period July and August	1178 sightings; All year, May – May Largest Pod sighting max 90 individuals. Recorded in May (2021)	0.017	Celtic & Greater North Seas	23,528
Humpback whale (*Megaptera novaeangliae*)	Occasional sightings in Irish Sea waters.	209 sightings; June – May Largest Pod sighting max 8 individuals Recorded in April	No data available	N/A	No data available
Fin whale (*Balaenoptera physalus*)	Unclear, contradictory evidence with sightings during summer months, and acoustic monitoring data suggest a peak in November – December.	233 sightings; All year, May – May (Including recordings of sitings "sei, fin or blue whale") Largest Pod sighting max 11 individuals. Recorded in September (2020)	No data available	N/A	No data available

Sources: * Marine Institute (2021), Reid et al. (2003) ** IWDG (2021) Sightings were filtered to display Counties Cork and Waterford only; *** Hammond et al (2017) ICES Management Units D (Irish seas) and **** DECC (2016).

All cetaceans are European Protected Species (EPS) protected under Annex IV of the EC Habitats Directive (92/43/EEC), which lists species of Community Interest in need of strict protection. It is an offence to deliberately capture, kill, injure or disturb animals classed as EPS. In addition, harbour porpoise, bottlenose dolphin, grey seal and common/harbour seal are listed under Annex II of the Habitats Directive, which lists species whose conservation requires designation of SAC.

In 1997, the Habitats Directive was transposed into Irish national law through Statutory Instrument (S.I) Number 94/1997 - European Communities (Natural Habitats) Regulations 1997. These were subsequently revised and consolidated in S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, which covers the terrestrial environment and marine waters up to the 12 NM limit.

The FLAA is within the Celtic and Irish Sea MU for harbour porpoise. Within the MU there are five SACs which list harbour porpoise as a Qualifying Interest; Rockabill to Dalkey Island SAC and the Roaringwater Bay and Islands SAC in Irish waters; and the Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC, West Wales Marine / Gorllewin Cymru Forol SAC; North Anglesey Marine/ Gogledd Môn Forol SAC in UK waters (JNCC 2017). As harbour porpoise are highly mobile species, animals from these sites maybe visitors to the FLAA. In UK waters, the Cardigan Bay/Bae Ceredigion SAC has been designated for the conservation of bottlenose dolphin.

Two species of seal are resident within Irish waters and will be observed in the FLAA; grey seal and harbour (or common) seal. Ireland's Marine Atlas identifies the coastline of the FLAA as within the distribution of Ireland's populations of both grey and harbour seal. Russel et al (2017) provide grey seal densities in the FLAA as <5 animals per 25km^2, whilst harbour seal densities are lower at <1 animal per 25km^2.

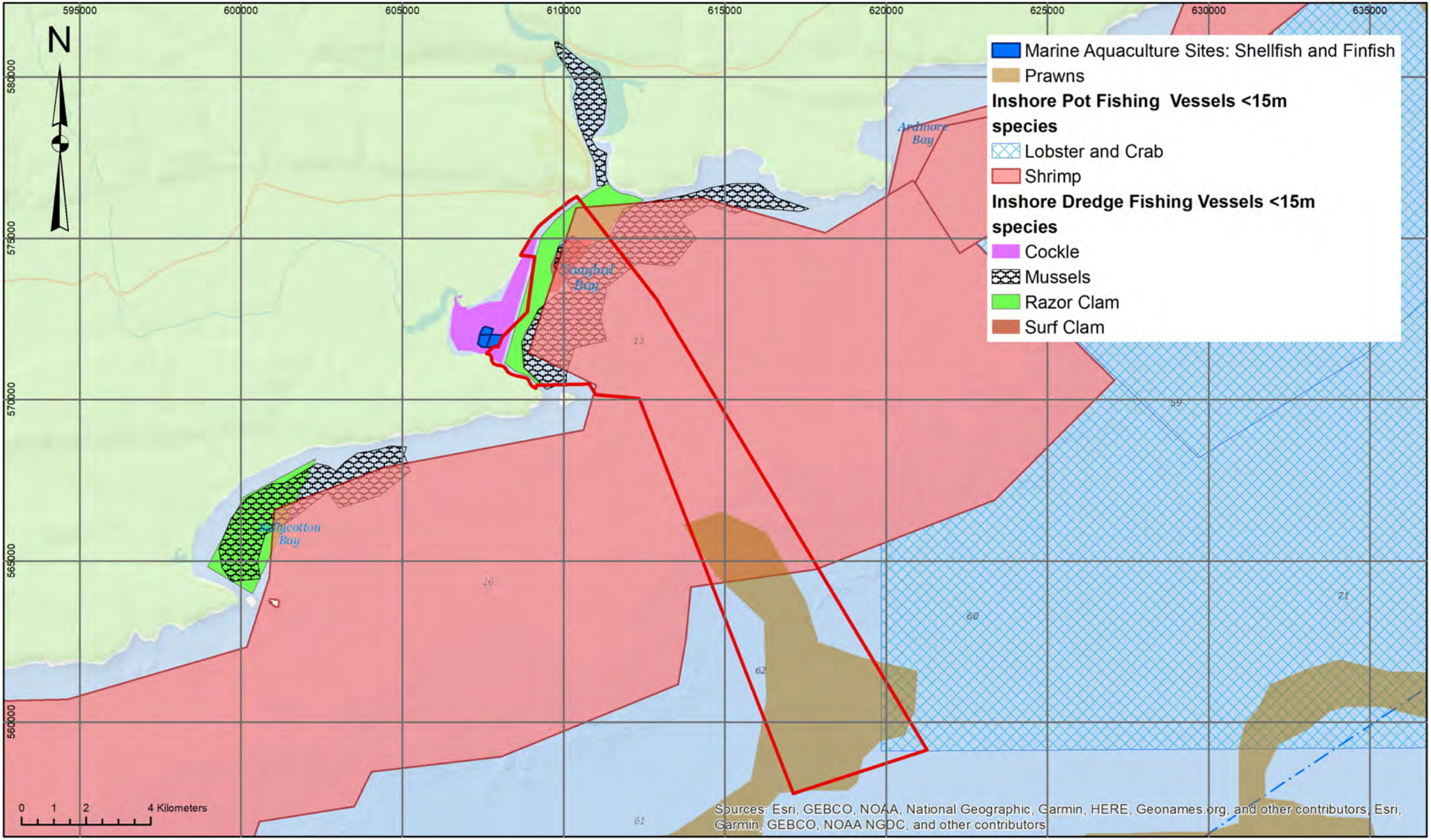
The closest SACs listing grey seal as a Qualifying Interest are the Saltee Islands SAC (75km from FLAA) and Roaringwater Bay SAC (110km). The closest SAC for harbour seal is the Slaney River Valley SAC, (128km from the FLAA).

European otter are protected within Ireland under the Wildlife Amendment Act (2000) where it is now illegal to hunt, disturb, or intentionally kill otter. The otter is also listed on Annex II and Annex IV of the EU Habitats Directive (92/43/EEC). The National Biodiversity Data Centre (www.maps.biodiveristy.ireland.ie) have sightings data for otter along the coastline within the FLAA. The Blackwater River SAC lists otter as a Qualifying Interest.

2.6 Commercial Fisheries

The seas around Ireland are among the most productive and biologically sensitive areas in EU waters. In 2010 an estimated 1.3 million tonnes of fish were taken by the fishing fleets of EU member states from the waters around Ireland (ICES Sub-areas VI & VII) (Marine Institute 2021). The main fish species caught were mackerel, horse mackerel, boarfish, blue whiting, herring, cod, whiting, haddock, saithe, hake, megrim, anglerfish, plaice, sole and Nephrops (DP Energy 2020).

There are over 2000 registered fishing vessels operating around the Irish coasts, the majority of which are under 12m (DAFMI 2019). The Irish fishing fleet is engaged in a variety of fisheries and targets a wide range of commercial species. Vessels under 12m tend to operate close to shore using both mobile and static gear types. These smaller vessels are engaged in fisheries such as potting for crab and lobster, gillnetting for whitefish, inshore trawling for whitefish or prawns and jigging/trolling for mackerel or whitefish (DP Energy 2020). Figure 2-6 (Map 14) presents an overview of the types of fishing activity likely to be engaged in across the FLAA, showing the area is important for shrimp potting, dredging for mussel and razor clams and further offshore trawling for prawns.



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 14

Atlas Commercial Fisheries
for Shellfish around Ireland

Legend

- Foreshore Licence Application Area
- Irish Territorial Sea 12nm Limit

Data Source: MI, DCCAE

Ver	Date	Drawn by	Checked	Approved
V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIAAtlasCommercialFisheries_V1.0_20210518 | Size A3

Scale: 1:150,000 Printed @ A3

Coordinate System: IRENET95 Irish Transverse Mercator
Projection: Transverse Mercator

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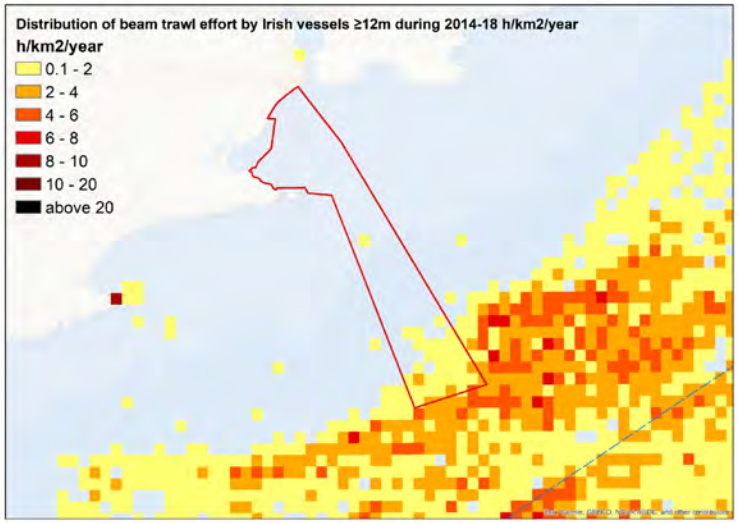
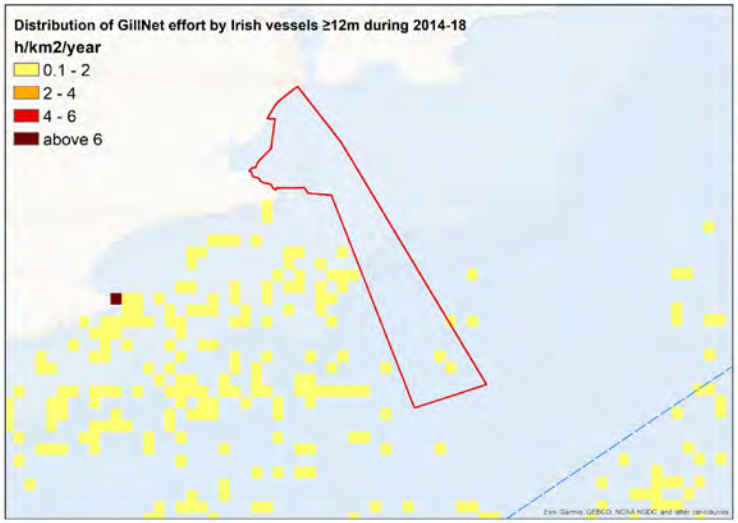
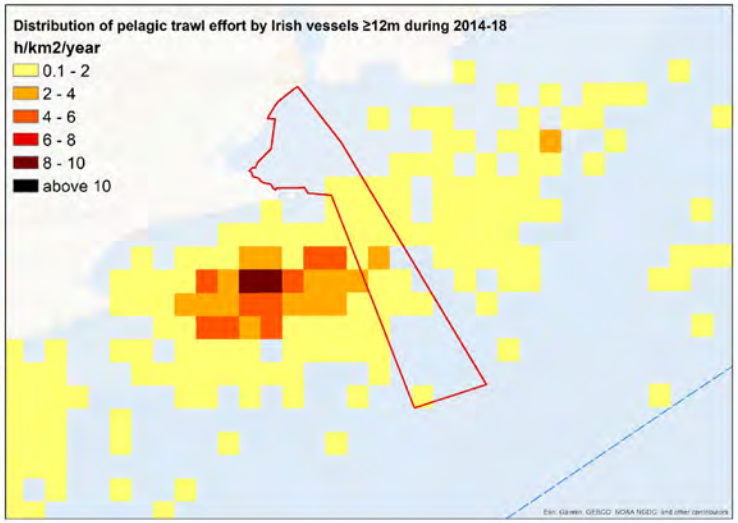
Larger vessels (>15m) tend to operate further from shore and engage in fisheries such as gillnetting for whitefish, trawling for whitefish or prawns, seining for whitefish, long-lining for whitefish, or pelagic pair trawling. Figure 2-7 (Map 12) shows that the FLAA is not intensely used by larger vessels although trawling vessels, likely targeting prawn will be present.

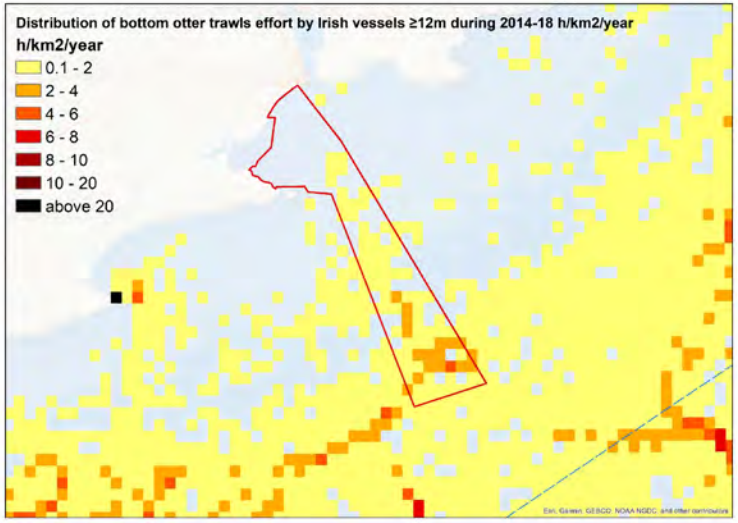
A full baseline on commercial fisheries will be provided as part of the Environmental Impact Assessment Report (EIAR) to be prepared in support of an application for development consent for IEMEP. The EIAR Commercial Fisheries Chapter will be informed through desktop studies (i.e. ICES block landings data) and through consultation with fishers.

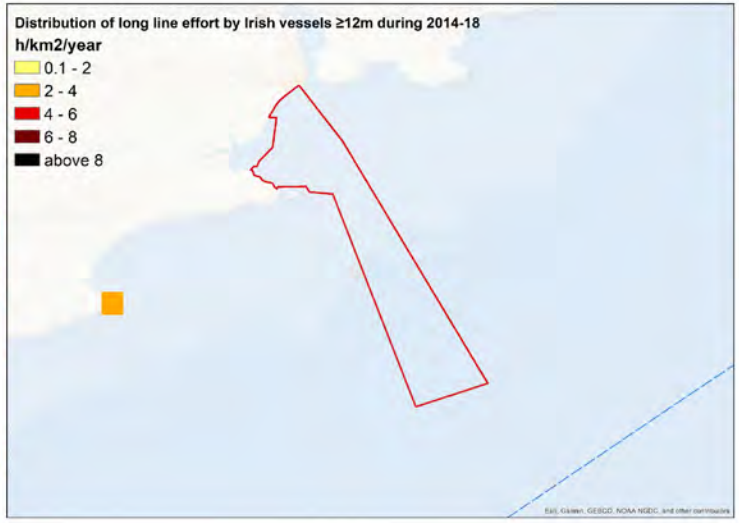
The project has appointed a Fisheries Liaison Officer (FLO). The scope of this appointee covers the commercial fishing industry but also includes a wider selection of stakeholders including recreational fishing industry and other recreational users of the marine area. Engagement is underway with these stakeholders. The FLO has or will engage with the following organisations as a minimum: South East Regional Inshore Fishermens Forum (SERIFF), Bord Iascaigh Mhara (BIM), Irish South & East Fish Producers Organisation (IS&EFPO) and Irish South & West Fish Producers Organisation (IS&WFPO). Information on the exact timing of the site investigations proposed as part of this application will be shared with these stakeholders as it becomes available.

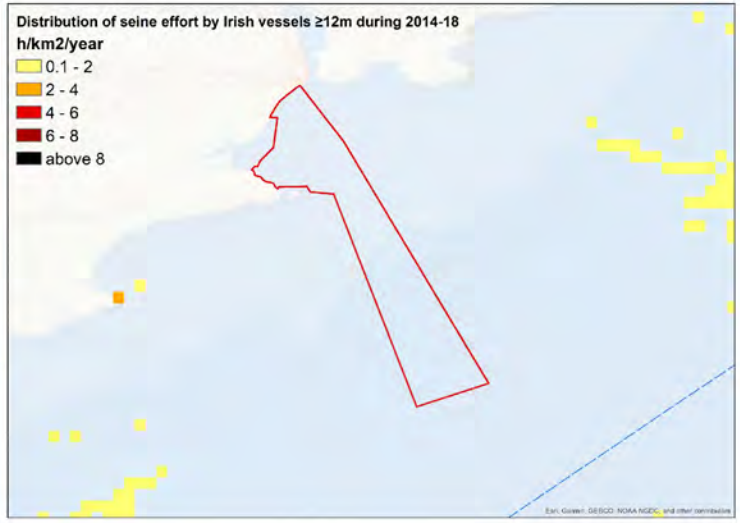












Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 12

Commercial Fisheries - Irish Vessels > 12m

Legend

- Foreshore Licence Application Area
- Irish Territorial Sea 12nm Limit

Data from Ireland's Marine Atlas at http://atlas.marine.ie/, 09/08/2019.

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V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIACommercialFisheries_V1.0_20210518 Size A3

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2.7 Shipping and Navigation

The following sections provide an overview of the shipping activities and navigational features within or near the FLAA.

2.7.1 Navigational features

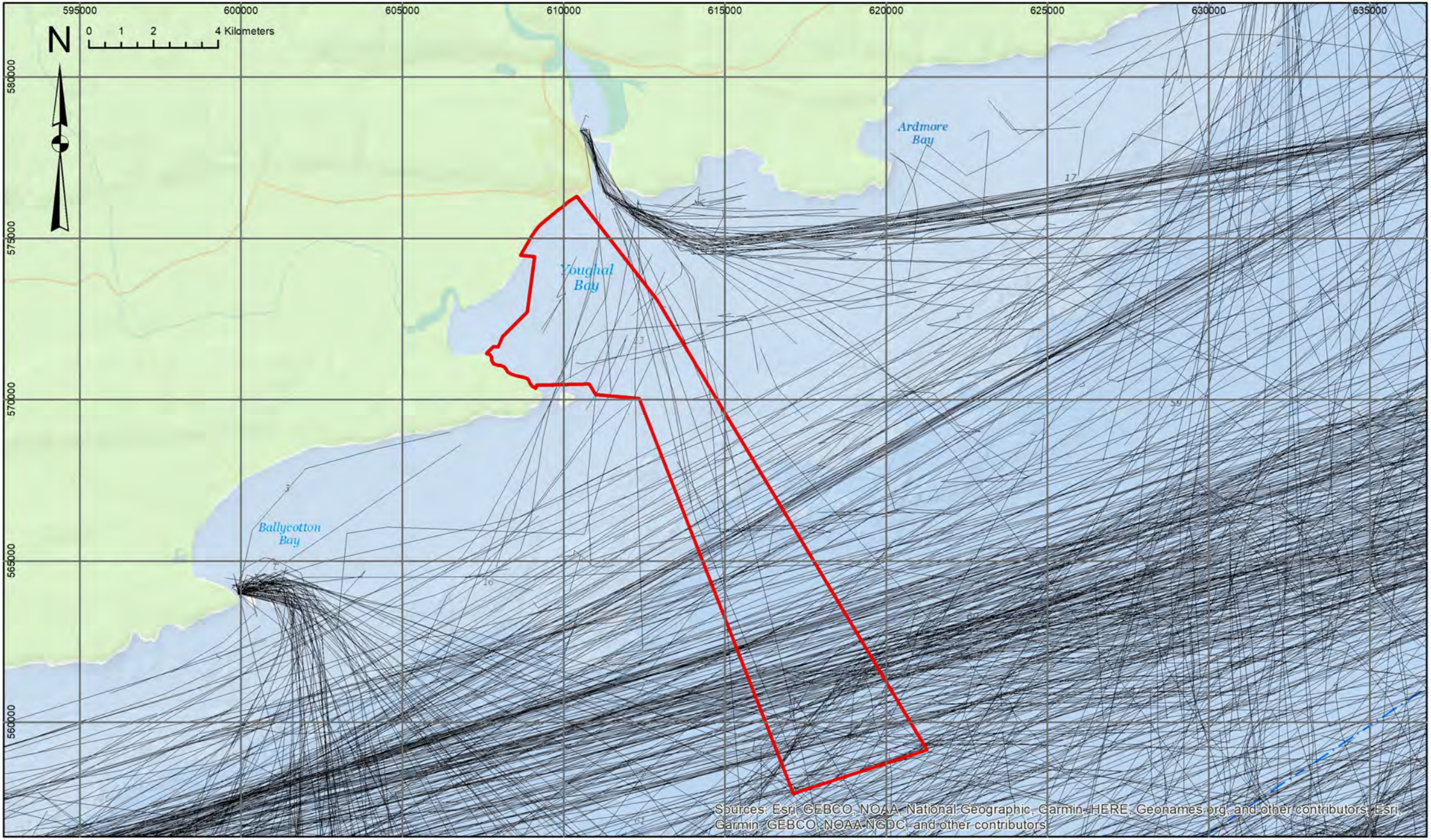
The following points summarise the main navigational features identified in proximity to the FLAA:

- The nearest commercial ports to the FLAA are Youghal Port (0.8km), Ballycotton Port (14km) and Cobh Port in Cork Harbour (40km).
- The closest ferry port to the FLAA is Cork Ferry Port located approximately 30km west of FLAA.
- There are a number of fishing ports located close to the FLAA, the nearest of these is in Ballycotton, located 14km from the FLAA.
- There are two RNLI Lifeboat stations close to the FLAA, Youghal Lifeboat Station (RNLI 2021b) and Ballycotton Lifeboat Station (RNLI 2021a).

2.7.2 Marine traffic analysis

The coastguard Automatic Identification System (AIS) presented in Ireland's Marine Atlas shows three high/medium density traffic routes surrounding the FLAA (Figure 2-8, Map 4). One route is transiting directly across the FLAA, made up of cargo and tankers, coming to/from Cork Port heading to/from Dublin Port or further. Other adjacent high-density tanker and cargo routes are from Cork Port to the UK and a lower density from Ballyhack, Co. Waterford ferry port to the UK (Marine Institute 2021). AIS data presented in Ireland's Marine Atlas shows that passenger vessel density in the FLAA is low (Marine Institute 2021). EMODnet shipping density data for the period 2017 to 2020 shows the area experiences low to moderate use (EMODNet 2021).

The recorded sailing activity within the FLAA is low (Marine Institute 2021). However, it should be noted that only a minority of recreational vessels broadcast on AIS. The majority of vessels visiting facilities in the area were routeing to / from Cork Port or Youghal. Recreational activity is likely to be highest during the summer months.



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 4

Shipping

Legend

- Foreshore Licence Application Area
- Shipping Routes (2011 and 2015)
- Irish Territorial Sea 12nm Limit

Data Source: data.gov.uk

Ver	Date	Drawn by	Checked	Approved
V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIAShipping_V1.0_20210518 Size A3

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Projection: Transverse Mercator

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2.8 Other Marine Users

2.8.1.1 Infrastructure

Ireland's Marine Atlas does not highlight any ocean infrastructure such as data buoys within the area. There is one tidal gauge located at Ballycotton Harbour.

According to Marine Irish Digital Atlas and Submarine Cable Map there are no subsea cables within the FLAA (MIDA 2021, Teleography 2021). Ireland Marine Atlas does not highlight any other pipelines or subsea infrastructure in the FLAA.

2.8.1.2 Recreation/Other

There are two blue flag beaches located in Youghal Bay, where the potential export cable route could landfall, these are Redbarn Beach and Claycastle Beach. Both beaches are described as excellent bathing water locations (Marine Institute 2021). It is likely that the beaches will be popular for walking, swimming, surfing and other water sports in the summer holiday period (July – August).

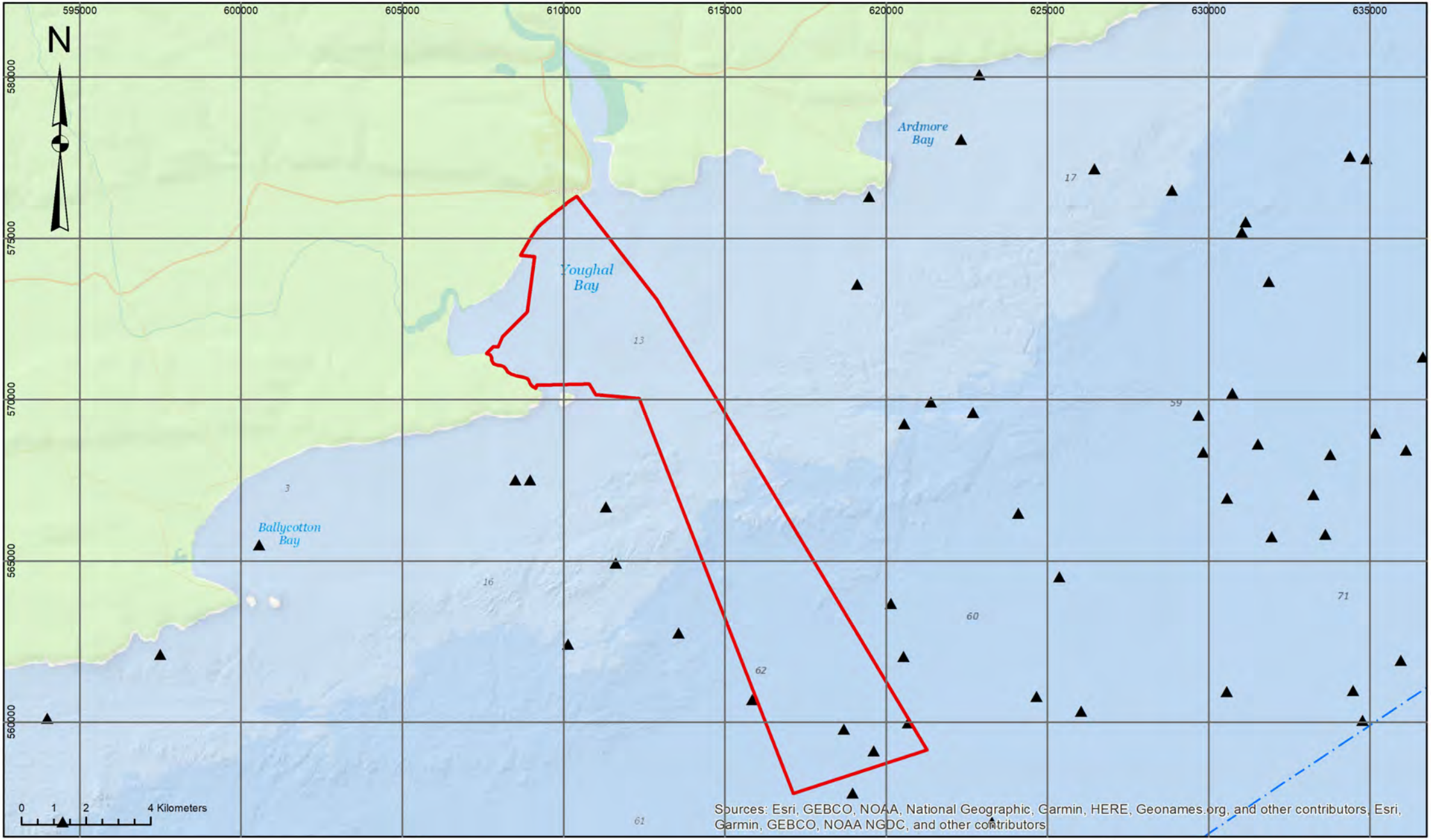
Located at the landfall sites is tourist accommodation Pilmore Cottages and Redbarn Caravan Park.

The main recreational activities relating to the offshore area are sailing and sea angling. Whale and dolphin watching is also popular along the Cork coast and other water sports including scuba-diving, diving, and surfing take place along the coast (Youghal 2021).

2.9 Wrecks

Ireland's Marine Atlas identifies three wrecks within the FLAA with an additional seven wrecks close to but outside of the FLAA (Figure 2-9 Map 6). Wrecks are protected under the National Monuments Act 1930-2014. The named wrecks, identified on the National Monuments Service Wreck Viewer mapping tool which are within the FLAA are (WIID 2020);

- Wreck number: W10756, Name: Unknown, Place of Loss: Knockadoon Headland 15.1km SE, Description: Wreck measures 34.5m long, 7.6m in maximum width and lies in 66m of water.
- Wreck number: W10758, Name: Unknown, Place of Loss: Unknown, Description: Unknown
- Wreck number: W11587, Name: Unknown, Place of Loss: Unknown, Description: Unknown



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 6

Shipwrecks

Legend

- Foreshore Licence Application Area
- Shipwrecks
- Irish Territorial Sea 12nm Limit

Data Source: Minister for Culture, Heritage and the Gaeltacht

Ver	Date	Drawn by	Checked	Approved
V1	18/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

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2.10 Other Proposed Activities in the Area

A search of Foreshore Applications for surveys or other activities which could interact with the proposed site investigation works was conducted using the Department of Housing, Local Government and Heritage (DHLGH) 'Applications and Determinations' website. The FLAA is part of the wider IEMEP, therefore projects which could interact with the IEMEP have been included within this assessment also. Commercial fisheries, shipping interests and recreational use have been scoped out of the list of projects as they are considered to represent baseline conditions, and are not considered as projects, plans or licenced activities. No existing pipelines and cables were identified within the FLAA.

Table 2-6 lists the projects identified near the FLAA.

Table 2-6 Development applications near the FLAA

Name of development	Licence ref	Type of activity	Commencement date	Licence Status	Approx. distance from FLAA (km)
PiPiper infrastructure fibre optic data cable	FS006528	Cable installation	2015	Consultation	Intersects with IEMEP FLA
Simply Blue - Emerald Windfarm	FS007139	Site investigation works		Not determined	17
Celtic One – ESB/Equinor FLA	Not available	Site investigation works likely consisting of Geophysical, Geotechnical, Archaeological, Ecological, Oceanographic and Meteorological investigations	Not known	Submitted but not added to Foreshore Applications and Determinations website	Intersects offshore section of FLAA
Celtic two – ESB/Equinor FLA	Not available	Site investigation works likely consisting of Geophysical, Geotechnical, Archaeological, Ecological, Oceanographic and Meteorological investigations	Not known	Not within 12NM limit	19.5
Helvick Head – ESB/Equinor FLA	Energia Helvick Head: FS006982	Site investigation works likely consisting of Geophysical, Geotechnical, Archaeological, Ecological, Oceanographic and Meteorological investigations	Not known	Submitted by previous developer Energia - Consultation	34
North Celtic Sea Wind project of Energia	FS006982	Geophysical, Geotechnical, Archaeological, Ecological, Oceanographic and Meteorological investigations	Geophysical and Geotech and ecological – Spring -September 2020 Completion campaign – spring/summer 2021	Consultation	13

Name of development	Licence ref	Type of activity	Commencement date	Licence Status	Approx. distance from FLAA (km)
Celtic Sea Array Survey – SSE Renewables	FS006983	Assumed to be – Multi-beam Echosounder (MBES), magnetometer, SSS, grab, CPT, VC, ecological, archaeological, wind and current monitoring	Between April and October within the five years of license award (likely 2020 -2025)	Consultation	25.5
Celtic Interconnector - EIRGRID	Foreshore Licence reference: not available SID application case reference - VA04.310798	Cable installation (including pre-installation geophysical survey- MBES, magnetometer, SSS)	To be completed by 2026	FLA – not available on DoHLGH SID application case reference - VA04.310798. Lodged 09/07/2021	Intersects FLAA
Greenlink Interconnector cable	FS006582	Geophysical, Geotechnical, Archaeological, Ecological,	Complete Autumn 2018	Complete*	70
Greenlink Interconnector application corridor	FS007050	Cable installation (including pre-installation geophysical survey- MBES, magnetometer, SSS)	2020 -2023	Consultation	70

* DHLGH website says in Consultation but IEMEP LTD are aware that this Foreshore Licence was awarded and the survey has been completed.

PiPiper infrastructure fibre optic data cable, Ballycotton Bay – Cork

The foreshore licence application was submitted in October 2014 and installation was planned to commence in 2015. This application is still under consultation which suggests the project has been put on hold.

Greenlink Interconnector – Greenlink Interconnector Limited, Baginbun Beach – Wexford

A Foreshore Licence application was submitted on 21 December 2017 to carry out survey works to assess the site and seabed in order to select an optimum route for two submarine electricity power cables. Public consultation was carried out from 23 January 2018 to 22 February 2018. Although the DHLGH website indicates that the application is still in the 'Consultation' phase, IEMEP Ltd. is aware that the licence was granted and geophysical surveys were completed in autumn 2018. A second Foreshore Licence application was submitted in August 2019 (ref FS007050) for the installation of the interconnector and is currently under consultation. Cable installation is due to start between 2020-2023, subject to obtaining the necessary permits and consents. There is therefore the potential that cable installation works could occur at the same time as the proposed site investigations at Inis Ealga.

Celtic Sea Array Survey – Waterford

A foreshore licence application was submitted on 19 March 2019, to carry out survey works to assess the site and seabed to assess the suitability of two areas of interest for cable installation associated with a potential circa 800MW offshore wind development. The proposed survey works will likely be carried out between April and October within the five years following award of the Foreshore Licence. The geophysical survey campaign is expected to take up to 2 months. Geotechnical survey works will be undertaken once geophysical works have been completed and the necessary archaeological assessment of data has been carried out. Geotechnical survey works are expected to take up to 3 months. DHLGH website indicates that the application is still in the 'Consultation' phase which would

indicate that a Foreshore Licence has not yet been granted. There is potential that the survey works for this project would overlap (in time) with the Inis Ealga proposed site investigations.

North Celtic Sea Wind project - Energia
A foreshore licence application was submitted on May 2019, to determine optimum windfarm layout design of a 600-1000MW development. The FLA stated that the proposed survey works will likely be carried out between April and September 2020 with the completion campaign being carried out in spring/summer 2021. The geophysical survey campaign is expected take up to 3 months. Geotechnical survey works will be undertaken once geophysical works have been completed and the necessary archaeological assessment of data has been carried out. Geotechnical survey works are expected to take up to 2 months. DHLGH website indicates that the application is still in the 'Consultation' phase which would indicate that a Foreshore Licence has not yet been granted. There is potential that the survey works for this project would overlap (in time) with the Inis Ealga proposed site investigations.

Simply Blue - Emerald offshore windfarm site investigations, Kinsale – Cork
A foreshore license application (FS007139) was made to DHLGH on 19 May 2020 for site investigations to assess the potential of offshore wind power generation. The project is c.35-60 km from the coast and includes a total site area of 835.36 km2 with a potential output of approx. 1000MW. The application is for permission to conduct surveys 12 NM off Cork Harbour to determine project design and site selection (Simply Blue Group 2021). The intention is for the proposed surveys to begin in Summer 2021 with a staged programme of investigations being carried out over five years. The proposed survey works consists of geophysical survey, geotechnical surveys, wind resource monitoring, metocean surveys, nearshore and intertidal surveys and environmental surveys. At present there is no time frame for when each element of survey work will take place. There is potential that the survey works for this project would overlap (in time) with the Inis Ealga proposed site investigations.

Celtic One – ESB/Equinor FLA
The Celtic One Offshore Wind Farm is one of ESB and Equinor's proposed development projects. This site Intersects offshore section of FLAA. The ultimate site will be refined over time and it is anticipated that the final windfarm area is likely to be in the order of 120 km2 which is approximately 45% of the overall turbine array study area (subject to detailed layout/energy analysis). The expected capacity output of the project will be approximately 600MW. This project is being developed as a deep water fixed foundation offshore windfarm for delivery by 2030 as it is expected that ongoing developments in design, manufacture, transport, and installation of fixed foundations will allow developments in water depths up to 80 m whilst maintaining competitive cost advantage against floating wind platforms in this time period. It is reported that ESB and Equinor submitted a Site Investigation Foreshore License application in December 2020 (Celtic One Offshore Wind 2021). However, as of April 2021, this has yet to be added to the Foreshore Applications and Determinations website. At present there is no time frame for when each element of survey work will take place. There is potential that the site investigation works for this project would overlap (in time) with the Inis Ealga proposed site investigations.

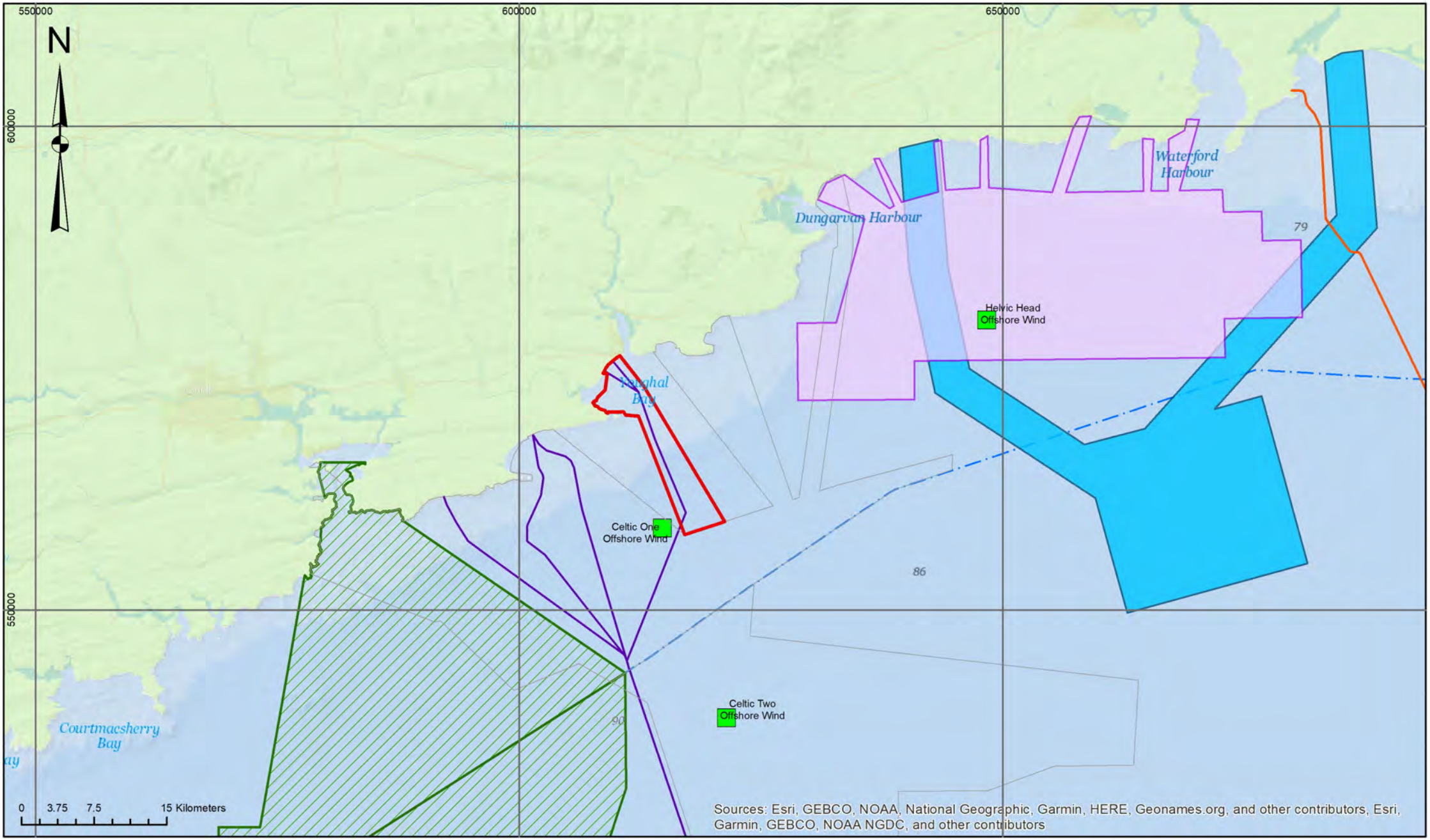
Celtic Two – ESB/Equinor FLA
The Celtic Two Offshore Wind Farm will be the second phase development for ESB and Equinor in the Celtic Sea, following the completion of Celtic One OWF. This site is located approximately 12km from the FLAA and beyond the 12 NM limit (Celtic Two Offshore Wind 2021).. Within the terms of the current legislation a foreshore licence cannot be sought for any survey works within this area. It is the apparent intention of ESB and Equinor to seek consent for investigative surveys once the Marine Planning and Development Management (MPDM) Bill is enacted. At present there is no time frame for when each element of survey work will take place. There is potential that the site investigation works for this project would overlap (in time) with the Inis Ealga proposed site investigations.

Helvick Head – ESB/Equinor FLA

The Helvick Head OWF is one of ESB and Equinor's proposed development projects and in located approximately 12km from the FLAA. The site is likely to be in the order of 140km2 which is approximately 40% of the overall turbine array study area. A FLA has been made (according to the ESB and Equinor) however as of April 2021, this has yet to be added to the Foreshore Applications and Determinations website Helvick Head Offshore Wind (2021) . At present there is no time frame for when each element of survey work will take place. There is potential that the site investigation works for this project would overlap (in time) with the Inis Ealga proposed site investigations.

Celtic Interconnector

The Celtic Interconnector is a planned subsea (undersea) link to allow the exchange of electricity running from the south coast of Ireland to the north-west coast of France. This cable will landfall at Claycastle Beach in Youghal, Co. Cork and the estimated completion date for installation is 2026. At this stage, no FLA has been lodged for the installation of this cable, however it is likely that this cable will be installed in the next 5 years. There is therefore potential that the installation of this project could overlap with the Inis Ealga proposed site investigations. A planning application for the Celtic Interconnector was submitted to the An Bord Pleanála, case reference: VC04.302725, signed 02/06/2021.



Inis Ealga Marine Energy Park
June 2021 Cable Investigation Area

Map 3

Other Developments

Legend

- Foreshore Licence Application Area
- Inis Ealga MEP
- Greenlink Interconnector
- Celic Interconnector Survey Routes
- ESB Equinor Offshore Projects FLA
- North Celtic Sea Wind - Energia/Viridian FLA
- Celtic Sea Array - Offshore Wind - 800 MW
- Emerald Wind Farm - Floating Wind
- Irish Territorial Sea 12nm Limit

Data Source: DHPLG, MI, 4C Offshore, MRIA,
https://www.helvickheadoffshorewind.ie/
https://www.celticoneoffshorewind.ie/project-information.html

Ver	Date	Drawn by	Checked	Approved
V2	27/05/2021	AM	EW	SDP

Map prepared by: Agnieszka Matysik, MEngSc in Environmental Engineering, PGD in Sustainable Energy, HDG GIS

Filename: I002IE_FIG_J21CIAOtherDevelopments_V2.0_20210527 | Size A3

Scale: 1:500,000 Printed @ A3

Coordinate System: IRENET95 Irish Transverse Mercator
Projection: Transverse Mercator

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3. POTENTIAL ENVIRONMENTAL EFFECTS

To assess the significance of effects on the environment from the proposed site investigation, it is first necessary to identify the pressures and potential effects associated with the proposed site investigations.

Pressures are the mechanism through which an activity has an effect on any part of the ecosystem. The nature of the pressure is determined by the activity type, intensity and distribution. A list of marine physical / chemical and biological pressures and their definitions has been formally agreed by the OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) (OSPAR 2011). The list of pressures as published within OSPAR Agreement 2014-02 has been used in the assessment. The ICG pressure list does not include human pressures, and therefore, categories have been developed based on industry experience.

An impact is the consequence of the pressure i.e. a predicted change in the baseline environment. The effect is the consequence of the impact and is usually measurable. Effects only occur when an impact is present within an environment that is sensitive to it. In assessing the significance of the effect, the magnitude (the spatial extent of the impact, the duration and frequency) and sensitivity, recoverability and importance of the receptor are considered. The Environment Protection Agency (EPA) Ireland (2017) definitions of significance have been used in the assessment as follows:

- Imperceptible – An effect capable of measurement but without significant consequences.
- Not Significant – An effect which causes noticeable changes in the character of the environment but without significant consequences.
- Slight – An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- Moderate – An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- Significant – An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- Very Significant – An effect which, by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment.
- Profound – An effect which obliterates sensitive characteristics.

This section describes the potential pressures that the proposed site investigation works could have on the environment and the significance of the resulting effects. The section is ordered by receptor. If necessary and appropriate, project specific mitigation has been proposed to reduce the significance of effects.

3.1 Identification of Pressures

Potential pressures associated with the proposed site investigation works were identified as:

- Penetration and/or disturbance of the substrate
- Visual disturbance
- Underwater sound changes
- Risk of injury by collision
- Temporary displacement of vessels or fishing activity
- Loss or damage to fisheries habitats/fish stocks

- Direct or indirect damage to an archaeological asset
- Restricted access to recreational users
- Cumulative and in-combination effects

3.2 Intertidal and Benthic Communities

3.2.1 Potential effects

3.2.1.1 Penetration and/or disturbance of the substrate

Small areas of seabed will be removed by the geotechnical and environmental sampling. Based on figures presented in the Scope of Survey Works document submitted in support of this FLA, the geotechnical (VC) and environmental grab sampling combined will remove approximately 12.6m^3 of sediment from the FLAA.

At the selected landfall, the JUB legs and two boreholes will affect an area of 20.32m^2. Following completion of drilling, the borehole will be left to naturally backfill with sediments and cuttings material.

As discussed in Section 2.3, the seabed sediments in the most offshore section of the FLAA is dominated by mud, and muddy mixed gravelly sand. Towards the nearshore area the seabed is dominated by a strip of bedrock which runs parallel to the shore. The muddy and sandy mixed sediment habitat are likely to be dominated by polychaetes, bivalves and echinoderms which will recover quickly from disturbance. It is unlikely that geotechnical sampling will be undertaken on bedrock as the equipment cannot penetrate the substrate, therefore no effects to the rocky habitat in the FLAA from sampling is expected.

The geotechnical sampling programme will create small depressions (from the JUB legs) and mounds (from risings) within these sediments. However, metocean conditions within the study area are highly dynamic and the region is subject to strong tidal streams and swells (DCCAE 2015). Therefore, any mounds or depressions created during sampling will be quickly dispersed and infilled following equipment removal.

All benthic communities in the footprint of sampling equipment and borehole drill site will be affected through minor disturbance around the sample station and a very small volume of substratum loss, direct displacement or smothering during sampling. Any smothering will be a thin layer due to the small volumes of sediment displaced during the sampling and this deposited sediment will be quickly dispersed given the strong currents in the area. The area of disturbance will back fill leaving no permanent significant loss or damage. Areas of sandy and coarser sediments are highly recoverable given that the sample depressions will be quickly infilled following cessation of disturbance and therefore typical species are able to quickly recolonise the area (Dernie et al 2003).

The sedimentary benthic habitats identified within the FLAA are widespread and common for the region. Therefore, any disturbance is not expected to have an effect on the wider population of benthic fauna and the significance of any effect will be Imperceptible for sedimentary habitats.

The Screening for AA (Appendix A) concluded that given that there are no SACs within the direct footprint of the FLAA, there is no potential for likely significant effect (LSE) from the drilling of boreholes on any European protected areas.

3.2.2 Potential effects

Screening for AA has been undertaken and is presented in Appendix A. The Screening for AA assessed the 18 European Sites that are either within the direct Zone of Influence of the proposed site

investigation works or the wider IEMEP area, or that contain mobile Annex II species which could potentially travel into the FLAA.

It was identified that the proposed site investigations could have potential to induce the following pressures on Qualifying Interests / Special Conservation Interests:

- Visual disturbance;
- Underwater sound changes; and
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion.

Screening of the 18 European Sites concluded that the proposed site investigation works will not have a likely significant effect, either alone or in combination with other plans and projects, and will not undermine the conservation objectives of any SAC or SPA.

3.2.3 Project specific mitigation

Given that the Screening for AA concluded that Appropriate Assessment is not required, no project specific mitigation has been proposed in relation to protected sites.

3.3 Fish and Shellfish

3.3.1 Potential effects

3.3.1.1 Underwater sound changes

The ability of fish to hear noise is dependent on their hearing structures, which indicate their sensitivity to sound. Sound pressure is only detected by those species possessing a swim bladder; the otolith organ acts as a particle motion detector and where linked to the swim bladder, converts sound pressure into particle motion, which is detected by the inner ear. Generally, species with specialisations for sound pressure detection (e.g. a swim bladder) can hear higher frequencies (between 200Hz – 3kHz) than fishes lacking morphological adaptations, which can detect sound at lower frequencies between 100Hz to 1kHz (Carroll et al. 2017). High sensitivity hearing species such as clupeids (e.g. Atlantic herring, sprat, twaite shad and allis shad) have specialisations of the auditory apparatus where the swim bladder and inner ear are intimately connected and are able to detect frequencies up to 3kHz; with optimum sensitivity between 300Hz-1kHz (Nedwell et al. 2007).

Most of the proposed site investigations operate at frequencies above the audible range for hearing specialist fish however disturbance and injurious effects can occur from the sudden change in pressure generated by activities. The greater the sound pulse the greater the likely effects to hearing specialist fish. There is also potential for some fish and shellfish species to be vulnerable to impulsive activities during sensitive life stages, for example during the egg and larvae development stages.

All SACs within 40km of the FLAA have been screened within the Screening for AA submitted with this application (Appendix A) for the presence of Annex II migratory fish species as Qualifying Interests, in recognition that as mobile species, fish could potentially enter the FLAA. It is possible that the following Annex II listed species are likely to be within or moving through the FLAA at certain times of the year:

- Sea lamprey – late April to early June
- River lamprey – September to June
- Twaite shad – year-round and migrate into rivers from April-July
- Atlantic salmon – May to June and autumn months.

Of these four species, only twaite shad are known to be sensitive to underwater noise associated with geophysical surveys. Other species present in the FLAA known to be sensitive to underwater noise include Atlantic herring. Twaite shad and Atlantic herring are both members of the Clupidae family.

Continuous sound

Existing environmental conditions of background sound are considered when assessing anthropogenic activities that produce additional sound. Sources of background sound come from shipping, interaction of waves and currents with the seabed, seabed development and operation, fishing industry and recreational activities. Fish are likely to become habituated to levels of background sound (Carroll et al. 2017). A decreased responsiveness over time could arise through a change in tolerance, through habituation (Radford et al. 2016). Therefore, effects are only expected if sound produced during the proposed site investigations is significantly above the background sound levels.

Popper et al. (2014) identified that there is no direct evidence of permanent injury to fish species from shipping and other continuous noise. The typical behavioural response to sound might range from no change in behaviour, to a mild awareness (startle response) to larger movements of temporary displacement for the duration of the sound (Popper and Hastings 2009).

Twaite shad (Clupidae family) are the only hearing specialist fish present within the survey area that is a Qualifying Interest of a European Site. Twaite shad are a qualifying feature of the Blackwater River (Cork/Waterford) SAC (IE002170) located 0.5km from the FLAA. Atlantic herring are also likely to be present within the FLAA. Nedwell et al. (2012) reviewed herring sensitivity to sources of noise from non-pulse cable laying operations (i.e. cable lay and trenching) and proposed effect ranges. Clupeids are expected to show strong avoidance behaviour (i.e. reaction by virtually all individuals) within 8m of the works, whilst significant avoidance (85% of individuals will react to noise) is expected within 66m. The screening assessment for this site indicated that migrating twaite shad from the Blackwater River SAC may be present in the FLAA. However, as any disturbance effects from noise associated with operations will be localised, temporary and transient and outside of the SAC, the proposed site investigation works will not undermine the conservation objectives of any SAC. There will be no long-term effect on the distribution of the species and migration to and from rivers will not be impeded. Therefore, disturbance effects to fish resulting from vessel noise will be temporary and have been assessed as Not Significant.

Impulsive Sound

A combination of multi-beam echosounder, side scan sonar and sub-bottom-profiler will be utilised during the geophysical survey. Most noise from the geophysical surveys is likely to be generated at frequencies greater than 1kHz, above the auditory capacity of fish (generally between 0.2Hz to 1kHz). In addition, sound from survey equipment is targeted towards the seabed, meaning that effects to fish are only expected if they are within the immediate zone of ensonification below the geophysical equipment. It is expected that fish will avoid the area once the geophysical surveys have started and are extremely unlikely to move towards the sound source. Studies of penned Pacific herring identified that they showed no visible response to sonar and echosounders indicating that they are not as sensitive to the high frequency sound emitted from geophysical equipment as the low frequency sound emitted from vessel movements (Peng et al 2015). Investigations into the influence of seismic surveys on the distribution and abundance of pelagic fish (including herring) revealed insignificant short-term horizontal distribution effects (Carroll et al 2017). It is therefore concluded that hearing specialist fish may experience temporary displacement from the immediate area surrounding the survey, however individuals will return to the area quickly based on the transient and brief nature of the survey activities. In conclusion, disturbance effects to fish resulting from impulsive sound sources will be brief to temporary and have been assessed Not Significant. Taking this assessment into consideration, underwater sound generated by the site investigation works will not affect commercial fisheries stocks in the area. A full assessment on commercial fisheries will be undertaken as part of the EIAR to be submitted in support of any development consent application.

3.3.2 Project specific mitigation

The effects from underwater noise on fish have been assessed as Not Significant and therefore, no project specific mitigation has been proposed.

Without prejudice to this conclusion, it is relevant to note that IEMEP Ltd are proposing to follow the Department of Arts, Heritage and the Gaeltacht (DAHG) 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters' (DAHG 2014); in particular Section 4.3.4 (ii) applicable to MBES, SSS and SBP surveys. This guidance is provided in Appendix B. Although not directly applicable to fish species, the principles in the guidance, namely use of soft-start and ramp-up procedures, and minimising the duration of noise generating surveys, will be of benefit to hearing sensitive fish species, further reducing the potential for effect.

3.4 Birds

3.4.1 Potential effects

3.4.1.1 Visual disturbance

The proposed site investigations (both at the beach and in the foreshore area) may disturb birds which use the area for feeding, loafing and breeding.

Disturbance can lead to physiological and behavioural responses which can affect demographic characteristics of the population. Responses to disturbance can result in loss of energy; impaired breeding; unrest through increased vigilance; and disruption to incubation leading to increased nest failures due to predation and nest abandonment (Valente et al. 2011).

The extent to which a seabird responds to disturbance is dependent upon a number of factors including: period of breeding cycle during which disturbance occurs; duration, type and intensity of the disturbance; presence of opportunistic predators; and the degree of habituation with the disturbance (Showler et al. 2010). Some seabirds are more resilient to disturbance than others.

Whilst birds present on the surface waters in the vicinity of the survey vessel could be temporarily displaced from their chosen feeding/resting location, they are likely to readily move to another nearby location. Given the short duration of the operations with the vessel moving steadily forward along the survey route, any disturbance at a given location will be minimal and given the level of vessel activity in the region, disturbance is unlikely to be felt against background levels. Therefore, the significance of effects on birds in the offshore environment from the proposed site investigations will be temporary and has been assessed as Imperceptible.

The birds most vulnerable to disturbance would be any nesting birds in the immediate vicinity of the site investigation works during the breeding season. Disturbance to nesting birds due to vessel presence, could have an effect on the success rate of the breeding population. The zone of influence of disturbance on nesting birds (notably Northern fulmar, guillemot and kittewake) is considered to be up to approximately 2km surrounding the FLAA (NE and JNCC 2012). Therefore, all SPAs within this 2km distance were screened for nesting birds as part of the Screening for AA (Appendix A).

The Screening for AA concluded that the proposed site investigations will not undermine the conservation objectives of any SPA either alone or in combination with other plans or projects.

3.4.2 Project specific mitigation

Given that the Screening for AA concluded that Appropriate Assessment is not required for any SPAs within the vicinity of the FLAA, no project specific mitigation has been proposed.

3.5 Marine Mammals

3.5.1 Potential effects

3.5.1.1 Underwater sound changes

This Underwater Sound Assessment within this section has been produced to identify and assess potential sound sources and effects resulting from the geophysical survey campaign for the potential export cable corridor and offshore substation (s) between Clonard and Ballymacoda. The assessment presented is qualitative and based on a review of existing literature. The underwater sound assessment submitted for the wider Inis Eagla Marine Energy Park (IEMEP) (FLA FS006859) was informed by in-house geometric spreading calculation which is used to determine the propagation of underwater sound from the proposed survey works. Since submission of FLA FS006859 in October 2019, regulatory guidance on under water noise has developed and therefore this assessment is in line with current guidance. It should be noted that this assessment in more conservative than the one provided in support of FLA FS006859 in October 2019. However, the conclusion of the Natura Impact Statement submitted in support of FLA FS006859, that there will be No likely significant effects from underwater sound on protected features of any SACs, still stands.

One of the most important environmental considerations related to the proposed site investigations is the potential effects of underwater sound on marine mammals. For the purposes of this assessment, a qualitative approach has been taken using existing literature as this was considered proportionate to the proposed site investigations and their potential to generate underwater sound changes which could affect environmental receptors (i.e. marine mammals). The proposed site investigations will generate two distinct types of sound: continuous and impulsive.

- **Impulsive**: Geophysical survey will produce either a discrete pulse or a series of pulses. Impulsive sounds are generally transient and brief, but in the case of geophysical surveys could also be near continuous where the repetition of pulses is considered a series of multiple discrete acoustic events within a 24-hour period.
- **Continuous:** Non-pulsed and can be broadband, narrowband, or tonal. The survey vessel movements including the use of thrusters for dynamic positioning will produce continuous sound over a period of 24 hours throughout the survey campaign.

Background levels of sound will influence how marine species react to the temporary introduction of sound from the survey campaign. Parts of the FLAA experiences relatively low levels of marine traffic. However, adjacent to the FLAA are relatively high density shipping and cargo traffic routes to/from Cork Port. Therefore, the environment surrounding the FLAA will already experience levels of anthropogenic sound in addition to natural ambient sound levels.

Most research has described changes in behaviour or damage (or not) to hearing in marine mammals due to underwater sound. In extreme cases, physical injury has also been reported due to underwater sound, but this effect has not been found associated with the type of geophysical survey campaign proposed and therefore has not been considered further in the assessment.

Continuous Sound

Shipping is a large contributor of low frequency background noise in oceans. There are concerns regarding noise generated by propellers, thrusters (like those used in dynamic positioning systems) and noise from the ship‘s hull from the ship‘s engine and other systems.

Continuous sound will be produced by the survey vessels for the duration of the campaign. Table 3-1 below outlines indicative parameters for continuous sound sources associated with the proposed site investigations.

Table 3-1 Continuous sound sources

Activity	DP vessel (Genesis 2011)
Source Level: SPL RMS (Total dB re 1 µPa^2 @ 1m)	184
Frequency: Hz	3 – 131kHz (16 Octave)

Impulsive Sound

Specific equipment details are not currently known as the contracts for the proposed site investigations have not been awarded. Table 3-2 outlines typical parameters for an offshore cable route geophysical survey campaign targeting penetration of the top 10m of sediment.

Table 3-2 Impulsive sound sources

Geophysical Survey Method	Frequency (kHz)	Source level SPL (peak) in dB re 1 µPa	Source
Multi-beam Echosounder (MBES)	12 – 400	210 - 245	Danson 2005, Hopkins 2007, Genesis 2011; Lurton and DeReutier 2011; BEIS 2020
Side Scan Sonar (SSS)	100 - 500	200 – 240	BOEM 2019; BEIS 2020
Sub-Bottom Profiler (SBP)	0.5 - 300	196 - 225	Danson 2005; King 2013; BOEM 2016; BEIS 2020

Assessment

Both cetaceans and pinnipeds have evolved to use sound as an important aid in navigation, communication, and hunting (Richardson et al. 1995). It is generally accepted that exposure to anthropogenic sound can induce a range of behaviour effects and, in extreme circumstances, lead to permanent injury in marine mammals. Loud and prolonged sound above background levels may be considered noise and may have a negative effect on marine life. In marine mammals, this may mask communicative or hunting vocalisations, inhibiting social interactions and effective hunting.

High intensity noises can cause temporary or permanent changes to animals' hearing if the animal is exposed to the sound in proximity and, in some extreme circumstances, can lead to the death of the animal (Richardson et al. 1995). Where the threshold of hearing is temporarily damaged, it is considered a temporary threshold shift (TTS), and the animal is expected to recover. If there is permanent damage (permanent threshold shift (PTS)) where the animal does not recover, social isolation and a restricted ability to locate food may occur, potentially leading to the death of the animal (Southall et al. 2007). Despite this, there is no direct evidence to link physical injury and geophysical survey to marine mammals, however there is evidence that marine mammals exhibit short-term behavioural responses to geophysical survey (Gordon et al. 2004; Stone and Tasker 2006; Southall et al. 2007; Thompson et al. 2013; Sarnocińska et al. 2020).

Behavioural disturbance from underwater sound sources is more difficult to assess than injury and is dependent upon many factors related to the circumstances of the exposure (Southall et al. 2007, NFMS 2018). An animal's ability to detect sounds produced by anthropogenic activities depends on its hearing sensitivity and the magnitude of the noise compared to the amount of natural ambient and background anthropogenic sound. In simple terms, for a sound to be detected it must be louder than background and above the animal's hearing sensitivity at the relevant sound frequency. The direction of the sound is also important.

Southall et al (2019) separated marine mammals into auditory groups based on their functional hearing sensitivity. The generalised hearing ranges of these groups are provided by NMFS (2018) as summarised in Table 3-3.

Table 3-3 Marine mammal groups based on auditory bandwidth

Group (based on auditory bandwidth)	Species observed within and in proximity to the FLAA	Auditory range
Low-frequency cetaceans (LF)	Minke whale, humpback whale, fin whale	7Hz - 35kHz
High frequency cetaceans (HF)	Short-beaked common dolphin, common bottlenose dolphin, white-beaked dolphin, long-finned pilot whale, Northern bottlenose whale	150Hz – 160kHz
Very high frequency cetaceans (VHF)	Harbour porpoise	275Hz - 160kHz
Phocid carnivores in water (PCW)	Grey seal, harbour seal	50Hz - 86kHz
Other marine carnivores in water (OCW)	European otter	60Hz – 39kHz

The thresholds for the onset of PTS and TTS, as published in Southall et al. (2019), are provided in Table 3-4. These reflect the latest peer-reviewed published state of scientific knowledge.

Table 3-4 Injury thresholds for marine mammals from impulsive (SPL, unweighted) and continuous (SEL, weighted) sound

Auditory Group	Impulsive noise		Continuous noise	
	SPL (unweighted) - dB re 1 µPa (peak)		SEL (24 hr, weighted) - dB re 1 μPa^2s	
	PTS onset	TTS onset	PTS onset	TTS onset
LF	219	213	199	179
HF	230	224	198	178
VHF	202	196	173	153
PCW	218	212	201	181
OCW	232	226	219	199

Source: Southall *et al.* (2019) Table 6: non-impulsive sound and Table 7: impulsive sound.

Continuous sound

The estimated unweighted source level for sound from the survey vessels is approximately 184dB re 1 µPa @ 1m. The survey vessels will use thrusters sporadically throughout the proposed site investigations; therefore, the source level will fluctuate throughout the duration of the proposed site investigations and will only peak at approximately 184 dB re 1 µPa @ 1m for short periods.

The estimated sound levels exceed the thresholds for the onset of a temporary threshold shift, indicating that there is the potential for temporary auditory injury in cetaceans. However, the likelihood of potential injury has been assessed as low and limited to discrete windows during the proposed site investigations and only in close vicinity (<10m) to the works. It is assumed that all marine mammals will move away at a speed of 1.5m/s (Otani et al. 2000, Lepper et al. 2012) from a sound source level. This is considered conservative as there is data (McGarry et al. 2017, Kastelein et al. 2019, van Beest et al. 2018) to suggest that animals will, at least initially, move away at much higher speeds (e.g. harbour porpoise at 1.9m/s, Kastelein et al. 2019). During the proposed site investigations,

the survey vessel will be operating at lower speeds, therefore it is expected that any individuals in proximity to the survey vessel will be able to move away from the area affected to avoid injurious noise levels. However, the action of moving away from a sound level is a behavioural response. Whether this can be considered disturbance relates to whether the animal(s) is significantly affected by the response e.g. whether the sound will lead to a change in the animals' condition. Immediately following either the vessels transit through the area or the proposed site investigations overall, individuals will be able to return to the area.

There are no published guidelines available on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. For the purposes of this assessment, the threshold for behavioural disturbance is 120dB re 1 µPa-2s (RMS) (Gomez et al. 2016, BOEM 2017, NMFS 2018) and has been used for continuous sound for all cetacean species. The likelihood of disturbance from continuous noise will depend on the types of vessel and cumulative effect of several vessels operating in the area.

The proposed site investigations should be considered in the context of the existing baseline sound environment. Shipping density within the FLAA is low, however there is high coastal shipping density in the surrounding coastal region suggesting that marine mammals in the area will be habituated to higher levels of underwater sound. The change in underwater sound caused by the addition of the survey vessels for the proposed site investigations will not be noticeable above natural and anthropogenic noise in the region. Overall, effects of continuous underwater sound changes as part of the proposed site investigations will be temporary and has been assessed as Not Significant.

Impulsive Sound

MBES

MBES are widely used in the marine environment to measure water depth by emitting rapid pulses of sound towards the seabed and measuring the sound reflected (BEIS 2020). Sound frequencies emitted, in water depths of less than 200m, are typically between 300 and 400kHz (Danson 2005, Hopkins 2007, Lurton and DeReutier 2011). Sound source levels have been reported ranging from 210 – 245dB re 1µPa-m (Genesis 2011, Lurton and DeReutier 2011). Evidence has shown that MBES operating at greater than 200kHz do not cause behavioural responses in harbour porpoise (Dyndo et al. 2015). This is because the frequency range falls outside the hearing thresholds of cetaceans and the sound attenuates more swiftly than lower frequencies and operate at a lower power (JNCC 2017). The MBES survey will therefore not cause injurious or disturbance effects to marine mammals.

The assessment concluded the MBES will have No Effect on marine mammals.

SSS

SSS systems operate at relatively high frequencies (between 100-600kHz) with the higher frequencies (above 160kHz) being outside the hearing thresholds of cetaceans and other marine mammals (Genesis 2011, JNCC 2010). Maximum source levels for SSS can be up to 228 dB re 1 µPa-m (peak SPL) (SCAR 2002). Little evidence of potential effects to marine mammals from SSS exists. The relatively high frequencies at which SSS operate will attenuate more swiftly than lower frequencies with sound levels reducing rapidly from the source. The geophysical survey will be of short duration, a total of approximately 3 months, therefore any disturbance effects resulting from SSS to marine mammals will be temporary and Not Significant.

SBP

SBP systems are used to produce images of the seabed. The resolution and type of images required determines which system is required. Pingers operate on a range of single frequencies between 3.5 kHz and 7 kHz. Boomers have a broader frequency between 500 Hz to 5 kHz and sparkers which generate lower frequencies for maximum penetration in the seabed. CHIRP systems are modern systems designed to replace pingers and boomers. CHIRP systems operate around a central frequency

but alternate through a range of frequencies between 3 kHz to 40 kHz. SBP produce sound source levels between 196 and 225 dB re 1 µPa - 1m (rms SPL) which are therefore audible to some marine mammals, particularly harbour porpoise (Danson 2005; King 2013; BOEM 2016).

Most sound energy generated by SBP will be directed towards the seabed and the pulse duration is very short with the survey constantly moving. Lower frequencies generated by SBP are within the hearing range of marine mammals, therefore this type of equipment could have localised, temporary effects on marine mammal behaviour. The UK Department for Business, Energy & Industrial Strategy (BEIS) undertook noise modelling as part of a review of consented offshore wind farms in the Southern North Sea SAC (designated to conserve harbour porpoise) which was based on the maximum source levels and bandwidths obtained from a range of SBP's. The results of the noise modelling demonstrated that for harbour porpoise in particular the onset of PTS could arise from between 17 m and 23 m from source and potential behavioural effects within 2.4km and 2.5km (BEIS 2020). This was a worst-case scenario and the use of a Chirper with a peak SPL of 267 dB re 1 µPa-m.

The zone of ensonification based on the above geophysical survey methods are within proximity to the source, therefore marine mammals would need to be present in close proximity to the survey vessel and remain within the localised zone of ensonification for an extended period of time to experience injurious effects. Research has shown that marine mammals can swim away from a sound source level at a speed of 1.5m/s (Otani et al. 2000, Lepper et al. 2012). This is considered conservative as there is research to suggest that animals will move away at much higher speeds (e.g. harbour porpoise at 1.9m/s (McGarry et al. 2017, van Beest et al. 2018; Kastelein et al. 2019)), at least initially. During the proposed site investigations, the survey vessel will be operating at lower speeds, therefore it is expected that any individuals in proximity of the survey vessel will be able to move outside of the zone of ensonification to avoid injurious noise levels.

There are no published guidelines on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. In relation to geophysical surveys, the UK JNCC have established an effective deterrent range (EDR) of 5km for geophysical surveys (JNCC 2020). The EDR represents the limit range at which disturbance effects have been detected (for example avoidance behaviour) specifically for harbour porpoise (Crocker & Fratantonio 2016, Crocker et al. 2019). On this basis there is the potential for the proposed site investigations to induce a disturbance response in marine mammals, in particular very high and high frequency cetacean species.

Evidence suggests that avoidance behaviour will be temporary, with individuals returning to the area affected once the sound has ceased (Bowles et al. 1994; Morton and Symonds 2002; Stone and Tasker 2006; Gailey et al. 2007; Stone et al. 2017). It is important to note that, the geophysical survey investigations are temporary, being undertaken intermittently over the course of 3 months, therefore any individuals that are disturbed will be able to return to the FLAA as soon as the survey activity has ceased. However, as best practice certain mitigation can be adopted into the design of the proposed site investigations to reduce the potential for a significant effect on the marine mammals. Screening for AA identified that the FLAA is not close to a European Site designated for Annex II listed cetacean or pinniped species, the closest site lies 75km distant. However, cetaceans are protected no matter there location as EPS, and as such it is appropriate to follow the DAHG 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters' (DAHG 2014) to ensure disturbance to EPS is minimised as far as possible.

The proposed site investigations will not be carried out in a European site which has a marine mammal as a Qualifying Interest. The localised zone of influence and temporary nature of the proposed site investigations has led to the conclusion that effects to marine mammals will be temporary and Not Significant.

3.5.1.2 Risk of injury from collision

There is the risk that animals could collide with survey vessels. Shipping collision is a recognised cause of marine mammal mortality worldwide, the key factors influencing the injury or mortality caused by collisions is the ship size and whether its travelling speed. Ships travelling at 14 knots or faster are most likely to cause lethal or serious injuries.

Vessels involved in the proposed site investigations are likely to be either stationary or travelling considerably slower than 14 knots therefore the collision risk is lower than that posed by commercial shipping activity. The risk of injury from collision to marine mammals is very low, and the significance of any effects will be Imperceptible.

3.5.1.3 Visual disturbance

Seals hauled out on land could react to the presence of vessels. In general, ships more than 1,500m away from hauled out grey or common seal are unlikely to evoke any reactions, between 900m and 1,500m seals could be expected to detect the presence of vessels and at closer than 900m a flight reaction could be expected (Brasseur & Reijnders, 1994). This pressure would be most significant for breeding and moulting seals, hauled out on the coast and on intertidal banks.

There are no European sites listing seal as a Qualifying Interest within the vicinity of the FLAA. The closest is the Saltee Islands SAC located 72km from the FLAA. A literature search could not identify any seal haul-out sites within Youghal Bay. Therefore, the assessment concluded that there will be No Effect on seals within European sites or within the FLAA.

3.5.2 Project Specific Mitigation

Without prejudice to the conclusion of No Effect to Not Significant effects reached by the assessment, it is relevant to note that IEMEP Ltd are proposing to follow the Department of Arts, Heritage and the Gaeltacht (DAHG) 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters' (DAHG 2014); in particular Section 4.3.4 (ii) applicable to MBES, SSS and SBP surveys. This guidance is provided in Appendix B. This guidance is to be followed as industry best practice.

3.6 Marine Activity

3.6.1.1 Potential effects

3.6.1.2 Displacement of vessels and fishing activity

The types of marine activity that occur in the FLAA relate to shipping, fisheries and leisure/sports traffic categories.

This section summarises the potential effects of the proposed site investigations based on the navigational features and traffic identified in the review.

The proposed site investigation works are minor, temporary activities, involving geophysical (including archaeology and benthic), geotechnical, environmental surveys (including intertidal, birds and marine mammal) on location for a few months, plus the deployment of wind resource and metocean survey buoys and potential deployment of PAM and SAM.

Notices to Mariners will be issued by the contractor for the proposed site investigations requesting that vessels keep a safe distance from the works. IEMEP FLO will ensure that all local fishing organisations are in receipt of the Notice to Mariners and are aware of the proposed site investigations ahead of mobilisation. Other marine users will be requested to keep a safe distance from the survey vessels; this is generally 500m radial distance, although it might be extended further to the rear of the survey vessel if towed gear is in use. The FLO will request fishermen with static gear in the FLAA move the pots until the proposed site investigations have been completed. The contractor for the proposed

site investigations will define specific 'blocks' in which survey activities will be completed before the next block starts. This will minimise the time a particular area has to be cleared by static gear.

As the exclusion zone moves with the survey spread, potential effects will be temporary and restricted to this relatively small zone. The geotechnical vessels will also have a temporary exclusion zone due to their restricted manoeuvrability.

The execution of the proposed site investigation works will increase the volume of shipping traffic by an imperceptible amount; within the boundary of seasonal fluctuations. Therefore, there will be no additional navigational safety implications. However, established marine navigation practices will be adhered to and maintained by the survey vessels involved.

As the works are temporary there will be no effect on marine navigation and fishing activity once the proposed site investigations have been completed.

Whilst it is acknowledged there will be temporary disruption to individual vessels using the FLAA during the proposed site investigations, the effects will be localised. In the context of the whole commercial fishery, and the wider pattern of shipping use, the significance of effects will be temporary and have been assessed as Imperceptible.

3.6.1.3 Loss or damage to commercial fisheries habitats/fish stocks

The FLAA lies within the Ballymacoda designated shellfish waters. However, the proposed site investigation works will not affect water quality.

Commercially exploited shellfish species in the area include lobster, crayfish, spider and brown crabs, shrimp and periwinkles (DP Energy 2020; Marine Institute 2021). The likelihood of the proposed site investigations affecting these species will be minimal as these species commonly occur in naturally turbid environments and have the ability to recover from environmental disturbance (Marlin 2020). Furthermore, the re-suspension of sediments will be extremely small and localised to the two geotechnical borehole locations. Therefore, there will be No Effect on these commercially exploited species.

Potential effects on fish will be limited to disturbance from underwater sound generated by the vessel and survey equipment. Most sound generated by the geophysical survey is likely to be at frequencies above the auditory capacity of fish. Fish may avoid the survey area once operations have started but will not experience a significant effect other than temporary displacement from the immediate area surrounding the survey activity. Any loss of individuals (adults or juveniles) within the immediate area of the survey is unlikely and given the wider geographic extent of the spawning and nursery areas, if there is a disturbance effect it will be slight. Therefore, the effects of the marine survey on commercial fish will be temporary and Not Significant.

The project has already appointed an FLO. The scope of this appointee covers the commercial fishing industry but also includes a wider selection of stakeholders including recreational fishing industry and other recreational users of the marine area.

3.6.1.4 Project specific mitigation

The assessment has identified the potential for cumulative effects with other site investigations in the region. IEMEP Ltd will liaise with other developers in the region to determine whether survey schedules will overlap. Efforts will be made to coordinate survey activities in a manner that reduces cumulative effects on other marine users.

To mitigate against risks to shipping and navigation, standard industry measures should be adequate, including:

- A Fisheries Liaison Officer has been appointed.
- Liaison with local fishers has commenced and will continue.

- Liaison with local ports and harbours has commenced and will continue.
- Notices to Mariners will be issued.
- Consultation with Commissioners of Irish Lights regarding marking and lighting.
- Consultation with Irish Coast Guard.
- Vessel assurance and management including procedures such as compliance with The International Regulations for Preventing Collisions at Sea 1972 (COLREGS), use of appropriate marking and lighting, AIS broadcasts with up-to-date navigational status, adverse weather policy, emergency response plans, etc.

3.7 Recreational Resource

3.7.1 Potential effects

3.7.1.1 Restricted access to recreational users

The key recreational activity relating to the offshore area is likely to be restricted to sailing and possibly diving. Notices to Mariners will be issued by the contractor for the proposed site investigations requesting that vessels keep a safe distance from the works.

The main concern in the intertidal / nearshore (out to 1NM) area of the FLAA will be maintaining access to the beach areas for recreational use during the works. The locations of the geotechnical boreholes are currently not known, but it is possible that a location within the intertidal area will be required. Any restrictions on the beach will be limited in duration (i.e. one to two weeks) and the beach will be left in a pre-impact condition. Disturbance to recreational users will be temporary. Therefore, effects on recreational users in the area will be temporary and have been assessed as Imperceptible.

Located at the landfall sites is tourist accommodation Pilmore Cottages and Redbarn Caravan Park. As work is scheduled to be carried out between April and October there is an overlap with the main tourist season. Depending on the position of the jack-up barge at the landfall there is the potential that there might be limited beach access, visual disturbance, or higher than normal levels of noise. This has the potential to affect temporarily the amenity value of the foreshore for a restricted duration (i.e. one to two weeks). The effect on tourists and the supporting services will be temporary and have been assessed as Slight.

3.7.2 Project specific mitigation

IEMEP Ltd will consult with all the relevant stakeholders e.g., local authorities, sailing clubs, tourist accommodation as appropriate ahead of planned site investigation works, once schedules and locations are confirmed.

3.8 Archaeology

3.8.1.1 Direct or indirect damage to an archaeological asset

The geophysical survey is non-intrusive and therefore it is not anticipated it will have any impact on archaeological features.

In addition, to obtaining the environmental conditions of the seabed, the geophysical survey is intended to determine the location of any unknown archaeology. The magnetometer data acquired during the geophysical survey is a key component of this. A detection device consent will be applied for ahead of the survey, and consultation undertaken with the Department of Culture, Heritage and the Gaeltacht – Underwater Archaeology Unit to ensure that all requirements are met during the application process.

The results of the geophysical survey will be interpreted by a licensed marine archaeologist to inform: the positioning of the intrusive features of the geotechnical and environmental surveys e.g., vibrocores, CPTs, geotechnical boreholes and environmental grab sample stations; and future environmental assessment. In addition to this, an archaeologist will carry out a walkover inspection of the intertidal area prior to commencement of any intrusive survey works. All sample locations will be positioned to avoid archaeological sensitive areas. An archaeological excavation licence will be applied for once the geophysical data has been reviewed.

This mitigation within the survey design and compliance with the conditions of the archaeological excavation licence will ensure that the effect of the proposed survey on archaeology will be Imperceptible.

3.8.2 Project specific mitigation

- An archaeology desk-based assessment will be undertaken by a qualified and experienced marine archaeologist prior to intrusive survey works occurring.
- An archaeologist will carry out a walkover inspection of the land/intertidal area prior to commencement of any boreholes or sampling within the land/intertidal area.
- Geophysical data will be reviewed by an archaeologist and geotechnical sampling locations moved as appropriate to avoid features of interest.
- A written scheme of investigation and protocol for archaeological discoveries will be prepared and implemented during the site investigation works. An archaeologist will be on-hand during the survey should any archaeological finds be made.

3.9 Waste Management

The survey vessels will operate under international standards The International Convention for the Prevention of Pollution from Ships (MARPOL) with respect to black and grey wastewater and food waste discharges, which are designed to eliminate impacts to coastal waters, and reduce the levels of discharge in offshore waters. Therefore, no effects are expected.

3.9.1 Cumulative and in-combination effects

When assessing the potential for cumulative and in-combination effects, the IEMEP (Foreshore Licence application reference FS006859) as well as the site investigations proposed under this FLA have been considered. This is because the site investigations proposed under this FLA will be part of the wider survey conducted across the IEMEP and are not likely to be undertaken in isolation.

3.9.2 Marine Mammals and fish

The assessment provided in Section 3.5 concluded that the significance of the effect of the proposed site investigations on fish and marine mammals is Not Significant. Without prejudice to this conclusion, best practice guidance in the form of the DAHG (2014) 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters' will be followed.

Several projects have been identified in the wider region which are proposing to undertake similar site investigation works, namely PiPiper infrastructure fibre optic cable, Celtic One, Celtic Two, and Helvick Head Energia ESB/ Equinor proposed windfarms, North Celtic Sea Energia proposed windfarm, Simply Blue -Emerald proposed windfarm, Celtic Sea Array SSE proposed windfarm. In addition, the Celtic Interconnector and Greenlink Interconnector are both scheduled to be constructed over the next five years. It is possible that one or more of these planned projects could coincide with the proposed site investigations giving rise to the potential for cumulative effects.

Cumulative effects are likely to result where localised disturbance from more than one activity either occurs simultaneously resulting in a wider zone of disturbance restricting foraging, migratory or breeding behaviour; or consecutively within a restricted area resulting in an extended period of disturbance or the production of a barrier restricting movements.

It is planned that the proposed site investigations will be conducted over a five year period from award of the appropriate licences to capitalise on suitable weather windows over this time period. At this time, it is not known when the licences will be awarded or when other offshore wind site investigations will be conducted, therefore two scenarios were considered for this assessment. Firstly, that this FLAs geophysical survey is conducted at the same time as other proposed geophysical surveys in the area, (Table 2-6)and secondly that they occur consecutively. The first scenario is highly unlikely as data acquisition can be impaired if two or more geophysical surveys occur at the same time in proximity due to equipment interference. It is therefore more likely that site investigations would occur consecutively. This would result in an extension of the time period that marine mammals and fish would be disturbed.

The potential cumulative effect has been assessed as Not Significant for both marine mammals and fish. This is based on the results of a study in the UK Southern North Sea SAC on the potential cumulative effects from a number of nearby windfarms on harbour porpoise (BEIS 2020). The study found that harbour porpoise displacement was temporary and harbour porpoise relocated elsewhere. It was concluded that seismic surveys would not have an adverse effect upon the integrity of the Southern North Sea SAC. The same behavioural response is likely in open coastal waters where marine mammals have the ability to avoid the temporary site investigation works. There is potential for cumulative effects on fish where one or more activities occurs simultaneously resulting in a wider zone of disturbance. However, this disturbance will be temporary and any fish in the area will be able to relocate elsewhere, therefore there will not be an effect on the wider population of fish species in the area.

In addition, in order to ensure that marine mammals are not disturbed for an extended period of time, IEMEP Ltd. will co-ordinate with the and Foreshore Unit and any developers that are granted a Foreshore Licence or development consent within the region to determine if works should not occur simultaneously or concurrently.

3.9.3 Other marine users

There is therefore the potential for cumulative effects on commercial fisheries and other marine users from the proposed site investigation works and other proposed projects in the area. The worst-case is that fishermen using static gear (pot fishing) are requested to move fishing gear or other marine users are requested to keep at a safe distance for/from more than one survey at a time, extending the period in which they cannot access their traditional grounds or normal routes. The cumulative effect from the surveys will be temporary as fishermen and other marine users will be able to return to the area once the proposed site investigations have passed and therefore it is concluded that the significance of cumulative effects will be Slight.

IEMEP Ltd recognise that an important factor in reducing disruption to fishers and other marine users will be strong communication. As previously outlined, the project has appointed a FLO. The scope of this appointee covers the commercial fishing industry but also includes a wider selection of stakeholders including recreational fishing industry and other recreational users of the marine area. Engagement is underway with these stakeholders. The FLO has or will engage with the following organisations as a minimum: South East Regional Inshore Fishermens Forum (SERIFF), Bord Iascaigh Mhara (BIM), Irish South & East Fish Producers Organisation (IS&EFPO) and Irish South & West Fish Producers Organisation (IS&WFPO). Information on the exact timing of the site investigations proposed as part of this application will be shared with these stakeholders as it becomes available.

4. SUMMARY AND CONCLUSIONS

To determine whether the proposed site investigation are likely to have a significant effect on the surrounding environment and European Sites, either individually or in-combination with other plans or projects, a number of assessments were carried out, including a significance assessment (Section 3) and Screening for AA (Appendix A).

Within Appendix A, screening of 18 relevant European Sites concluded that the proposed site investigation works will not have a likely significant effect either alone or in combination with other plans and projects and will not undermine the conservation objectives of any SAC or SPA.

The activities will generate underwater noise which has the potential to cause disturbance effects to fish and Annex II listed pinnipeds and European Protected Species (cetaceans) outside of a European site. Whilst the assessment concluded that disturbance will be Not Significant, IEMEP Ltd are proposing to implement the DAHG (2014) 'Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters' as best practice.

The proposed site investigations may cause temporary and localised disturbance to other marine users within the FLAA e.g. fishing, shipping and recreational users. To mitigate effects, standard industry measures have already been undertaken, for example the appointment of a Fisheries Liaison Officer, or will be implemented, such as the distribution of Notices to Mariners, compliance with COLREGS, use of appropriate marking and lighting

REFERENCES

1 BEIS (2018). Offshore Oil & Gas Licensing 30th Seaward Round. Habitat Regulations Assessment. Draft Appropriate Assessment: Southern North Sea. February 2018. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/681627/30th_Round_Draft_AA_-_Southern_North_Sea_Blocks.pdf [Accessed May 2021]

2 BEIS. (2019). Record of the Habitats Regulations Assessment Undertaken Under Regulation 5 of the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (As Amended). [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/799521/Spectrum_Seismic_Survey_HRA_Rev_1.3.pdf [Accessed May 2021]

3 BEIS. (2020). Review of Consented Offshore Wind Farms in the Southern North Sea Harbour Porpoise SAC. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/921754/RoC_SNS_SAC_HRA_FINAL.pdf (Accessed May 2021)

4 Bird Watch Ireland 2021, Capel Island & Knockadoon Head, Co. Cork [online] Available at: https://birdwatchireland.ie/our-work/nature-reserves/nature-reserves-capel-island-and-knockadoon-head/

5 6 Bureau of Ocean Energy Management (BOEM) (2016). Characteristics of sounds emitted during high-resolution marine geophysical surveys U.S. OCS Study BOEM 2016-044 NUWC-NPT Technical Report 12,203

6 BOEM (2017). BOEM: Best Management Practices Workshop for Atlantic Offshore Wind Facilities. Overview of NMFS 2016 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing. [online] Available at: https://www.boem.gov/sites/default/files/renewable-energy-program/Day-1_Afternoon_Scholik_Overview_of_Guidance.pdf [Accessed May 2021]

7 Bowles, A.E., Smultea, M., Wuesig, B., DeMaster, D.P. and Palka, P. (1994). Relative abundance and behavior of marine mammals exposed to transmissions from the Heard Island Feasibility Test. J Acoust Soc Am. 96 (4) 2469-84, doi 10.1121/1.410120.

8 Carroll, A.G., Przeslawski, A.D., Gunning, M and Bruce, B. (2017). A critical review of the potential impacts of marine seismic surveys on fish & invertebrates. Marine Pollution Bulletin 112 (1) pp 9-24. [online] Available at: https://www.sciencedirect.com/science/article/pii/S0025326X16309584 [Accessed May 2021]

9 Celtic One Offshore Wind. (2021) [Online] Available at https://www.celticoneoffshorewind.ie/project-information [Accessed April 2021]

10 Celtic Sea Array OWF. SSE Renewables (2021). [Online] Available at https://www.sserenewables.com/offshorewind/future/celtic-array [Accessed April 2021]

11 Celtic Two Offshore Wind (2021). [Online] Available at https://www.celticoneoffshorewind.ie/projectinformation [Accessed April 2021]

12 Crowe, O. (2005). Ireland's Wetlands and their Waterbirds: Status and Distribution. BirdWatch Ireland. Newcastle.

13 Crocker, S.E. and Fratantonio, F.D. (2016). Characteristics of high-frequency sounds emitted during high-resolution geophysical surveys. OCS Study, BOEM 2016-44, NUWC-NPT Technical Report 12, 203pp.

14 Coull, K.A., Johnstone, R., and Rogers, S.I. (1998). Fisheries Sensitivity Maps for British Waters. Published and distributed by UK Oil and Gas.

15 DAHG (2014). Guidance to manage the risk to marine mammals from man-made sound sources in Irish Waters. [online] Available at: https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf [Accessed May 2021]

16 Danson, E. (2005). Geotechnical and geophysical investigations for offshore and nearshore developments. Written and produced by Technical Committee 1, International Society for Soil Mechanics and Geotechnical Engineering, September 2005.

17 Department of Communications, Energy and Natural Resources (DCENR) (2015). Irish Offshore Strategic Environmental Assessment (IOSEA) 5 Environmental Report. [online] Available at: https://www.dccae.gov.ie/en-ie/natural-resources/publications/Documents/6/IOSEA5EnvironmentalReport.pdf [Accessed November 2019]

18 DCENR (2011). Shellfish Stocks and Fisheries Review 2011 An assessment of selected stocks. [online] Available at: https://oar.marine.ie/bitstream/handle/10793/751/Shellfish%20Stocks%20and%20Fisheries%20Review%202011.pdf?sequence=1. (Accessed February 2019)

19 DCCAE (2015). Irish Offshore Strategic Environmental Assessment (IOSEA) 5 Environmental Report. [online] Available at: https://oar.marine.ie/bitstream/handle/10793/751/Shellfish%20Stocks%20and%20Fisheries%20Review%202011.pdf?sequence=1. [Accessed February 2019]

20 DEHLG (2010). Guidance "Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. [online] Available at: https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2009_AA_Guidance.pdf [Accessed May 2021]

21 DHLGH (2021) Designated Shellfish Waters [online] Available at: https://www.gov.ie/en/publication/7faa4-designated-shellfish-waters-in-cork/ [Accessed May2021]

22 Department of Energy and Climate Change (DECC) (2016). Offshore Energy Strategic Environmental Assessment. Department of Energy and Climate Change. March 2016.

23 DP Energy (2020) Pre-project fisheries Report - Assessment of fisheries activities for DP Energy. Clarus floating offshore windfarm project.

24 Dyndo, M., Wiśniewska, D.M., Rojano-Doñate, L. and Madsen, P.T. (2015). Harbour porpoises react to low levels of high frequency vessel noise. Scientific Reports 5, Article number: 11083 (2015). doi:10.1038/srep11083

25 EHLG (2009). Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. [online] https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2009_AA_Guidance.pdf [Accessed July 2021]

26 Environment Protection Agency (EPA) 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR). [online] https://www.epa.ie/publications/monitoring--assessment/assessment/draft-guidelines-on-the-information-to-be-contained-in-environmental-impact-asse.php [Accessed July 2021]

27 EMODnet (2021). Human Activities. [online] Available at: https://www.emodnet-humanactivities.eu/view-data.php (Accessed May 2021).

28 Ellis, J., Milligan, S. Readdy, L., Taylor, N and Brown, M. (2012). Spawning and Nursery Grounds of Selected Fish Species in UK Waters. Science Series Technical Report No. 147. CEFAS, Lowestoft.

29 European Commission (2001). Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC [online] Available at: https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf [Accessed May 2021]

30 European Commission (2018). Managing European Sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC [online] Available at: https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/Provisions_Art_6_nov_2018_en.pdf [Accessed May 2021]

31 European Marine Observation Data Network (EMODnet) (2019) "Seabeds Habitat Project" [online] Available at: https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification/ [Accessed May 2021]

32 European Nature Information System (EUNIS) (2019) "EUNIS Habitat Classifications" [online] Available at https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification [Accessed May 2021]

33 Gailey, G., Wursig, B. and McDonald, T.L. (2007). Abundance, behavior, and movement patterns of western gray whales in relation to a 3-D seismic survey,

Northeast Sakhalin Island, Russia. Environmental Monitoring and Assessment. 134 (75).

34 Department of Communications, Energy and Natural Resources (DCENR) (2015). Irish Offshore Strategic Environmental Assessment (IOSEA) 5 Environmental Report. [online] Available at: https://www.dccae.gov.ie/en-ie/natural-resources/publications/Documents/6/IOSEA5EnvironmentalReport.pdf [Accessed November 2019]

35 European Marine Observation Data Network (EMODnet) (2021) "Seabeds Habitat Project" [online] Available at: https://www.emodnet-seabedhabitats.eu/ [Accessed May 2021]

36 Greenlink Interconnector (2019) "Greenlink Interconnector Project". [online] Available at: https://www.greenlink.ie/ [Accessed May 2021]

37 Genesis Oil and Gas Consultants. (2011). Review and Assessment of Underwater Sound Produced from Oil and Gas Sound Activities and Potential Reporting Requirements under the Marine Strategy Framework Directive. Report for the Department of Energy and Climate Change. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/50017/finreport-sound.pdf (Accessed May 2021)

38 Gomez, C., Lawson, J., Wright, A.J., Buren, A.D., Tollit, D.J. and Lesage, V. (2016). A systematic review on the behavioural responses of wild marine mammals to noise: The disparity between science and policy. Canadian Journal of Zoology. 94(12) doi: 10.1139/cjz-2016-0098

39 Gordon, J. G., Gillespie, D., Potter, J., Frantzis, A., Simmonds, M., Swift, R. J. and Thompson, D. (2004) A review of the effects of seismic survey on marine mammals. Marine Technology Society Journal, 37, pp.14-34.

40 Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Borjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M.B., Scheidat, M., Teilmann, J., Vingada, J. and Øien, N. (2017) Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. [online] Available at: https://synergy.st-andrews.ac.uk/scans3/files/2017/04/SCANS-III-design-based-estimates-2017-04-28-final.pdf (Accessed May 2021).

41 Hopkins, A. (2007). Recommended operating guidelines (ROG) for swath bathymetry. MESH. [Online]. Available at: http://www.emodnet-seabedhabitats.eu/PDF/GMHM3_Swath_Bathymetry_ROG.pdf. (Accessed May 2021)

42 ICES (2009). Review of the Biologically Sensitive Area/Irish Box. [online] Available at http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2009/Special%20Requests/EC%20Irish%20box.pdf#search=%22Irish%20Box%22%20in%20the%20context%20of%20the%20Western%20Waters%20Regime . [Accessed May 2021].

43 IWDG (2021). Sightings. [online] Available at: http://www.iwdg.ie/ (Accessed May 2021).

44 Irish Government. Department of Housing, Local Government and Heritage. Foreshore Applications and Determinations. [online] Available at: https://www.gov.ie/en/collection/d81e9-foreshore-applications-and-determinations-2021/ [Accessed April 2021].

45 Joint Nature Conservation Committee (JNCC) (2015). Management Units for cetaceans in UK waters. JNCC Report No: 547, p.42

46 Joint Nature Conservation Committee (JNCC) (2019a) "Bristol Channel Approaches/Dynesfeydd Mor Hafren" Available at: https://sac.jncc.gov.uk/site/UK0030396 [Accessed May 2021]

47 Joint Nature Conservation Committee (JNCC) (2019b) "Cardigan Bay/ Bae Ceredigion" [online] Available at: https://sac.jncc.gov.uk/site/UK0012712 [Accessed May 2021]

48 Joint Nature Conservation Committee (JNCC) (2019c) "North Anglesey Marine/ Gobledd Mon Forol" [online] Available at: https://sac.jncc.gov.uk/site/UK0030398 [Accessed May 2021]

49 Joint Nature Conservation Committee (JNCC) (2019d) "North Channel" [online] Available at: https://sac.jncc.gov.uk/site/UK0030399 [Accessed May 2021]

50 Joint SNCB Interim Displacement Advice Note (2017). [online] Available at: http://archive.jncc.gov.uk/pdf/Joint_SNCB_Interim_Di

splacement_AdviceNote_2017.pdf (Accessed May 2021)

51 Joint Nature Conservation Committee (JNCC) (2019f) "West of Wales Marine? West Gorllewin Crymru Forol SAC" [online] Available at: https://sac.jncc.gov.uk/site/UK0030397 [Accessed May 2021]

52 Kastelein, R.A., Helder-Hoek, L., Booth, C., Jennings, N. and Leopold, M. (2019). High Levels of Food Intake in Harbour Porpoises (Phocoena phocoena): Insight into Recovery from Disturbance. Aquatic Mammals 45: 380-388, DOI 10.1578/AM.45.4.2019.380

53 King, S.L. (2013). Seismic survey licensing: sub-bottom profile surveys. SMRU Marine Ltd report number SMRUL-DEC-2013-024.September 2013

54 Lepper, P.A., Robinson, S.P., Ainslie, M.A., Theobald, P.D. and de Jong, C.A. (2012). Assessment of cumulative sound exposure levels for marine piling events. Pages 453-457 The Effects of Noise on Aquatic Life. Springer

55 Lurton, X. and DeReutier, S. (2011). Sound radiation of seafloor-mapping echosounders in the water column, in relation to the risks posed to marine mammals. International Hydrographic Review 7-17.

56 Mackey, M., Ó Cadhla, O., Kelly, T.C., Aguilar, A., de Soto, N. and Connolly, N. (2004). Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume I – Seabird distribution, density & abundance.

57 McGarry, T., Boisseau, O., Stephenson, S., and Compton, R. (2017). Understanding the Effectiveness of Acoustic Deterrent Devices (ADDs) on Minke Whale (Balaenoptera acutorostrata), a Low Frequency Cetacean. ORJIP Project 4, Phase 2. RPS Report EOR0692. Prepared on behalf of The Carbon Trust. November 2017

58 Marine Institute (2021) Ireland's Marine Atlas. [online] Available at: http://atlas.marine.ie/ (Accessed May 2021)

59 MIDA (Undated). Tides, Waves and Currents. [online] Available at: http://mida.ucc.ie/pages/information/phys/oceanography/tidesWavesCurrents/full.htm (Accessed November 2020)

60 MMO (Marine Management Organisation) (2018). Fisheries statistics. [online] Available at: https://www.gov.uk/government/statistical-data-sets [Accessed February 2018]

61 Morton, A. and Symonds, H.K. (2002). Displacement of Orcinus orca (L.) by high amplitude sound in British Columbia, Canada. ICES Journal of Marine Science. 59(1). pp 71-80. DOI: 10.1006/jmsc.2001.1136

62 National Biodiversity data Centre (2021) Biodiversity Maps [online] Available at: https://maps.biodiversityireland.ie/ [Accessed May 2021]

63 National Parks & Wildlife Services (NPWS) (2011a) "Conservation Objective Series: Roaringwater Bay and Islands SAC 000101" Available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000101.pdf [Accessed May 2021]

64 National Parks & Wildlife Services (NPWS) (2012a) "Conservation Objective Series: Blackwater Estuary SPA 004028 [online] Available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004028.pdf [Accessed May 2021]

65 National Parks & Wildlife Services (NPWS) (2012b) Blackwater river SAC 002170 [Online] available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002170.pdf [Accessed May 2021]

66 National Parks & Wildlife Services (NPWS) (2012c) "Conservation Objective Series: Dungarvan Harbour 004032" available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004032.pdf [Accessed May 2021]

67 National Parks & Wildlife Services (NPWS) (2013a) "Conservation Objective Series: Rockabill to Dalkey Island SAC 003000" Available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO003000.pdf [Accessed May 2021]

68 National Parks & Wildlife Services (NPWS) (2013b) "Conservation Objective Series: Saltee Islands SAC 0000707" Available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000707.pdf [Accessed May 2021]

69 National Parks & Wildlife Services (NPWS) (2014a) "Conservation Objective Series: Ballycotton Bay SPA 004022" available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004022.pdf [Accessed May 2021]

70 National Parks & Wildlife Services (NPWS) (2014b) "Conservation Objective Series: Cork Harbour SPA 004030" available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004030.pdf [Accessed November 2019]

71 National Parks & Wildlife Services (NPWS) (2015a) "Conservation Objective Series: Ballymacoda Bay SPA 004023" available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004023.pdf [Accessed November 2019]

72 National Parks & Wildlife Services (NPWS) (2015b) "Conservation Objective Series: Ballymacoda Bay and Clonpriest SAC 000077" available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000077.pdf [Accessed May 2021]National Parks & Wildlife Services (NPWS) (2016a) "Conservation Objective Series: Ardmore Head SAC 002123" available online at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002123.pdf [Accessed November 2019]

73 National Parks & Wildlife Services (NPWS) (2018b) "Conservation Objective Series: Mid-Waterford Coast SPA 004193" available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004193.pdf [Accessed November 2019]

74 National Parks & Wildlife Services (NPWS) (2018c) "Capel Island and Knockadoon Head Nature Reserve" available online at: https://www.npws.ie/nature-reserves/cork/capel-island-and-knockadoon-head-nature-reserve [Accessed May 2021]

75 National Parks & Wildlife Services (NPWS) (2021) "Conservation Objective Series: Sovereign Islands SPA 004124" available online at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004124.pdf [Accessed November 2019]

76 Natural England and JNCC (2012) Joint Natural England and JNCC Interim Advice Note: Presenting information to inform assessment of the potential magnitude and consequences of displacement of seabirds in relation of Offshore Windfarm Developments.

77 Natural England and Suffolk Coast and Heaths (2012). A simple method for assessing the risk of disturbance to birds at coastal sites. November 2012. [online] Available at: http://www.suffolkcoastandheaths.org/assets/Projects--Partnerships/Stour--Orwell/disturbance/A-simple-method-for-assessing-the-risk-of-disturbance-to-birds-at-coastal-sites.pdf (Accessed February 2019)

78 NatureScot. (2020). Otter. [Online]. Available at: https://www.nature.scot/plants-animals-and-fungi/mammals/land-mammals/otter [Accessed May 2021].

79 Nedwell, J.R., Edwards, B., Turnpenny, A.W.H., and Gordon, J (2004) Fish and Marine Mammal Audiograms: A summary of available information. [online] Available online: https://www.jstor.org/stable/41811925?seq=3#metadata_info_tab_contents (Accessed February 2019).

80 Nedwell, J., Mason, T., Barham, R. and Chessman, S (2012). Assessing the environmental impact of underwater noise during offshore windfarm construction and operation. Proceedings of Acoustics 2012, Fremantle, Australia [online] Available at: http://www.acoustics.asn.au/conference_proceedings/AAS2012/papers/p116.pdf (Accessed March 2018)

81 Nedwell, J.R., Parvin, S.J., Edwards, B., Workman, R., Brooker, A.G. and Kynoch, J.E. (2007). Measurement and interpretation of underwater noise during construction and operation of offshore windfarms in UK waters. [Online]. Available at: https://tethys.pnnl.gov/sites/default/files/publications/COWRIE_Underwater_Noise_Windfarm_Construction.pdf (Accessed November 2020)

82 National Marine Fisheries Service (NMFS) (2018). 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59, 167 p.

83 Otani, S., Naito, T., Kato, A., and Kawamura, A. (2000). Diving behaviour and swimming speed of a free-ranging harbour porpoise (Phocoena phocoena). Marine Mammal Science, Volume 16, Issue 4, pp 811-814, October 2000.

84 People Over Wind and Sweetman v. Coillte Teoranta, (C-323/17) (2018) [Online] Available at: https://curia.europa.eu/juris/document/document.jsf?docid=200970&doclang=EN [curia.europa.eu]

85 Pollock, C. and Barton, C. (2008). A Gap Analysis of Irish Waters using the European Seabirds at Sea (ESAS) database. Irish Wildlife Manuals. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

86 Popper, A. N., Hawkins, A. D., Fay, R. R., Mann, D. A., Bartol, S., Carlson, T. J., Coombs, S., Ellison, W. T., Gentry, R. L., Halvorsen, M. B., Løkkebog, S., Rogers, P. H., Southall, B. L., Zeddies, D. G., and Tavolga, W. N. (2014). Sound Exposure Guidelines for Fishes and Sea Turles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI.

87 Popper, E.N. and Hastings, M.C. (2009). The effects of human-generated sound on fish. Integrative Zoology. Volume 4. Pg 43-52.

88 Radford, A.N., Lebre, L., Lacaillon, G., Nedelc, S.L. and Simpson, S.D. et al. (2016). Repeated exposure reduces the response to impulsive noise in European seabass. Global Change Biology. Vol. 22, Iss. 10, pp.3349 – 3360

89 Reid, J.B., Evans, P.G.H. and Northridge, S.P. (2003). Atlas of Cetacean distribution in north-west European waters. Joint Nature Conservation Committee, Peterborough, UK

90 Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

91 Richardson, W.J., Greene, C.R. Jr., Malme, C.I., and Thomson, D.H. (1995). Marine Mammals and Noise. Academic Press, San Diego, CA, USA.576p.

92 RNLI (2021a). Ballycotton LifeBoat Station [Online] Available at: https://rnli.org/find-my-nearest/lifeboat-stations/ballycotton-lifeboat-station [Accessed May 2021]

93 RNLI (2021b). Youghal LifeBoat Station [Online] Available at: https://rnli.org/find-my-nearest/lifeboat-stations/youghal-lifeboat-station [Accessed May 2021]

94 Robson, S.M (2004). Age, growth, reproductive biology and population dynamics of the common megrim Lepidorhombus whiffiagonis (Walbaum, 1972) from off the west coast of Ireland. [online] Available at: https://core.ac.uk/download/pdf/51065107.pdf [Accessed May 2021]

95 Russell, D.J.F., Jones, E.L and Morris, C.D. (2017). Updated Seal Usage Maps: The Estimated at-sea Distribution of Grey and Harbour Seals. Scottish Marine and Freshwater Science Vol 8 No 25

96 Sarnocińska, J., Teilmann, J., Balle, J.D., van Beest, F.M., Delefosse, M., and Tougaard, J. (2020) Harbour porpoise (Phocoena phocoena) reaction to a 3D seismic airgun survey in the North Sea. Frontiers in Marine Science, 6, p. 824

97 Simply Blue Emerald Site Investigations for possible Floating Offshore Wind project off Kinsale – Foreshore License (FS007139) (2021). [Online] Available at: https://www.gov.ie/en/collection/22654-foreshore-applications-anddeterminations-2020/#cork [Accessed April 2021]

98 Simply Blue Group. (2021) Emerald floating offshore wind farm. [Online] Available at: https://simplyblueenergy.com/emerald/ [Accessed April 2021]

99 Showler, D.A., Stewart, G.B., Sutherland, W.J., and Pullin, A.S. (2010). What is the impact of public access on the breeding success of ground-nesting and cliff-nesting birds? CEE review 05-010 (SR16).

100 Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene Jr, C.R., Kastak, Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. and Tyack, P.L. (2007). Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. Aquatic Mammals, 33: Number 4. [online] Available at: http://sea-inc.net/assets/pdf/mmnoise_aquaticmammals.pdf (Accessed November 2019)

101 Stone, C. J. and Tasker, M. L. (2006). The effects of seismic airguns on cetaceans in UK waters. Journal of Cetacean Research and Management, 8, pp. 255-264.

102 Stone, C.J., Hall, K., Mendes, S. and Tasker, M. (2017). The effects of seismic operations in UK waters: analysis of Marine Mammal Observer data. [Online]. Available at: http://www.carolynbarton.co.uk/RS6884_JCRM16_alt12.pdf (Accessed November 2020)

103 Teleography (2021) Submarine Caple Map [online] Available at: https://www.submarinecablemap.com/ (Accessed May 2021)

104 Thompson P.M., Brookes K.L., Graham I.M., Barton T. R., Needham K., Bradbury G. and Merchant N.D. (2013). Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. Proceedings of the Royal Society B: Biological Sciences. DOI: 10.1098/rspb.2013.2001

105 Valente, J.J. and Fischer, R.A (2011). Reducing human disturbance to waterbird communities near corps of engineers projects. Report reference ERDC TN-DOER-E29. [online] Available at: http://el.erdc.usace.army.mil/elpubs/pdf/doere29.pdf [Accessed May 2021]

106 van Beest, F.M., Teilmann, J., Hermannsen, L., Galatius, A., Mikkelsen, L., Sveegaard, S., Balle, J.D., Dietz, R. and Nabe-Nielsen, J. (2018). Fine-scale movement responses of free-ranging harbour porpoises to capture, tagging and short-term noise pulses from a single airgun. Royal Society Open Science. Volume 5, Issue 1.

107 Wreck Inventory of Ireland Database (WIID) (2020) National Monuments Service: Wreck Viewer. [online] Available at: https://www.arcgis.com/apps/webappviewer/index.html?id=89e50518e5f4437abfa6284ff39fd640 [Accessed May 2021]

108 Youghal (2021) [Online] Available at https://youghal.ie/top-10-things-to-do/youghal-bay/ [Accessed May 2021]

APPENDIX A

Screening for Appropriate Assessment

A.1 INTRODUCTION

A.1.1 Introduction

The FLAA lays on the boundary of the Ballymacoda Bay (SPA) (site code: IE004023) and is located within 15km of seven other European Sites. As the project is not directly connected with or necessary to the management of the European Sites it is regarded as necessary that the project should be subject to the Appropriate Assessment (AA) process. This Screening for Appropriate Assessment has been completed by the Applicant in support of this process.

The AA process will be undertaken by the Department of Housing, Local Government and Heritage. This Screening for AA has been prepared by Intertek on behalf Inis Eagla Marine Energy Park (IEMEP) Ltd, in accordance with relevant guidance, to inform the AA process.

A.1.2 Legislative Context

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) require European Union (EU) Member States to establish a network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. This network of sites is known as the Natura 2000 network. The network comprises Special Areas of Conservation (SACs) designated under the Habitats Directive, and Special Protection Areas (SPAs) designated under the Birds Directive. SPAs and SACs are designated by the individual member states and are collectively referred to as European Sites. European sites which have been submitted to the European Union, but which have not formally been adopted e.g. candidate SACs, proposed SPAs and Sites of Community Importance (SCI), also form part of the network and are treated as if fully designated.

A key requirement of the Habitats Directive is that the effects of any plan or project, alone, or in combination with other plans or projects, on the European Site network, should be assessed before any decision is made to allow that plan or project to proceed. This process is known as Appropriate Assessment (AA). Each plan or project considered for approval, must take into consideration the possible effects it may have in combination with other plans and projects when going through the AA process.

The obligation to undertake AA derives from Article 6(3) and 6(4) of the Habitats Directive.

Article 6(3) of the Habitats Directive states that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

This provision is transposed into Irish law in respect of this foreshore application by Part 5 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011), (as amended). Regulation 42(1) of the 2011 Regulations provides for screening for Appropriate Assessment as follows:

"A screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of

the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site."

Regulations 42(6) and 42(7) provide for the outcome of screening for Appropriate Assessment as follows:

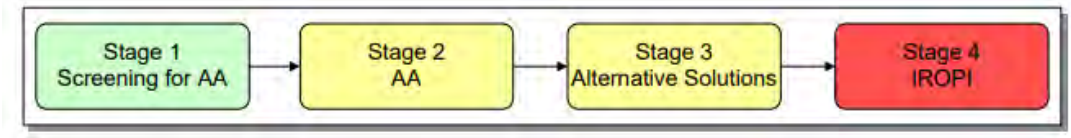
"*The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site. Alternatively, a public authority shall determine that an Appropriate Assessment of a plan or project is not required where: the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it can be excluded on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site*."

Pursuant to the Foreshore Acts 1933 – 2011 (the "Foreshore Acts") this NIS will be submitted to the submitted to the Department of Housing, Local Government and Heritage to support Foreshore Licence Application for the Ballymacoda/Clonard site. A NIS was also submitted in December 2019 for site investigation for the wider Inis Ealga project (reference: FS006859).

The European Commission's methodological guidance (EC 2001) outlines a four-stage approach to the AA process, where the outcome at each successive stage determines whether a further stage in the process is required. The results at each step must be documented so there is transparency of the decisions made. The four stages are shown in Figure A-1 and described below.

Figure A-1 Stages of AA

"Double Click to Insert Image"



A.1.2.2 Stage 1 - Screening for Appropriate Assessment

Stage 1 of the AA process is referred to as screening for Appropriate Assessment and identifies whether the proposed plan or project, either on its own or in combination with other plans or projects, would be "likely to have a significant effect" upon any European site. A likely effect is one that cannot be ruled out on the basis of objective information. The test is a 'possibility' of effects rather than a 'certainty' of effects. The test of significance is whether a plan or project could undermine the site's conservation objectives.

A.1.2.3 Stage 2 - Appropriate Assessment

If effects are considered likely to be significant, potentially significant or uncertain, or if the screening process becomes overly complicated, the process must proceed to Stage 2: Appropriate Assessment, with the preparation of a Natura Impact Statement to inform the Appropriate Assessment that is to be conducted by the competent authority.

The European Court of Justice has also made a relevant ruling on what should be contained within an Appropriate Assessment:

"[The Appropriate Assessment] cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned".

A.1.2.4 Stage 3 – Alternative solutions

This stage examines any alternative solutions or options that could enable the plan or project to proceed without adverse effects on the integrity of a European Site. Demonstrating that all reasonable alternatives have been considered and assessed, and that the least damaging option has been selected, is necessary to progress to Stage 4.

A.1.2.5 Stage 4 - Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a European Site to proceed in cases where it has been established that no less damaging alternative solution exists.

The extra protection measures for Annex I priority habitats come into effect when making the IROPI case. IROPI reasons that may be raised for sites hosting priority habitats are those relating to human health, public safety or beneficial consequences of primary importance to the environment. In the case of other IROPI for Annex I priority habitats, the opinion of the European Commission is necessary and should be included in the AA. Compensatory measures must be proposed and assessed. The European Commission must be informed of the compensatory measures. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the Minister for Housing, Local Government and Heritage.

A.1.3 Aim of this Screening for AA

The aim of this Screening is to inform the AA process in determining whether the proposed site investigations, both alone and in combination with other plans or projects, are likely to have a significant effect on any European Site. The effects of the site investigations on the European Sites are considered in the context of the SPA and SAC conservation objectives and specifically on the habitats and species for which the European Sites have been designated. If significant effects are likely then effects are examined to determine if they will either alone, or in combination with other plans or projects effect the integrity of the European Site.

A description of the site investigation works on the receiving environment, the potential pressures that could arise from the planned activities on the receiving environment and potential in-combination effects of this project with other plans/projects in the nearby vicinity have been described in the Schedule of Survey Works and Section 1.4 of this document. Screening of relevant European sites has been conducted to determine if there is any connectivity between the proposed site investigations and any European sites. Any sites where a pathway between the site investigation works, and the European site is certain or uncertain are examined to determine the potential for likely significant effect (LSE) on the conservation objectives of these sites.

This report has been prepared in accordance with current guidance:

- The European Commission notice "Managing Natura 2000 Sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC", 21 November 2018;
- The Department of Arts, Heritage and the Gaeltacht “Marine Natura Impact Statements in Irish Special Areas of Conservation: A Working Document, April 2012.”
- The Department of Environment, Heritage and Local Government (DEHLG) Guidance “Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, 11 February 2010.”

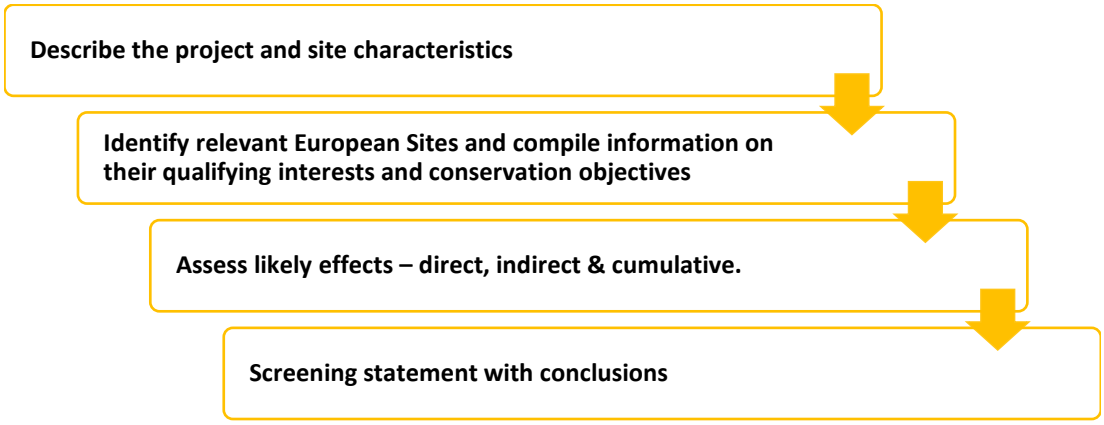
- The European Commission Guidance "Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, November 2001".

A.2 APPROACH TO AA SCREENING

This AA screening has been undertaken according to the process set out in the National Parks and Wildlife Service (NPWS) and Department of the Environment, Heritage and Local Government (DEHLG) (2010) Guidance; following the process illustrated in Figure A-2. It has considered all case law relevant to the Habitats Directive summarised in the recently issued European Commission Guidance (European Commission 2018).

Screening has been undertaken prior to the application of mitigation measures in accordance with Court of Justice of the European Union ruling C-323/17 (People Over Wind and Sweetman v Coillte Teoranta, 2018).

Figure A-2 AA Screening Process



The structure for the remainder of the AA screening therefore reflects the key steps in this process.

A.2.2 Describe the Project and Site Characteristics

Full details of the scope of work are provided in the Schedule of Survey Works (which accompanies the FLA) and Section 1.4 of this report. The site characteristics i.e. the baseline environment within the FLAA, are described in Section 2 of this report.

A.2.3 Identification of Relevant European Sites

The potential for a European Site to be significantly affected depends on whether receptors which are designating features of a European Site:

a. Can come into contact with the surveys; and

b. Are sensitive to the survey activities to the extent that the activity is likely to have an adverse effect on the conservation objectives for the features.

Identifying relevant European Sites has therefore been achieved by applying the following steps:

1. Identify which receptors could be sensitive to the proposed site investigations.

2. Identify potential effects the proposed site investigations could have on these receptors and what the zone of influence for these receptors is, i.e. how far from the survey could a receptor be potentially affected.
3. Define search area for relevant sites using zone of influence and expert judgement.
4. Screen SACs and SPAs within these search areas to identify Qualifying Interests (QIs) / Special Conservation Interests (SCIs) and assess whether Interest Features of the European Site could be significantly affected by the proposed site investigations.
5. Assess whether any SACs and SPAs further afield from the survey area have mobile QIs / SCIs which may travel into the zone of influence and have the potential to be significantly affected.

A.2.3.1 Identification of sensitive receptors

The receptors which could potentially be affected by the proposed site investigations and could be the designating interest features of European Sites in the region are:

- Benthic habitats;
- Fish;
- Birds; and
- Marine mammals.

A.2.3.2 Identification of potential effects, defined zones of influence and search area

The OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) pressure list and definitions (OSPAR, 2011) have been used to describe the potential pressures expected from the proposed site investigations. These potential pressures may be direct or indirect, temporary or permanent, beneficial or harmful to the site, or a combination of these. The zone of influence (ZOI) – spatial extent over which effects may extend – has also been defined.

Irish Guidance states (EHLG 2009) that all sites within 15km should be screened. However, this approach does not take into consideration the mobility of the receptor and the zone of influence of the activities proposed. Therefore, although all European Sites with marine components within 15km of the FLAA have been screened consideration has also been given to how sensitive receptors could be affected and what the zone of influence (the geographical extent over which an effect on the receiving environment is predicted to occur) is likely to be in defining the search area for relevant European Sites.

The geographical extent of the likely zone of influence for non-mobile receptors such as benthic communities will represent the required search area for relevant European Sites. For highly mobile species such as fish, birds and marine mammals the European Sites which are most likely to be significantly affected will be those within or near the zone of influence. A justification for the established zone of influence and search area for each receptor is explained below:

Benthic habitats have the potential to be directly affected in three ways:

- During the geotechnical and environmental surveys from the very small removal of sediment samples;
- Through very localised temporary smothering by the deposition of risings from the geotechnical boreholes; and
- Through smothering by positioning of equipment on the seabed e.g. JUB legs, or concrete/steel mooring anchors.

Given that sampling points have not been determined (positions on figures are indicative only), the zone of influence for benthic communities has been assumed to be the entire FLAA. Relevant sites would include SACs designated for Annex I habitats which support benthic communities. Therefore, only SACs designated for benthic habitats which the FLAA passes directly through have been screened for Annex I habitats.

Fish have the potential to be affected by the geophysical survey from changes in underwater sound. Effects may range from temporary behavioural changes, or temporary hearing loss, through to migration pathways being impeded by a noise barrier. Of the four migratory Annex II species known to be present in the vicinity of the FLAA, only twaite shad are known to be sensitive to underwater noise generated from geophysical survey.

Review of underwater noise literature concluded that sensitive fish species will show strong avoidance behaviour at a distance of up to 66m within the FLAA. However, there is the potential that the noise could also impede migration to/from rivers near the FLAA. European Sites within 40km of the FLAA have therefore been screened for the presence of twaite shad as a Qualifying Interest feature.

Marine birds – Advice on how to present assessment information on the extent and potential consequences of seabird displacement from offshore wind farm developments published by the UK Joint Statutory Nature Conservation Bodies (JNCC 2017) states that for most bird species a standard displacement buffer of 2km is recommended. For divers and sea ducks this should be extended to 4km. [1] The most vulnerable birds to disturbance would be nesting birds in the breeding season in the immediate vicinity of the proposed site investigations. Disturbance to nesting birds caused by the presence of the survey vessel could have an effect on the success rate of the breeding population. The zone of influence of disturbance on nesting birds has been assessed as up to 2km from the FLAA.

To allow for the mobility of bird species which could forage into the zone of influence, all SPAs within 15km have been screened. While individuals from other sites outwith 15km may potentially be found foraging within the FLAA, a Likely Significant Effect on an SPA and their conservation interests can be excluded due to the temporary nature and limited scope of the proposed activities, and the localised nature of the pressures.

Marine mammals have the potential to be affected by changes in underwater noise. EC Habitats Directive Annex II listed species likely to be observed in the FLAA include grey seal, harbour seal, European otter, common bottlenose dolphin and harbour porpoise.

There are no published guidelines on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. In relation to geophysical surveys, the UK JNCC have established an effective deterrent range (EDR) of 5km for geophysical surveys (JNCC 2020). Relevant sites would include SACs designated for marine mammals within 5km of the FLAA. However, in recognition of the highly mobile nature of marine mammals, the following has been assumed and used to define the area of search for relevant European Sites:

- Any harbour porpoise or common bottlenose dolphin from European Sites located in the relevant Management Unit (MU) could be present in the FLAA. The MU for harbour porpoise is the Celtic and Irish Sea; for bottlenose dolphin it is the Irish Sea and offshore Channel and SW England;
- Harbour seal are not known to make trips greater than 50km from haul out sites (DECC, 2016).

[1] The Joint SNCB Interim Displacement Advice Note (JNCC 2017) categorises species by their sensitivity to disturbance by wind farm structures, ship and helicopter traffic and their habitat specialisation. There are no similar guidelines for site investigations and therefore Intertek use the windfarm guidance as a proxy, recognising that the effects from site investigations will be significantly lower than from windfarm construction and therefore the use of the guidance is a more conservative approach to assessment.

- Otters are known to have a home range of 20km (NatureScot, 2020).

In summary, Table A-1 defines the search areas used to identify relevant European Sites for screening.

Table A-1 Search areas and zone of influence

Interest feature	Species	Search Area	Zone of influence
Fish	Twaite shad	40km	<100m
Birds	Most bird species	15km	2km
	Divers, seaduck	15km	4km
Cetacean	Harbour porpoise	Celtic and Irish Sea MU	5km (disturbance)
	Bottlenose dolphin	Irish Sea and offshore Channel and SW England	
Pinniped	Grey seal	100km	
	Harbour seal	50km	
European otter		FLAA + 20km	250m

A.2.3.3 In-combination effects

A key requirement of the Habitats Directive is that the effects of any project on the European Site network should be considered in combination with other plans or projects.

Section 2.10 identified the PiPiper infrastructure fibre optic cable, Celtic One, Celtic Two, and Helvick Head Energia ESB/ Equinor proposed windfarms, North Celtic Sea Energia proposed windfarm, Simply Blue - Emerald proposed windfarm, Celtic Sea Array SSE proposed windfarm and the Celtic Interconnector and Greenlink Interconnector could potentially interact with the proposed site investigation works.

A.3 SCREENING OF EUROPEAN SITES

A geographic information system (GIS) was used to map the boundaries of SACs and SPAs in relation to the FLAA. All SACs and SPAs which are within the defined search areas for identified receptors have been listed along with their QIs / SCIs in Table A-3. A total of 18 sites were screened in this assessment. This also includes European Sites which are outside the 15km of the FLAA, but which are within 15km of the IEMEP FLAA to ensure that the potential for intra-project cumulative effects have been appropriately assessed.

For each European site, potential effects to the QIs / SCIs were identified and it was determined whether there is the potential for an interaction between the proposed site investigation and the receptors i.e. whether there is an impact-receptor pathway. This is determined by comparing information such as the extent of the zone of influence with information regarding the conservation feature e.g. species foraging distances, spatial extent of habitats etc. The interactions were defined as follows:

- Yes: A pathway between the proposed site investigation and the QI / SCI can be identified that is likely to result in an effect; or
- No: Either a pathway between the proposed site investigation and the QI / SCI cannot be identified or a pathway exists but there is no physical overlap of the impact and the QI / SCI.

For all QIs / SCIs where it is determined that there is a potential pressure receptor pathway , the likely significance of the effect has been assessed in light of the sites conservation objectives. Information that informed this assessment has been provided in Section A.2.5.

For all QIs / SCIs where it is determined that there is no pathway, the QIs / SCIs has been screened out from further assessment. Screening has been undertaken without consideration of any project specific mitigation measures.

Table A-2 Screening Assessment

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
IE004022 Ballycotton Bay SPA	**Wetland and Waterbirds – wintering:** ▪ Teal (*Anas crecca*) ▪ Ringed Plover (*Charadrius hiaticula*) ▪ Golden Plover (*Pluvialis apricaria*) ▪ Grey Plover (*Pluvialis squatarola*) ▪ Lapwing (*Vanellus vanellus*) ▪ Black-tailed Godwit (*Limosa limosa*) ▪ Bar-tailed Godwit (*Limosa lapponica*) ▪ Curlew (*Numenius arquata*) ▪ Turnstone (*Arenaria interpres*) ▪ Common Gull (*Larus canus*) ▪ Lesser Black-backed Gull (*Larus fuscus*) (NPWS, 2014a)	8.35	Visual disturbance	**No** - The SPA is important for overwintering birds and not breeding birds. As the survey will be conducted during summer months (April to October) outside of the over wintering period there will not be a temporal overlap between the Qualifying Interest of the site and the proposed site investigations.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
IE004023 Ballymacoda Bay SPA	**Wintering wetland, waterbirds and seabirds:** ▪ Teal (*Anas crecca*) ▪ Ringed Plover (*Charadrius hiaticula*) ▪ Golden Plover (*Pluvialis apricaria*) ▪ Grey Plover (*Pluvialis squatarola*) ▪ Lapwing (*Vanellus vanellus*) ▪ Sanderling (*Calidris alba*) ▪ Black-tailed Godwit (*Limosa limosa*) ▪ Bar-tailed Godwit (*Limosa lapponica*) ▪ Curlew (*Numenius arquata*) ▪ Turnstone (*Arenaria interpres*) ▪ Black-headed Gull (*Chroicocephalus ridibundus*) ▪ Common Gull (*Larus canus*) ▪ Lesser Black-backed Gull (*Larus fuscus*) ▪ Wigeon (*Anas penelope*) ▪ Redshank (*Tringa totanus*) (NPSW, 2015b)	0.01	Visual disturbance	**No** - The SPA is important for overwintering birds and not breeding birds. As the survey will be conducted during summer months (April to October) outside of the over wintering period there will not be a temporal overlap between the Qualifying Interests of the site and the proposed site investigations.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
IE000077 Ballymacoda (Clonpriest and Pillmore) SAC	▪ Estuaries ▪ Mudflats and sandflats not covered by seawater at low tide ▪ Salicornia and other annuals colonising mud and sand ▪ Atlantic salt meadows (Glauco-Puccinellietalia maritimae) ▪ Mediterranean salt meadows (Juncetalia maritimi)	0.05	None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
IE004028 Blackwater Estuary SPA	**Overwintering waterfowl and wildfowl:** ▪ Golden Plover (*Pluvialis apricaria*) ▪ Lapwing (*Vanellus vanellus*) ▪ Black-tailed Godwit (*Limosa limosa*) ▪ Bar-tailed Godwit (*Limosa lapponica*) ▪ Curlew (*Numenius arquata*) ▪ Dunlin (*Calidris alpina*) ▪ Redshank (*Tringa totanus*) ▪ Wigeon (*Anas penelope*) (NPWS, 2012a)	1.92	Visual disturbance	**No** - The SPA is important for overwintering birds and not breeding birds. As the survey will be conducted during summer months (April to October) outside of the over wintering period there will not be a temporal overlap between the Qualifying Interests and the proposed site investigations.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
IE002170 Blackwater River SAC	▪ Estuaries, ▪ Mudflats and sandflats not covered by seawater at low tide, ▪ Perennial vegetation of stony bank, ▪ Salicornia and other annuals colonizing mud and sand, ▪ Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), ▪ Mediterranean salt meadows (*Juncetalia maritimi*), ▪ Freshwater pearl mussel (*Margaritifera margaritifera*) ▪ White-clawed crayfish (*Austropotamobius pallipes*) (NPWS, 2012b)	0.50	None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
	▪ Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, ▪ Old sessile oak woods with Ilex and Blechnum in the British Isles,		None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pressure receptor pathway	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
	▪ Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior *Alno-Padion*,					
	Fish species: ▪ Twaite shad *(Alosa fallax fallax*)		Underwater sound changes	**No** refer to information provided in Section A.3.2.1.	**No** potential for in-combination effect. Refer to information provided in Section A.3.2.1.	**SCREENED OUT**
	▪ Atlantic salmon (*Salmo salar*) ▪ Sea lamprey *(Petromyzon marinus*) ▪ River Lamprey *(Lampetra fluviatilis*) ▪ Brook lamprey (*Lampetra planeri*) ▪ (NPWS, 2012b)		Underwater sound changes	**No** – Atlantic salmon, sea lamprey and river lamprey are not sensitive to underwater sound changes generated by geophysical survey.	**No** potential for in-combination effect as species are not sensitive to underwater noise changes.	**SCREENED OUT**
	▪ Otter (*Lutra lutra*)		Underwater sound changes	**No** – These species are restricted to the estuary or close to the shore and therefore animals from the site will not be observed in the FLAA.	**No** potential for in-combination effect as these species will be restricted to the estuary and coast and away from the zone of influence.	**SCREENED OUT**
IE004030 Cork Harbour SPA	**Wintering waterfowl** (NPWS 2014b) ▪ Little Grebe (*Tachybaptus ruficollis*) ▪ Great Crested Grebe (*Podiceps cristatus*) ▪ Cormorant (*Phalacrocorax carbo*) ▪ Grey Heron (*Ardea cinerea*) ▪ Shelduck (*Tadorna tadorna*) ▪ Wigeon (*Anas penelope*) ▪ Teal (*Anas crecca*) ▪ Pintail (*Anas acuta*) ▪ Shoveler (*Anas clypeata*) ▪ Red-breasted Merganser (*Mergus serrator*) ▪ Oystercatcher (*Haematopus ostralegus*) ▪ Golden Plover (*Pluvialis apricaria*) ▪ Grey Plover (*Pluvialis squatarola* ▪ Lapwing (*Vanellus vanellus*)	19	Visual disturbance	**No -** The SPA is important for overwintering birds and not breeding birds. As the survey will be conducted during summer months (April to October) outside of the over wintering period there will not be a temporal overlap between the Qualifying Interests and the proposed site investigation.	**No** potential for in-combination effect as there is no pathway for effect with the survey	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
	▪ Dunlin (*Calidris alpina*) ▪ Black-tailed Godwit (*Limosa limosa*) ▪ Bar-tailed Godwit (*Limosa lapponica*) ▪ Curlew (*Numenius arquata*) ▪ Redshank (*Tringa totanus*) ▪ Black-headed Gull (*Chroicocephalus ridibundus*) ▪ Common Gull (*Larus canus*) ▪ Lesser Black-backed Gull (*Larus fuscus*) ▪ Common Tern (*Sterna hirundo*)					
	Breeding seabirds (NPWS 2014b) Common tern (*Sterna hirundo*)	19	Visual disturbance	**No –** The survey operations are planned between April and October. Considering the breeding seasons for chough, peregrine, kittiwake, herring gull and cormorant, the combined breeding season for this SPA extends from February through to September. The most vulnerable birds to disturbance would be nesting birds and breeding birds within 2km of the proposed site investigation works. As the SPA is located 11km from the SPA boundary site investigation works will not disturb breeding or nesting birds.	**No.** The wider IEMEP is partly within this SPA. Although there is the potential for intra-project effects as the proposed site investigations would be part of a wider survey campaign, the Screening for AA for the IEMEP (reference FLA FS006859) concluded that the IEMEP survey will not have a likely significant effect on the SPA either alone or in combination. The introduction of the proposed site investigation does not change this conclusion, due to the distance of the proposed site investigations from the SPA.	**SCREENED OUT**
IE004192 Helvick Head to Ballyquin SPA	**Breeding birds** (NPWS 2018b): ▪ Cormorant (*Phalacrocorax carbo)* ▪ Herring gull (*Larus argentatus)* ▪ Kittiwake (*Rissa tridactyla*) ▪ Peregrine (*Falco peregrinus*)	11.06	Visual disturbance	**No –** The survey operations are planned between April and October. Considering the breeding seasons for chough, peregrine, kittiwake, herring gull and cormorant, the combined	**No.** The wider IEMEP is partly within this SPA. Although there is the potential for intra-project effects as the proposed site investigations would be part of a wider survey campaign, the	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
	▪ Chough (*Pyrrhocorax pyrrhocorax*)			breeding season for this SPA extends from February through to September. The most vulnerable birds to disturbance would be nesting birds and breeding birds within 2km of the proposed site investigation works. As the SPA is located 11km from the SPA boundary site investigation works will not disturb breeding or nesting birds.	Natura Impact Statement for the IEMEP (reference FLA FS006859) concluded that with the implementation of project specific mitigation the IEMEP survey will not have an adverse effect on the integrity of the SPA either alone or in combination. The introduction of the proposed site investigation does not change this conclusion, due to the distance of the proposed site investigations from the SPA.	
IE004032 Dungarvan Harbour SPA	**Wintering waterbirds** (NPWS 2012c) ▪ Great Crested Grebe (*Podiceps cristatus*) ▪ Light-bellied Brent Goose (*Branta bernicla* hrota) ▪ Shelduck (*Tadorna tadorna*) ▪ Red-breasted Merganser (*Mergus serrator*) ▪ Oystercatcher (*Haematopus ostralegus*) ▪ Golden Plover (*Pluvialis apricaria*) ▪ Grey Plover (*Pluvialis squatarola*) ▪ Lapwing (*Vanellus vanellus*) ▪ Knot (*Calidris canutus*) ▪ Black-tailed Godwit (*Limosa limosa*) ▪ Bar-tailed Godwit (*Limosa lapponica*) ▪ Curlew (*Numenius arquata*) ▪ Turnstone (*Arenaria interpres*) ▪ Dunlin (*Calidris alpina*) ▪ Redshank (*Tringa totanus*)	19.3	Visual disturbance	**No** - The SPA is important for overwintering birds and not breeding birds. As the survey will be conducted during summer months (April to October) outside of the over wintering period there will not be a temporal overlap between the designating features and the proposed works. Birds will not be disturbed by the proposed works. In addition, there is no spatial overlap between the important habitat and the intrusive survey works.	**No** potential for in-combination effect from visual disturbance as there will be no spatial or temporal overlap with other projects in the area.	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
IE004193 Mid-Waterford Coast SPA	**Breeding birds** (NPWS 2018c): ▪ Cormorant (*Phalacrocorax carbo)* ▪ Herring Gull (*Larus argentatus)* ▪ Peregrine (*Falco peregrinus)* ▪ Chough (*Pyrrhocorax pyrrhocorax)*	11	Visual disturbance	**No –** Birds identified as being sensitive to the proposed survey are nesting birds and individuals within 2km of the FLAA. SPA is located 11km from the SPA boundary site investigation works and therefore it will not disturb breeding or nesting birds.	**No.** The wider IEMEP is partly within this SPA. Although there is the potential for intra-project effects as the proposed site investigations would be part of a wider survey campaign, the Natura Impact Statement for the IEMEP (reference FLA FS006859) concluded that with the implementation of project specific mitigation the IEMEP survey will not have an adverse effect on the integrity of the SPA either alone or in combination. The introduction of the proposed site investigation does not change this conclusion, due to the distance of the proposed site investigations from the SPA.	**SCREENED OUT**
IE004124 Sovereign Islands SPA	**Breeding waterbirds** (NPWS 2018e): Cormorant (*Phalacrocorax carbo)*	12	Visual disturbance	**No** - Birds identified as being sensitive to the proposed survey are nesting birds and individuals within 2km of the FLAA. SPA is located 12km from the SPA boundary site investigation works and therefore it will not disturb breeding or nesting birds.	**No** potential for in-combination effect from visual disturbance as there will be no spatial or temporal overlap with other projects in the area.	**SCREENED OUT**
UK0030396 Bristol Channel Approaches/ Dynesfeydd Mor Hafren SAC	▪ Harbour porpoise *(Phocoena phocoena)* JNCC (2019a)	177	Underwater sound changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives.	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
				Further information on how this conclusion has been reached is provided in Section A.3.2.2 below.		
UK0012712 Cardigan Bay/ Bae Ceredigion SAC	▪ Bottlenose dolphin (*Tursiops truncatus*) JNCC (2019b)	191	Underwater sound changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is provided in Section A.3.2.2 below.	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**
UK0030398 North Anglesey Marine/ Gobledd Mon Forol SAC	▪ Harbour porpoise (*Phocoena phocoena* (JNCC 2019)	233	Underwater sounds changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is provided in Section A.3.2.2 below.	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**
UK0030399 North Channel SAC	▪ Harbour porpoise (*Phocoena phocoena*) JNCC (2019e)	297	Underwater sound changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
				very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is provided in Section A.3.2.2 below.	the FLAA and other projects that would undermine the conservation objectives of the SAC.	
IE000101 Roaringwater Bay and Islands SAC	▪ Large shallow inlets and bays ▪ Reefs ▪ Submerged or partially submerged sea caves	110km	None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
	▪ Vegetated sea cliffs of the Atlantic and Baltic coasts ▪ European dry heaths		None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
	▪ Otter (*Lutra lutra)*		Underwater sounds changes	**No** – Will not be present in FLAA or zone of influence for underwater sound changes.	**No** potential for in-combination effect as these species will be restricted to the estuary and Coast and away from the zone of influence.	**SCREENED OUT**
	▪ Grey Seal (*Halichoerus grypus*)		Underwater sounds changes	**No** – Will not be present in FLAA or zone of influence for underwater sound changes.	**No** potential for in-combination effect as these species will be restricted to the estuary and Coast and away from the zone of influence.	**SCREENED OUT**
	▪ Harbour Porpoise (*Phocoena phocoena*).		Underwater sounds changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
				provided in Section A.3.2.2 below.		
IE003000 Rockabill to Dalkey Island SAC	▪ Reefs	188	None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
	▪ Harbour Porpoise (*Phocoena phocoena*). NPWS (2013c)		Underwater sound changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is provided in Section A.3.2.2 below.	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**
IE003000 Saltee Islands SAC	▪ Mudflats and sandflats not covered by seawater at low tide ▪ Large shallow inlets and bays ▪ Reefs ▪ Vegetated sea cliffs of the Atlantic and Baltic coasts ▪ Submerged or partially submerged sea caves	72km	None	**No** - No pressure receptor pathway identified.	**No** potential for in-combination effect as there is no pathway for effect with the survey.	**SCREENED OUT**
	▪ Grey Seal (*Halichoerus grypus*) NPWS (2013a)		Underwater sound changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**

Site Code & Name	Qualifying Interests	Distance to FLAA (km)	Potential Pressures	Likelihood of interaction between site investigation works and designating feature(s)	Potential for In-combination effects	Conclusion
				provided in Section A.3.2.2 below.		
UK0030397 West Wales Marine/ West Gorllewin Crymru Forol SAC	▪ Harbour porpoise (*Phocoena phocoena*) JNCC (2019c)	142	Underwater sounds changes	**No** – Due to the distance of this site from the FLAA, the likelihood of any interaction between individuals from the site with the proposed site investigations is very low. Therefore, the proposed site investigations are not capable of undermining the site's conservation objectives. Further information on how this conclusion has been reached is provided in Section A.3.2.2 below.	**No** potential for in-combination effect. Given that the zone of influence for disturbance is 5km, there will not be a spatial overlap of disturbance between the FLAA and other projects that would undermine the conservation objectives of the SAC.	**SCREENED OUT**

A.3.2 Information to Support Screening Conclusion

A search for relevant European Sites identified 18 European Sites within the defined search areas listed in Table A-3. Table A-3 has concluded that the proposed site investigation will not have a likely significant effect either alone or in combination with other plans and projects and will not undermine the conservation objectives of any SAC or SPA. Information to support this conclusion in relation to underwater sound changes is provided below.

A.3.2.1 Underwater sound changes – Annex II fish species

Table A-3 identified a possible pressure-receptor pathway for the pressure underwater sound changes between the proposed survey and the Qualifying Interest twaite shad, of the Blackwater River (Cork/Waterford) SAC. The FLAA does not lie within the boundary for the SAC, but it is recognised that due to its proximity twaite shad from the SAC may be present within the FLAA. Twaite shad are sensitive to noise changes and therefore potentially vulnerable to the proposed site investigations.

The conservation objectives for the SAC are:

To restore the favourable conservation condition of twaite shad in the site, which is defined by the following list of attributes and targets:

- Distribution: extent of anadromy - greater than 75% of main stem length of rivers accessible from estuary,
- Population structure: age classes - more than one age class present,
- Extent and distribution of spawning habitat - No decline in extent and distribution of spawning habitats,
- Water quality: oxygen levels – no lower than 5mg/l, and
- Spawning habitat quality: Filamentous algae; macrophytes; sediment - Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth.

The upper stretches of the Blackwater River (Cork/Waterford) SAC are designated for the presence of twaite shad. Twaite shad occur in coastal waters and in estuaries along the southeast coast of Ireland. Twaite shad are anadromous, migrating to freshwater to spawn in early summer (May to July). At maturity (3 years old for males and 5 years old for females), they stop feeding and congregate in the estuaries of suitable rivers in April and May. Upstream migration from the estuaries appears to be triggered by temperature, with peak migratory activity occurring at water temperatures of 10–14°C. Given that twaite shad reach maturity at age 3-5, twaite shad are likely to be found in coastal areas of the FLAA all year round, with the greatest density likely to be observed during the May-July migration. The proposed geophysical survey is not within the estuaries of any of the important Twaite shad rivers.

Different fish species react differently to sound. The typical behavioural response to sounds by fish might range from no change in behaviour, to a mild awareness (startle response) to larger movements of temporary displacement for the duration of the sound (Popper and Hastings, 2009). Popper et al. (2014) identified that there is no direct evidence of permanent injury to fish species from shipping and other continuous noise (such as the near-continuous noise produced by geophysical equipment). Most noise from a geophysical survey is generated at frequencies greater than 1kHz, above the auditory capacity of fish (generally between 0.2Hz to 1kHz). In addition, sound from survey equipment is targeted towards the seabed, meaning that effects to fish are only expected if they are within the immediate zone of ensonification below the survey vessel.

Clupeids (the family which Twaite shad is a member of) are expected to show strong avoidance behaviour (i.e. reaction by virtually all individuals) within 8m of the works, whilst significant avoidance (85% of individuals will react to noise) is expected within 66m (Nedwell et al. 2012). The proposed site

investigations should be considered in the context of the existing baseline sound environment. Shipping density within the FLAA is generally low. However, adjacent to the FLAA are relatively high density shipping and cargo traffic routing to/from Cork Port. Therefore, the change in underwater sound caused by the addition of the survey vessels for the proposed site investigations will not be noticeable above natural and anthropogenic noise in the region.

In relation to the impulsive, high frequency sounds that will be produced as part of the geophysical survey, it has been found that pacific herring (another member of the Clupidae family) display no behavioural response to high frequency sounds from sonar or echo sounders (Peng, Zhao and Liu, 2015). As such, it is likely that twaite shad will show no visible behavioural response to these survey methods.

During the geophysical survey, the continued noise within 24-hour operations means it is likely that the most hearing sensitive fish species e.g. twaite shad will demonstrate temporary avoidance behaviour from early on and remain outside the zone of influence for the duration of the operation. The potential zone of influence is transient as it moves slowly in a constant direction along the principal survey line orientation. It is predicted that fish will avoid the area once operations have started and are extremely unlikely to move towards the sound source. The works will not lead to any long-term displacements as they are transient and brief. Individuals are expected to return once the operation has passed through.

Based on the above discussion, any disturbance effects from noise associated with operations will be localised, brief and transient. There will be no long-term effect on the distribution of the species and migration to and from rivers will not be impeded.

Given that spawning occurs upstream in the relevant rivers, outside the zone of influence of the survey, the survey will not affect twaite shad spawning habitat, their distribution and population structure, nor will it cause a deterioration in water quality.

None of the proposed projects identified will be conducted in the reivers important for twaite shad and there is therefore no potential for cumulative effects. In conclusion, screening for AA has identified no likely significant effects on the conservation objectives of the SAC.

A.3.2.2 Underwater sound changes - Annex II cetacean and pinniped species

Table A-3 identified a possible pressure-receptor pathway for the pressure underwater sound changes between the proposed survey and the Qualifying Interests of eight European Sites. The FLAA does not lie within proximity to any SAC designated for Annex II cetacean or pinniped species. The closest site lies 72km distant.

The geophysical survey includes the use of multi-beam echo-sounders, side scan sonars and sub bottom profilers. One of the most important environmental concerns related to the proposed activities is the potential effects of underwater sound on marine mammals. Both cetaceans and pinnipeds have evolved to use sound as an important aid in navigation, communication and hunting (Richardson et al. 1995). It is generally accepted that exposure to anthropogenic sound can induce a range of effects on marine mammals. These range from insignificant effects to behavioural changes, non-injurious type effects (including masking of biologically relevant sound signals, such as communication signals), and ultimately can lead to physical injury and death if the sound source is sufficiently intense.

The AA screening has used the qualitative underwater noise assessment provided in Section 3.5 to inform the conclusions, namely:

- There is no evidence that the geophysical survey will lead to injurious effects.
- Harbour porpoise, common, bottlenose dolphin, grey and harbour seal could be exposed to sound levels that are sufficient to cause disturbance within 5km of the geophysical sound source.

The AA screening concluded that for all SACs screened the distant from the FLAA is too far for the zone of influence to overlap with the SAC boundaries. The conservation objectives for the SACs are broadly similar and seek to maintain the favourable condition of the Annex II species by protecting the following attributes:

a. Access to suitable habitat – species range within the site should not be restricted by artificial barriers to site use.
b. Disturbance - Human activities should occur at levels that do not adversely affect the community at the site
c. The species is a viable component of the site.
d. Breeding behaviour – The breeding sites should be maintained in a natural condition.
e. Moulting behaviour - The moult haul-out sites should be maintained in a natural condition.
f. Resting behaviour - The resting haul-out sites should be maintained in a natural condition.
g. Population composition - The population occurring within the site should contain adult, juvenile and pup cohorts annually

The zone of influence for the geophysical survey will not restrict access to suitable habitat within any of the SACs, it is sufficiently distant to not affect breeding, moulting or resting behaviour and will not alter population composition. In addition, it will not act as a barrier impeding access to or from a site. In conclusion, it will not undermine any of the site's conservation objectives. This conclusion is drawn without taking into consideration the implementation of mitigation measures.

It is acknowledged that all cetaceans are protected in Irish waters no matter their location as a European Protected Species. An assessment of the potential effects on European Protected Species outside of a designated SAC are described in Section 3.5 above.

A.4 SCREENING STATEMENT AND CONCLUSIONS

To determine whether the proposed survey is likely to have a significant effect on any European Sites, either individually or in-combination with other plans or projects, AA screening was carried out.

Screening of 18 relevant European Sites concluded that the proposed site investigation works will not have a likely significant effect either alone or in combination with other plans and projects and will not undermine the conservation objectives of any SAC or SPA.

APPENDIX B

Guidance to Manage the Risk to Marine Mammals from Man-made sound sources in Irish Waters: Section 4.3.4

B.1 GEOPHYSICAL ACOUSTIC SURVEYS

B.1.1 Multibeam, single beam, side-scan sonar & sub-bottom profiler surveys

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 (Appendix 6).
2. Unless information specific to the location and/or plan/project is otherwise available to inform the mitigation process (e.g., specific sound propagation and/or attenuation data) and a distance modification has been agreed with the Regulatory Authority, acoustic surveying using the above equipment 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.

B.1.1.1 Pre-Start Monitoring

3. Sound-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the Marine Mammal Observer has been achieved. Where effective visual monitoring, as determined by the Marine Mammal Observer, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.
4. An agreed and clear on-site communication signal must be used between the Marine Mammal Observer 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 Marine Mammal Observer.
5. **In waters up to 200m deep**, the Marine Mammal Observer 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 Marine Mammal Observer.
6. This prescribed Pre-Start Monitoring shall subsequently be followed by a Ramp-Up Procedure which should include continued monitoring by the Marine Mammal Observer.

B.1.1.2 Ramp-Up Procedure

7. 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.
8. 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.

9. 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

B.1.1.3 Breaks in sound output

10. 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.
11. 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.

B.1.1.4 Reporting

12. Full reporting on Marine Mammal Observer operations and mitigation undertaken must be provided to the Regulatory Authority as outlined in Appendix 6.