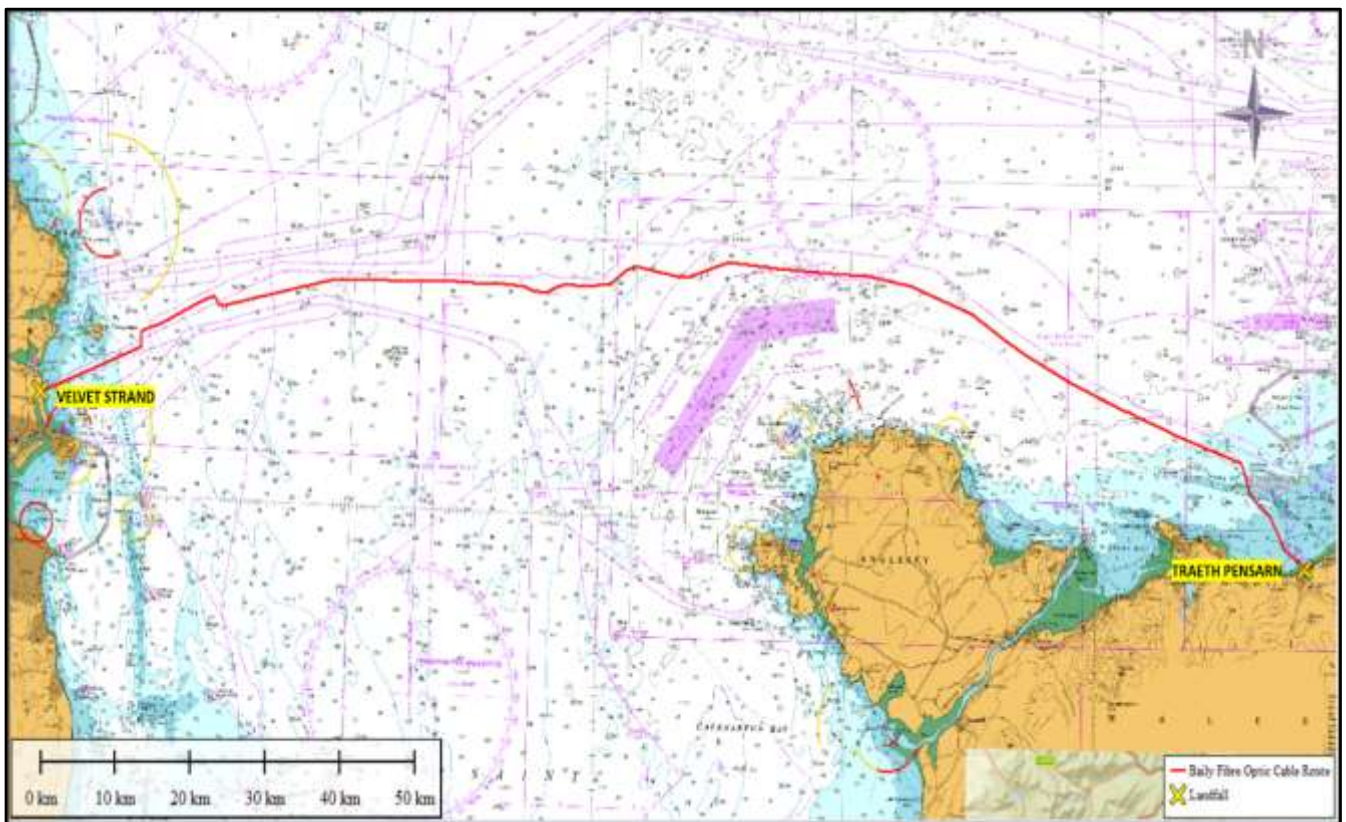


Natura Impact Statement – Information for a Stage 2 (Natura Impact Statement) AA for Marine Survey and Site Investigation Works for a Fibre Optic Cable at Velvet Strand, Portmarnock, Co. Dublin.



01st September 2026

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1. Introduction

The following Natura Impact Statement (NIS) has been prepared by **Altamar Ltd.** for marine survey and site investigation works for a fibre optic cable at Portmarnock, Co. Dublin.

An Appropriate Assessment is an assessment of the potential effects of a proposed project or plan, on its own, or in combination with other plans or projects, on one or more European sites. European sites are those sites designated as Special Areas of Conservation (SAC) or Special Protection Areas (SPA). A Supporting Information for Screening for Appropriate Assessment Report (SISAA) was carried out for the proposed project and concluded that *'Acting on a strictly precautionary basis, NIS is required in respect of the effects of the project on the Natura 2000 sites screened IN for NIS (potential habitat and disturbance effects in the absence of mitigation) because it cannot be excluded on the basis of best objective scientific information following screening, in the absence of control or mitigation measures that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the named European Site/s.'*

An NIS or Stage 2 Appropriate Assessment is not required for the effects of the project on all other Natura sites because it can be excluded on the basis of the best objective scientific information following screening that the plan or project, individually and/or in combination with other plans or projects, will have a significant effect on the European Site/s. A Stage 2 AA is required for the proposed project.'

This Natura Impact Statement (NIS) examines whether the plan or project, either alone, or in combination with other plans and projects, in the view of best scientific knowledge and in view of the sites' conservation objectives, will adversely affect the integrity of the European sites or species populations for which the site/s were designated.

1.1 Altamar Ltd.

Since its inception in 2001, Altamar has been delivering ecological and environmental services to a broad range of clients. Operational areas include residential, infrastructural, renewable, oil & gas, private industry, local authorities, EC projects and State/semi-State Departments. Bryan Deegan is the managing director of Altamar. Bryan is an environmental scientist and marine biologist with 32 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture). Bryan Deegan carried out all elements of this Appropriate Assessment Screening.

2. Background to the Appropriate Assessment

The Habitats Directive 92/43/EEC (together with the Birds Directive (2009/1477/EC)) forms the cornerstone of Europe's nature conservation policy. The Directive protects over 1000 animals and plant species and over 200 "habitat types" which are of European importance. In the Habitats Directive, Articles 3 to 9 provide the legislative means to protect habitats and species of European Community interest through the establishment and conservation of an EU-wide network of conservation sites (Natura, 2000). These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive), Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European sites. Article 6(3) establishes the requirement for Appropriate Assessment:

"Any plan or project not directly connected with or necessary to the management of the [EUROPEAN] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the component 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."

As outlined in “Managing European sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC” (European Commission, 21 November 2018) *“The purpose of the appropriate assessment is to assess the implications of the plan or project in respect of the site’s conservation objectives, either individually or in combination with other plans or projects. The conclusions should enable the competent authorities to ascertain whether the plan or project will adversely affect the integrity of the site concerned. The focus of the appropriate assessment is therefore specifically on the species and/or the habitats for which the European site is designated.”*

As outlined in the EC guidance document on Article 6(4) (January 2007)¹:

“Appropriate assessments of the implications of the plan or project for the site concerned must precede its approval and take into account the cumulative effects which result from the combination of that plan or project with other plans or projects in view of the site's conservation objectives. This implies that all aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field.

Assessment procedures of plans or projects likely to affect European sites should guarantee full consideration of all elements contributing to the site integrity and to the overall coherence of the network, both in the definition of the baseline conditions and in the stages leading to identification of potential impacts, mitigation measures and residual impacts. These determine what has to be compensated, both in quality and quantity. Regardless of whether the provisions of Article 6(3) are delivered following existing environmental impact assessment procedures or other specific methods, it must be ensured that:

- *Article 6(3) assessment results allow full traceability of the decisions eventually made, including the selection of alternatives and any imperative reasons of overriding public interest.*
- *The assessment should include all elements contributing to the site’s integrity and to the overall coherence of the network as defined in the site’s conservation objectives and Standard Data Form, and be based on best available scientific knowledge in the field. The information required should be updated and could include the following issues:*
 - *Structure and function, and the respective role of the site’s ecological assets;*
 - *Area, representativity and conservation status of the priority and nonpriority habitats in the site;*
 - *Population size, degree of isolation, ecotype, genetic pool, age class structure, and conservation status of species under Annex II of the Habitats Directive or Annex I of the Birds Directive present in the site;*
 - *Role of the site within the biographical region and in the coherence of the European network; and,*
 - *Any other ecological assets and functions identified in the site.*
- *It should include a comprehensive identification of all the potential impacts of the plan or project likely to be significant on the site, taking into account cumulative impacts and other impacts likely to arise as a result of the combined action of the plan or project under assessment and other plans or projects.*
- *The assessment under Article 6(3) applies the best available techniques and methods, to estimate the extent of the effects of the plan or project on the biological integrity of the site(s) likely to be damaged.*
- *The assessment provides for the incorporation of the most effective mitigation measures into the plan or project concerned, in order to avoid, reduce or even cancel the negative impacts on the site.*
- *The characterisation of the biological integrity and the impact assessment should be based on the best possible indicators specific to the European assets which must also be useful to monitor the plan or project implementation.”*

¹ European Commission. (2007). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission;

3. Stages of the Appropriate Assessment

This Appropriate Assessment screening was undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001), Part XAB of the Planning and Development Act 2000, as amended, in addition to the December 2009 publication from the Department of Environment, Heritage and Local Government; 'Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities' and the European Communities (Birds and Natural Habitats) Regulations 2011. In order to comply with the above Guidelines and legislation, the Appropriate Assessment process must be structured as follows:

1) Screening stage:

- Description of plan or project, and local site or plan area characteristics;
 - Identification of relevant European sites, and compilation of information on their qualifying interests and conservation objectives
 - Identification and description of individual in combination effects likely to result from the proposed project;
 - Assessment of the likely significance of the effects identified above. Exclusion of sites where it can be objectively concluded that there will be no likely significant effects; and,
- Conclusions

2) Appropriate Assessment (Natura Impact Statement):

- Description of the European sites that will be considered further;
 - Identification and description of potential adverse impacts on the conservation objectives of these sites likely to occur from the project or plan; and,
 - Mitigation Measures that will be implemented to avoid, reduce or remedy any such potential adverse impacts
 - Assessment as to whether, following the implementation of the proposed mitigation measures, it can be concluded, beyond all reasonable scientific doubt, that there will be no adverse impact on the integrity of the relevant European Site in light of its conservation objectives"
- Conclusions.

If it can be demonstrated during the AA screening phase (Stage 1), that the proposed project will not have a significant effect, whether alone or in combination with other plans or projects, on the conservation objectives of a European site, then no further AA (Stage 2) will be required. It is important to note that there is a requirement to apply a precautionary approach to AA screening. Therefore, where effects are possible, certain or unknown at the screening stage, AA will be required.

In addition, it should be noted that Article 6(3) of the Habitats Directive must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an AA of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.

4. Description of the Proposed Project

4.1 Management of the Site

The plan or project is not directly connected with, or necessary to the management of Natura 2000 sites.

4.2 Background

The applicant plans to investigate the feasibility of constructing a new subsea telecoms cable system, Baily, linking Ireland to the United Kingdom, from a landfall at Velvet Strand, Dublin to a landfall at Traeth Pensarn, Wales as shown in Figure 1 below. The applicant intends to undertake the survey campaign at the proposed Licence Application Area within the IRL Exclusive Economic Zone (EEZ) in order to inform the location and design of the proposed cable route and landfall.

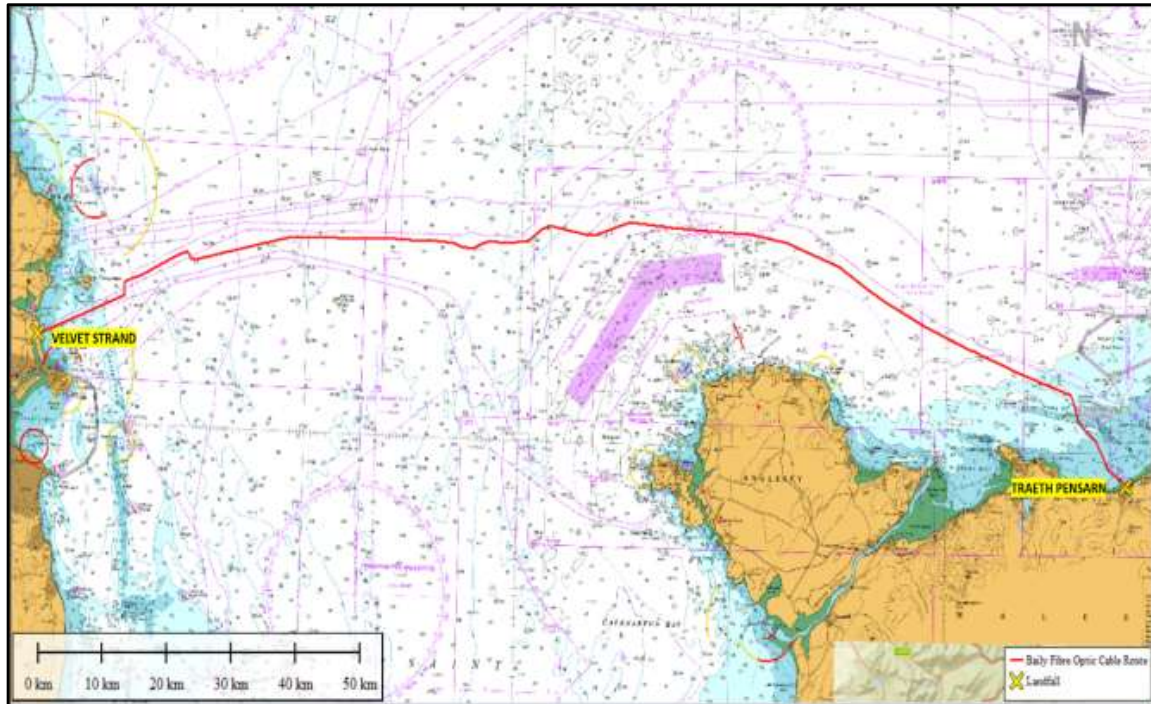


Figure 1. Proposed Baily Telecoms Cable System (source: MDM)

The works will be carried out predominantly by remote seabed mapping techniques (geophysical survey) with some selective sampling of the upper layers of the seabed (geotechnical survey). Once the results of the survey are obtained and analysed a preferred route corridor will be determined, design and method statements will be developed, and a final Route Position List (RPL) will be defined as part of further submissions for a Maritime Area Consent and Planning consent for the installation works.

PROPOSED SURVEY ROUTE AND SURVEY LICENCE APPLICATION AREA IN IRISH TERRITORIAL WATERS

Licence Application Area

The License Application Area is situated off the coast of North Dublin (Figure 2). The licensed survey corridor has length of approx. 60 km and a total area of 3000 hectares within EEZ limits. A cable route corridor of approx. 500m width will be surveyed within the licence application area.

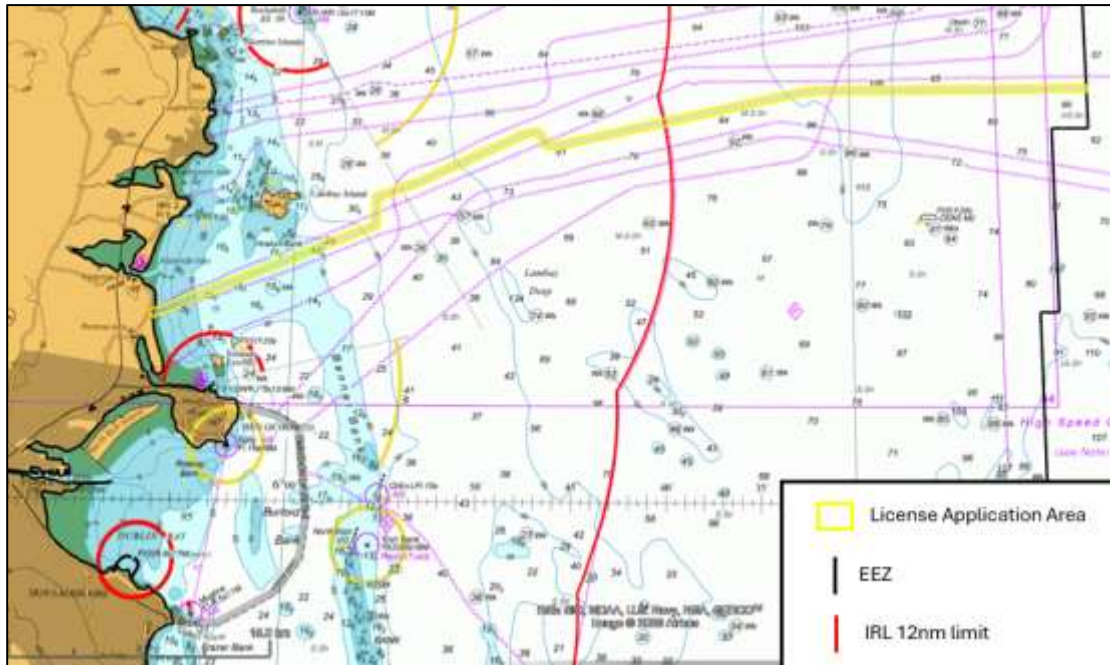


Figure 2. Proposed Survey Licence Application Area (Source: MDM)



Figure 3. Landfall Location (Source: MDM)

Landfall & Inshore Survey Corridors

The License application area covers the proposed landfall option at Portmarnock. The location of the proposed landfall and proposed survey route is shown above in Figure 3.

Portmarnock & Malahide

The License application area covers potential landfall at Portmarnock. At Portmarnock the landfall location is adjacent to the Portmarnock Resort & Jameson Golf Links. The Route Position List represents the survey corridor and encompasses the landfall area. If required, access to the beach and intertidal zone at the landfall for vehicles or equipment will be via the concrete public slipway off the R106 Coast Road (Figure 4).

The Route Position List for the Licence Application Area is presented in Table 1.

Table 1. Survey Licence Area RPL (Source: MDM)

Idx	Latitude	Longitude	Idx	Latitude	Longitude
1	53° 25' 42.1995" N	6° 07' 26.5107" W	30	53° 33' 27.3736" N	5° 17' 4.8869" W
2	53° 26' 8.1669" N	6° 05' 41.7828" W	31	53° 33' 26.6720" N	5° 18' 58.5380" W
3	53° 26' 34.1083" N	6° 03' 57.0203" W	32	53° 33' 25.7897" N	5° 20' 52.2245" W
4	53° 27' 0.0170" N	6° 02' 12.2186" W	33	53° 33' 25.2761" N	5° 22' 45.9216" W
5	53° 27' 25.7409" N	6° 00' 27.2726" W	34	53° 33' 24.7323" N	5° 24' 39.6194" W
6	53° 27' 51.4567" N	5° 58' 42.3047" W	35	53° 33' 24.1585" N	5° 26' 33.3177" W
7	53° 28' 16.9428" N	5° 56' 57.1633" W	36	53° 33' 23.5547" N	5° 28' 27.0166" W
8	53° 28' 50.0408" N	5° 55' 27.5673" W	37	53° 33' 22.9296" N	5° 30' 20.7160" W
9	53° 29' 42.1344" N	5° 54' 48.3812" W	38	53° 33' 19.6834" N	5° 32' 14.0607" W
10	53° 30' 6.3266" N	5° 53' 2.3556" W	39	53° 33' 7.0152" N	5° 34' 5.6824" W
11	53° 30' 35.4342" N	5° 51' 19.8012" W	40	53° 32' 52.1330" N	5° 35' 56.5924" W
12	53° 31' 4.5167" N	5° 49' 37.2085" W	41	53° 32' 37.2431" N	5° 37' 47.4898" W
13	53° 31' 33.4103" N	5° 47' 54.4485" W	42	53° 32' 22.5097" N	5° 39' 38.4368" W
14	53° 31' 14.7959" N	5° 46' 25.3995" W	43	53° 32' 7.4024" N	5° 41' 29.2327" W
15	53° 31' 25.5822" N	5° 44' 34.1982" W	44	53° 31' 52.2520" N	5° 43' 20.0022" W
16	53° 31' 40.6710" N	5° 42' 43.4235" W	45	53° 31' 37.1517" N	5° 45' 10.7800" W
17	53° 31' 55.8584" N	5° 40' 52.6771" W	46	53° 31' 51.2870" N	5° 46' 42.9362" W
18	53° 32' 10.6500" N	5° 39' 1.7717" W	47	53° 31' 41.5394" N	5° 48' 29.8405" W
19	53° 32' 25.3795" N	5° 37' 10.8323" W	48	53° 31' 12.7371" N	5° 50' 12.6780" W
20	53° 32' 40.2886" N	5° 35' 19.9515" W	49	53° 30' 43.4891" N	5° 51' 55.1441" W
21	53° 32' 55.5876" N	5° 33' 29.2112" W	50	53° 30' 14.8125" N	5° 53' 37.9877" W
22	53° 33' 6.4570" N	5° 31' 37.1263" W	51	53° 29' 51.2561" N	5° 55' 24.4663" W
23	53° 33' 6.7738" N	5° 29' 43.4360" W	52	53° 28' 54.1453" N	5° 55' 54.3420" W
24	53° 33' 7.1774" N	5° 27' 49.7464" W	53	53° 28' 25.6606" N	5° 57' 32.5017" W
25	53° 33' 7.6351" N	5° 25' 56.0584" W	54	53° 27' 59.9412" N	5° 59' 17.4899" W
26	53° 33' 8.3431" N	5° 24' 2.3752" W	55	53° 27' 34.1957" N	6° 01' 2.4437" W
27	53° 33' 8.6489" N	5° 22' 8.6883" W	56	53° 27' 8.4241" N	6° 02' 47.3629" W
28	53° 33' 9.4403" N	5° 20' 15.0094" W	57	53° 26' 42.6264" N	6° 04' 32.2476" W
29	53° 33' 11.0904" N	5° 18' 21.3579" W	58	53° 26' 16.8025" N	6° 06' 17.0978" W



Figure 4. Landfall at Portmarnock (Source: MDM)

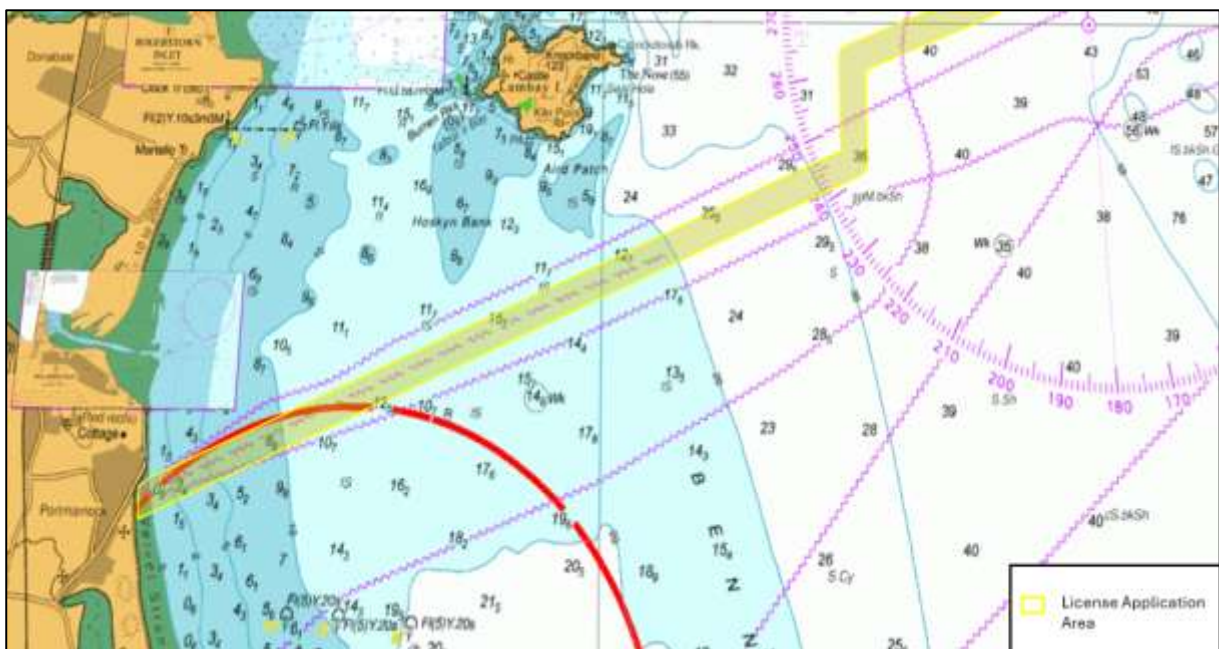


Figure 5. Inshore Survey Sections and Landfalls (Source: MDM)

PROPOSED MARINE SURVEY & SITE INVESTIGATIONS SCHEDULE OF WORKS

The principal objective of the Marine Survey & Site Investigations is to ascertain a feasible and safe route for cable system design, deployment, survivability and subsequent maintenance with due regard for environmental and ecological considerations. The survey will also enable decisions to be made on cable armouring and burial. The survey will identify the necessary water depths, route features, seabed obstructions, seabed geomorphology and cable hazards and will also provide detailed information on the seabed sediment, subsurface stratigraphy and upper sediment layers to support cable route and installation engineering. The site investigations will provide “ground-truthing” of the geophysical data along the route.

The objectives of the marine geophysical survey shall be:

- To collect up to date high-resolution bathymetry along a 400 – 500m wide cable corridor within the License Application Area;
- To obtain information on the seabed surface (type, texture, variability, etc.) and in particular, to identify any seabed features that may be of interest.
- Identify any shallow geohazards and man-made hazards (including but not limited to outcropping, boulders, shallow gas, wrecks, debris etc.);
- Determine the stratigraphy of the upper layers of the seabed along the cable route and quantify the variability in the lateral and vertical extents to depths of 2-5m
- Identify any magnetic anomalies;
- Identify sensitive marine habitats which will need to be avoided during site investigations and sampling.

The survey operations will be broken down into separate but overlapping areas, with boundaries defined by water depth as specified in the technical requirements outlined below. These water depth boundaries may be adjusted due to suitability of the survey vessel(s) and survey spread. The survey and survey line spacing will be designed to ensure adequate coverage and overlap of geophysical measurements.

- Landfall Survey – Intertidal Zone
- Inshore Survey – from 3m Chart Datum to 15m Chart Datum
- Offshore Survey – Water depths greater than 15m Chart Datum

In order to ensure data continuity, coverage between the survey areas is required with indicated overlap below;

- Landfall Survey to Inshore Survey – 50m overlap
- Inshore Survey to Offshore Survey – 500m overlap

Landfall Survey & Site Investigations

A non-intrusive topographic survey along the line of the proposed cable route at the landfall is required to the low water mark. Intertidal and beach surveys (walkover survey) will be carried out on the beach by the project ecologist and the project archaeologist. Access to the beach and intertidal zone at the landfall for vehicles or equipment will be via the concrete public slipway off the R106 Coast Road (Figure 4).

The topographical survey would typically be carried out by GPS Rover, Total Station or UAV Aerial Drone using photogrammetry or LiDAR techniques. The terrestrial geophysical survey will comprise remote sensing techniques such as Ground Penetrating Radar or Electrical Resistivity Tomography (ERT) to establish subsurface features and depth to bedrock and magnetometer or handheld marine metal detector to locate buried ferrous objects.

Landfall Site Investigations will be undertaken to establish the depth and nature of the sediment. The focus of the site investigations will be on the upper layers of sediment to assess the feasibility of cable burial and installation techniques. The following may be undertaken at the landfall:

- Bar probes on the intertidal at 10m spacing (approx. 8 to 10 at the landfall).
- Bar probes from the Low Water Line to the 3m water depth contour at 30m spacing. (approx. 8 to 10 at the landfall)
- 3 Trial Pits on the beach (target depth 2.5m).

The bar probes on the intertidal are manually driven to a depth of 2 metres simply to prove the depth of upper layers of sand, gravel or soft material.

The Trial Pits will be positioned at approximately 30 to 50m centres starting seaward of the High Water Mark. The Trial Pits will be excavated, logged, photographed and backfilled in a single tidal cycle. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated.

A summary Method Statement for excavation of the Trial Pits is as follows;

- Excavate sand and place to one side.
- Excavate substrate and place separate from sand.
- Measure, log and photograph each Trial Pit.
- Backfill in sequence compacting with bucket of back-hoe as the backfilling proceeds.

Inshore Marine Survey

The area extending seaward from the low water mark at the landfall and inshore of the safe working draft limits of the primary survey vessel will be accurately surveyed with a small craft or Unmanned Survey Vessel (USV) using Multibeam Echosounder (MBES), sidescan sonar, marine magnetometer and sub-bottom profile equipment. Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 metres of seabed and will be used on a non-interfering basis with other sounding systems. A minimum of seven survey lines, based upon the Survey RPL, is required.

Features such as shallow reefs, surge channels, debris fields, archaeological features or anything that could be a hazard to the cable or installation team will be noted. General reconnaissance of the survey corridor beyond the planned survey lines and tie-lines may be necessary to describe the seabed as accurately as possible. A line plan showing number of survey lines as a function of depth will be determined prior to start of survey operations.

Table 2. Inshore Survey (Source: MDM)

Survey Area	Depth Range	Survey Corridor Width	Min. # of Lines	Min. Overlap	Typical Survey Speed
Inshore	3m to 15m	400 - 500m	9	SSS: 100% MBES Bathy: 20%	4 knots

Offshore Marine Survey

The area extending seaward from the outer limits of the inshore survey to the EEZ limits will be surveyed by the primary survey vessel using Multibeam Echosounder (MBES), sidescan sonar, marine magnetometer and sub-bottom profiler equipment. A continuous bathymetric swathe along with side scan sonar imagery and sub-bottom traces will be obtained, centred on the preliminary route and along all wing lines needed to complete the route corridor coverage. A minimum of seven survey lines, based upon the Survey RPL, is required.

Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 metres of seabed and will be used on a non-interfering basis with other sounding systems.

Table 3. Offshore Survey (Source: MDM)

Survey Area	Depth Range	Survey Corridor Width	Min. # of Lines	Min. Overlap	Typical Survey Speed
Offshore	> 15m	500m	7	SSS: 100% MBES Bathy: 20%	4 knots

Marine Site Investigations and Seabed Sampling

The purpose of the marine site investigations and seabed sampling is to evaluate the physical properties of the superficial seabed sediments along the cable route. These methodologies will ensure that a full understanding of the subsurface is achieved, focussing on the upper 3 metres of sediment to subsequently develop a cable burial assessment, installation and burial plan.

The scheduled site investigations and seabed sampling within EEZ limits will comprise of the following techniques:

- Up to 15 CPTs (2m to 3m)
- Up to 12 Gravity Cores / Vibrocores (3m)
- Up to 11 Grab Samples

Indicative locations for the relevant site investigation activities (Gravity or Vibrocore and CPT's) are shown in Figure 6. Typically, individual sampling positions will be determined following initial interpretation of the geophysical survey data. The positioning of individual site investigation locations will also take into consideration environmental constraints such as the position of sensitive habitats or archaeological features.

Two or more attempts may be made at each location to acquire a suitable sample. If an acceptable sample is achieved on the first attempt, there is no need to perform a second attempt.

An acceptable sample is defined as;

- Grab Sample – recovery of approximately a full bucket of sediment. Recovery of large size granular material may be taken as indication of a hard seabed.
- Gravity Core / Vibrocore – recovery of < 3m core of soil. If stiff or hard soils are encountered and are clearly indicated in the sample, it sample may be deemed acceptable. Any sample site yielding less than 1m of recovery must be investigated a second or third time unless there is obvious damage to the coring equipment indicating a hard or rocky substrate.
- CPT – Penetration to the 2m target depth or refusal. Any push resulting in less than 2m penetration will warrant a second attempt.

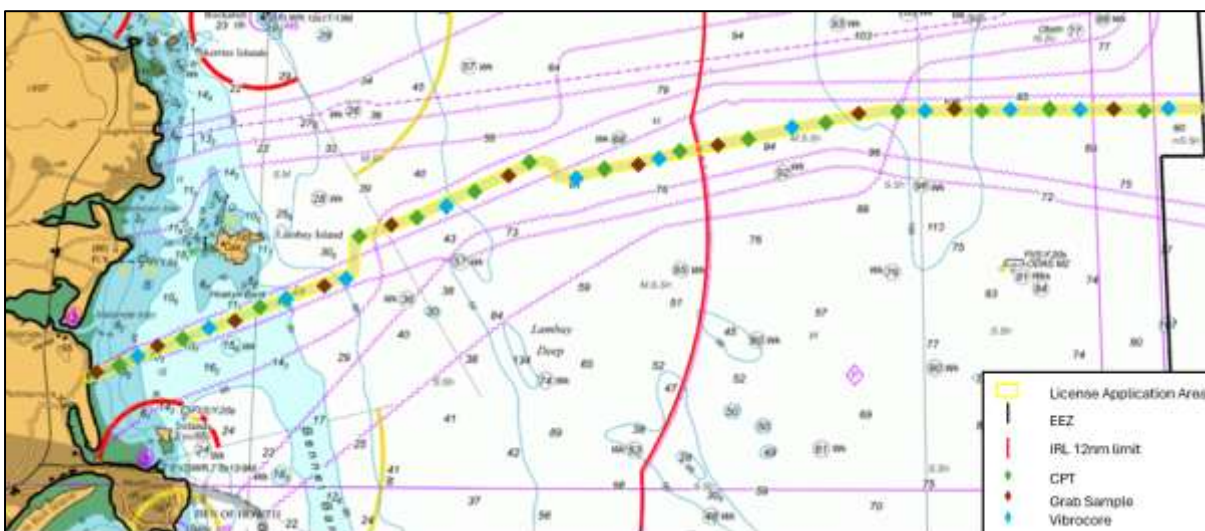


Figure 5. Indicative CPT and Vibrocore Locations (Source: MDM)

The total overall scope of the Site Investigations is as follows

- Bar Probes 10 No. on the intertidal
- Trial Pits 3 No. on the beach
- Bar Probes 10 No. from Low Water to 3m contour.
- Grab Samples 11 No. along the route corridor.
- Gravity Cores / Vibrocores 12 No. along the route corridor.
- Cone Penetration Tests 15 No. along the route corridor.

Underwater Video Survey

Underwater video camera system may be used for inspections of the seabed to investigate seabed obstructions, marine archaeology or benthic habitats. An underwater drop-down camera system or similar may be used in a series of video transects which would be georeferenced and later mapped in GIS.

Archaeological Survey

The proposed survey specification takes into account archaeological data acquisition to enable professional archaeological interpretation and analysis of data. The survey equipment deployed and data acquisition and processing shall comply with the requirements of the National Monuments Service, Underwater Archaeology Unit.

All archaeological assessments will be carried out by a suitably qualified and experienced marine archaeologist to determine the location of all known archaeological features in advance of the intrusive site investigations and seabed sampling. The data collected will be used to support the archaeological assessments.

SURVEY EQUIPMENT PARAMETERS

Multibeam Echosounder (MBES)

Echo-sounders are a diverse group of acoustic sources used to collect information on bathymetry, seabed features and objects in the water column (e.g. Multi beam echosounder, scientific echo-sounders/ fish-finders). They measure water depth by emitting rapid pulses of sound towards the seabed and measuring the sound reflected back.

Multibeam Echosounder (MBES) will be used during the marine survey to provide detailed 3 dimensional bathymetric mapping of the cable route corridor using multiple beams elongated in the across-track direction to cover a fan-shaped sector (or swath) (Figure 7). Measurements of the across-track beam from MBES showed 3 dB beam widths of 150-160°; in the along-track orientation beam width is narrow, typically ~1.5-3.0° (Crocker & Fratantonio 2016).

MBES is non-intrusive and does not interact with the seabed. The MBES system will be used will be confirmed following the appointment of a survey contractor but typical systems which can be taken as examples would be the R2 Sonic 2024, Kongsberg EM2040 or Teledyne Seabat T50 which would be hull mounted on the survey vessel.

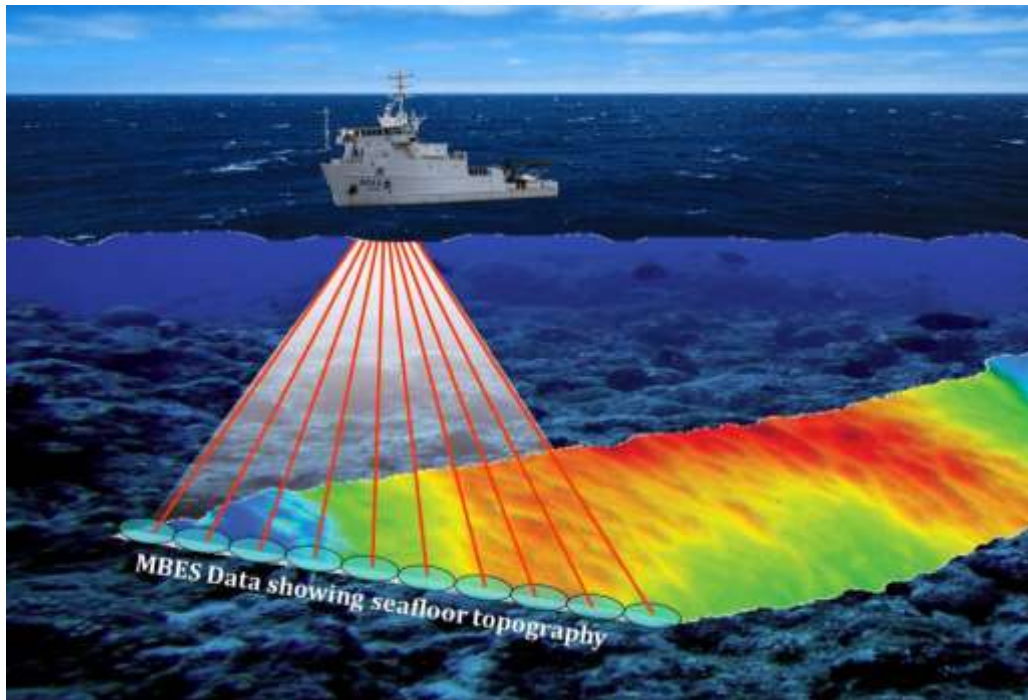


Figure 7. *Graphic of MBES survey in operation*

The acoustic signal emitted by MBES systems is short duration, typically of a few milliseconds or less, and can be configured to within the range 0.05-10 ms for certain systems. Repetition rates are highly customisable, varying with signal frequency and water depth. Ping rates of up to 10-20 pings per second may be used in very high frequency systems, whereas there may be several seconds between pings in low-frequency deep-water applications.

For collecting information on the seabed, emitted sound frequencies are typically between 12 – 400 kHz depending on water depth, with surveys in continental shelf applications operating at between 70 to 150 kHz, and in shallower waters of less than 200 m using multi-beam echosounders operating at between 200 and 500 kHz. The typical operating frequencies for the cable route survey within the licence application area will be in the range of 200kHz to 500kHz. (Danson 2005, Hopkins 2007, Lurton and DeReutier 2011)

Maximum sound source pressure levels of MBES have been reported as ranging from 210-245 dB re 1 μ Pa at 1m with the highest levels corresponding to the lowest frequency systems (DECC 2011, Lurton and DeReutier 2011, Lurton 2016, BEIS 2020). The highest measured source levels among three MBES systems when operated at maximum power for central operating frequencies of ≥ 100 kHz was between L_p,pk 225-228 dB re 1 μ Pa at 1m (L_E,p 181-197 dB re 1 μ Pa² s at 1m (Crocker & Fratantonio 2016).

Side Scan Sonar

Side-scan sonar (SSS) is a seabed imaging technique used to provide high-resolution and detailed 2-dimensional imagery of the seabed for a variety of purposes. SSS involves the use of an acoustic beam to obtain an accurate image over a narrow area of seabed to either side of the instrument.

Piezoelectric transducers in the SSS generate high-frequency acoustic pulses which are directed either side of the tow fish. The transducers are oriented such that the acoustic signal covers a wide angle perpendicular to the path of the tow fish through the water, providing information on a strip either side of the device (port and starboard). The intensity of the acoustic reflections from the seafloor is recorded in a series of cross-track images. When stitched together along the direction of motion, these images form a waterfall view of the sea floor within the swath of the beam. The range (swath width) is dependent upon the frequency, power and other source configurations, but is typically between 50-300 m on both sides.

Analysis of SSS data can aid identification of seafloor sediment, surficial bedrock outcrops and geomorphology mapping. Obstacles rising proud of the seafloor, such as shipwrecks, boulders, pipelines, outfalls, exposed cables, fishing gear etc. can cast shadows on the resulting seafloor image where no acoustic signal is returned. The size of the shadow can be used to determine the size of the feature casting it (Figure 8).

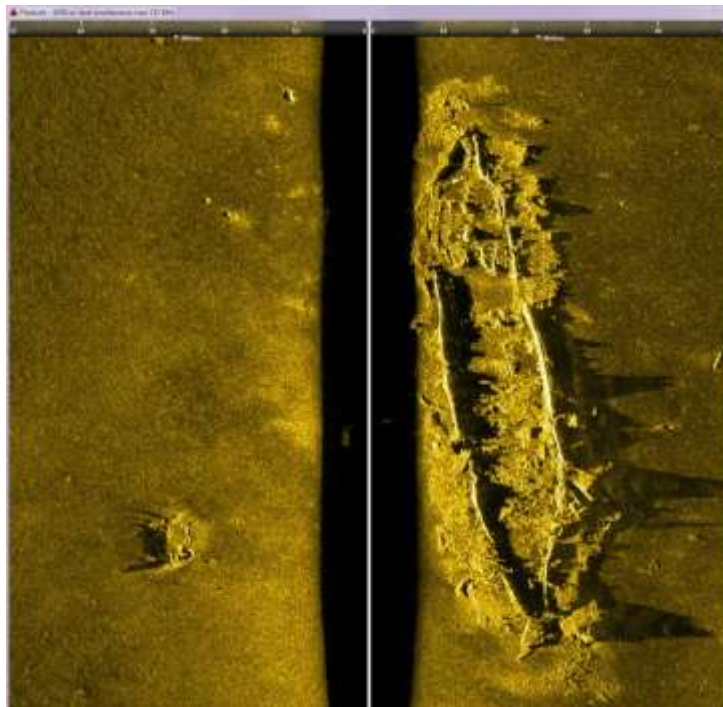


Figure 8. SSS image of shipwreck on seabed and nadir gap (Source: MDM)

SSS is non-intrusive and does not interact with the seabed. The SSS system will be used will be confirmed following the appointment of a survey contractor but typical systems which can be taken as examples would be the Klein 3000 or Edgetech 4200 (Figure 9). The SSS may be hull mounted but is typically towed at depth behind the survey vessel on an armoured tow cable.



Figure 9. Deployment of Edgetech 4200 Tow fish (Source: MDM)

Acoustic signal durations of SSS systems are short (0.4ms – 1.0ms) but vary between models and configurations with longer signal durations are required to survey greater ranges. Repetition rates are highly customisable with ping rates of up to several tens of pings per second (Crocker & Fratantonio 2016).

The frequencies used by side-scan sonar are relatively very high, typically between 100 and 900 kHz. Most SSS systems offer real-time dual frequency operation which allows acquisition of both frequencies across a swath independently and simultaneously. The higher frequency produces higher resolution data and sharper images but with a narrow swath width while the lower frequency results in wider seabed coverage at lower resolutions.

SSS typically offer a selection of two operational frequencies in the range of 100-500 kHz, or may operate both simultaneously. Some models may offer an upper frequency of up to 900 kHz for applications requiring the highest resolution data. Across-track resolutions vary between 1-8 cm with finer resolution at higher operating frequencies. The typical operating frequencies for the cable route survey within the licence application area will be between 200 to 700 kHz.

The line spacing for the survey will be determined after consideration of all factors including water depth and prevailing conditions at time of survey. Generally for SSS, full coverage requires two passes with 100% overlap over a given area of seafloor, with the two passes each insonifying the sea-floor from opposite directions to ensure targets are adequately imaged. This also ensures that the 'nadir gap' or the centre of the image directly under the path of the towfish is fully covered (Figure 8).

Sound source pressure levels of SSS systems have been reported typically in the range L_p, pk 200-240 dB re $1\mu Pa$ at 1m. (BOEM 2016, BEIS 2020, DAHG 2014). Maximum calibrated source levels, (sound pressure) measured by Crocker & Fratantonio (2016) were L_p, pk 227 dB re $1\mu Pa$ at 1m for a 0.1 ms pulse, whereas the highest energy source level of LE, p 205 dB re $1\mu Pa^2 s$ at 1m corresponded to a longer pulse of 1.1 ms at lower maximum pressure (L_p, pk 210 dB re $1\mu Pa$ at 1m).

Marine Magnetometer

A marine magnetometer is a passive towed sensor used to measure magnetic field strength and to detect variations in the total magnetic field of the underlying seafloor. The magnetometer does not transmit any signals into the marine environment.

Usually, the increased magnetization is caused by the presence of ferrous (unoxidized) iron on the seafloor or buried below the surface, whether from a shipwrecked vessel made of steel or from natural rock formations containing grains of magnetite. After corrections are made to measurements of the total magnetic field, magnetic data is used to locate existing infrastructure such as buried pipelines, undersea cables and to identify shipwrecks and potential unexploded ordnance.

Marine magnetometers are non-intrusive and do not interact with the seabed. They are towed at depth at least two and a half ship-lengths behind the survey vessel, so that the ship's magnetic field does not interfere with magnetic measurements. The marine magnetometer may be integrated and towed in tandem with the SSS. The marine magnetometer will be of the Caesium Vapour type and capable of recording variations in magnetic field strength during survey to an accuracy of $\pm 0.5 nT$.

The marine magnetometer system to be used will be confirmed following the appointment of a survey contractor but typical systems which can be taken as examples would be the Geometrics G-882 or Marine Magnetics SeaSpy (Figure 10). The line spacing and coverage will generally match the SSS as they are towed in tandem and the parameters of the survey may be determined by the requirements of the Underwater Archaeology Unit of the National Monuments Service.



Figure 10. Marine Magnetics SeaSpy towfish (Source: MDM)

Sub-bottom profiler

Sub-bottom profilers (SBPs) encompass a range of acoustic systems which are designed to collect information on the characteristics of strata below the seabed, establish changes in sediments and detect and image structures buried within the sediments (Figure 11). Shallow Sub-bottom profiling can penetrate the seabed to a range of depths, from a few metres to tens of metres depending on the geological conditions encountered, and with vertical resolutions from a few centimetres to a few metres. Most are towed behind a survey vessel, either at/near the surface or at depth, whereas some smaller devices may be hull-mounted or lowered over the side of a vessel on a pole mount.

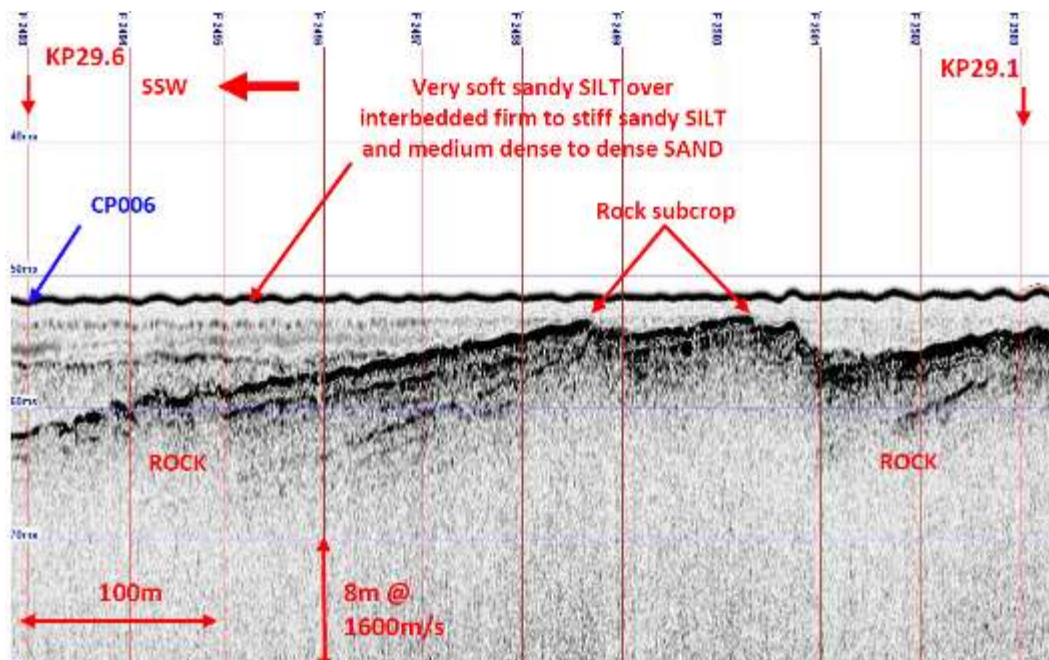


Figure 11. Interpreted SBP seabed profile.

Pulsed waveform SBPs generate an acoustic signal either through the impulsive physical processes of electrostatic discharge, as in sparkers, or electromechanically via accelerated water mass, as in boomers. All periodic waveform SBPs i.e. pingers, chirpers and parametric SBPs are electromechanical sources which employ piezoelectric transducers to generate an acoustic waveform by converting electrical energy into mechanical movement i.e. vibrations. Through the reverse of this process, the transducers can also detect sound. As such, these sources are highly customisable; in many cases, the signal is modulated in frequency and/or amplitude to improve its detectability and performance.

The systems most commonly used for high-resolution surveying are the boomer (such as the Applied Acoustics S-Boom), pinger (such as the Kongsberg GeoPulse), chirp (such as the Edgetech SB-424, Figure 12) and parametric chirp systems (such as the Innomar SES-2000). Whereas the boomer system provides best results for coarser sediments, the pinger and chirp systems deliver detail for finer sediments.

The objective of the SBP cable route survey is to investigate the upper layers of the seabed sediments for cable burial potential and installation risk from seabed obstructions such as subcropping rock formations and is not focussed on deep seabed conditions such as required for investigation of offshore wind farm foundations or deepwater seismic surveys carried out by Oil and Gas Exploration. The SBP system used for the survey will be confirmed following the appointment of a survey contractor and the most appropriate system chosen depending on the seabed, anticipated geological environment and the survey vessel capabilities.

Sound source pressure levels of various SBP systems have been reported typically in the range $L_{p,pk}$ 185-247 dB re $1\mu Pa$ at 1m. (Hartley Anderson 2020, Crocker & Fratantonio 2016). A summary of the Maximum Sound Pressure Levels for SBP systems is described in Table 4 below. The SBP survey is non-intrusive therefore does not interact with the seabed.



Figure 12. Edgetech SB-424 tow body (Source: MDM)

Table 4. Typical SBP specifications (Source: MDM)

Equipment Type	Frequency Range	Duration	Maximum Source Pressure Level (re 1µPa at 1 m)	Reference
Sub-bottom Profiler (SBP) - Pinger	2 kHz to 15 kHz	0.5 - 30 ms	214 dB.	Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Chirper	2 kHz to 13 kHz	5 - 40 ms	185 - 215 dB.	Crocker & Fratantonio 2016, Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Boomer	500 Hz to 15 kHz	0.5 - 1.0 ms	205 - 215 dB.	Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Parametric	4 to 15 kHz, 85 to 115 kHz	0.2 - 30 ms	238 - 247 dB. 200 - 206 dB.	Hartley Anderson 2020

Ultra-Short Baseline (USBL) Subsea Positioning

An Ultra-Short Baseline (USBL) is a subsea positioning system widely used by the offshore marine industry and scientific research vessels to accurately track the position of towed equipment and sensors. The USBL system consists of a transceiver mounted to the survey vessel, and transponders on the towed equipment.

To calculate a subsea position, the USBL calculates both a range and an angle from the transceiver to the subsea beacon. Angles are measured by the transceiver, which contains an array of transducers. The transceiver emits an acoustic signal at predetermined periods (often 0.5 seconds) which is returned by the transponder and allows for the bearing and distance to be calculated.

USBL systems are designed for close range transmission and thus typically emit pulses of medium frequency sound (20 to 50 kHz). Manufacturers report SPL values of 194 to 207dB re 1µPa at 1m depending on the model used, taking as an example the higher range of USBL source (Kongsberg HiPAP) with a SPL of 207dB re 1µPa at 1m.

Cone Penetration Test (CPT)

The survey vessel will position itself over the target position to carry out the CPT. The seabed CPT rig (such as a Neptune 3000, Figure 13) is deployed to the seabed from the vessel crane, A-frame or dedicated Launch and Recovery System (LARS). Once on the seabed, in a stable position, a steel rod with a conical tip (typically an apex angle of 60° and a diameter of 35.7 mm) is pushed at a steady rate into the seabed until it reaches target penetration depth of 3 to 6m or refusal. The penetration resistance at the tip and along a section of the shaft (friction sleeve) is measured and recorded for later analysis

Refusal is indicated by peak system thrust, excessive load on the tip or excessive inclination of the cone. If target penetration depth is not met, the CPT rig may be moved to a nearby position on the seabed and the test repeated. The time taken to complete a shallow CPT is typically less than 10 minutes but the total time in the water from deployment to recovery may be 1 to 2 hours at each position, depending on water depth and sea state.

There is very little published information on the sound pressure levels generated from CPT equipment, collected either from field experimentation or from manufactures specifications. Data from a similar device, deep boring, indicates that sound pressure source levels are typically within the range 118 - 145 decibels (dB) (BOEM 2012, EIRGRID 2014).



Figure 13. Neptune 3000 CPT rig (Source: MDM)

Gravity Core

Gravity corers (Figure 14) provide a rapid means of obtaining a continuous core sample in water depths from a few metres down to several thousand metres. A gravity corer consists of a steel tube in which is inserted a plastic liner to hold the core sample. Gravity corers are commonly used for cable route investigations.

A set of heavy weights, up to 750 kg, is attached at the top end of the tube above which is a fin arrangement to keep the corer stable and vertical during its fall to the seabed. The sampler penetrates the seabed under its own weight. Normal practice is to lower the device to within 10 m of the seabed before releasing. The penetration depth is between 1 m and 3 m. Penetration in stiffer clays or sands is usually limited.

The penetrating end of the tube is fitted with a cutter and a concave spring-steel core-catcher to retain the sample when the corer is retracted from the soil. The suction caused when withdrawing a core barrel from a soft soil such as clay, can pull the sample from the barrel, or in other ways disturb its homogeneity. By fitting a piston above the sample, the partial vacuum caused above the piston, when the barrel is withdrawn, keeps the sample from being pulled out of the tube.

Upon refusal or at target depth of 3m, the sampler is recovered on deck where the sample is split, typically into 1m lengths, logged, sealed and stored for later laboratory analysis. The typical diameter of the liner is in the region of 90mm with a typical maximum diameter of 120mm.



Figure 14. Gravity Corer schematic

Vibrocorer

Vibrocorers are used wherever soil conditions are unsuited to gravity corers or where greater penetration of the seabed is necessary. Vibrocore is best suited to non-cohesive soils (e.g. gravel or sand) as samples recovered are considered disturbed. Vibrocorers are commonly used for cable route investigations.

To penetrate soils such as dense sands and gravels, or to reach deeper into stiff clays, rather than depending on a gravity free-fall, the corer's barrel is vibrated, thus facilitating its penetration into the soil. This vibration energy allows the core barrel to penetrate the sediments under self-weight. In other respects, the barrel and sample retention systems are similar to gravity corers.

The typical vibrocorer consists of a tall steel frame and tripod support. Within the frame is a standard 102 mm steel coring barrel in which is inserted a PVC liner to contain the sample. The typical diameter of the PVC liner is in the region of 90mm with a typical maximum diameter of 120mm. A spring steel core catcher is fitted to the cutting shoe, as with the gravity corer. Two linear electric motors enclosed in a pressure housing provide the vibratory motion; the core barrel is attached directly to the motor housing. Power is fed to the motors via an electrical control line from the survey vessel.

Once in motion, the heavy motor housing provides the mass to drive the core barrel into the seabed. The penetration depth can be from 2m to 8m depending on seabed conditions. A typical 6 m vibrocorer will weigh nearly two tonnes and requires a crane for A-Frame or deployment and recovery. Vibrocorers come with barrel lengths of 3m, 6m and 8m. A normal coring operation in 100 m water depth will take about one hour.

Once coring is started, the core barrel will penetrate to the target depth. Upon refusal or at target depth of 3m, the vibrocore is recovered on deck where the sample in the liner is removed from the barrel, the sample is split, typically into 1m lengths, logged, sealed and stored for later laboratory analysis.

The sounds produced by the operation of a vibrocorer on the seabed consist of a series of impulses corresponding to the movement and impacts of the mechanics of the vibrating motion from the oscillating motors on the core barrel. Expected sound pressure levels generated by vibrocore equipment would be approximately 187.4 dB re 1 μ Pa at 1m (LGL, 2010).



Figure 15. *Deployment of Vibrocorer from Survey Vessel (Source: MDM)*

Grab-samplers

Grab samplers are one of the most common methods of retrieving soil samples from the seabed surface. The grab sampler is a device that simply grabs a sample of the topmost layers of the seabed by bringing two steel clamshells together and cutting a bite from the seabed surface to a depth of 0.1 to 0.5m. The information they provide can be applied in a number of applications such as seabed classification, environmental sampling, chemical and biological analysis and ground truthing for morphological mapping and geophysical survey. Grab samplers can be used to recover samples of most seabed soils, although care is needed in selecting the right size unit for the task.

There are various grab sampler types to include but not limited to Van Veen (single or double, Figure 16), Hamon, Shipek and Day Grab samplers. Generally, some variants may come both as single or double, and in a variety of different sizes. The grab sampler comprises two steel clamshells acting on a single or double pivot. The shells are brought together either by a powerful spring (Shipek type) or powered hydraulic rams operated from the survey vessel.

In operation, the grab is lowered from the survey vessel to the seabed with the clamshells in the open position and which trigger shut when the sampler is in contact with the seafloor. The shells swivel together in a cutting action and retains a sample of seabed. The sampler is then recovered to the survey vessel for visual inspection, processing, logging and transfer to suitable sample containers for storage and later laboratory analysis. Typical performance rates are between three and four samples per hour.

The smaller Shipek type grab sampler is useful for ground truthing geophysical surveys for the surface layer, and samples are taken to about 0.1 m below the seabed. Larger hydraulic grabs are capable of recovering relatively intact samples of consolidated soils to a depth of about 0.5 m. In areas of large cobbles or boulders, grabs can become jammed open and their contents washed away during recovery to the surface. However, the hydraulic grab is more likely to recover cobbles and small boulders than any other system, and in this respect is invaluable. Various grabs will be available for the survey to ensure adequate sampling equipment for various sediment types.

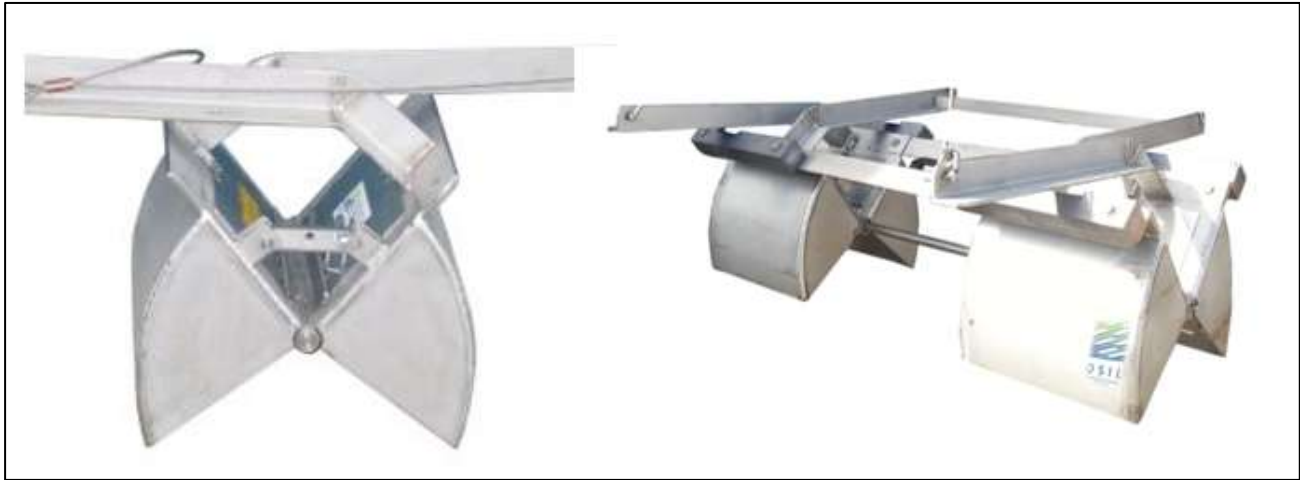


Figure 16. Single and Double Van Veen Grab (Source: MDM)

SURVEY VESSELS

Offshore survey vessels are typically between 15m and 75m in length with potential for smaller vessels to be used in nearshore / shallow water areas. Offshore survey vessels typically have an endurance of approximately 14 to 28 days. A vessel with a shallow water draft will be utilised for the inshore survey area. An unmanned surface vehicle (USV) and/or autonomous surface vehicle (ASV) may also be used for the geophysical survey. The survey vessels may use a local port for personnel / equipment mobilisation, bunkering and provisioning.

The marine survey works will consist of a dedicated marine spread which will be suitable for the scope of work required, the water depth and the anticipated seabed conditions of the survey area. The exact equipment to be used will be confirmed following a tender process to procure the marine survey contractor.

All survey vessels will be fit for purpose, will possess all relevant classification certificates and capable of safely undertaking the survey work required. Health, safety, environment and welfare considerations will be a priority and will be actively managed during the course of the survey scopes of work. Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work. Prior to survey works taking place under Licence, both Project Supervisor for Design Process (PSDP) and Project Supervisor for Construction Stage (PSCS) will be appointed under the relevant legislation and project / survey specific HSE plans will be put in place which will form part of the survey project execution plans.

The vessels will conform to the following minimum requirements as appropriate:

- Compliance with Safety of Life at Sea (SOLAS), International Maritime Organization (IMO) and national requirements for operating within Irish territorial waters.
- Station-keeping and sea keeping capabilities required to carry out the proposed survey operations safely;
- Calibrated equipment and spares with necessary tools for all specified works;
- Endurance (e.g. fuel, water, stores, etc.) to undertake the required survey works;
- Sufficient qualified staff to allow the survey operations to be carried out efficiently, (typically 24 hour continuous for offshore survey, 12 hour for nearshore survey); and
- Appropriate accommodation and crew welfare facilities.

Survey vessels will generate some subsea noise in the marine environment from engine noise and dynamic positioning thrusters. Shipping noise is typically within the 50-300 Hz frequency band and is the dominant noise source in deeper water (DECC, 2011). Propellers on vessels all have the potential to produce cavitation noise. This sound is caused by vacuum bubbles that were generated by the collapse of bubbles created by the spinning of the propellers.

Acoustic broadband source pressure levels typically increase with increasing vessel size, with smaller vessels (<50 m) having source pressure levels 160-175 dB (re 1µPa at 1m), medium size vessel (50-100 m) 165-180 dB (re 1µPa at 1m) and large vessels (>100 m) 180-190 dB (re 1µPa at 1m) (DECC, 2011). Every vessel has a unique noise signature and for each vessel this can change in response to a number of factors, including; ship speed, operational status, vessel load, the condition of the vessel and even the properties of the water that the vessel is operating in.

MARINE SURVEY AND SITE INVESTIGATIONS SOUND PRESSURE LEVEL SUMMARY

All survey works that involve the use of acoustic instrumentation will follow the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters, 2014.

The ranges of noise frequency and sound pressure levels associated with all the surveys outlined in previous sections is summarised in Tables 5 and 6 below. It can be noted that as the focus of the cable route surveys within the licence application area is the seabed surface and upper layers of seabed sediments and generally obtaining higher resolution data, the geophysical equipment such as MBES and SSS is generally operated more towards the higher end of the frequency range where possible.

TIMELINE AND DURATION OF SURVEY ACTIVITIES

The intention is to commence the survey as soon as feasible following license award, taking into account survey vessel availability, the overall cable route survey programme, seasonality and suitable weather windows. The exact mobilisation dates will not be known until the process of procuring a contractor and issue of the marine licence is complete. It is anticipated that the marine geophysical survey and site investigations activities within the marine licence area will take less than 6 weeks in total and will be completed over a 6 month period.

The estimated time required to complete the cable route survey campaign activities is described in Table 7 below.

Table 5. Marine Survey Activities (Source: MDM)

Equipment Type	Purpose	Frequency Range	Duration	Maximum Source Pressure Level (re 1µPa at 1 m)	Reference
Multibeam Echo Sounder (MBES)	Measure detailed bathymetry by transmitting sound pulses (active sonar).	200 kHz to 500 kHz	0.05 - 10 ms	210 - 245 dB.	Danson 2005, Hopkins 2007, DECC 2011, Lurton and DeReutier 2011, Lurton 2016, BEIS 2020, Crocker & Fratantonio 2016
Side Scan Sonar (SSS)	Determine surficial nature of the seabed and detect objects by transmitting sound pulse.	200 kHz to 700 kHz	0.4 - 1.0 ms	200 - 240 dB.	BOEM 2016, BEIS 2020, DAHG 2014, Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Pinger	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 15 kHz	0.5 - 30 ms	214 dB.	Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Chirper	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 13 kHz	5 - 40 ms	185 - 215 dB.	Crocker & Fratantonio 2016, Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Boomer	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	500 Hz to 15 kHz	0.5 - 1.0 ms	205 - 215 dB.	Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Parametric	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	4 to 15 kHz, 85 to 115 kHz	0.2 - 30 ms	238 - 247 dB. 200 - 206 dB.	Hartley Anderson 2020
Ultra-Short Base Line (USBL)	Subsea positioning.	20 kHz to 50 kHz	5 - 10 ms	194 - 207 dB.	Kongsberg
Magnetometer	Identify ferrous anomalies for metal obstructions, shipwrecks, etc. on and under the seabed.	Passive	N/A	Passive	N/A
Survey Vessels	Carry out the survey and deploy the equipment.	50 Hz to 300 Hz	N/A	160 - 190 dB.	DECC 2011

Table 6. Marine Site Investigation Activities (Source: MDM)

Equipment Type	Purpose	Number of locations within Licence Application Area (up to)	Frequency Range	Maximum Source Pressure Level (re 1µPa at 1 m)	Reference
Cone Penetration Test (CPT)	Determine geotechnical engineering properties of seabed sediments.	15	28 Hz	118 - 145 dB.	BOEM 2012, EIRGRID 2014
Gravity Corer	Retrieve a seabed sediment sample by penetrating seabed with a steel core barrel under self-weight	12	N/A	N/A	N/A
Vibrocorer	Retrieve a seabed sediment sample by penetrating seabed with a vibrating steel core barrel	12	30 Hz	187.4 dB.	LGL 2010
Grab Samples	Collect small sediment samples from seabed surface with clamshell mechanism	11	N/A	N/A	N/A

Table 7. Estimated Time and Duration of Survey Activities (Source: MDM)

Activity	Typical Time Period Required for Activity	Total Number of SI Locations	Total Time for SI	Foot Print Affected per SI	Foot Print Affected per SI (ha)	Total Foot Print (ha)	Area Directly Affected as % of Licence Application Area
Inshore Geophysical Survey	3 to 4 days (weather and sea state dependent)	400 - 500 m cable route corridor	3 to 4 days (weather and sea state dependent)	N/A	N/A	560 ha	18.66667%
Offshore Geophysical Survey	8 to 10 days (weather and sea state dependent)	500 m cable route corridor	10 to 12 days (weather and sea state dependent)	N/A	N/A	2441 ha	81.3667%
CPT	30 minutes - 2 hours in any one location	15	30 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	8m ²	0.0008 ha	0.012 ha	<1%
Gravity Corer	30 minutes - 2 hours in any one location	12	24 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	1m ²	0.0001 ha	0.0012 ha	<1%
Vibro Corer	30 minutes - 2 hours in any one location	12	24 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	8m ²	0.0008 ha	0.0096 ha	<1%
Grab Samples	20 minutes - 45 minutes in any one location	11	9 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	0.5m ²	0.00005 ha	0.0006 ha	<1%

4.3 Zone of Influence

As outlined in the Office of the Planning Regulator (2021) *“The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km).”*

IEEM (2006) defined the zone of influence as *“the areas/resources that may be affected by the biophysical changes caused by activities associated with a project”*. To define the extent of the study area for assessment, all elements of the project were assessed and reviewed in order to identify the spatial scale at which ecological features could be impacted. Due to the limited temporal and geographical scale of the project and the use of Best Available Techniques (BAT), and the slow speed of the survey vessel (4kn), it is considered that the potential impacts of the proposed works could only extend beyond 500 m of the subtidal elements of the project due to noise generation and potential disturbance of sediment. However, as outlined in IEEM (2010) *“in the marine environment it is more difficult to define the geographical framework precisely and to accommodate all factors that should influence the definition of value, e.g. size or conservation status of populations or the quality of habitats.”* As a result, *“it is very unlikely that the impacts on integrity can be evaluated without considering functions and processes acting outside the site’s formal boundary.”* It is important to note that unlike other maritime operations, the research vessel speed will be very slow (4 knots). However, the project has the potential to introduce noise into the marine environment particularly through the use of Ultra-Short Baseline (USBL), Multibeam Echosounder (MBES), and Side-scan Sonar (SSS) equipment, which may extend the effects of the project beyond 2km. In the interest of carrying out a thorough assessment in line with both the Habitats Directive, and the precautionary principle, the ZOI was expanded for this assessment to include designated sites within 15km of the proposed survey site, and sites beyond 15km that have the potential to be impacted by the proposed survey works based on the Source-Pathway-Receptor model. This was done in the interest of ensuring that any potential impacts, however indirect or remote, were taken into account.

4.3.1 Marine Mammals

4.3.1.1 Seals and Cetaceans

As outlined in NPWS² *“Cetaceans account for 48% of all the native species of mammals, both marine and terrestrial, recorded in Ireland and Irish waters are thought to contain important habitats for cetaceans within the northeast Atlantic. To date, 24 species of cetacean, or 28% of species described worldwide, have been recorded in Ireland. Irish cetaceans include six species of baleen whale and eighteen species of toothed whale, including five species of beaked whale. Twenty-two of these have been reported stranded ashore and 20 species observed at sea. Two species (Pygmy sperm whale and Gervais’ beaked whale) are only known from stranded individuals and two species (Northern right whale and White whale/beluga) have only been recorded historically, with neither species occurring in the stranding record so far.*

Ireland also has two species of seals, the Common Seal (or Harbour Seal) and the Grey Seal. Whilst both species haul out on land for key stages of their life history, the majority of their time is spent in the marine environment.

In Ireland, the 1992 EC Habitats Directive as transposed by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) requires that both seal species and all cetaceans occurring in Ireland are maintained at favourable conservation status. Under Article 12 of the Directive, all cetaceans should receive strict protection within the Exclusive Economic Zone. Under Article 4 of the Directive, Special Areas of Conservation (SACs) must be proposed for the following species:”

- Bottlenose Dolphin
- Harbour Porpoise
- Common Seal
- Grey Seal

The protection afforded to marine mammals in Ireland is summarised below:

² <https://www.npws.ie/marine-species/cetaceans>

- Harbour Porpoise Annex II of EC Habitats Directive/Annex IV of EC Habitats Directive/Protected species of Wildlife (Amendment) Act/OSPAR List of Threatened and Declining Species and Habitats
- Bottlenose Dolphin Annex II of EC Habitats Directive/Annex IV of EC Habitats Directive/Protected species of Wildlife (Amendment) Act
- All Cetacea Annex IV of EC Habitats Directive/Protected species of Wildlife (Amendment) Act
- Grey Seal/Harbour Seal Annex II of EC Habitats Directive/Protected species of Wildlife (Amendment) Act

Recent research suggests that the foraging range for grey seals is 448km (Carter et al., 2022). Further, the foraging range for harbour seal is estimated at 273 km (Carter et al., 2022). Further, there are a number of SACs designated for cetaceans (harbour porpoise and common dolphin) in Ireland. As these species are a highly mobile species, and are designated as qualifying interests of Natura 2000 sites outside the Irish EEZ, specific Management Units (MU) are utilised to assess the potential impacts of a proposed project on these species, based on the JNCC Review of Management Unit boundaries for cetaceans in UK waters (2023) methodology³. The proposed project is located within the Celtic and Irish Seas MU for harbour porpoise, and the Irish Sea MU for bottlenose dolphin (IAMMWG, 2015). The ZoI of the proposed project has been extended to include the potential for significant effects on grey seal, harbour seal, harbour porpoise and common bottlenose dolphin as there is potential for these mobile marine mammals to enter the ZoI from within the Celtic and Irish Seas MU.

4.3.1.2 Otter

Otters are a semi-aquatic species that use the marine environment for foraging and are protected under Annex II and Annex IV of the Habitats Directive. As detailed by Reid et al. (2013), female otters have territories of 7.5 ± 1.5 km in length along a riverine environment and 6.5 ± 1.0 km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3 km in length with a high degree of variability. Out of an abundance of caution, the ZoI of the proposed project has been extended to include the potential for significant effects on otters that may enter the proposed area of works.

4.3.2 Migratory Fish

In relation to Atlantic salmon, it has been found that salmon populations from southeast Ireland appear to migrate towards the shelf edge before crossing the Atlantic towards Greenland for feeding (Rikardson et al., 2021). The recorded areas of salmon migration are demonstrated in Figure A.1 in Appendix I.

Twaite Shad is a rare red-listed (vulnerable) species that has an affinity for coastal habitats (Maitland & Hatton-Ellis, 2003), with recent studies recording movement of this species up to 950km from the River Severn with one individual detected in the Blackwater Estuary (Davies *et al.*, 2020). However, based on King et al. (2011), the twaite shad is restricted to the lower reaches of a handful of rivers in the south, with evidence of recruitment only from the Barrow, Suir and Munster Blackwater. The primary conservation objectives for Natura 2000 sites along the south coast of Ireland for which Twaite Shad are a designated Qualifying Interest (Slaney River Valley SAC [000781]; River Barrow and River Nore SAC [002162]; Lower River Suir SAC [002137]; Blackwater River (Cork/Waterford) SAC [002170]) relate to the restoration of freshwater habitats for this species. The proposed survey works are located within areas of existing vessel activity within Dublin Bay. In the unlikely event that Twaite Shad may be present along the proposed Baily Offshore Cable Survey Route, vessel speeds will be slow (4 knots) and operations are on a continual basis, therefore, the vessel and equipment would be easily avoided by this species if encountered. The proposed survey works will be isolated to the route corridor and will not impact on spawning grounds or migratory routes of this species.

Similarly, no likely significant effects on lamprey species are foreseen as a result of the proposed project. As outlined in King et al. 2011 '*juvenile river/brook lamprey (the two species are indistinguishable at juvenile stage) are widely distributed in catchments where suitable habitat is available and, on this basis, both river and brook lamprey have now been classified as of 'least concern'. The same survey programmes have also demonstrated that sea lamprey can be found in many of our larger river systems. However, these surveys have shown that sea lampreys are normally scarce, with low densities of juveniles where they do occur and a tendency for migrating adult fish to be concentrated downstream of major weirs in rivers. This species is now listed as Near Threatened.*' At sea, sea lamprey are widely

³ <https://data.jncc.gov.uk/data/b48b8332-349f-4358-b080-b4506384f4f7/jncc-report-734.pdf>

dispersed and their movements are largely dictated by their host fish (Igoe et al, 2004). Within the marine environment, river lamprey inhabit estuarine and coastal waters (Igoe et al, 2004).

Given the spatial and temporal nature of the proposed survey works, and given the minimum distance to Natura 2000 sites designated for sea and river lamprey (33.8 km to River Boyne and River Blackwater SAC), no likely significant effects on sea lamprey distribution or spawning habitats are foreseen as a result of the proposed project.

4.3.3 Birds

The marine waters off the coast of County Dublin constitute an important resource for marine birds. The estuaries and bays that open into it along with connecting coastal stretches of intertidal and shallow subtidal habitats, provide safe feeding and roosting habitats for waterbirds throughout the winter and migration periods. These areas, along with more pelagic marine waters further offshore, provide additional supporting habitats (for foraging and other maintenance behaviours) for those seabirds that breed at colonies on islands and coastal headlands. These marine areas are also important for seabirds outside the breeding period (NPWS, 2023). The proposed survey works are located within the intertidal at Velvet Strand, Portmarnock and offshore subtidal (up to EEZ Boundary), within Co. Dublin's coastal waters and North-West Irish Sea SPA. Given the location of the proposed works to these valuable waters, and given the potential for seabirds to utilise offshore waters within the proposed works corridor for transiting / feeding, the ZOI has been extended to include Natura 2000 Sites designated for seabirds which utilise this area; namely, Malahide Estuary SPA and North-West Irish Sea SPA.

4.4 Identification of Relevant Natura 2000 Sites

4.4.1 Management of the Site

The proposed works are not directly connected with, or necessary to, the management of Natura 2000 sites.

4.4.2 Relevant Natura 2000 Sites to the Proposed Project

A key factor in the consideration as to whether or not a particular European site is likely to be affected by the proposed survey works is its distance from the works location. It is generally, but not necessarily, the case that the greater the distance from the plan or project the smaller the likelihood of impacts. In this case, the proposed survey works are located within the Malahide Estuary SAC, Rockabill to Dalkey Island SAC, and North-West Irish Sea SPA.

Given that the proposed survey route is located within the Malahide Estuary SAC, Rockabill to Dalkey Island SAC, and North-West Irish Sea SPA, out of an abundance of caution, in the absence of mitigation, during the survey works there is the potential for significant effects on the qualifying interests of these European Sites through disturbance, pollution and physical impact on habitats and species. Further information is required to assess the potential effects of the proposed works on European Sites.

In relation to marine mammals, given that the proposed survey route is located within Rockabill to Dalkey Island SAC, there is potential for marine mammals from Rockabill to Dalkey Island SAC (*Phocoena phocoena* (harbour porpoise)) to be in the vicinity of the proposed survey works. Although Lambay Island SAC is located 2km from the proposed cable survey corridor, the qualifying interests of this SAC (harbour seal and grey seal) are mobile species and there is the potential for these species to be in the vicinity of the proposed survey works. Further, following an examination of relevant MU's for harbour porpoise / common bottlenose dolphin and foraging areas for grey seal and harbour seal, the following Natura 2000 sites have been screened IN due to the potential movements of harbour porpoise, common bottlenose dolphin, harbour seals, and grey seals (qualifying interests of these SAC):

- Slaney River Valley SAC (IE)
- Saltee Islands SAC (IE)
- Roaring Water Bay and Islands SAC (IE)
- Blasket Islands SAC (IE)
- Ballysadare Bay SAC (IE)
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (IE)
- Donegal Bay (Murvagh) SAC (IE)
- Galway Bay Complex SAC (IE)
- West of Ardara/Maas Road SAC (IE)
- Slieve Tooley/Tormore Island/Loughros Beg Bay SAC (IE)
- Killala Bay/Moy Estuary SAC (IE)
- Rutland Island and Sound SAC (IE)
- Kilkieran Bay and Islands SAC (IE)
- Clew Bay Complex SAC (IE)
- Inishbofin and Inishshark SAC (IE)
- Horn Head and Rinclevan SAC (IE)
- Slyne Head Islands SAC (IE)
- Duvillaun Islands SAC (IE)
- Inishkea Islands SAC (IE)
- North Anglesey Marine/Gogledd Môn Forol (UK)
- West Wales Marine / Gorllewin Cymru Forol (UK)
- Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau (UK)
- Murlough (UK)
- North Channel (UK)
- Strangford Lough (UK)
- Cardigan Bay / Bae Ceredigion (UK)
- Pembrokeshire Marine / Sir Benfro Forol (UK)
- The Maidens SAC (UK)
- Bristol Channel Approaches/Dynesfeydd Môr Hafren (UK)

- South-East Islay Skerries (UK)
- Lundy (UK)
- Isles of Scilly Complex (UK)
- Nord Bretagne DH (FR)
- Récifs et landes de la Hague (FR)
- Anse de Vauville (FR)
- Mers Celtiques – Talus du golfe de Gascogne (FR)
- Banc et récifs de Surtainville (FR)
- Côte de Granit rose-Sept-Iles (FR)
- Trégor – Goëlo (FR)
- Baie de Morlaix (FR)
- Abers – Côtes des legends (FR)
- Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay (FR)
- Cap d’Erquy-Cap Fréhel (FR)
- Ouessant-Molène (FR)
- Chausey (FR)
- Baie de Saint-Brieuc – Est (FR)
- Côtes de Crozon (FR)
- Baie du Mont Saint-Michel (FR)
- Baie de Lancieux, Baie de l’Arguenon, Archipel de Saint Malo et Dinard (FR)
- Estuaire de la Rance (FR)
- Chaussée de Sein (FR)
- Récifs du talus du golfe de Gascogne (FR)

Further information is required to assess the potential effects of the proposed works on these European Sites.

All Natura 2000 sites within 15km, and beyond 15km with the potential for significant effects on Natura 2000 sites (including Irish, French, and UK sites), are listed in Tables 8-10. The qualifying interests, and the potential impact of the development on each European site and qualifying interest, are screened in/out in Table 11.

The proposed Survey Route Corridor and Works (including landfall onto Velvet Strand, Portmarnock) are demonstrated in Figures 17-19. Waterbodies located proximate to the Survey Route Corridor are demonstrated in Figure 20. SACs and SPAs (incl. Marine SPAs) within / proximate to the proposed Survey Route Corridor are demonstrated in Figures 21-23. SACs and SPAs within 10km of the proposed Survey Route Corridor are demonstrated in Figures 24 - 26. SACs and SPAs within 15 km of the proposed Survey Route Corridor are seen in Figures 27 - 29. The proposed fibre optic survey route in relation to the 12 nm limit, Designated Irish Continental Shelf and Offshore SAC’s (no offshore SAC’s in the area) is demonstrated in Figure 30. IE, FR, & UK SACs designated for Grey Seals (*Halichoerus grypus*) within 448km of the Proposed Survey Route Corridor are demonstrated in Figure 31. IE, FR, & UK SACs designated for Harbour Seals (*Phoca vitulina*) within 273km of the Proposed Survey Route Corridor are demonstrated in Figure 32. IE, FR, & UK SACs located within the Management Units (MU) for Bottlenose dolphin (*Tursiops truncatus*) and Harbour Porpoise (*Phocoena phocoena*) are demonstrated in Figures 33 & 34.

Table 8. Proximity to designated sites of conservation importance (IE)

Designation	European Site	Distance
SAC	Malahide Estuary SAC	Within
SAC	Rockabill to Dalkey Island SAC	Within
SAC	Baldoyle Bay SAC	1.2 km
SAC	Lambay Island SAC	2 km
SAC	Ireland's Eye SAC	3.5 km
SAC	North Dublin Bay SAC	4.5 km
SAC	Rogerstown Estuary SAC	5.4 km
SAC	Howth Head SAC	5.7 km
SAC	South Dublin Bay SAC	10.3 km
SAC	Slaney River Valley SAC	53.9 km
SAC	Saltee Islands SAC	140.7 km
SAC	Ballysadare Bay SAC	179.4 km
SAC	Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	180.6 km
SAC	Donegal Bay (Murvagh) SAC	184.6 km
SAC	Galway Bay Complex SAC	185.7 km
SAC	West of Ardara/Maas Road SAC	201.5 km
SAC	Slieve Tooley/Tormore Island/Loughros Beg Bay SAC	210.3 km
SAC	Killala Bay/Moy Estuary SAC	213 km
SAC	Rutland Island and Sound SAC	223.5 km
SAC	Kilkieran Bay and Islands SAC	227.8 km
SAC	Clew Bay Complex SAC	230 km
SAC	Inishbofin and Inishshark SAC	265.2 km
SAC	Horn Head and Rinclevan SAC	266.5 km
SAC	Slyne Head Islands SAC	266.6 km
SAC	Duvillaun Islands SAC	273.8 km
SAC	Inishkea Islands SAC	277.2 km
SAC	Roaring Water Bay and Islands SAC	304.9 km
SAC	Blasket Islands SAC	325.9 km
SPA	North-West Irish Sea SPA	Within
SPA	Malahide Estuary SPA	500m
SPA	Baldoyle Bay SPA	1.2 km
SPA	Lambay Island SPA	1.7 km
SPA	Ireland's Eye SPA	3 km
SPA	North Bull Island SPA	4.5 km
SPA	Rogerstown Estuary SPA	4.9 km
SPA	Howth Head Coast SPA	5.7 km
SPA	Rockabill SPA	7.7 km
SPA	South Dublin Bay and River Tolka SPA	8.6 km
SPA	Skerries Islands SPA	12.5 km

Table 9. Proximity to designated sites of conservation importance (UK)

Designation	European Site	Distance
SAC	North Anglesey Marine/Gogledd Môn Forol	Borders the Survey Area (Within MU for Harbour Porpoise)
SAC	Murlough	65.8 km
SAC	North Channel	68.4 km (Within MU for Harbour Porpoise)
SAC	West Wales Marine / Gorllewin Cymru Forol	76.4 km (Within MU for Harbour Porpoise)
SAC	Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau	78.5 km (Within MU for Bottlenose Dolphin)
SAC	Strangford Lough	82.8 km
SAC	Cardigan Bay / Bae Ceredigion	139.8 km (Within MU for Bottlenose Dolphin)
SAC	The Maidens SAC	146.4 km
SAC	Pembrokeshire Marine / Sir Benfro Forol	170.5 km
SAC	Bristol Channel Approaches/Dynesfeydd Môr Hafren	207 km (Within MU for Harbour Porpoise)
SAC	South-East Islay Skerries	233 km
SAC	Lundy	263 km
SAC	Isles of Scilly Complex	381.7 km

Table 10. Proximity to designated sites of conservation importance (FR)

Designation	European Site	Distance
SAC	Nord Bretagne DH	452 km (Within MU for Harbour Porpoise)
SAC	Récifs et landes de la Hague	480.4 km (Within MU for Harbour Porpoise)
SAC	Mers Celtiques – Talus du golfe de Gascogne	480.8 km (Within MU for Harbour Porpoise)
SAC	Anse de Vauville	488.7 km (Within MU for Harbour Porpoise)
SAC	Banc et récifs de Surtainville	507 km (Within MU for Harbour Porpoise)
SAC	Côte de Granit rose-Sept-Iles	514.1 km (Within MU for Harbour Porpoise)
SAC	Trégor – Goëlo	519.1 km (Within MU for Harbour Porpoise)
SAC	Baie de Morlaix	538 km (Within MU for Harbour Porpoise)
SAC	Abers – Côtes des légendes	539.5 km (Within MU for Harbour Porpoise)
SAC	Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay	546.6 km (Within MU for Harbour Porpoise)
SAC	Ouessant-Molène	550.5 km (Within MU for Harbour Porpoise)
SAC	Cap d’Erquy-Cap Fréhel	555.5 km (Within MU for Harbour Porpoise)
SAC	Chausey	557.1 km (Within MU for Harbour Porpoise)
SAC	Baie de Saint-Brieuc - Est	574.1 km (Within MU for Harbour Porpoise)
SAC	Côtes de Crozon	582.8 km (Within MU for Harbour Porpoise)
SAC	Baie du Mont Saint-Michel	585 km (Within MU for Harbour Porpoise)
SAC	Baie de Lancieux, Baie de l’Arguenon, Archipel de Saint Malo et Dinard	586.6 km (Within MU for Harbour Porpoise)
SAC	Estuaire de la Rance	594.7 km (Within MU for Harbour Porpoise)
SAC	Chaussée de Sein	600.3 km (Within MU for Harbour Porpoise)
SAC	Récifs du talus du golfe de Gascogne	605 km (Within MU for Harbour Porpoise)

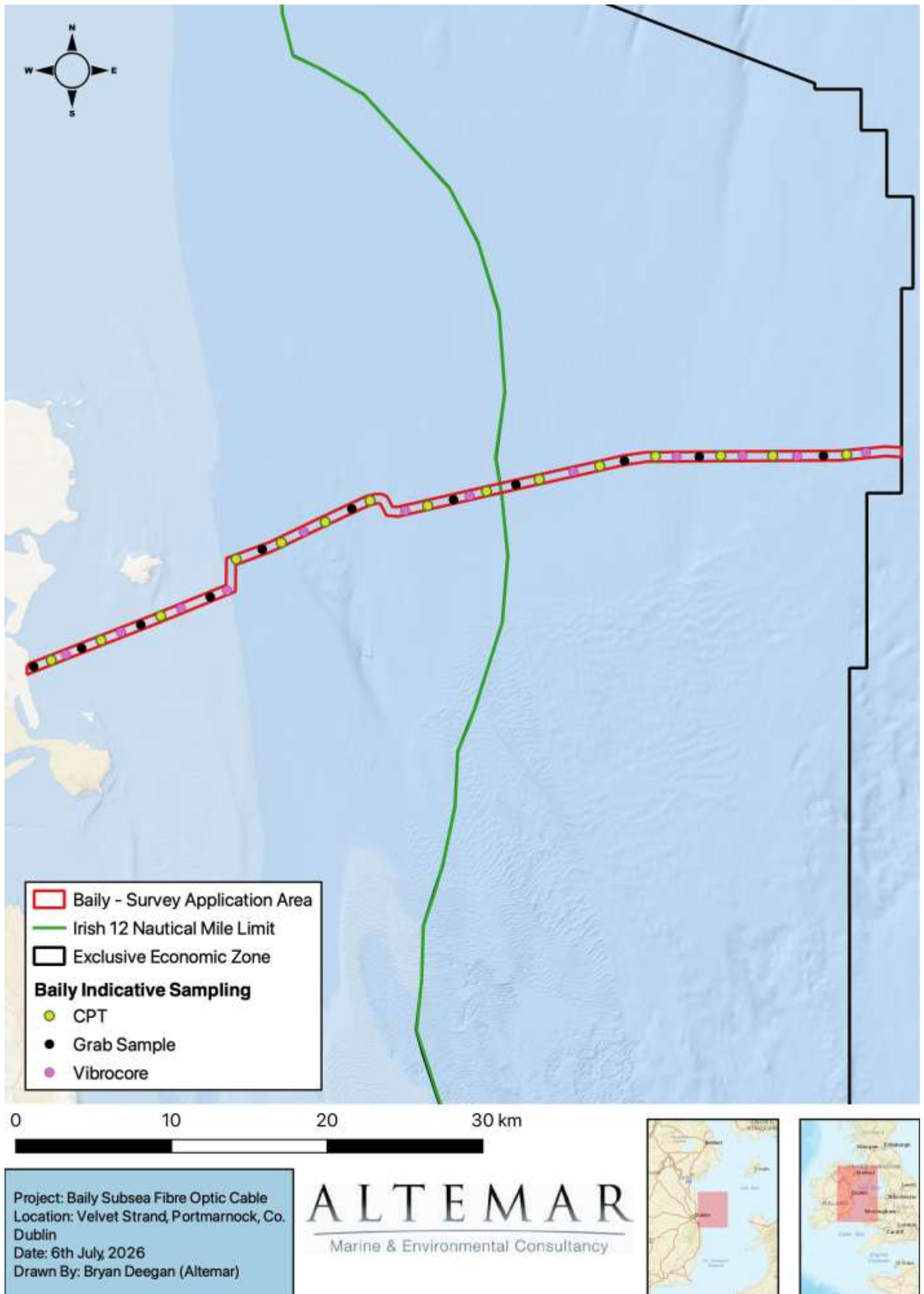


Figure 17: Proposed Survey Route Corridor and Works (to Irish Exclusive Economic Zone).

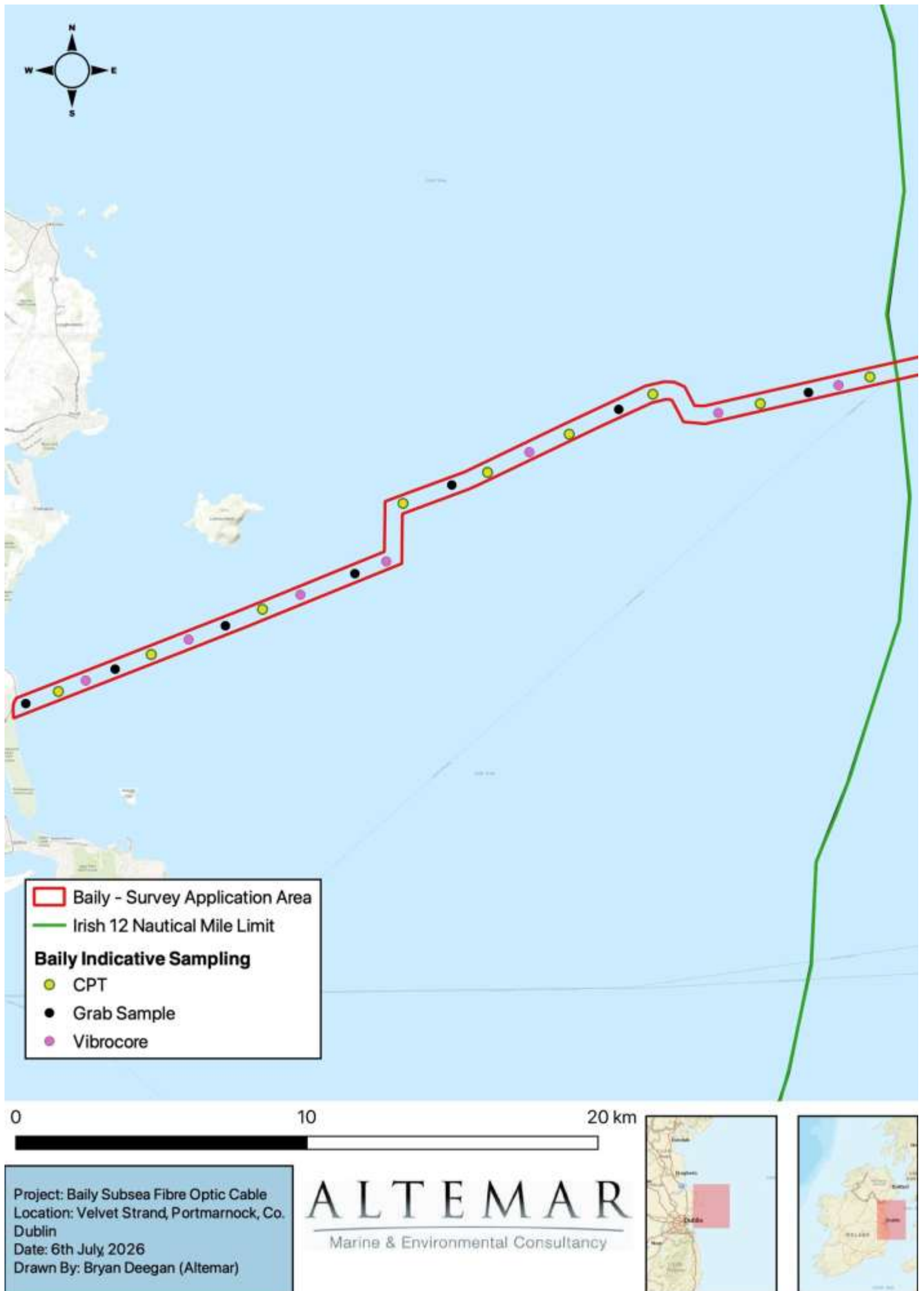


Figure 18: Proposed Survey Route Corridor and Works (to Irish 12 Nautical Mile Limit).



Figure 19. Proposed Survey Route Corridor within Portmarnock Beach

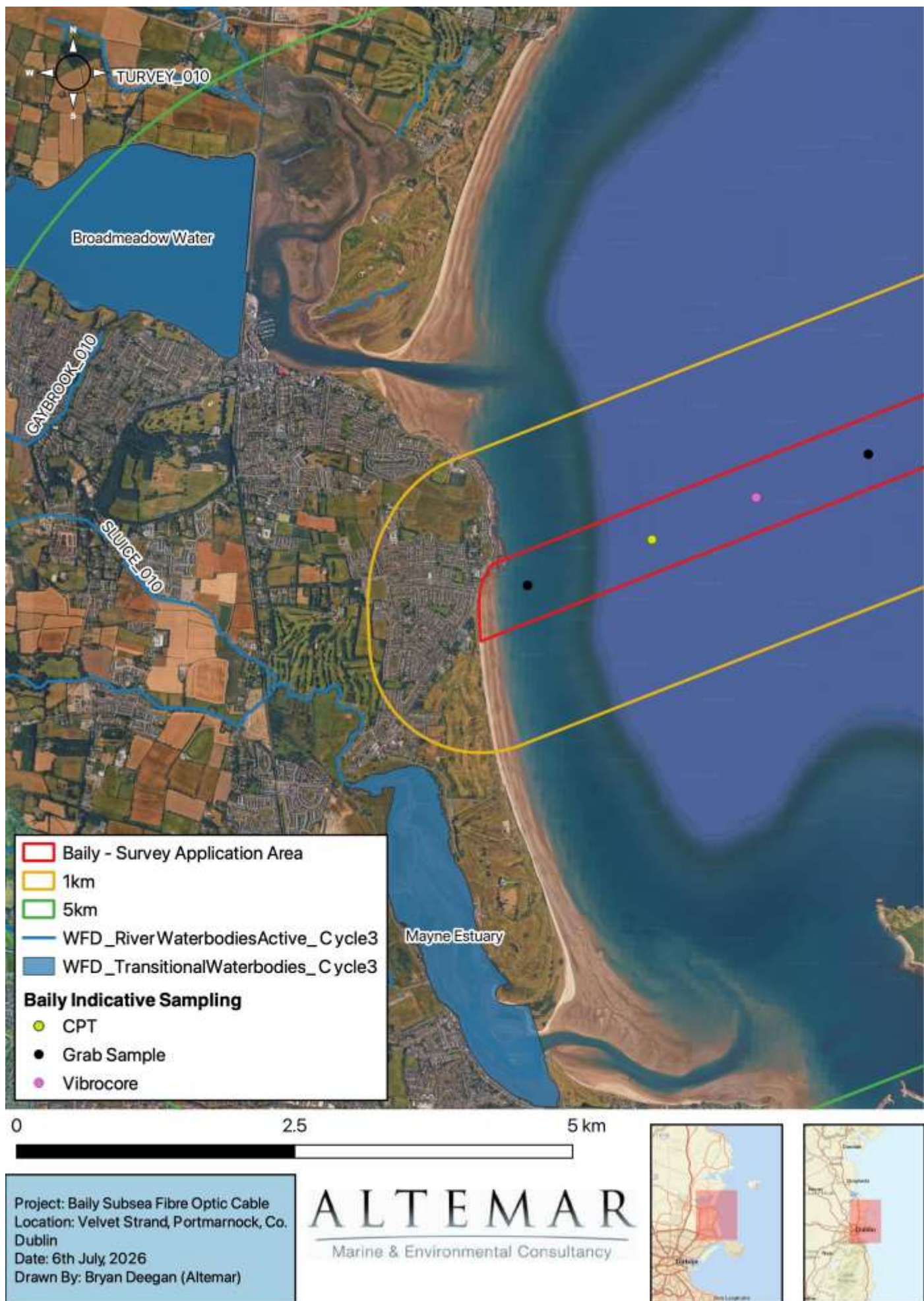


Figure 20. Waterbodies proximate to the proposed Survey Route Corridor.

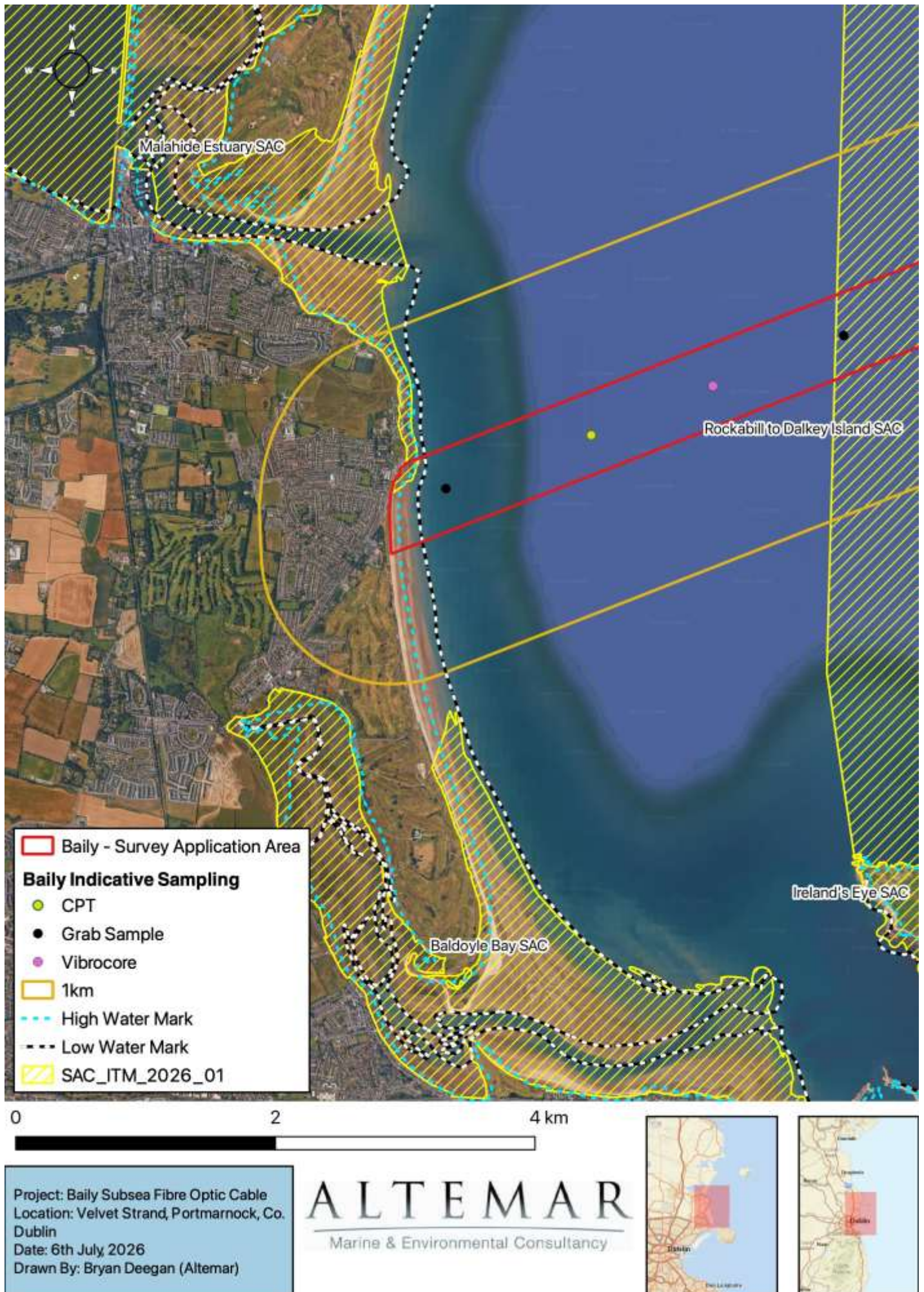


Figure 21: Special Areas of Conservation proximate to the proposed Survey Route Corridor Landfall.

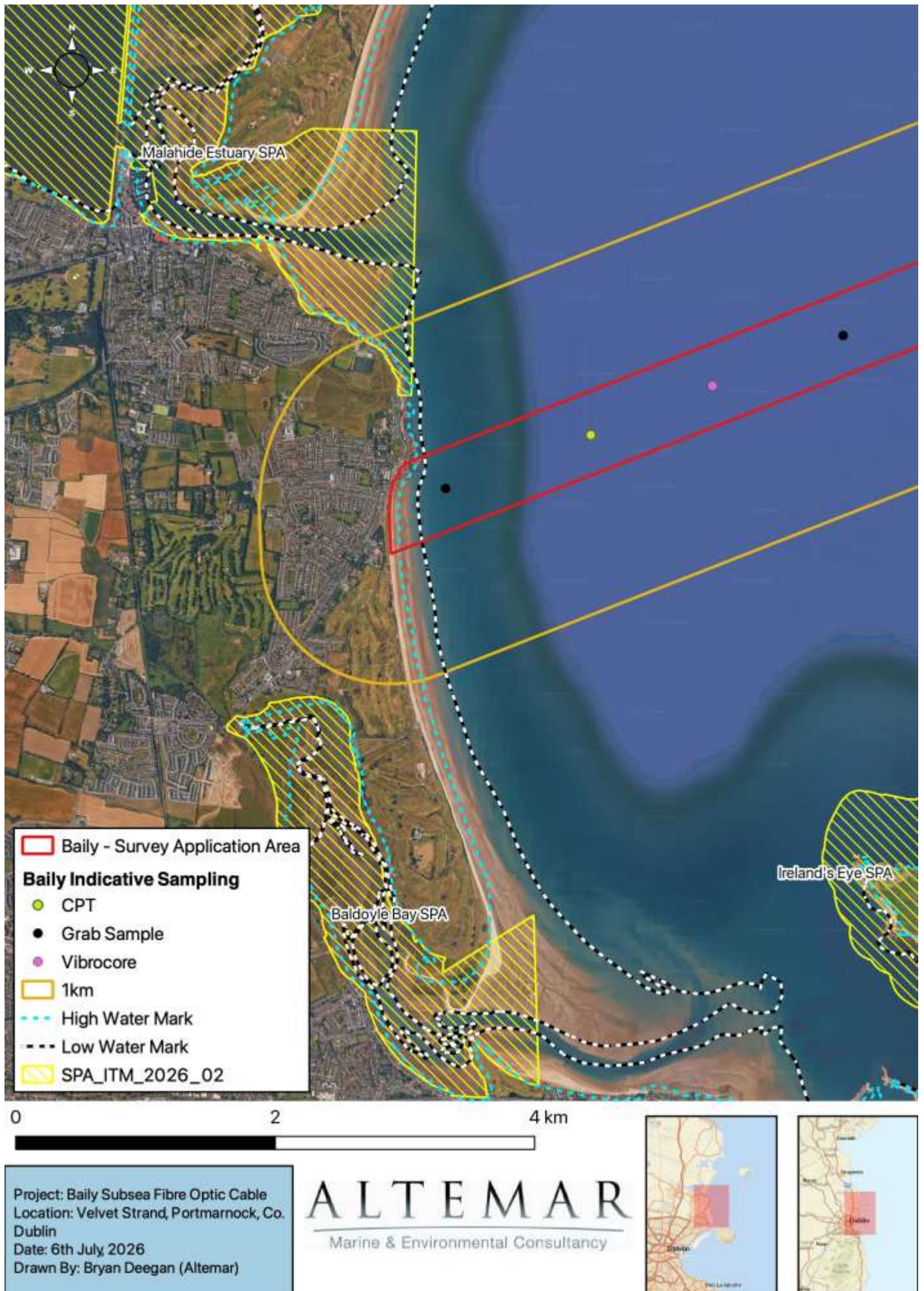


Figure 22: Special Protection Areas proximate to the proposed Survey Route Corridor Landfall.

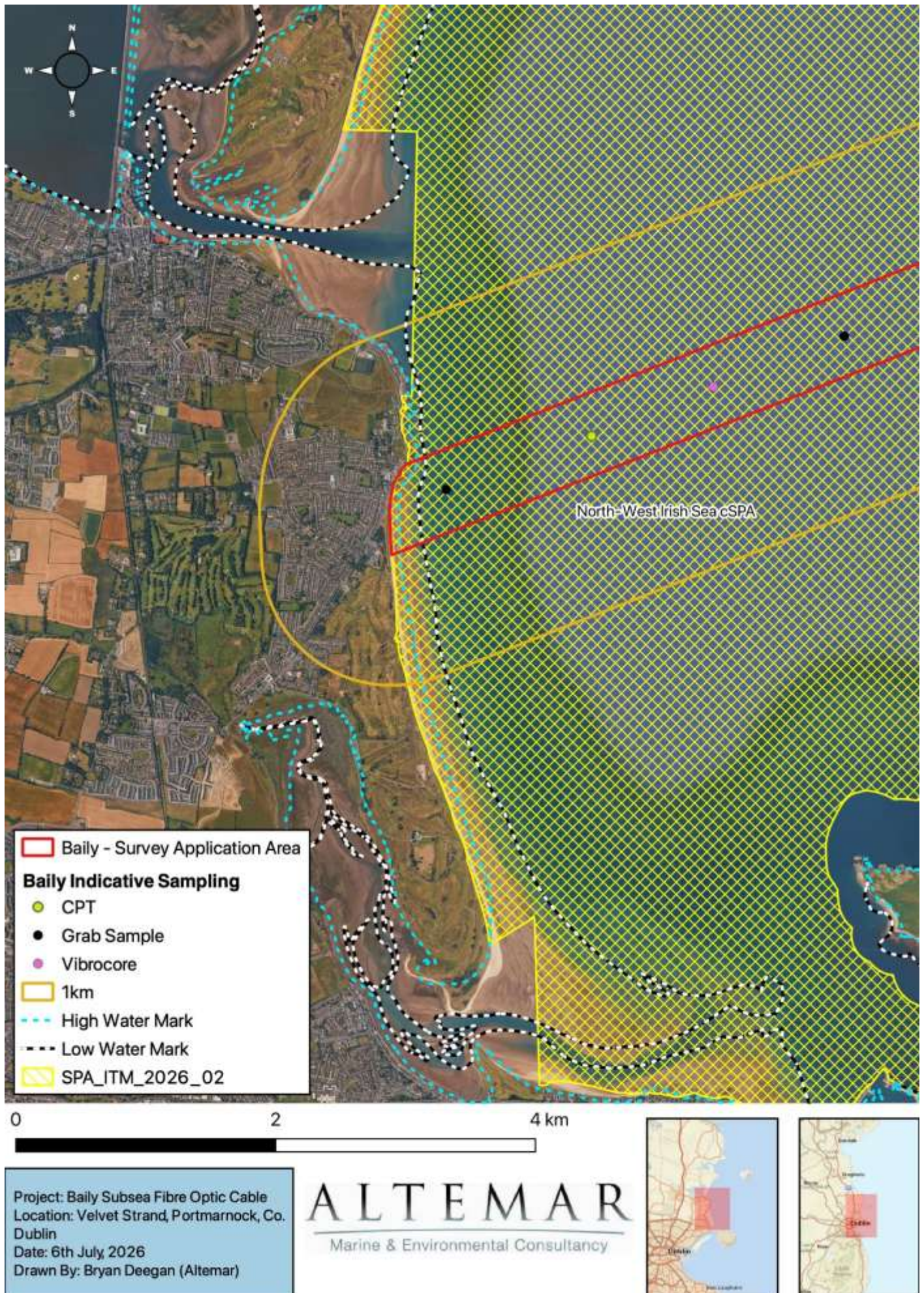
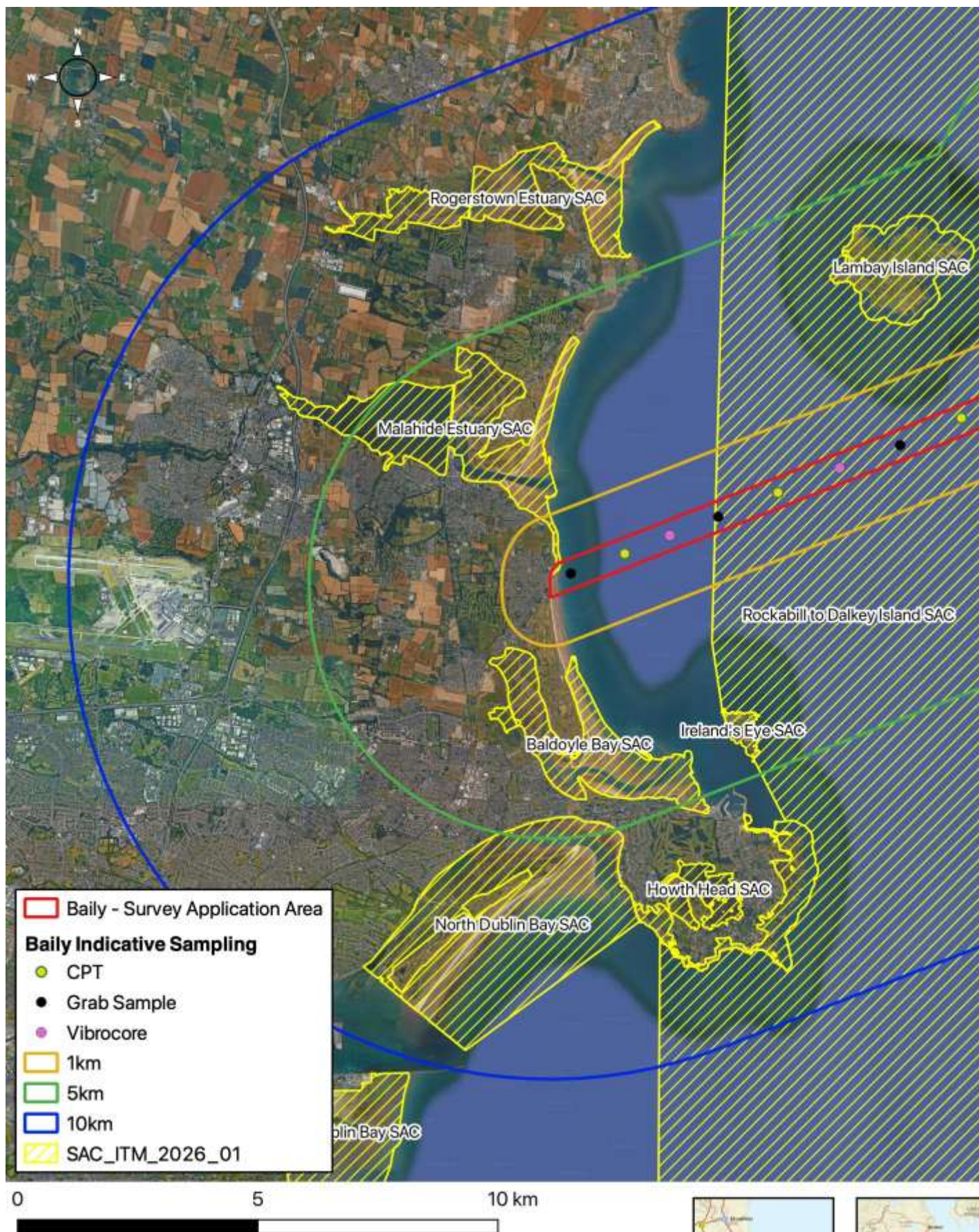


Figure 23: Marine SPAs proximate to the proposed Survey Route Corridor Landfall.



Project: Baily Subsea Fibre Optic Cable
 Location: Velvet Strand, Portmarnock, Co. Dublin
 Date: 6th July, 2026
 Drawn By: Bryan Deegan (Altamar)

ALTEMAR
 Marine & Environmental Consultancy



Figure 24: Special Areas of Conservation within 10km of the proposed Survey Route Corridor

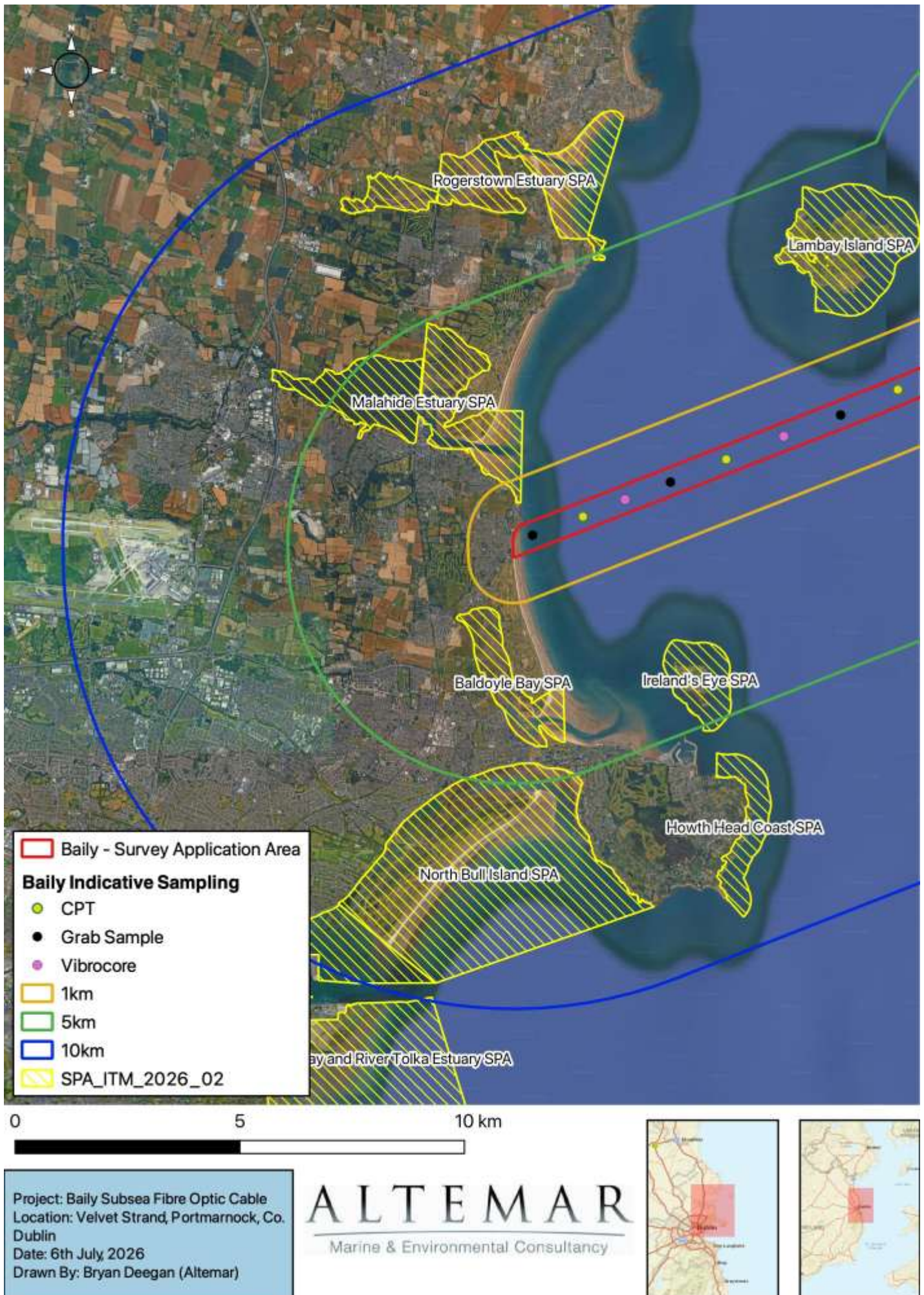


Figure 25: Special Protection Areas within 10km of the proposed Survey Route Corridor .



Figure 26: Marine SPAs within 10km of the proposed Survey Route Corridor

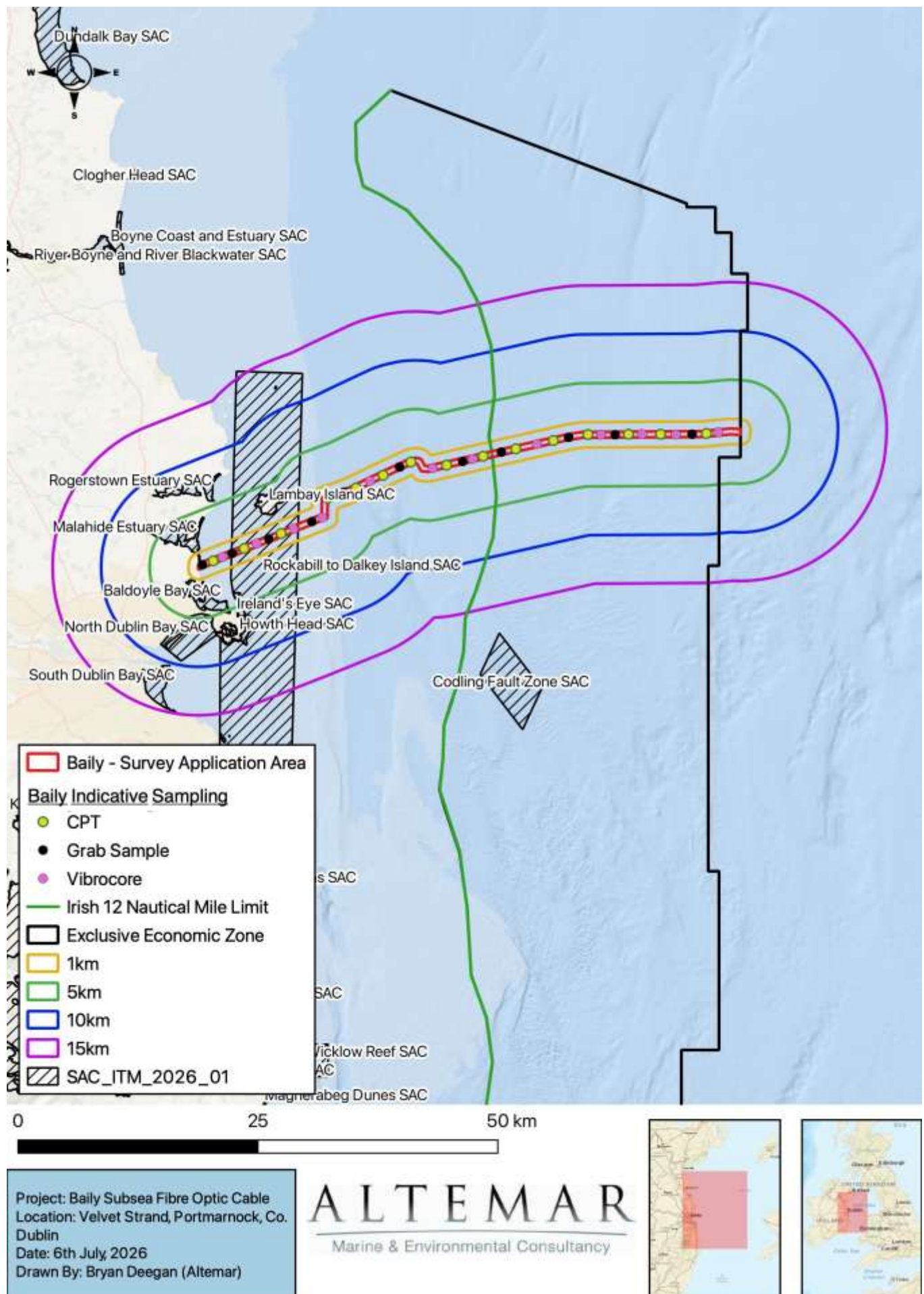


Figure 27: Special Areas of Conservation within 15 km of the proposed Survey Route Corridor.

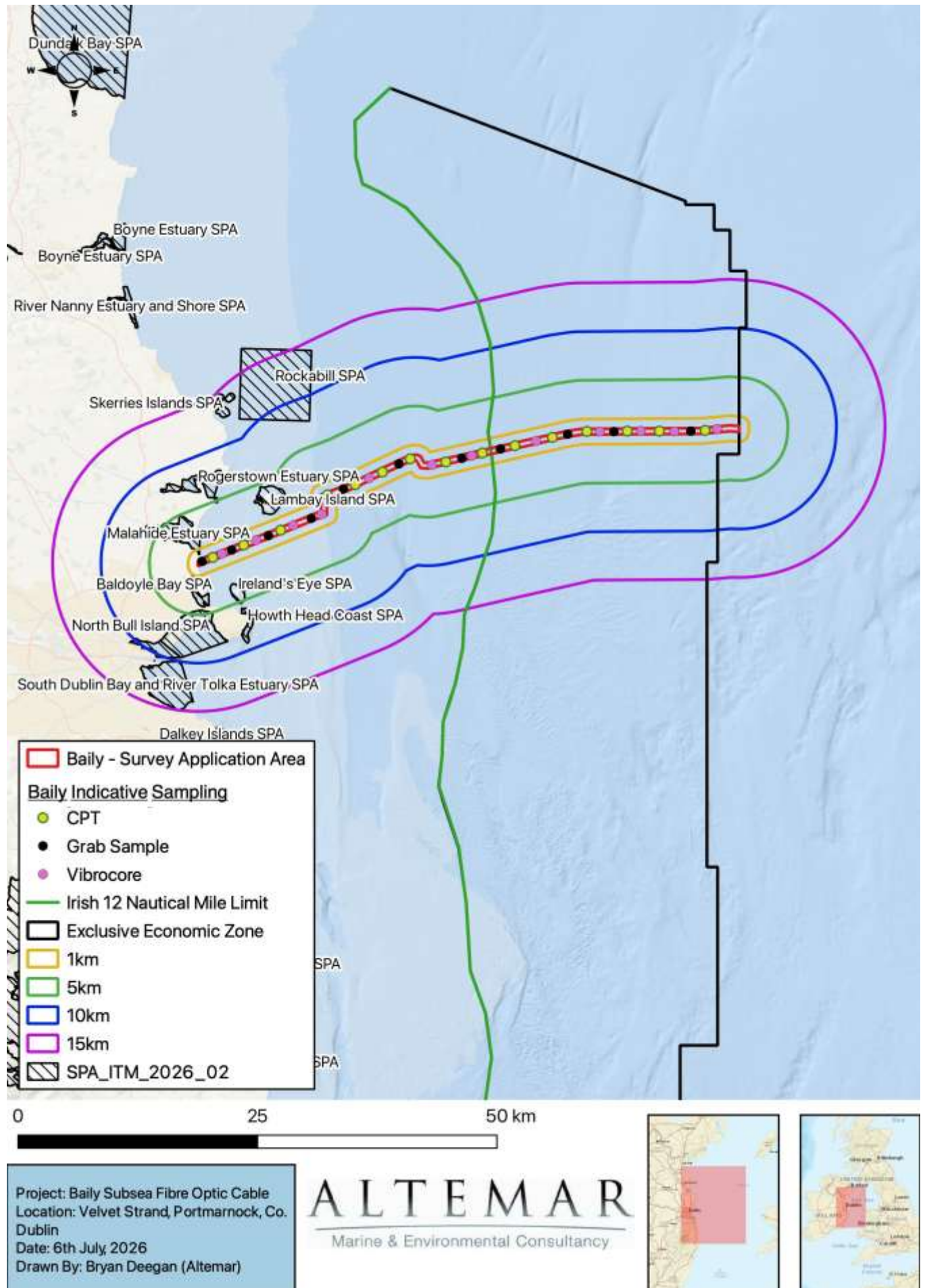


Figure 28: Special Protection Areas within 15 km of the proposed Survey Route Corridor.

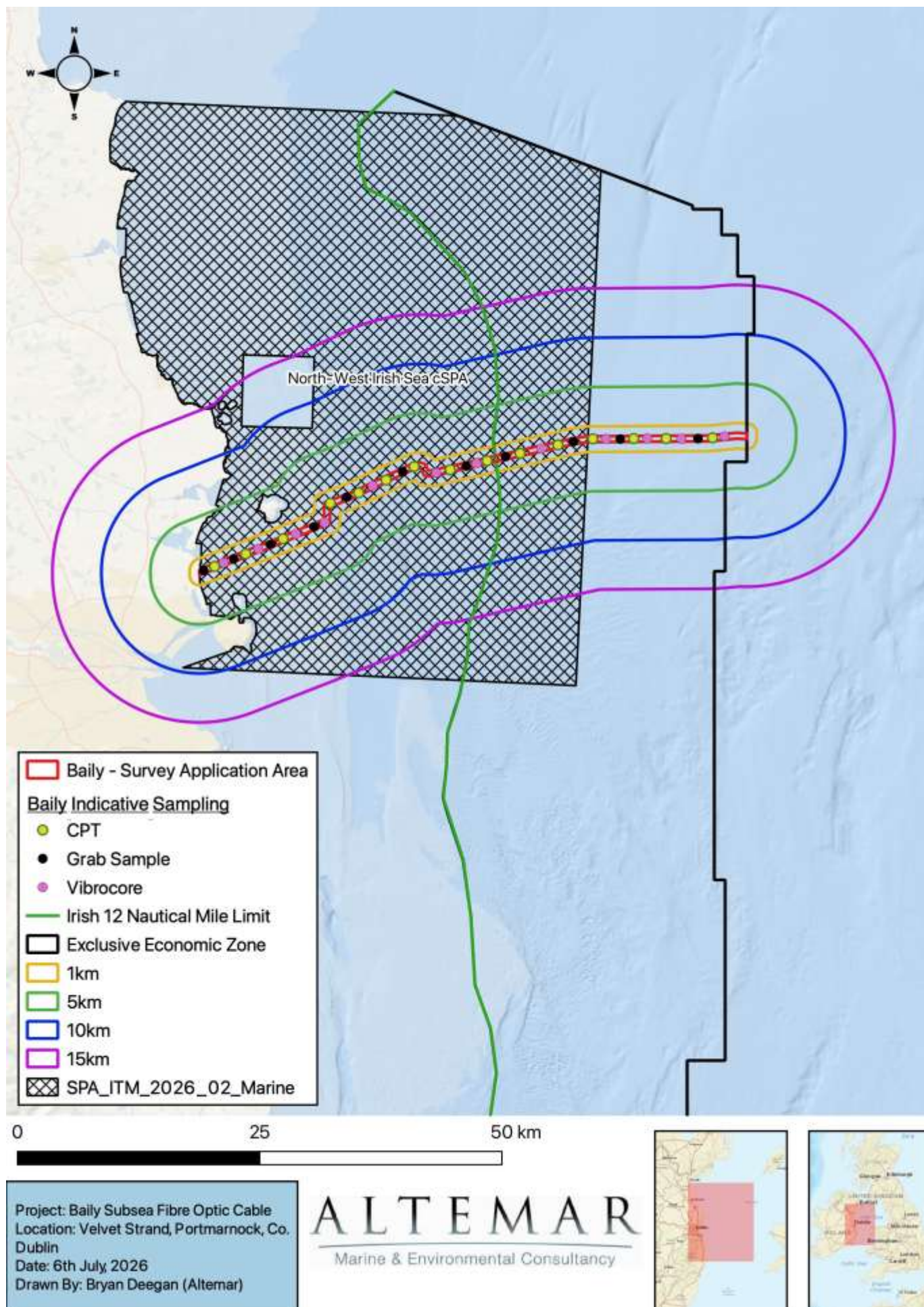


Figure 29: Marine SPAs within 15 km of the proposed Survey Route Corridor.

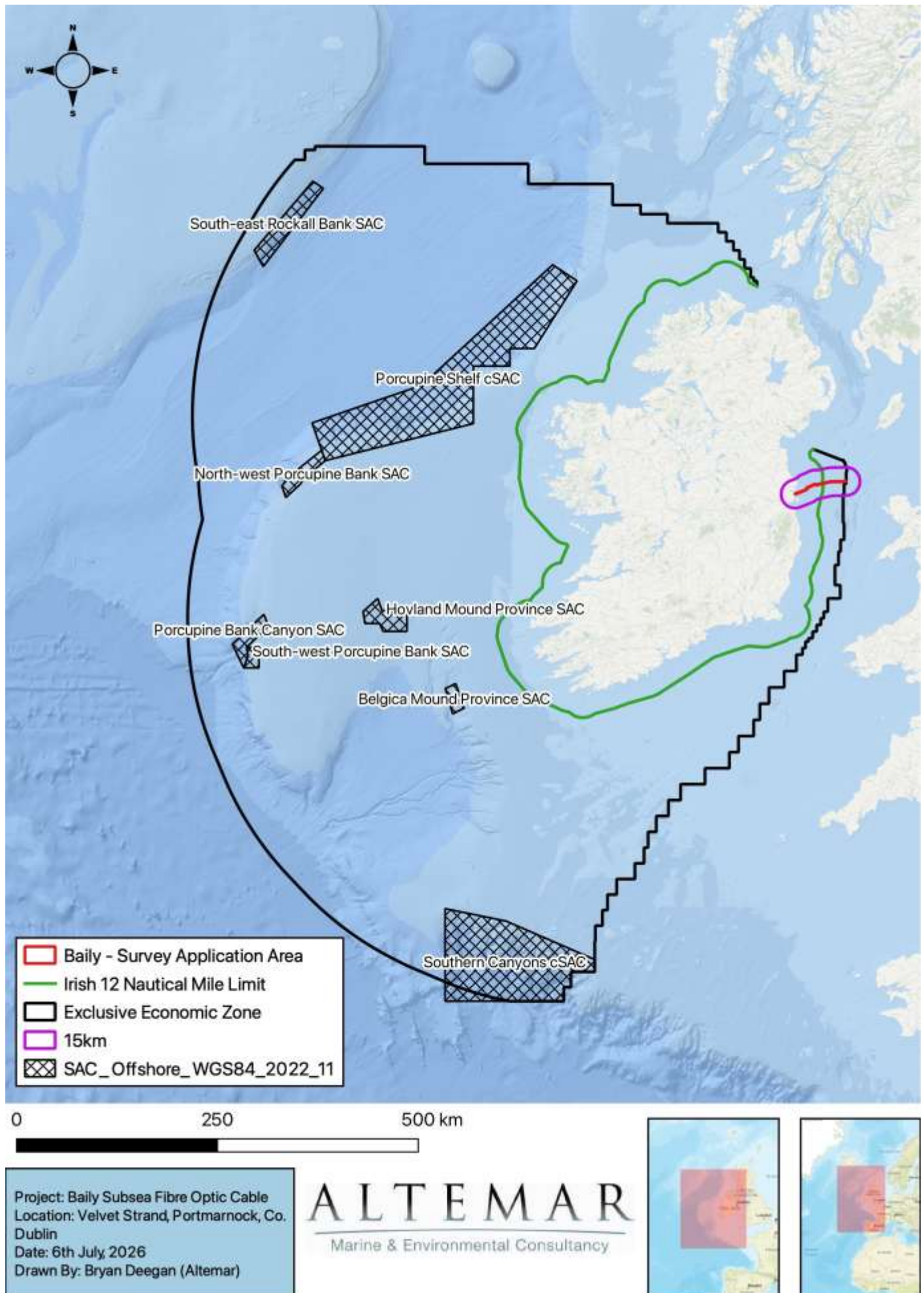


Figure 30: Fibre optic survey route in relation to the 12 nm limit, Designated Irish Continental shelf and Offshore SAC's (no offshore SAC's in the area).

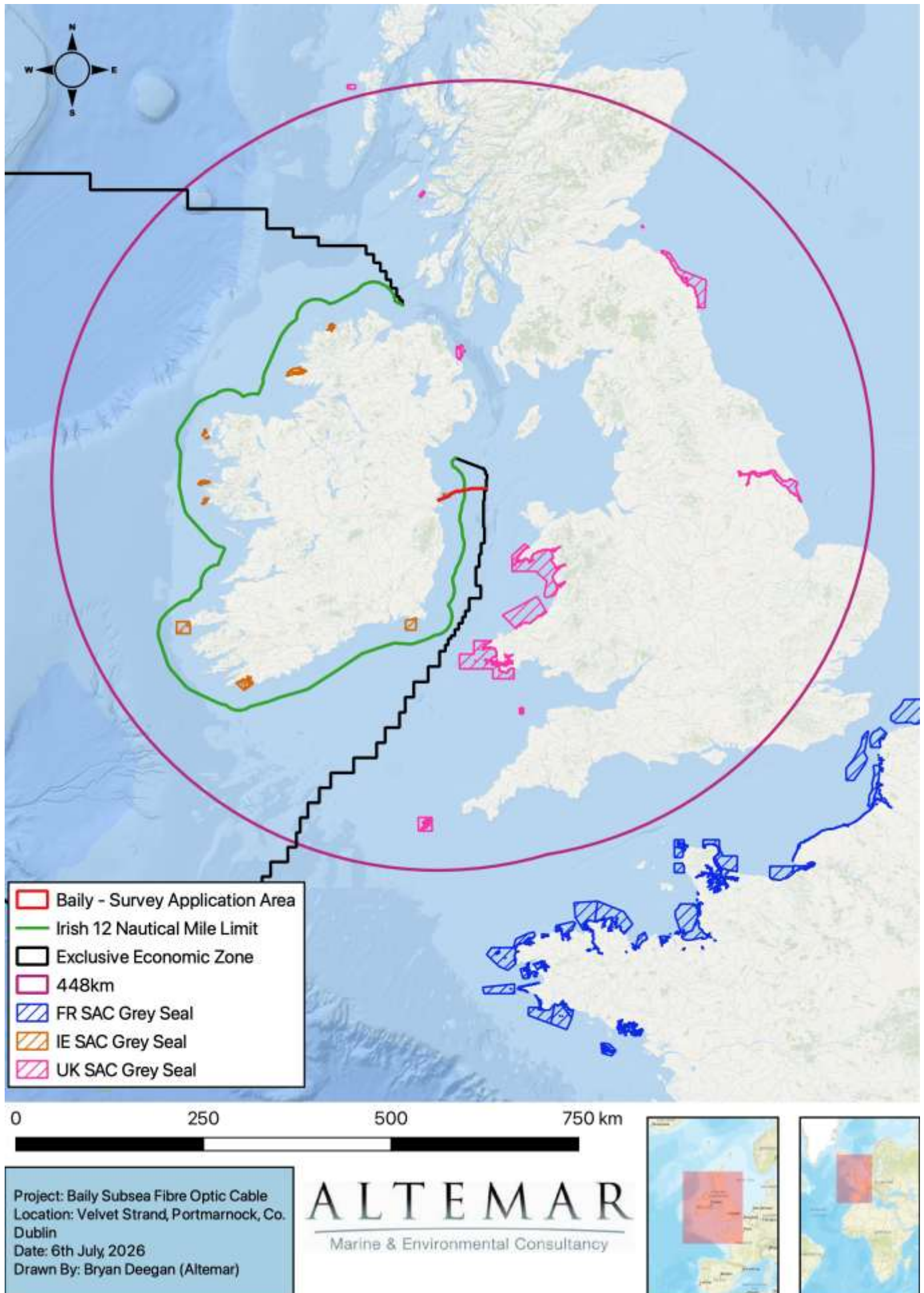


Figure 31: IE, FR, & UK SACs designated for Grey Seals (*Halichoerus grypus*) within 448km of the Proposed Survey Route Corridor.

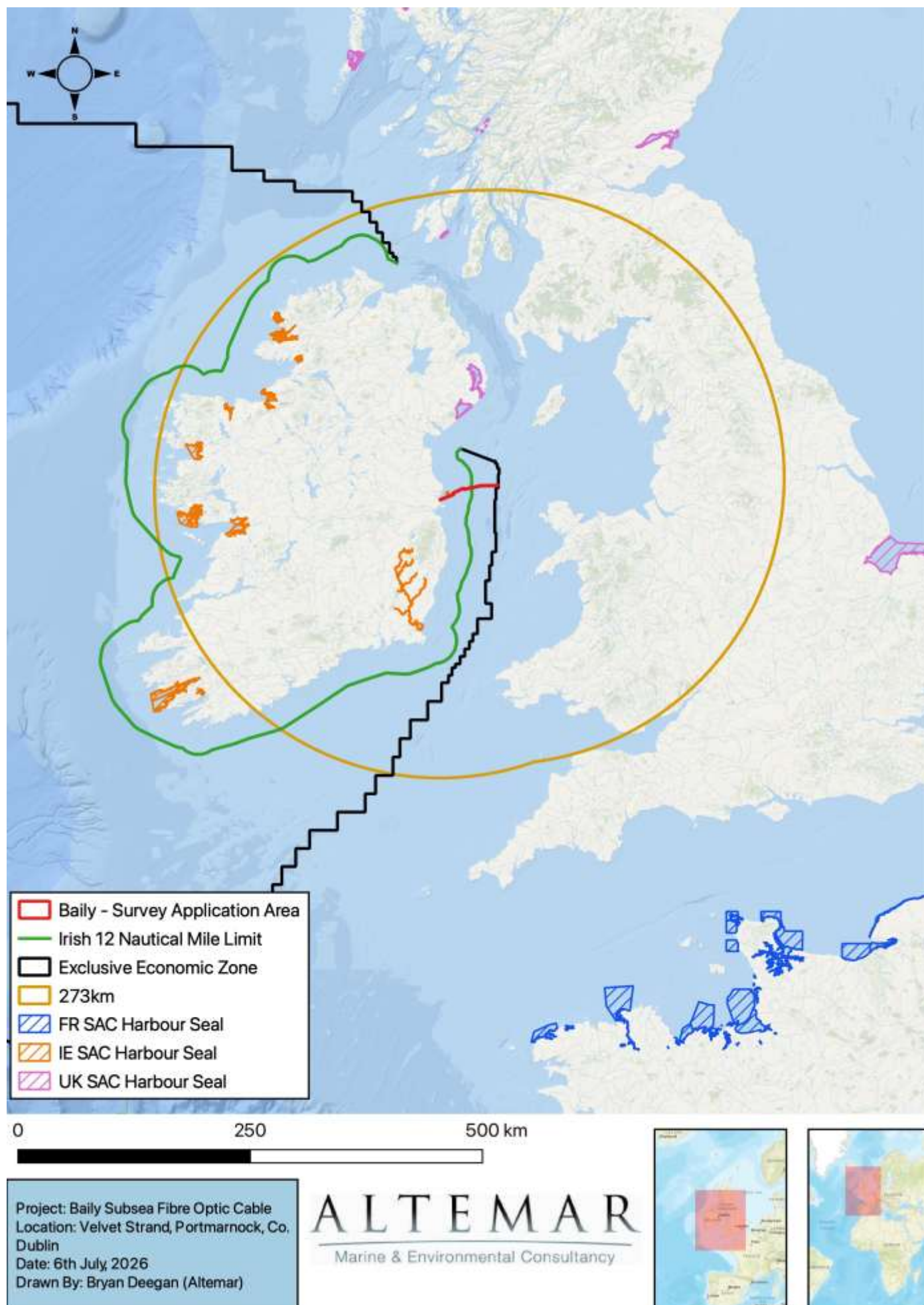


Figure 32: IE, FR, & UK SACs designated for Harbour Seals (*Phoca vitulina*) within 273km of the Proposed Survey Route Corridor

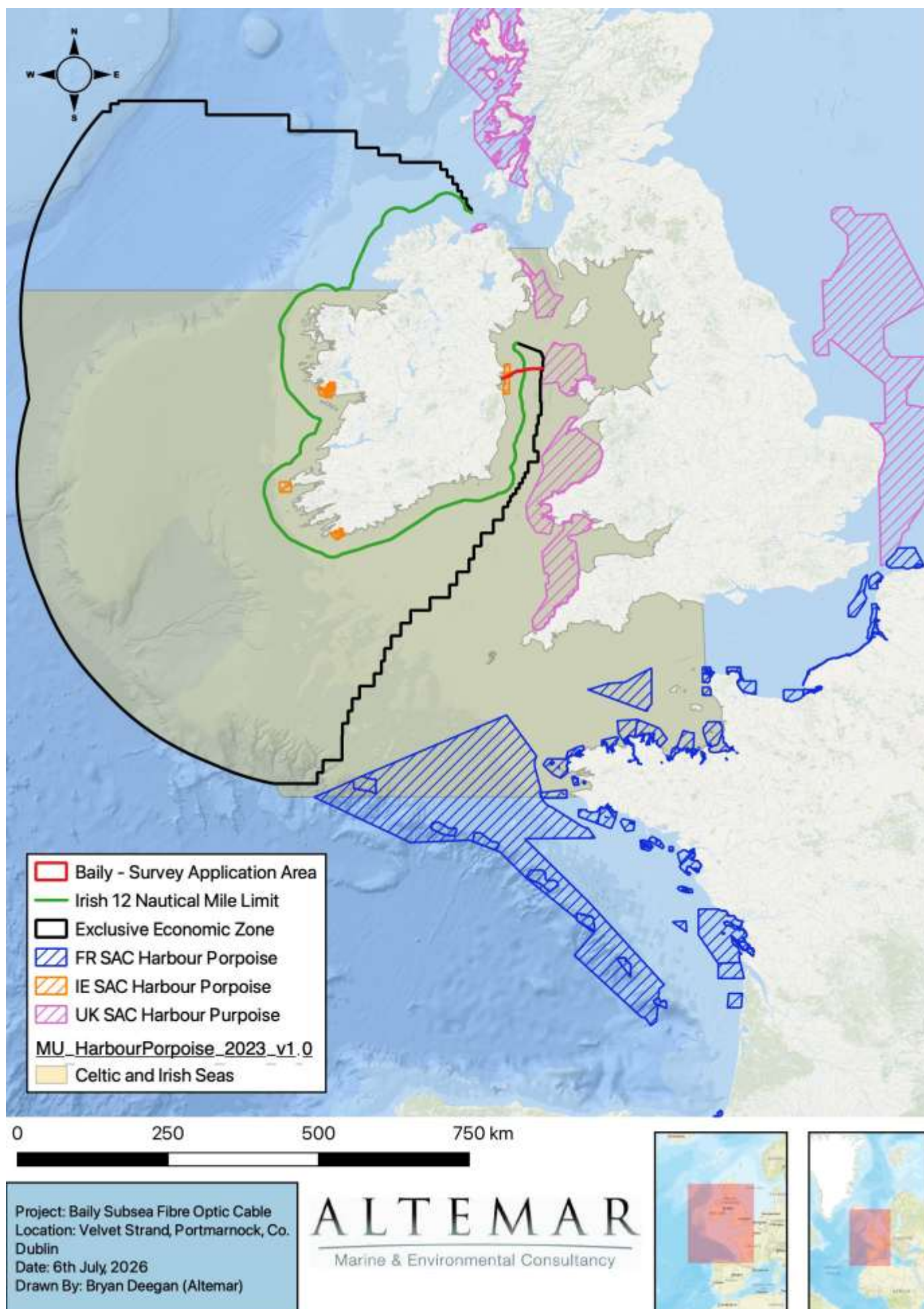


Figure 33: IE, FR, & UK SACs designated for Harbour Porpoise (*Phocoena phocoena*) within the Celtic and Irish Seas MU for Harbour Porpoise

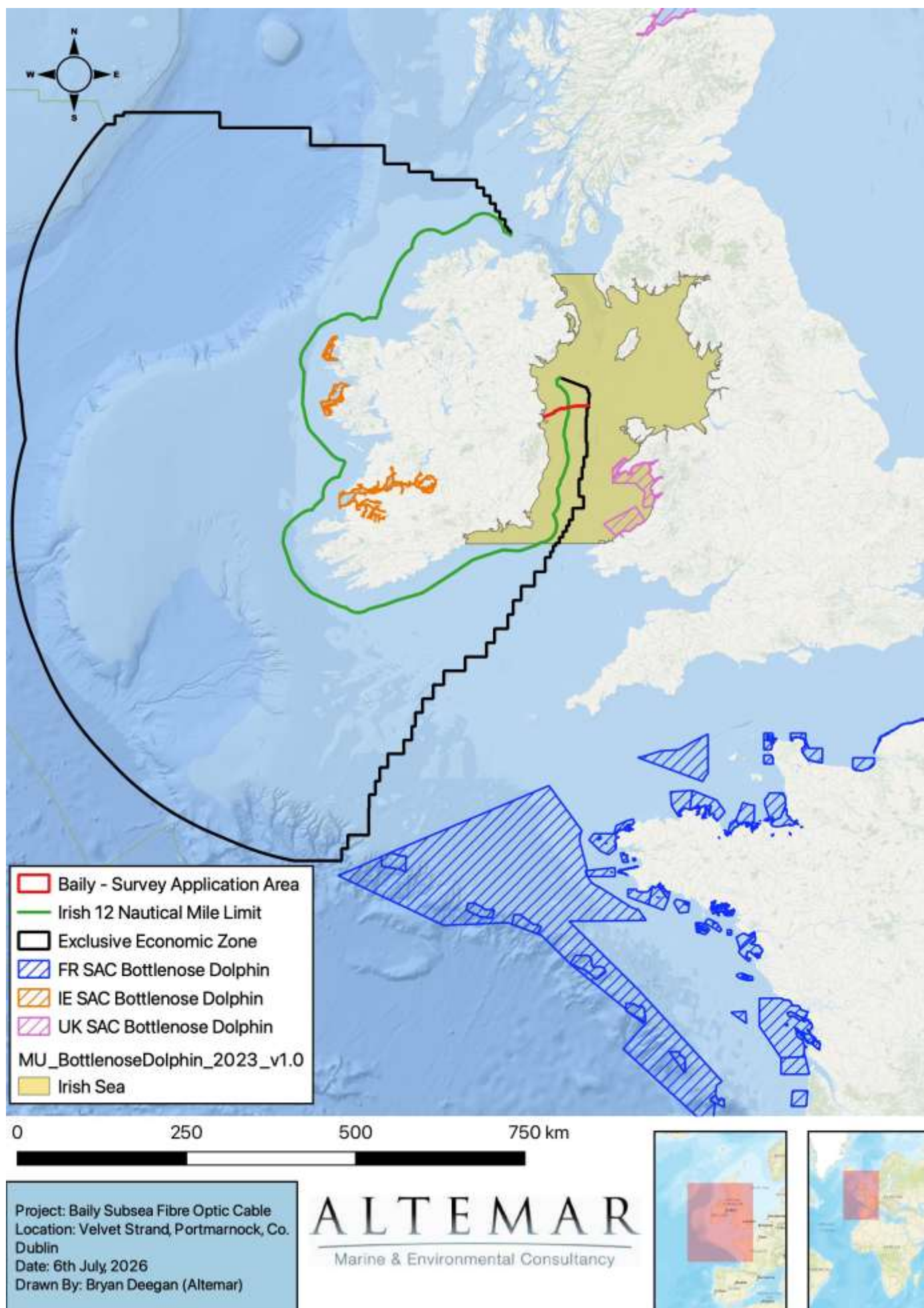


Figure 34: IE, FR, & UK SACs designated for Bottlenose Dolphin (*Tursiops truncatus*) within the Celtic and Irish Seas MU for Bottlenose Dolphin

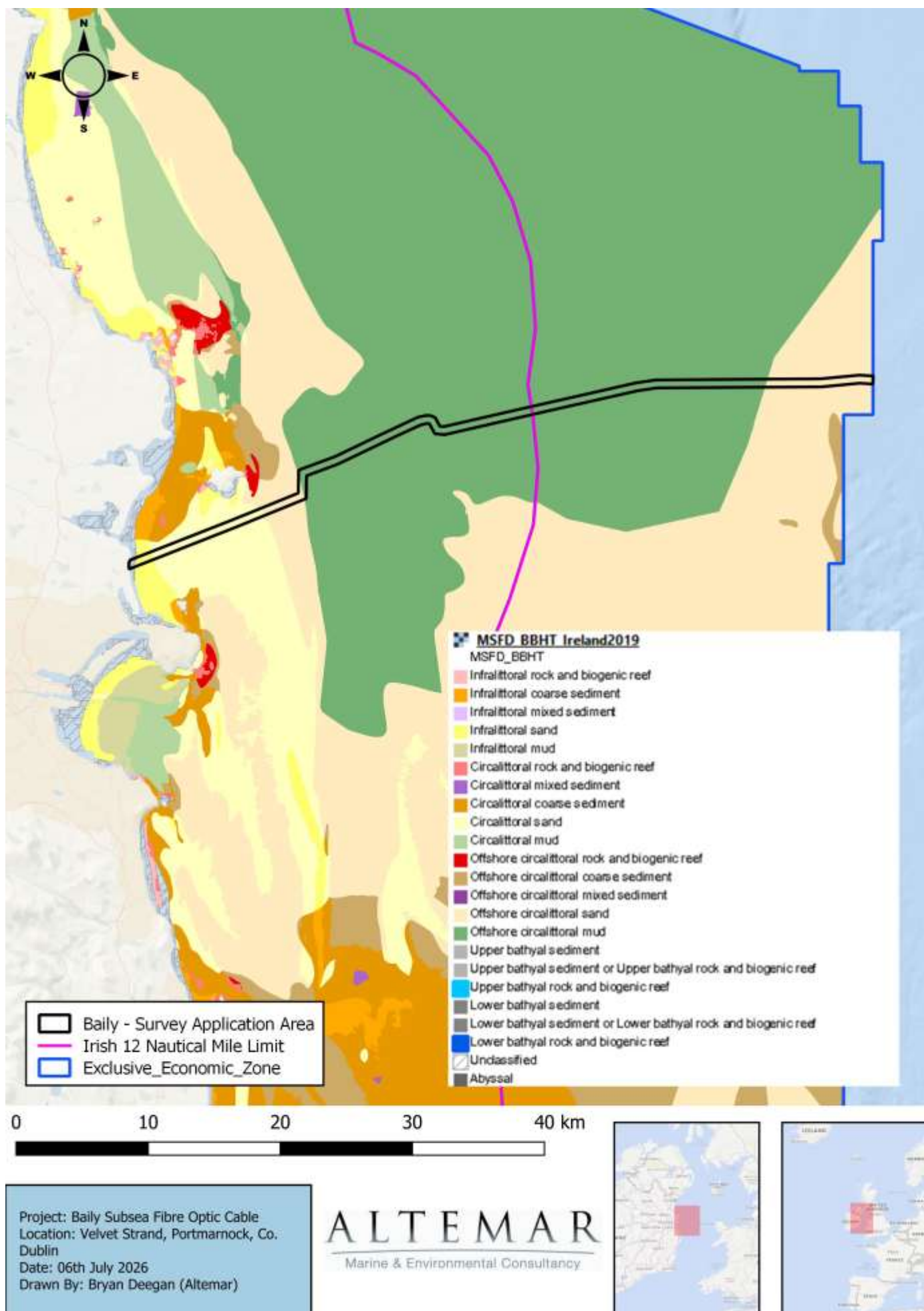


Figure 35. MSFD Benthic Boad Habitat Types along the Fibre optic survey route (Primarily offshore circalittoral mud)

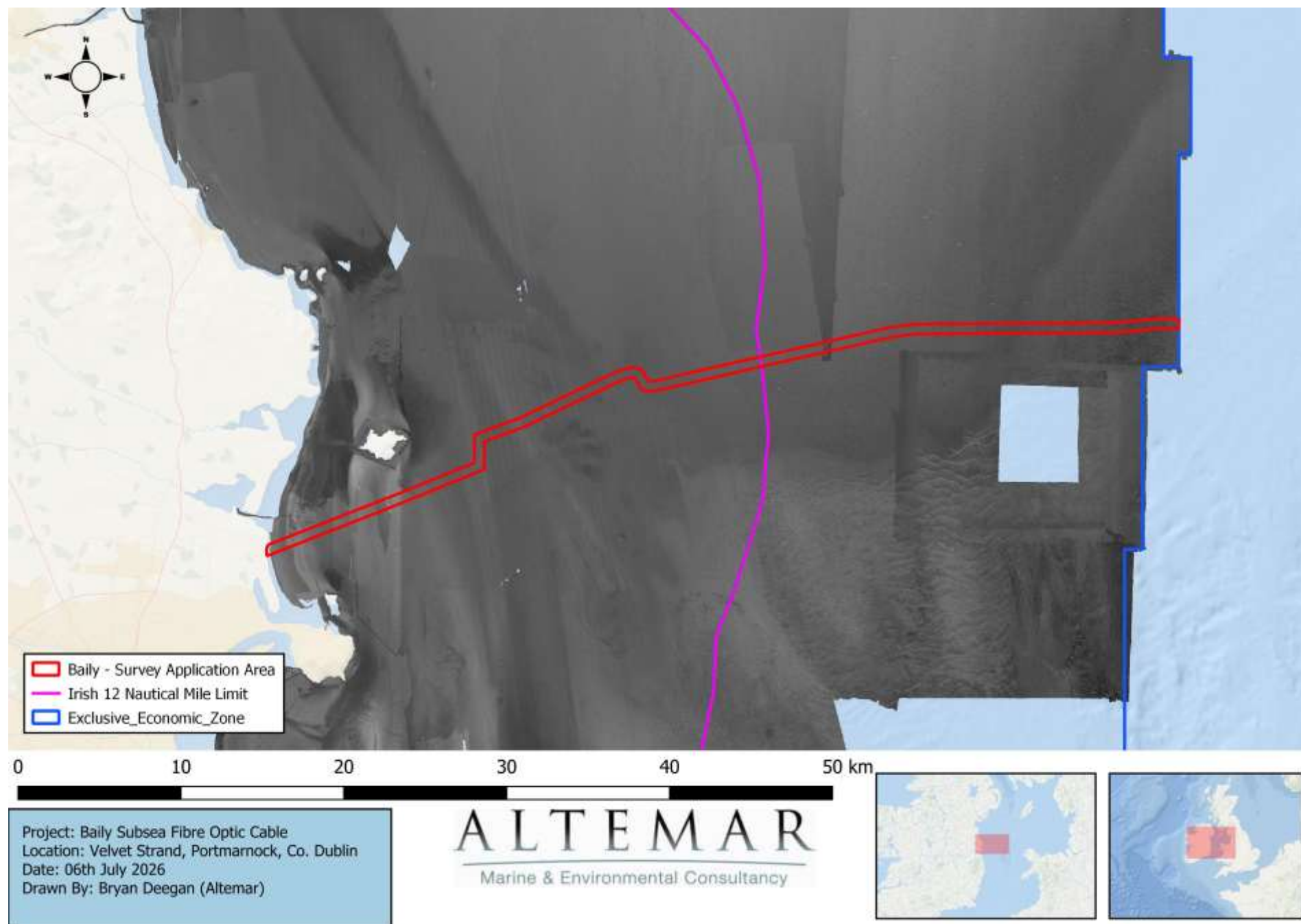


Figure 36. INFOMAR Backscatter along the Fibre optic survey route

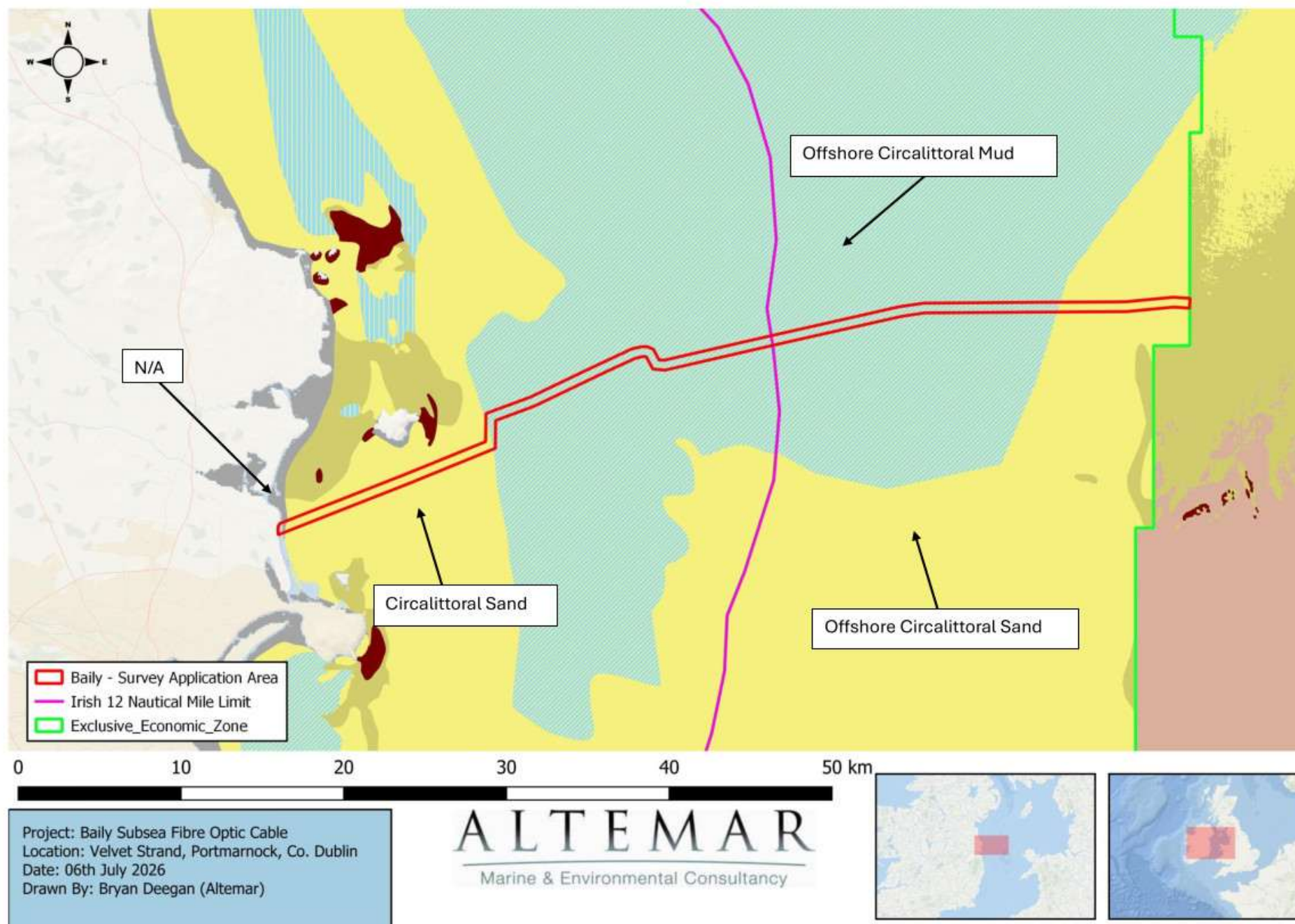


Figure 37. EUSeaMap (2025) Broad Scale Predictive Habitat Map along the Fibre optic survey route

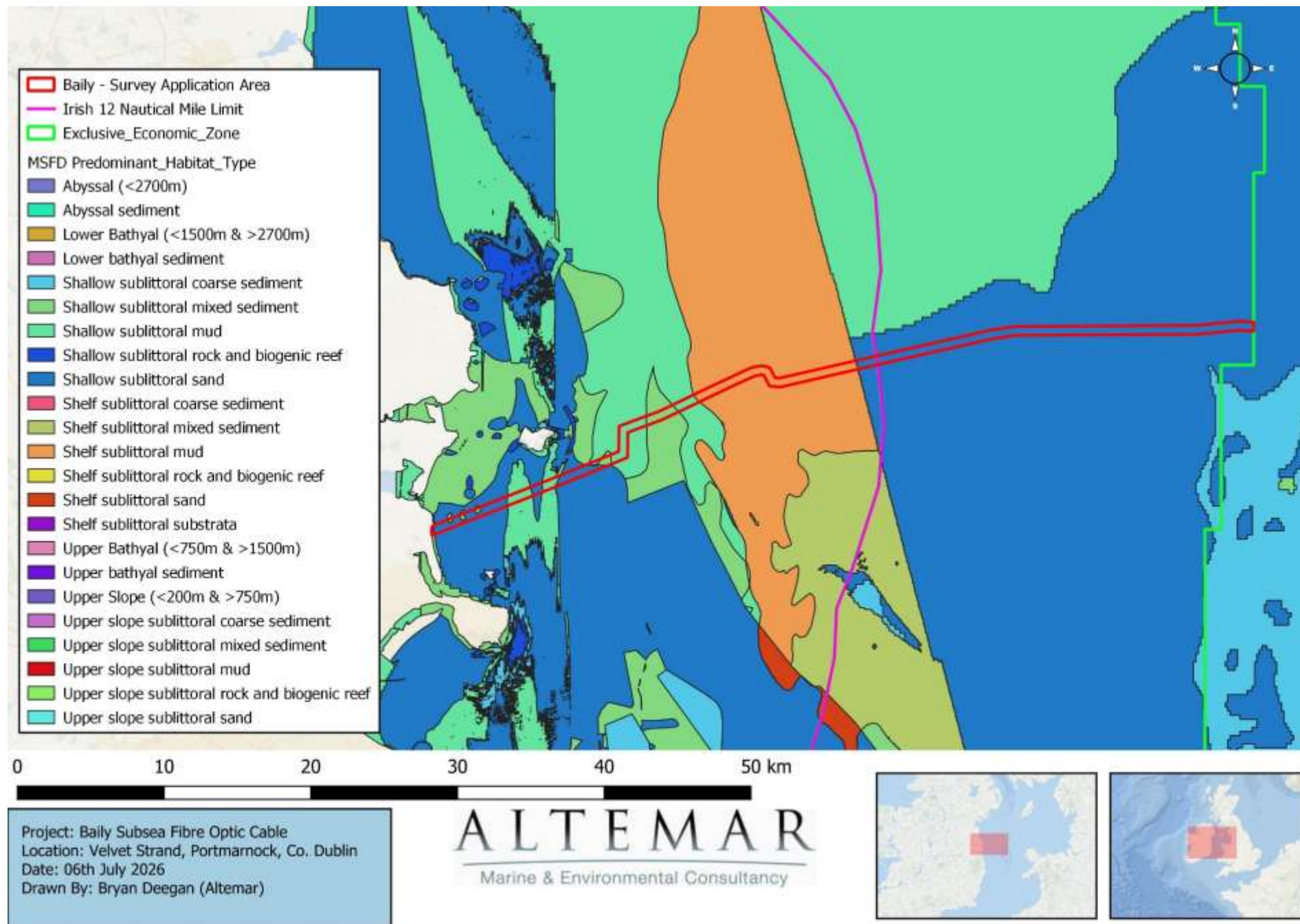


Figure 38. MSFD Predominant Habitat Types along the Fibre optic survey route

Table 11. Initial screening of Natura 2000 sites within the potential ZOI of the proposed survey route.

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
Special Protection Areas			
IE000205	Malahide Estuary SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Potential Impact The proposed intertidal works are within, and cable survey route passes through, this SAC. The proposed survey works will be within an area of existing vessel traffic proximate to the Malahide Marina and Howth Harbour. The intertidal element is on a popular beach (Velvet Strand, Portmarnock) with car parks and existing human and dog walking activity. However, initial assessment identifies that, in the absence of mitigation measures, there may be potential for impacts on the qualifying interests of this SAC through physical impact on the intertidal and subtidal sediments and physical disturbance which could impact the qualifying interests of this SAC. Mitigation measures are required to protect the SAC from significant effects. Natura Impact Statement Required
IE003000	Rockabill to Dalkey Island SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Reefs [1170] <i>Phocoena phocoena</i> (Harbour Porpoise) [1351] Potential Impact The proposed subtidal cable survey route passes through this SAC. The proposed survey works will be within an area of existing vessel traffic proximate to the Malahide Marina and Howth Harbour. However, initial assessment identifies that, in the

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			absence of mitigation measures, there may be potential for impact on harbour porpoise [1351] of this SAC through underwater noise and pollution and physical disturbance which could impact reefs protected as a qualifying interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. Natura Impact Statement Required
IE000204	Lambay Island SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] <i>Halichoerus grypus</i> (Grey Seal) [1364] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact The proposed cable survey area is located 2km from this SAC. Initial assessment identifies that, in the absence of mitigation measures, there may be potential for disturbance (noise) impacts on grey seals and harbour seals protected as QIs of this SAC. Due to short term scale of the project, the distance from the works to the SAC, and the low level of impact, there is no possibility of significant effects on the other QIs of this SAC. Mitigation measures are required for grey seals and harbour seals. Further information is required to determine the potential for adverse effects on this SAC. Natura Impact Statement Required.
IE000781	Slaney River Valley SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 53.9 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (qualifying interest of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required to protect harbour seal from significant effects. The survey area is located 53.9 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on designated habitats, Lamprey species (Sea, Brook, and River), or Freshwater pearl mussel protected as a qualifying interest of this SAC are foreseen from the proposed works associated with this survey license application. In relation to Atlantic salmon, it has been found that salmon from southeast Ireland tend to move out to the shelf edge before crossing the Atlantic towards Greenland (Rikardson et al., 2021). Given that the proposed project is located within Dublin Bay (outside of the recorded areas of salmon migration – see Appendix I), and the temporal nature of the proposed works, no significant impacts on salmon are foreseen as a result of the proposed project in the absence of mitigation. In relation to Twaite Shad, given the spatial and temporal nature of the proposed works, and the distance to this SAC, the proposed project is considered too far for any significant interaction to occur. Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of 7.5 ± 1.5 km in length along a riverine environment and 6.5 ± 1.0 km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3 km in length with a high degree of variability. Given the nature of the proposed works and the significant distance between the proposed survey area and this SAC (53.9 km), in the absence of

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			mitigation, no significant effects on otter species are likely as a result of the proposed project. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE000707	Saltee Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Submerged or partially submerged sea caves [8330] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is located 140.7 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 140.7 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000622	Ballysadare Bay SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Embryonic shifting dunes [2110]

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 179.4 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 179.4 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE000627	Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra fluviatilis</i> (River Lamprey) [1099]

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			<i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 180.6 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 180.6 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on designated habitats, Lamprey species (Sea and River) protected as a qualifying interest of this SAC are foreseen from the proposed works associated with this survey license application. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE000133	Donegal Bay (Murvagh) SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 184.6 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 184.6 km from this conservation site. Given the nature of the proposed works, and the

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE000268	Galway Bay Complex SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Turloughs [3180] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230] Limestone pavements [8240] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 185.7 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 185.7 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment,

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			in the absence of mitigation measures, no significant impacts on habitats protected as a qualifying interest of this SAC are foreseen from the proposed survey works. Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of 7.5 ± 1.5km in length along a riverine environment and 6.5 ± 1.0km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3km in length with a high degree of variability. Given the nature of the proposed works and the significant distance between the proposed survey area and this SAC (185.7 km), in the absence of mitigation, no significant effects on otter species are likely as a result of the proposed project. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE000197	West of Ardara/Maas Road SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with <i>Empetrum nigrum</i> [2140] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060]

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			<i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510] Blanket bogs (* if active bog) [7130] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Euphydryas aurinia</i> (Marsh Fritillary) [1065] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365] <i>Petalophyllum ralfsii</i> (Petalwort) [1395] <i>Najas flexilis</i> (Slender Naiad) [1833] Potential Impact This SAC is 201.5 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 201.5 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. In relation to Atlantic salmon, it has been found that salmon from southeast Ireland tend to move out to the shelf edge before crossing the Atlantic towards Greenland (Rikardson et al., 2021). Given that the proposed project is located within Dublin Bay (outside of the recorded areas of salmon migration – see Appendix I), and the temporal nature of the proposed works, no significant impacts on salmon are foreseen as a result of the proposed project in the absence of mitigation. Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of 7.5 ± 1.5km in length along a riverine environment and 6.5 ± 1.0km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3km in length with a high degree of variability. Given the nature of the proposed

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			works and the significant distance between the proposed survey area and this SAC (201.5 km), in the absence of mitigation, no significant effects on other species are likely as a result of the proposed project. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE000190	Slieve Tooley/Tormore Island/Loughros Beg Bay SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Decalcified fixed dunes with <i>Empetrum nigrum</i> [2140] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Alpine and Boreal heaths [4060] Blanket bogs (* if active bog) [7130] <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Lutra lutra</i> (Otter) [1355] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is located 210.3 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 210.3 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed works associated with this survey license application.

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of $7.5 \pm 1.5\text{km}$ in length along a riverine environment and $6.5 \pm 1.0\text{km}$ in coastal environments, while male otter territory along rivers is approximately $13.2 \pm 5.3\text{km}$ in length with a high degree of variability. Given the nature of the proposed works and the significant distance between the proposed survey area and this SAC (210.3 km), in the absence of mitigation, no significant effects on otter species are likely as a result of the proposed project. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000458	Killala Bay/Moy Estuary SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 213 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 213 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE002283	Rutland Island and Sound SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 223.5 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 223.5 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE002111	Kilkieran Bay and Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130] Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510] <i>Phocoena phocoena</i> (Harbour Porpoise) [1351] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365] <i>Najas flexilis</i> (Slender Naiad) [1833] Potential Impact This SAC is 227.8 km from the proposed cable survey area. The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023) and is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal and harbour porpoise (QIs of this SAC) through underwater noise and physical disturbance which could impact the Features of Interest of this SAC should this species enter the Zone of Influence. Mitigation measures are required to protect the SAC from significant effects. Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of 7.5 ± 1.5km in length along a riverine environment and 6.5 ± 1.0km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3km in length with a high degree of variability. Given the nature of the proposed works and the significant distance between the proposed survey area and this SAC (227.8 km), in the absence of mitigation, no significant effects on otter species are likely as a result of the proposed project. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
IE001482	Clew Bay Complex SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Machairs (* in Ireland) [21A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365] Potential Impact This SAC is 230 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on harbour seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 230 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of $7.5 \pm 1.5\text{km}$ in length along a riverine environment and $6.5 \pm 1.0\text{km}$ in coastal environments, while male otter territory along rivers is approximately $13.2 \pm 5.3\text{km}$ in length with a high degree of variability. Given the nature of the proposed works and the significant distance between the proposed survey area and this SAC (230 km), in the absence of mitigation, no significant effects on otter species are likely as a result of the proposed project. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
IE000278	Inishbofin and Inishshark SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Coastal lagoons [1150] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is located 265.2 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 265.2 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000147	Horn Head and Rinclevan SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			<i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013] <i>Halichoerus grypus</i> (Grey Seal) [1364] <i>Petalophyllum ralfsii</i> (Petalwort) [1395] <i>Najas flexilis</i> (Slender Naiad) [1833] Potential Impact This SAC is located 266.5 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 266.5 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000328	Slyne Head Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Reefs [1170] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is located 266.6 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). The proposed cable survey area is not located within the West Coast of Ireland MU for bottlenose dolphin which encapsulates this SAC. Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 266.6 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment,

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000495	Duvillaun Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is located 273.8 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). The proposed cable survey area is not located within the West Coast of Ireland MU for bottlenose dolphin which encapsulates this SAC. Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 273.8 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000507	Inishkea Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Machairs (* in Ireland) [21A0] <i>Halichoerus grypus</i> (Grey Seal) [1364] <i>Petalophyllum ralfsii</i> (Petalwort) [1395] Potential Impact

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			This SAC is located 277.2 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 277.2 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
IE000101	Roaringwater Bay and Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Large shallow inlets and bays [1160] Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030] Submerged or partially submerged sea caves [8330] <i>Phocoena phocoena</i> (Harbour Porpoise) [1351] <i>Lutra lutra</i> (Otter) [1355] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is 304.9 km from the proposed cable survey area. The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023) and is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal and harbour porpoise (QIs of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 304.9 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works. Further, no significant impacts on otter are foreseen. As detailed by Reid et al. (2013), female otters have territories of 7.5 ± 1.5 km in length along a riverine environment and 6.5 ± 1.0 km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3 km in length with a high degree of variability. Given the nature of the proposed works and the significant distance between the proposed survey area and this SAC (304.9 km), in the absence of mitigation, no significant effects on otter species are likely as a result of the proposed project. The proposed project has the potential to introduce noise, pollution, and physical disturbance into the marine environment and mitigation measures are required to protect harbour porpoise and grey seals. Natura Impact Statement Required
IE002172	Blasket Islands SAC	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030] Submerged or partially submerged sea caves [8330] <i>Phocoena phocoena</i> (Harbour Porpoise) [1351] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is 325.9 km from the proposed cable survey area. The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023) and is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal and harbour porpoise (QI of this SAC) through underwater noise and physical disturbance should this species enter the Zone of Influence. Mitigation measures are required. The survey area is located 325.9 km from this conservation site. Given the nature of the proposed works, and the significant distance to this SAC across a marine environment, in the absence of mitigation measures, no significant impacts on habitats or other species protected as a qualifying interest of this SAC are foreseen from the proposed survey works.

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour porpoise and grey seals. Natura Impact Statement Required
Special Protection Areas			
IE004236	North-West Irish Sea SPA	IN	Conservation Objectives The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Special Conservation Interests Red-throated Diver (<i>Gavia stellata</i>) [A001] Great Northern Diver (<i>Gavia immer</i>) [A003] Fulmar (<i>Fulmarus glacialis</i>) [A009] Manx Shearwater (<i>Puffinus puffinus</i>) [A013] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Shag (<i>Phalacrocorax aristotelis</i>) [A018] Common Scoter (<i>Melanitta nigra</i>) [A065] Little Gull (<i>Larus minutus</i>) [A177] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Common Gull (<i>Larus canus</i>) [A182] Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] Herring Gull (<i>Larus argentatus</i>) [A184] Great Black-backed Gull (<i>Larus marinus</i>) [A187] Kittiwake (<i>Rissa tridactyla</i>) [A188] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194] Little Tern (<i>Sterna albifrons</i>) [A195] Guillemot (<i>Uria aalge</i>) [A199] Razorbill (<i>Alca torda</i>) [A200] Puffin (<i>Fratercula arctica</i>) [A204] Potential Impact This SPA is located within the proposed intertidal and subtidal cable survey area. The proposed survey route is located in an area that currently experiences a high level of vessel activity. Waters within this SPA constitutes an important resource for marine birds. The estuaries and bays that open into it along with connecting coastal stretches of intertidal and shallow subtidal habitats, provide safe feeding and roosting habitats for waterbirds throughout the winter and migration periods. These areas, along with more pelagic marine waters further offshore, provide additional supporting habitats (for foraging and other maintenance behaviours) for those seabirds that breed at colonies on the north-west Irish Sea's islands and coastal headlands⁴. Given the minimal nature of the proposed survey works, no significant impacts on water quality are foreseen. However, out of an abundance of caution, despite

⁴ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004236.pdf>

NATURA Site Code	NAME	Screened In/Out	SSCO's/Reason
			the limited temporal and geographic scale of the proposed project, it is considered that there is the potential for visual and acoustic disturbance (via the works vessel and intertidal works) impacts on seabirds protected as SCIs of this SPA which may be foraging / resting in intertidal / subtidal waters along the proposed survey corridor in the absence of mitigation. Mitigation measures are required to protect the SPA from significant effects Natura Impact Statement Required.
IE004025	Malahide Estuary SPA	IN	Conservation Objective The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Special Conservation Interests Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Pintail (<i>Anas acuta</i>) [A054] Goldeneye (<i>Bucephala clangula</i>) [A067] Red-breasted Merganser (<i>Mergus serrator</i>) [A069] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Wetland and Waterbirds [A999] Potential Impact The proposed cable survey route is located 500m from this SPA. The survey is in the marine intertidal of Portmarnock Beach and subtidal environment of waters off Co. Dublin. The proposed survey works will be within an area of existing vessel traffic in proximate to the Malahide Marina and Howth Harbour, and the intertidal element is on a popular beach (Velvet Strand, Portmarnock) with car parks and existing human and dog walking activity. However, given the proximity from the survey area to this SPA (500m), initial assessment identifies that, in the absence of mitigation measures, there may be potential for noise and visual disturbance impacts on SCIs of this SPA. Mitigation measures are required to protect the SPA from significant effects. Natura Impact Statement Required.

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
Special Areas of Conservation (UK)			
UK0030398	North Anglesey Marine/Gogledd Môn Forol	IN	Conservation Objective Maintain site integrity by ensuring: 1. Harbour porpoise are a viable component of the site. 2. There is no significant disturbance of the species. 3. The condition of supporting habitats and processes, and the availability of prey is maintained. Relevant Qualifying Interest Harbour Porpoise (<i>Phocoena phocoena</i>) [1351] Potential Impact This SAC borders the proposed cable survey area within the Irish EEZ. The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour porpoise (qualifying interest of this SAC) through underwater noise, pollution, and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour porpoise. Natura Impact Statement Required
UK0016612	Murlough	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Harbour Seal (<i>Phoca vitulina</i>) [1365] Potential Impact This SAC is 65.8 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour seals (qualifying interests of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
UK0030399	North Channel	IN	Conservation Objective Maintain site integrity by ensuring: 1. Harbour porpoise are a viable component of the site. 2. There is no significant disturbance of the species. 3. The condition of supporting habitats and processes, and the availability of prey is maintained. Relevant Qualifying Interest Harbour Porpoise (<i>Phocoena phocoena</i>) [1351] Potential Impact This SAC is 68.4 km from the proposed cable survey area. The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour porpoise (qualifying interest of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour porpoise. Natura Impact Statement Required
UK0030397	West Wales Marine / Gorllewin Cymru Forol	IN	Conservation Objective Maintain site integrity by ensuring: 1. Harbour porpoise are a viable component of the site. 2. There is no significant disturbance of the species. 3. The condition of supporting habitats and processes, and the availability of prey is maintained. Relevant Qualifying Interest Harbour Porpoise (<i>Phocoena phocoena</i>) [1351] Potential Impact This SAC is 76.4 km from the proposed cable survey area. The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour porpoise (qualifying interest of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour porpoise. Natura Impact Statement Required

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
UK0013117	Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau	IN	Conservation Objective To achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status. Relevant Qualifying Interest <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Halichoerus grypus</i> (Grey Seal) [1364] Potential Impact This SAC is 78.5 km from the proposed cable survey area. The proposed cable survey area is located within the Irish Sea MU for Bottlenose Dolphin (JNCC, 2023) and is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, there may be potential for impact on grey seal and bottlenose dolphin (QIs of this SAC) through underwater noise and physical disturbance. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect bottlenose dolphins and grey seals. Natura Impact Statement Required
UK0016618	Strangford Lough	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Harbour (Common) Seal (<i>Phoca vitulina</i>) [1365] Potential Impact This SAC is 82.8 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour seals (qualifying interests of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
UK0012712	Cardigan Bay / Bae Ceredigion	IN	Conservation Objective

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
			To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Bottlenose dolphin (<i>Tursiops truncatus</i>) [1349] Potential Impact This SAC is 139.8 km from the proposed cable survey area. The proposed cable survey area is located within the Irish Sea MU for Bottlenose dolphin (JNCC, 2023). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on bottlenose dolphin (qualifying interest of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect bottlenose dolphin. Natura Impact Statement Required
UK0030384	The Maidens	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Grey Seal (<i>Halichoerus grypus</i>) [1364] Potential Impact This SAC is 146.4 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on grey seal (qualifying interests of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
UK0013116	Pembrokeshire Marine / Sir Benfro Forol	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
			Grey Seal (<i>Halichoerus grypus</i>) [1364] Potential Impact This SAC is 170.5 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on grey seal (qualifying interest of this SAC) through underwater noise and physical disturbance which could impact the Qualifying Interest of this SAC. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
UK0030396	Bristol Channel Approaches/Dynesfeydd Môr Hafren	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Harbour porpoise (<i>Phocoena phocoena</i>) [1351] Potential Impact This SAC is 207 km from the proposed cable survey area. The proposed cable survey area is located within the Celtic and Irish Seas MU for harbour porpoise (JNCC, 2023). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour porpoise (qualifying interest of this SAC) through underwater noise and physical disturbance. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour porpoise. Natura Impact Statement Required
UK0030067	South-East Islay Skerries	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Harbour (Common) Seal (<i>Phoca vitulina</i>) [1365] Potential Impact

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
			This SAC is 233 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of harbour seal (273 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on harbour seals (qualifying interest of this SAC) through underwater noise and physical disturbance. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour seals. Natura Impact Statement Required
UK0013114	Lundy	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Grey Seal (<i>Halichoerus grypus</i>) [1364] Potential Impact This SAC is 263 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be potential for impact on grey seal (qualifying interest of this SAC) through underwater noise and physical disturbance. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required
UK0013694	Isles of Scilly Complex	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest Grey Seal (<i>Halichoerus grypus</i>) [1364] Potential Impact This SAC is 381.7 km from the proposed cable survey area. The proposed cable survey area is located within the foraging range of grey seal (448 km) (Carter et al., 2022). Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution, there may be

NATURA Site Code	NAME	Screened In/Out	Conservation Objectives/ Features of interest/ Potential impact on Natura 2000 site.
			potential for impact on grey seal (qualifying interest of this SAC) through underwater noise and physical disturbance. Mitigation measures are required to protect the SAC from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect grey seals. Natura Impact Statement Required

Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
Nord Bretagne DH Mers Celtiques – Talus du golfe de Gascogne Côte de Granit rose-Sept-Iles Abers – Côtes des légendes Trégor – Goëlo Baie de Morlaix Ouessant-Molène Récifs et landes de la Hague Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay Anse de Vauville Banc et récifs de Surtainville Côtes de Crozon Chaussée de Sein Cap d’Erquy-Cap Fréhel Baie de Saint-Brieuc – Est Récifs du talus du golfe de Gascogne Chausey Baie de Lancieux, Baie de l’Arguenon, Archipel de Saint Malo et Dinard Estuaire de la Rance Baie du Mont Saint-Michel	IN	Conservation Objective To maintain (or restore where appropriate) the qualifying interests to favourable condition. Relevant Qualifying Interest <i>Phocoena phocoena</i> (Harbour Porpoise) [1351] Potential Impact The proposed cable survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise (JNCC, 2023). The Harbour Porpoise [1351] is a Qualifying Interest of the following French SACs located within the Celtic and Irish Seas MU: • Nord Bretagne DH • Mers Celtiques – Talus du golfe de Gascogne • Côte de Granit rose-Sept-Iles • Abers – Côtes des légendes • Trégor – Goëlo • Baie de Morlaix • Ouessant-Molène • Récifs et landes de la Hague • Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay • Anse de Vauville • Banc et récifs de Surtainville • Côtes de Crozon • Chaussée de Sein • Cap d’Erquy-Cap Fréhel • Baie de Saint-Brieuc – Est • Récifs du talus du golfe de Gascogne • Chausey • Baie de Lancieux, Baie de l’Arguenon, Archipel de Saint Malo et Dinard • Estuaire de la Rance • Baie du Mont Saint-Michel Initial assessment identifies that, in the absence of mitigation measures, and out of an abundance of caution,

Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
		there may be potential for impact on Harbour Porpoise (qualifying interests of the identified French SACs) through underwater noise and physical disturbance. Mitigation measures are required to protect these SACs from significant effects. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect harbour porpoise. Natura Impact Statement Required

5. Further Information on European Sites Screened in for NIS

5.1 Malahide Estuary SAC (site code: 000205)

As outlined in the Malahide Estuary SAC Site Synopsis (NPWS 2017)⁵:

'Malahide Estuary is situated immediately north of Malahide and east of Swords in Co. Dublin. It is the estuary of the River Broadmeadow. The site is divided by a railway viaduct which was built in the 1800s.'

*'The outer part of the estuary is mostly cut off from the sea by a large sand spit, known as 'the island'. The outer estuary drains almost completely at low tide, exposing sand and mud flats. There is a large bed of Eelgrass (Dwarf Eelgrass, *Zostera noltii*, and Narrow-leaved Eelgrass, *Z. angustifolia*) in the north section of the outer estuary, along with Beaked Tasselweed (*Ruppia maritima*) and extensive mats of green algae (*Enteromorpha* spp., *Ulva lactuca*). Common Cord-grass (*Spartina anglica*) is also widespread in this sheltered part of the estuary.*

*The dune spit has a well developed outer dune ridge dominated by Marram Grass (*Ammophila arenaria*). The dry areas of the stabilised dunes have a dense covering of Burnet Rose (*Rosa pimpinellifolia*), Red Fescue (*Festuca rubra*) and species such as Yellow-wort (*Blackstonia perfoliata*), Autumn Gentian (*Gentianella amarella*), Hound's-tongue (*Cynoglossum officinale*), Carline Thistle (*Carlinavulgaris*) and Pyramidal Orchid (*Anacamptis pyramidalis*). Much of the interior of the spit is taken up by a golf course. The inner stony shore has frequent Sea-holly (*Eryngium maritimum*). Well-developed saltmarshes occur at the tip of the spit. Atlantic salt meadow is the principle type and is characterised by species such as Sea-purslane (*Halimolobos portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Arrowgrass (*Triglochin maritima*) and Common Saltmarsh-grass (*Puccinellia maritima*). Elsewhere in the outer estuary, a small area of Mediterranean salt meadow occurs which is characterised by the presence of Sea Rush (*Juncus maritimus*). Below the salt marshes there are good examples of pioneering glasswort (*Salicornia* spp.) swards and other annual species, typified by *S. dolichostachya* and Annual Sea-blite (*Suaeda maritima*).*

*The inner estuary does not drain at low tide apart from the extreme inner part. Here, patches of saltmarsh and salt meadows occur, with Sea Aster, Sea Plantain (*Plantago maritima*) and Sea Club-rush (*Scirpus maritimus*). Beaked Tasselweed occurs in one of the channels.*

The site includes a fine area of rocky shore south-east of Malahide and extending towards Portmarnock. This represents the only continuous section through the fossiliferous Lower Carboniferous rocks in the Dublin Basin, and is the type locality for several species of fossil coral.

The estuary is an important wintering bird site and holds an internationally important population of Brent Goose and nationally important populations of a further 15 species. Average maximum counts during the 1995/96-1997/98 period were: Brent Goose 1217; Great Crested Grebe 52; Mute Swan 106; Shelduck 471; Pochard 200; Goldeneye 333; Red-breasted Merganser 116; Oystercatcher 1228; Golden Plover 2123; Grey Plover 190; Redshank 454; Wigeon 50; Teal 78; Ringed Plover 106; Knot 858; Dunlin 1474; Greenshank 38; Pintail 53; Black-tailed Godwit 345; Bar-tailed Godwit 99. The high numbers of diving birds reflects the lagoon-type nature of the inner estuary.

The estuary also attracts migrant species such as Ruff, Curlew Sandpiper, Spotted Redshank and Little Stint. Breeding birds of the site include Ringed Plover, Shelduck and Mallard. Up to the 1950s there was a major tern colony at the southern end of the island and the habitat remains suitable for these birds.

The inner part of the estuary is heavily used for water sports. A section of the outer estuary has recently been infilled for a marina and housing development.

This site is a fine example of an estuarine system with all the main habitats represented. The site is important ornithologically, with a population of Brent Goose of international significance."

⁵ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000205.pdf>

The European Standard Data Form (2020) states that:

“The site is situated in north Co. Dublin, between the towns of Malahide and Swords. It comprises the estuary of the River Broadmeadow. A railway viaduct, built in the 1800s, crosses the site and has led to the inner estuary becoming lagoonal in character and only partly tidal. Much of the outer part of the estuary is well sheltered from the sea by a large sand spit, known as ‘the island’. This spit is now mostly converted to golf-course though some sand dunes and salt marshes remain. A section of bedrock shore extending towards Portmarnock is included as it represents the only continuous section through the fossiliferous Lower Carboniferous rocks in the Dublin Basin, and is the type locality for several species of fossil coral.

*The site has an important example of intertidal sand and mud flats, with *Zostera* spp. Their quality is variable but generally good. Salt marshes are well represented, particularly Atlantic salt meadows and *Salicornia* flats. Most of the sand dune system is managed for a golf course but significant areas of fixed dunes and shifting white dunes remain. The site has *Viola hirta*, a Red Data Book plant species. It is of high importance for wintering waterfowl, with an internationally important population of *Branta bernicla horta* and nationally important populations of a further 14 species, including *Pluvialis apricaria*. It also supports a regionally important population of *Limosa lapponica*. this site has educational value and has been the subject of a number of research projects.”*

As outlined in the Conservation objectives supporting document, “Malahide Estuary SAC (site code: 205) is designated for a range of coastal habitats including saltmarshes and sand dunes. The following five coastal habitats are included in the qualifying interests for the site (denotes a priority habitat):*

- Salicornia and other annuals colonising mud and sand (1310)*
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (ASM) (1330)*
- Mediterranean salt meadows (*Juncetalia maritimi*) (MSM) (1410)*
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)*
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)**

*The first three are saltmarsh habitats and the last two are associated with sand dune systems, although all five of these habitats are found in close association with each other (McCorry, 2007; Ryle et al., 2009). A sixth Annex I habitat *Spartina* swards (*Spartinion maritimae*) (1320) is also currently listed as a qualifying interest for this site due to historical records in the Broadmeadow estuary of two other forms of cordgrass – small cordgrass (*Spartina maritima*) and Townsend’s cordgrass (*S. x townsendii*). However, Preston et al. (2002) consider both *S. maritima* and *S. x townsendii* to be alien to Ireland. In addition, neither of these rare cordgrasses has been recorded in the recent past (Doogue et al., 1998; Reynolds, 2002) and all stands of cordgrass in the Republic of Ireland are now thought to be common cordgrass (*S. anglica*) (McCorry et al., 2003, McCorry & Ryle, 2009). Consequently, conservation objectives for the habitat *Spartina* swards have not been set for this site.’*

As outlined in the Conservation objectives supporting document – marine habitats⁶ (NPWS, 2013):

‘Section 1

Principal Benthic Communities

Within Malahide Estuary SAC five community types were recorded in the Annex I habitat and the overlapping SPA. These are presented in table 1 and a description of each community type is given below.

Community Type	SAC Annex I Habitat	SPA
	Mudflats and sandflats not covered by seawater at low tide (1140)	
Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex	✓	✓
Estuarine sandy mud with Chironomidae and <i>Hediste diversicolor</i> community complex	✓	✓
Sand to muddy sand with <i>Peringia ulvae</i> , <i>Tubificoides benedii</i> and <i>Cerastoderma edule</i> community complex	✓	✓
<i>Zostera</i> -dominated community	✓	✓
<i>Mytilus</i> -dominated community complex	✓	✓

Table 1. The community types recorded in Malahide Estuary SAC and the overlapping SPA.

Estimated areas of each community type in the Annex I habitat, based on interpolation, are given in the objective targets in Section 2.

The development of a community complex target arises when an area possesses similar abiotic features but records a number of biological communities that are not regarded as being sufficiently stable and/or distinct temporally or spatially to become the focus of conservation efforts. In this case, examination of the available data from Malahide Estuary SAC identified a number of biological communities whose species composition overlapped significantly. Such biological communities are grouped together into what experts consider are sufficiently stable units (i.e. a complex) for conservation targets.

FINE SAND WITH OLIGOCHAETES, AMPHIPODS, BIVALVES AND POLYCHAETES COMMUNITY COMPLEX

This community complex occurs along the eastern boundary of the site from the Martello Tower at Balcarrick in the north to Portmarnock in the south (Figure 2).

The sediment of this community complex is largely that of fine sand (ranging from 74% to 88.9%) with negligible amounts of coarse material (

⁶https://www.npws.ie/sites/default/files/publications/pdf/000205_Malahide%20Estuary%20SAC%20Marine%20Supporting%20Doc_V1.pdf

The complex is distinguished by the oligochaete *Tubificoides benedii*, the crustacean *Bathyporeia guilliamsoniana*, the bivalve *Angulus tenuis* and the polychaetes *Nephtys cirrosa*, *Hediste diversicolor*, *Scoloplos armiger* and *Scoelepis squamata*, all of which occur in moderate abundances here (Table 2).

Distinguishing species of the Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex	
<i>Tubificoides benedii</i>	<i>Hediste diversicolor</i>
<i>Bathyporeia guilliamsoniana</i>	<i>Scoloplos armiger</i>
<i>Angulus tenuis</i>	<i>Scoelepis squamata</i>
<i>Nephtys cirrosa</i>	

Table 2. Distinguishing species of the Fine sand with oligochaetes, amphipods, bivalves and polychaetes
ESTUARINE SANDY MUD WITH CHIRONOMIDAE AND HEDISTE DIVERSICOLOR COMMUNITY COMPLEX

This complex is recorded at Swords where the Ward River and Broad Meadow River enter the Malahide estuary (Figure 2).

The sediment is largely that of sandy mud with silt-clay and very fine sand accounting for between 19.6% to 59.7% and 12.4% to 28.4% of the sediment fractions respectively. The remaining fractions range from 0.8% to 12.5% coarse sand, very coarse sand from 0.4% to 5.1%, medium sand from 1.6% to 27.7% and the fine sand fraction from 8.7% to 21.9%. The proportion of gravel recorded is negligible (<1%).

The fauna is distinguished by unidentified Chironomidae species and the polychaete *Hediste diversicolor* which occur in high to moderate abundances here. The oligochaetes *Heterochaeta costata* and *Paranais litoralis* are also recorded here (Table 3).

Distinguishing species of the Estuarine sandy mud with Chironomidae and <i>Hediste diversicolor</i> community complex	
Chironomidae	<i>Heterochaeta costata</i>
<i>Hediste diversicolor</i>	<i>Paranais litoralis</i>

Table 3 Distinguishing species of the Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex.

SAND TO MUDDY SAND WITH PERINGIA ULVAE, TUBIFICOIDES BENEDII AND CERASTODERMA EDULE COMMUNITY COMPLEX

This community complex is recorded extensively within the estuary from Donabate to Malahide (Figure 2).

The substrate here is composed largely of fine material with silt-clay ranging from 2.2% to 59.7%, very fine sand from 3.2% to 32.9% and fine sand from 6.1% to 80%. Coarse material accounts for less than 7% of the sediment fractions.

The fauna is distinguished by the gastropod *Peringia ulvae*, the oligochaete *Tubificoides benedii* and the bivalve *Cerastoderma edule* which all occur in moderate abundances within this complex. The polychaete *Hediste diversicolor* and the bivalve *Scrobicularia plana* are not uniformly distributed, having their highest abundances near Malahide Point. The polychaetes *Scoloplos armiger*, *Pygospio elegans* and *Nephtys hombergii* are also recorded here (Table 4).

Distinguishing species of the Sand to muddy sand with <i>Peringia ulvae</i> , <i>Tubificoides benedii</i> and <i>Cerastoderma edule</i> community complex	
<i>Peringia ulvae</i>	<i>Scrobicularia plana</i>
<i>Tubificoides benedii</i>	<i>Scoloplos armiger</i>
<i>Cerastoderma edule</i>	<i>Pygospio elegans</i>
<i>Hediste diversicolor</i>	<i>Nephtys hombergii</i>

Table 4 Distinguishing species of the Sand to muddy sand with *Peringia ulvae*, *Tubificoides benedii* and *Cerastoderma edule* community complex.

ZOSTERA-DOMINATED COMMUNITY

The intertidal seagrass *Zostera noltii* is recorded in two discrete areas to the north of the site, on Burrow Strand at Corballis and along the shore to the east of Kilcrea (Figure 2).

The sediment here is largely that of fine sand which accounts for 80% of the sediment fractions. Coarse material and fines fractions are negligible.

The coverage of *Zostera noltii* at this site ranges from 60% in the more westerly bed to 82% in the beds on Burrow Strand. The fauna is dominated by the gastropod *Peringia ulvae* which is recorded in very high abundances; the polychaetes *Pygospio elegans* and *Scoloplos armiger* occur in high abundance here. The infauna is similar to that recorded for the "Sand to muddy sand with *Peringia ulvae*, *Tubificoides benedii* and *Cerastoderma edule* community complex" (See Table 4).

MYTILUS-DOMINATED COMMUNITY COMPLEX

This community occurs on the intertidal expanse between the railway line and the spit at Malahide Point (Figure 2).

The bivalve *Mytilus edulis*, with algal epibionts such as *Ectocarpus* sp. are abundant here. Between the clumps of mussel patches of sandy mud occur in which the polychaete *Arenicola marina* is recorded in densities of between 3-4m². The bivalve *Scrobicularia plana*, barnacles and encrusting polychaetes also occur within this complex (Table 5).

Distinguishing species of the <i>Mytilus</i> -dominated community complex	
<i>Mytilus edulis</i>	<i>Fucus vesiculosus</i>
<i>Ectocarpus</i> sp.	<i>Enteromorpha</i> sp.
<i>Arenicola marina</i>	<i>Ulva intestinalis</i>
<i>Littorina littorea</i>	<i>Scrobicularia plana</i>

Table 5 Distinguishing species of the *Mytilus*-dominated community complex.

Section 2

Annex I Habitats

It is worth considering at the outset that in relation to Annex I habitat structure and function, the extent and quality of all habitats varies considerably in space and time and marine habitats are particularly prone to such variation. Habitats which are varying naturally, i.e. biotic and/or abiotic variables are changing within an envelope of natural variation, must be considered to have favourable conservation condition. Anthropogenic disturbance may be considered significant when it causes a change in biotic and/or abiotic variables in excess of what could reasonably be envisaged under natural processes. The capacity of the habitat to recover from this change is obviously an important consideration (i.e. habitat resilience) thereafter.

This Department has adopted a prioritized approach to conservation of structure and function in marine Annex I habitats.

- 1. Those communities that are key contributors to overall biodiversity at a site by virtue of their structure and/or function (keystone communities) and their low resilience should be afforded the highest degree of protection and any significant anthropogenic disturbance should be avoided.*
- 2. In relation to the remaining constituent communities that are structurally important (e.g. broad sedimentary communities) within an Annex I marine habitat, there are two considerations.*
 - 2.1 Significant anthropogenic disturbance may occur with such intensity and/or frequency as to effectively represent a continuous or ongoing source of disturbance over time and space (e.g. effluent discharge within a given area). Drawing from the principle outlined in the European Commission's Article 17 reporting framework that disturbance of greater than 25% of the area of an Annex I habitat represents unfavourable conservation status, this Department takes the view that licensing of activities likely to cause continuous disturbance of each community type should not exceed an approximate area of 15%. Thereafter, an increasingly cautious approach is advocated. Prior to any further licensing of this category of activities, an interDepartmental management review (considering inter alia robustness of available scientific knowledge, future site requirements, etc) of the site is recommended.*
 - 2.2 Some activities may cause significant disturbance but may not necessarily represent a continuous or ongoing source of disturbance over time and space. This may arise for intermittent or episodic activities for which the receiving environment would have some resilience and may be expected to recover within a reasonable timeframe relative to the six-year reporting cycle (as required under Article 17 of the Directive). This Department is satisfied that such activities could be assessed in a contextspecific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.*

The following technical clarification is provided in relation to specific conservation objectives and targets for Annex I habitats to facilitate the appropriate assessment process:

Objective: To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC, which is defined by the following list of attributes and targets.

Target 1 - The permanent habitat area is stable or increasing, subject to natural processes.

- This target refers to activities or operations that propose to permanently remove habitat from a site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site.*
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.*

Target 2 - Maintain the extent of the *Zostera*-dominated community and *Mytilus* dominated community complex, subject to natural processes.

- The *Zostera*-dominated community and *Mytilus*-dominated community complex are considered to be keystone communities that are of considerable importance to the overall ecology and biodiversity of a habitat by virtue of its physical complexity, e.g. the former community serves as important nursery grounds for commercial and non commercial species while both provide important food sources for a number of bird species.
- Any significant anthropogenic disturbance to the extent of this community should be avoided.
- An interpolation of the likely distribution of these community types are provided in figure 2. The areas given below are based on spatial interpolation and therefore should be considered indicative:
 - *Zostera*-dominated community – 5ha
 - *Mytilus*-dominated community complex- 4ha

Target 3 - Conserve the high quality of the *Zostera*-dominated community, subject to natural processes.

- It is important to ensure the quality as well as the extent of *Zostera*-dominated communities is conserved. For example, percent coverage can provide an indication of the habitat quality as well as giving information on the habitat complexity and refuge capability; all important components in maintaining the structural and functional integrity of the habitat.

Target 4 - Conserve the high quality of the *Mytilus edulis*-dominated community complex, subject to natural processes.

- Every effort should be made to avoid any death to living *Mytilus edulis*.
- Any significant anthropogenic disturbance to the quality (e.g. living individual/m²) of the community should be avoided.

Target 5 - Conserve the following community types in a natural condition: Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex; Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex; and Sand to muddy sand with *Peringia ulvae*, *Tubificoides benedii* and *Cerastoderma edule* community complex.

- A semi-quantitative description of the communities has been provided in Section 1.
- An interpolation of their likely distribution is provided in figure 2.
- The estimated areas of the communities within the Mudflats and sandflats not covered by seawater at low tide habitat given below are based on spatial interpolation and therefore should be considered indicative:
 - Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex – 126ha
 - Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex – 7ha
 - Sand to muddy sand with *Peringia ulvae*, *Tubificoides benedii* and *Cerastoderma edule* community complex – 169ha
- Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities.
- Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.'

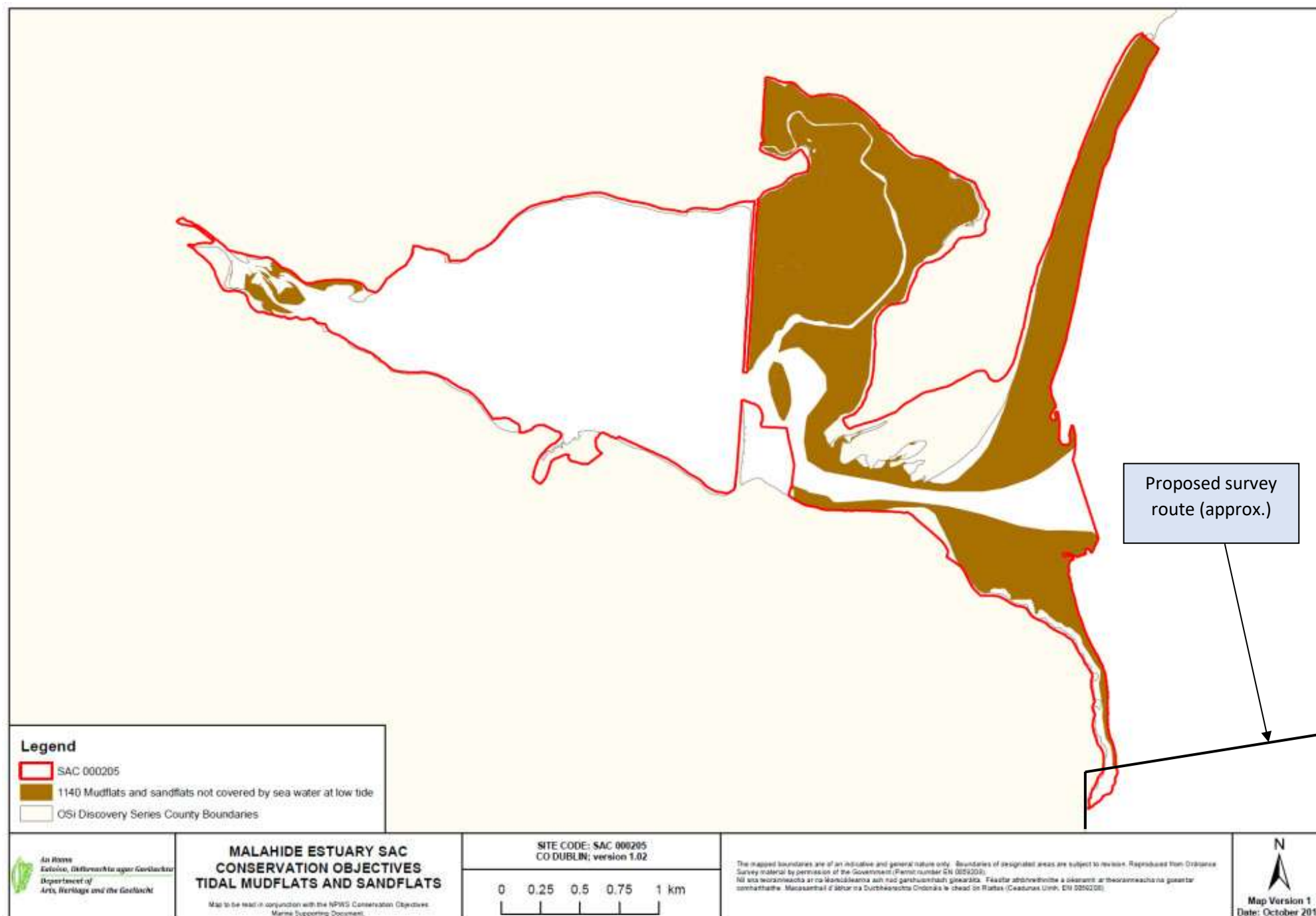


Figure 39. Extent of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC

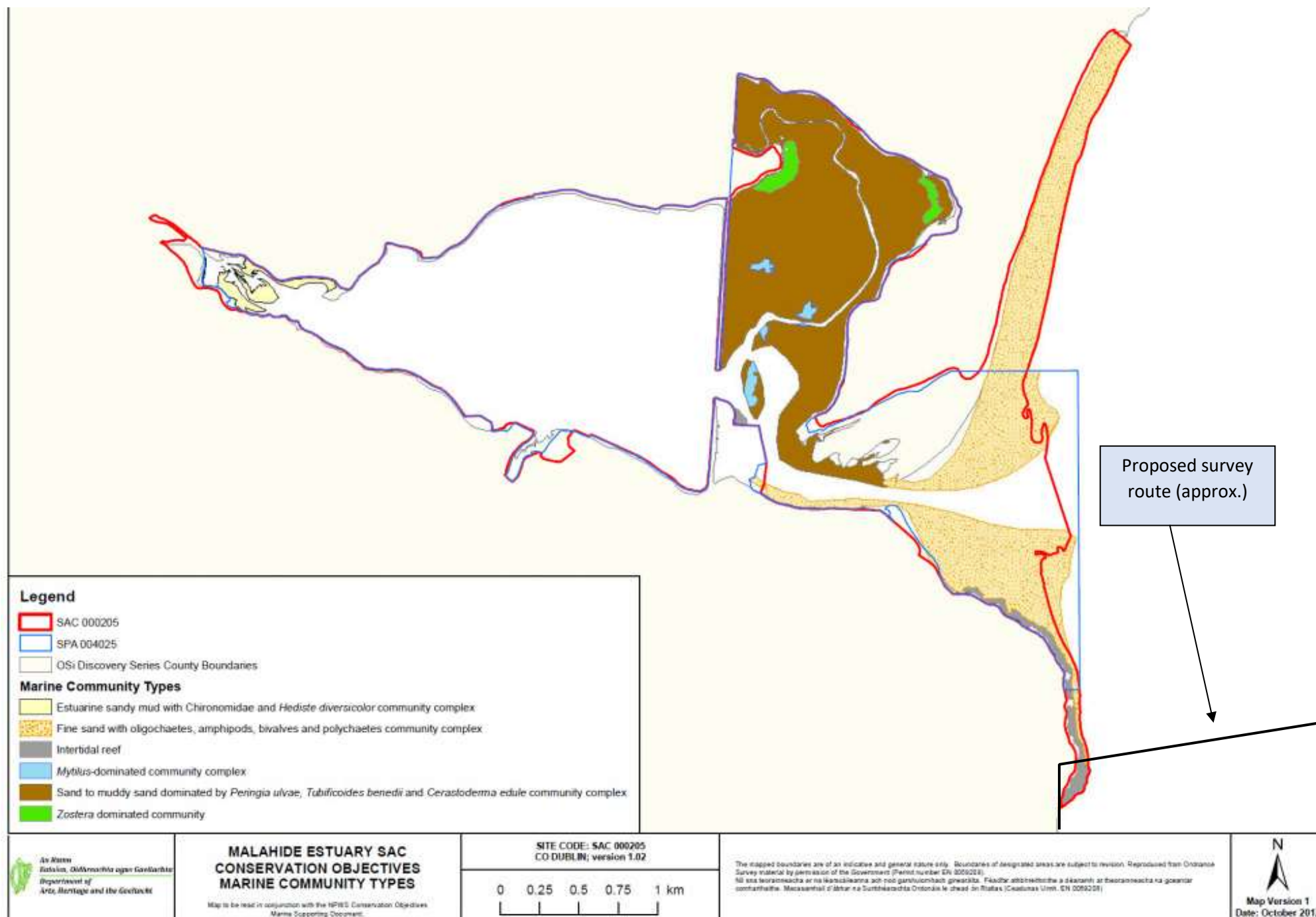


Figure 40. Distribution of community types in Malahide Estuary SAC

As outlined in the Conservation objectives supporting document – coastal habitats⁷ (NPWS, 2013):

‘2 Conservation Objectives

The conservation objective aims to define the favourable conservation condition of a habitat or species at a particular site. Implementation of these objectives will help to ensure that the habitat or species achieves favourable conservation status at a national level.

3 Saltmarsh habitats

Saltmarshes are stands of vegetation that occur along sheltered coasts, mainly on mud or sand, and are flooded periodically by the sea. They are restricted to the area between mid neap tide level and high water spring tide level. In Ireland, there are four saltmarsh habitats listed under Annex I of the EU Habitats Directive (92/43/EEC):

- *Salicornia and other annuals colonising mud and sand (1310)*
- *Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (ASM) (1330)*
- *Mediterranean salt meadows (Juncetalia maritimi) (MSM) (1410)*
- *Mediterranean and thermo-Atlantic halophilous scrub (1420)*

Three of the above habitats (in bold) are listed as Qualifying Interests for Malahide Estuary SAC. The last habitat is restricted in its distribution to sites in the southeast of the country.

The distribution of saltmarsh habitats within Malahide Estuary SAC is presented in Appendix I. The SMP surveyed, mapped and assessed one sub-site within Malahide Estuary SAC (McCorry, 2007) - Malahide Estuary (Appendix II).

Within Malahide Estuary SAC, ASM and Salicornia flats are particularly well represented. MSM is present only in small amounts at the two small strips of marsh in the northern part of the outer estuary. Detailed descriptions of each habitat in the sub-site recorded by McCorry (2007) in Malahide Estuary can be found in Appendix II.

3.1 Overall Objectives

The overall objective for ‘Salicornia and other annuals colonising mud and sand’ in Malahide Estuary SAC is to ‘maintain the favourable conservation condition’.

The overall objective for ‘Atlantic salt meadows’ in Malahide Estuary SAC is to ‘restore the favourable conservation condition’.

The overall objective for ‘Mediterranean salt meadows’ in Malahide Estuary SAC is to ‘maintain the favourable conservation condition’.

These objectives are based on an assessment of the recorded condition of each habitat under a range of attributes and targets. The assessment is divided into three main headings (a) Area (b) Range and (c) Structure and Functions.

3.2 Area

3.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is no decrease in extent from the baseline which was established by McCorry (2007). Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is assessed subject to natural processes, including erosion and succession.

A baseline habitat map was produced for the saltmarsh in Malahide Estuary during the SMP. This map is included with the individual site report in the Appendices at the end of this document (Appendix II).

The total areas of each saltmarsh habitat within each sub-site as mapped by the SMP and the total area of the habitat within the SAC are presented in the following tables.

⁷https://www.npws.ie/sites/default/files/publications/pdf/000205_Malahide%20Estuary%20SAC%20Coastal%20Supporting%20Doc_V1.pdf

There are a number of differences in the figures below. Most of the differences can be explained by the fact that the SMP mapped the total saltmarsh resource at Malahide Estuary and not all of the saltmarsh mapped is contained within the SAC boundary. In addition, the total area within the SAC can be greater than given in the SMP as the SMP did not include any mosaics when calculating their total areas. The following rules were applied when calculating the areas for the site's conservation objectives:

1. Where a polygon was identified as a mosaic of an Annex I habitat and a non-Annex I habitat, then the entire area was counted as the Annex I habitat.
2. Where a polygon was identified as a mosaic of two Annex I habitats, the area was divided 50:50 for each habitat.

Sub-site	Total area (ha) of <i>Salicornia</i> mudflats from SMP	Total area (ha) of <i>Salicornia</i> mudflats within SAC boundary (including mosaics)
Malahide Estuary	1.95	1.925
Total	1.95	1.925

The target for *Salicornia* flats is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

The target for ASM is that the area should be increasing, subject to natural processes, including erosion and succession.

Sub-site	Total area (ha) of ASM (excluding mosaics) from SMP	Total area (ha) of ASM within SAC boundary (including mosaics)
Malahide Estuary	26.21	25.33
Total	26.21	25.33

Sub-site	Total area (ha) of MSM (excluding mosaics) from SMP	Total area (ha) of MSM within SAC boundary (including mosaics)
Malahide Estuary	0.64	0.636
Total	0.64	0.636

The target for MSM is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

The SMP sub-divided the Malahide Estuary into three sub-sites:

- i. Malahide Island
- ii. Outer estuary
- iii. Inner Estuary

i. Malahide Island

This saltmarsh is located on the eastern side of the outer estuary on the sand spit and ASM dominates. The site has an unusual topography and there are long narrow bands of saltmarsh situated between sand dune ridges. Creeks flow into these narrow bands and drain them. *Salicornia* flats occur on the seaward side of the ASM on sand and mud. Common cord grass (*Spartina anglica*) is also found here.

ii. Outer Estuary

Saltmarsh is also located along the northern side of the outer estuary and is mainly situated in both of the corners of the estuary. The north-eastern corner of the estuary contains a range of different Annex I habitats that are located in a sheltered area and are typically zoned in an arc around the edge of the shoreline. The most prominent habitat is ASM. There are several patches of MSM located to the landward side of the ASM and this is the only MSM present within Malahide Estuary. *Spartina* swards also occur in this area.

iii. Inner Estuary

Most of the saltmarsh in the inner estuary is situated at the western end, although there are several other fragments on the north and southern sides further east. The saltmarsh at the western side of the inner estuary is made up of low-lying islands at Lissenhall including Horse Bank and Mill Marsh, which are all dominated by ASM (McCorry, 2007)

The target is that there should be no decline or change in the distribution of these saltmarsh habitats, unless it is the result of natural processes, including erosion, accretion and succession.

3.4 Structure and Functions

The location, character and dynamic behaviour of saltmarshes are governed by sediment supply, tidal regime, wind-wave climate and sea level change. The slope of the saltmarsh allows the development of several ecological gradients such as tidal submergence and salinity, and this influences the development of distinctive zones of halophytic and salt tolerant plant communities. Maintaining the favourable conservation condition of the saltmarsh habitats in Malahide Estuary in terms of its structure and functions depends on a range of attributes for which targets have been set as outlined below.

3.4.1 Physical structure: sediment supply

Accretion and erosion are natural elements of saltmarsh systems. Maintaining the sediment supply is vital for the continued development and natural functioning of a saltmarsh system. Interruption to the sediment circulation through physical structures can starve the system and lead to accelerated erosion rates.

The saltmarsh habitats at this site have been disturbed in the past by the construction of the railway viaduct across the estuary. This has led to the development of more brackish or lagoonal-type conditions in the inner estuary and a reduced tidal range (McCorry, 2007).

The M1 Broadmeadow Motorway Bridge was constructed to cross the estuary at Lissenhall in 2001-2003. Care was taken during the construction phase not to damage the structure or surface of the saltmarsh and by and large the structure of the saltmarsh has remained intact (McCorry, 2007).

A comparison of the 1920's OSI 2nd edition six inch map to the current extent of saltmarsh shows there has been some minor gains and losses of saltmarsh around the estuary. The southern edge of Malahide Island indicates some erosion and realignment of saltmarsh since the 1920s. There has also been some accretion in portions of this site which is actively occurring albeit at a slow rate. There has also been some transition of saltmarsh to sand dune and vice versa. Active accretion at this location may also affect the extent of Salicornia flats as this habitat transitions to ASM (McCorry, 2007).

A substantial area of the estuary at the north-western corner was reclaimed between the drawing of the 1st and 2nd edition 6inch maps. This probably occurred in the 19th Century and was facilitated by the construction of the viaduct across the estuary. The area reclaimed was behind the viaduct in Mullan Intake. There has been some loss of saltmarsh around this old shoreline due to this reclamation (McCorry, 2007).

Within the ASM there is some erosion albeit at a slow rate at the seaward side of the northern tip as seen from comparisons of the 2nd ed OS map with 2000 aerial photos. The erosion is countered by accretion along the north side of the causeway (McCorry, 2007). The MSM is mainly situated along the boundary of St Anne's Golf Course and the extent of this habitat is likely to have been greater in the past prior to the development of the golf courses (McCorry, 2007).

The target is to maintain the natural circulation of sediment and organic matter, without any physical obstructions.

3.4.2 Physical structure: creeks and pans

Saltmarshes can contain a distinctive topography with an intricate network of creeks and pans occurring on medium to large-sized sites. Creek density is influenced by vegetation cover, sediment supply and tidal influence. Creeks absorb tidal energy and assist with delivery of sediment into the saltmarsh. The efficiency of this process depends on creek pattern. Creeks allow pioneer vegetation to

become established along their banks higher up into the saltmarsh system. Major erosion of saltmarsh is indicated by internal dissection and enlargement of the drainage network, ultimately leading to the creation of mud basins.

At Malahide Island the saltmarsh is in good condition, though there are fewer salt pans than expected for a saltmarsh associated with a sandier substrate. The ASM at Lissenhall is also in relatively good condition despite any disturbance resulting from construction of the M1 motorway bridge. There are few signs of disturbance to the physical structure of the saltmarsh and old pans are still present in some of the brackish communities.

The target is to maintain creek and pan networks where they exist and to restore areas that have been altered.

3.4.3 Physical structure: flooding regime

The regular ebb and flow of the tide brings salinity, but also nutrients, organic matter and sediment, which are central to the development, growth and indeed survival of saltmarshes. Saltmarsh vegetation consists of a limited number of halophytic (salt-tolerant) species that are adapted to regular immersion by the tides. Species in the lowest part of the saltmarsh require regular inundation, while those higher up on the marsh can only tolerate occasional inundation.

The viaduct that was built over the estuary in the 1800s has modified the tidal regime of the estuary over time, which prevents the inner estuary from emptying completely at low tide, thereby creating a lagoon (McCorry, 2007).

The target is to maintain a flooding regime whereby the lowest levels of the saltmarsh are flooded daily, while the upper levels are flooded occasionally (e.g. highest spring tides).

3.4.4 Vegetation structure: zonation

Saltmarshes are naturally dynamic coastal systems. As is the case on the majority of Irish saltmarshes, ASM is the dominant saltmarsh habitat at Malahide Estuary where it occurs in a mosaic with other saltmarsh habitats, including 'Salicornia and other annuals colonising mud and sand' and 'Mediterranean salt meadows'.

At Malahide Island there is some natural transition between ASM and Salicornia flats in an actively accreting area. This is a feature of particular significance and indicates active accretion is occurring and the saltmarsh is in transition. There are also some natural transitions between the ASM and the sand dune habitats, as well as transitions between ASM and *Spartina* swards at the northern end of the outer estuary (McCorry, 2007).

The target is to maintain the range of coastal habitats, including transitional zones, subject to natural processes including erosion and succession.

3.4.5 Vegetation structure: vegetation height

A varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. Grazing is often used as a tool for maintaining structural diversity in the sward but stocking levels need to be appropriate. Overgrazing can lead to loss of species and destruction of the vegetation cover, while undergrazing can lead to a loss of plant diversity due to competitive exclusion.

Grazing by livestock is absent from Malahide Estuary resulting in a high vegetation cover and a wide range of sward heights (McCorry, 2007). The saltmarsh is grazed by wildfowl as the estuary is an important wintering bird site.

The target is to maintain structural variation within the sward. A general guideline is that there should be a sward ratio of 30% tall:70% short across the entire saltmarsh.

3.4.6 Vegetation structure: vegetation cover

Vegetation cover can have a major effect on saltmarsh development by reducing the velocity of the tide and thereby enhancing the deposition of sediment. Excessive bare mud, however, is often a sign

of overuse by livestock or humans and can lead to destabilisation and accelerated erosion of the system.

There is some amenity use of the saltmarsh at Malahide Island, such as by walkers and probably off-road vehicles and motor bikes. This use has created eroded tracks in the saltmarsh. There are also wheel ruts present in the ASM at the north-eastern corner of the outer estuary. O'Reilly & Pantin (1957) recorded cart tracks across the saltmarsh which may have been related to the collection of gravel from the foreshore (McCorry, 2007).

The target is to maintain 90% of the area outside of the creeks vegetated.

3.4.7 Vegetation composition: typical species & sub-communities

Saltmarshes contain several distinct zones that are related to elevation and frequency of flooding. The lowest part along the tidal zone is generally dominated by the most halophytic (salt-tolerant) species including common saltmarsh-grass (*Puccinellia maritima*) and species more usually associated with *Salicornia* muds. The mid-marsh zone is generally characterised by sea thrift (*Armeria maritima*), sea plantain (*Plantago maritima*) and sea aster (*Aster tripolium*). This mid-zone vegetation generally grades into an herbaceous community in the upper marsh, dominated by red fescue (*Festuca rubra*), sea milkwort (*Glaux maritima*) and saltmarsh rush (*Juncus gerardii*). Below are lists of typical species for the different saltmarsh zones, although some of these species have a restricted distribution nationally and may not occur in the Malahide Estuary area.

Typical species		
Lower marsh	Low-mid marsh	Mid-upper marsh
<i>Salicornia</i> spp. <i>Suaeda maritima</i> <i>Puccinellia maritima</i> <i>Aster tripolium</i>	<i>Puccinellia maritima</i> <i>Triglochin maritima</i> <i>Plantago maritima</i> <i>Atriplex portulacoides</i> <i>Aster tripolium</i> <i>Spergularia</i> sp. <i>Suaeda maritima</i> <i>Salicornia</i> spp. <i>Glaux maritima</i>	<i>Festuca rubra</i> <i>Juncus gerardii</i> <i>Armeria maritima</i> <i>Agrostis stolonifera</i> <i>Limonium humile</i> <i>Glaux maritima</i> <i>Seriphidium maritimum</i> <i>Plantago maritima</i> <i>Aster tripolium</i> <i>Juncus maritimus</i> <i>Triglochin maritima</i> <i>Blysmus rufus</i> <i>Eleocharis uniglumis</i> <i>Leontodon autumnalis</i> <i>Carex flacca</i> <i>Carex extensa</i>

The target for this attribute is to ensure that a typical flora of saltmarshes is maintained, as are the range of sub-communities within the different zones.

3.4.8 Vegetation structure: negative indicator species

The only invasive and non-native species recorded on saltmarshes during the SMP was common cordgrass (*Spartina anglica*), which was recorded throughout the SAC by the SMP (McCorry, 2007).

The largest area of *Spartina* sward is situated in the north-western corner of the outer estuary. This is quite a dense stand and there are frequent creeks draining the sward that link to the main channel. There are some small open patches within the sward with exposed mud and less aggregated clumps of common cordgrass (McCorry, 2007).

Spartina sward is also located in the north-east corner of the outer estuary. There is natural transition seaward from ASM to dense *Spartina* swards to a mosaic of frequent clumps of Common cord grass and exposed mud flats to isolated clumps of cord grass (McCorry, 2007).

Some small patches of *Spartina* sward are located in the inner estuary on the saltmarsh at Lissenhall, where *Spartina* has colonised the edge of established saltmarsh and along the adjacent mudflats. There is also a small area of *Spartina* sward located at the Southern end of Malahide Island (McCorry, 2007).

The aim is that negative indicators such as *Spartina* should be absent or under control. The current target for this particular site is no significant expansion and an annual spread of less than 1%.

4 Sand dune habitats

Sand dunes are hills of wind blown sand that have become progressively more stabilised by a cover of vegetation. In general, most sites display a progression through strandline, foredunes, mobile dunes and fixed dunes. Where the sandy substrate is decalcified, fixed dunes may give way to dune heath. Wet hollows, or dune slacks, occur where the dunes have been eroded down to the level of the water-table. Machair is a specialised form of dune system that is only found on the northwest coasts of Ireland and Scotland. Transitional communities can occur between dune habitats and they may also form mosaics with each other. Dune systems are in a constant state of change and maintaining this natural dynamism is essential to ensure that all of the habitats present at a site achieve favourable conservation condition.

In Ireland, there are 9 sand dune habitats (including annual vegetation of drift lines) listed under Annex I of the EU Habitats Directive (92/43/EEC) (* denotes a priority habitat):

- Annual vegetation of drift lines (1210)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) *
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Decalcified dune heath (2150) *
- Dunes with *Salix repens* (2170)
- Humid dune slacks (2190)
- Machair (21AO) *

Three dune habitats were recorded by Ryle et al. (2009) and two are listed as Qualifying Interests (indicated in bold above) for Malahide Estuary SAC. Embryonic shifting dunes were also recorded by the CMP. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems.

Annual vegetation of drift lines is found on beaches along the high tide mark, where tidal litter accumulates. It is dominated by a small number of annual species (i.e. plants that complete their life-cycle within a single season). Tidal litter contains the remains of marine algal and faunal material, as well as a quantity of seeds. Decaying detritus in the tidal litter releases nutrients into what would otherwise be a nutrient-poor environment. The habitat is often represented as patchy, fragmented stands of vegetation that are short-lived and subject to frequent re-working of the sediment. The vegetation is limited to a small number of highly specialised species that are capable of coping with salinity, wind exposure, an unstable substrate and lack of soil moisture. Typical species include spear-leaved orache (*Atriplex prostrata*), frosted orache (*A. laciniata*), sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*).

Embryonic dunes are low accumulations of sand that form above the strandline. They are sometimes referred to as foredunes, pioneer dunes or embryo dunes, as they can represent the primary stage of dune formation. They are characterised by the presence of the salt-tolerant dune grasses sand couch (*Elytrigia juncea*) and lyme grass (*Leymus arenarius*), which act as an impediment to airborne sand. Strandline species can remain a persistent element of the vegetation.

Where sand accumulation is more rapid, marram grass (*Ammophila arenaria*) invades, initiating the transition to mobile dunes (Shifting dunes along the shoreline with *Ammophila arenaria*). Marram growth is actively stimulated by sand accumulation. These unstable and mobile areas are sometimes referred to as 'yellow dunes' (or white dunes in some European countries), owing to the areas of bare sand visible between the tussocks of marram.

Fixed dunes refers to the more stabilised area of dune systems, generally located in the shelter of the mobile dune ridges, where the wind speed is reduced and the vegetation is removed from the influence of tidal inundation and salt spray. This leads to the development of a more or less closed or 'fixed' carpet of vegetation dominated by a range of sand-binding species (Gaynor, 2008).

All the dune habitats indicated above occur as a complex mosaic of constantly changing and evolving vegetation communities. They are inextricably linked in terms of their ecological functioning and

should be regarded as single geomorphological units. As such, no dune habitat should be considered in isolation from the other dune habitats present at a site, or the adjoining semi-natural habitats with which they often form important transitional communities. Detailed descriptions from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) of each sand dune habitat found at Malahide Estuary are presented in Appendix IV.

The CMP surveyed a single sub-site within Malahide Estuary SAC. See Appendix III for map:

- Malahide Island (Appendix IV for site report)

Malahide Island is a sand spit overlying a gravel ridge and extends 3km southwards in to Malahide estuary from the rocky promontory of Portrane. The Corballis Golf Course and the Island Golf Course occupy most of the sand dune system. These golf courses have been excluded from the SAC.

4.1 Overall objectives

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria*' in Malahide Estuary SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation' in Malahide Estuary SAC is to 'restore the favourable conservation condition'.

These objectives are based on an assessment of the current condition of each habitat under a range of attributes and targets. The assessment is divided into three main headings (a) Area (b) Range and (c) Structure and Functions.

4.2 Area

4.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. A baseline habitat map was produced for the sand dune habitats at each sub-site in Malahide Estuary SAC during the Coastal Monitoring Project (CMP) (Ryle et al., 2009). The map for Malahide Island is included with the individual site report in Appendix IV.

The total areas of each sand dune habitat within the SAC as estimated by Ryle et al. (2009) are presented in the second column of the following table. These figures were subsequently checked and adjusted to take into account some overlapping polygons and mapping errors. The adjusted figures are presented in the final column

Habitat	Total area (ha) of habitat from CMP	Total area (ha) of habitat within SAC boundary
Shifting dunes along the shoreline with <i>Ammophila arenaria</i>	1.804	1.80
Fixed coastal dunes with herbaceous vegetation	21.430	21.42
Total	23.234	23.22

The general target for this attribute in the case of each habitat is that the area should be stable, or increasing. Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is always assessed subject to natural processes, including erosion and succession

4.3 Range

4.3.1 Habitat distribution

The fixed dune habitat flanks the eastern and southern edge of Malahide Island while the mobile dunes occur as a thin band along the northeastern edge of the spit (Ryle et al., 2009).

The distribution of sand dune habitats as mapped by Ryle et al. (2009) is presented in Appendix II.

There should be no decline or change in the distribution of these sand dune habitats, unless it is the result of natural processes, including erosion, and succession.

4.4 Structure and Functions

The location, character and dynamic behaviour of sand dunes are governed by a combination of geographic, climatic, edaphic and anthropogenic factors. Sand dunes are highly complex, dynamic

systems, where the habitats occur in a complex and constantly evolving and changing mosaic. They function as systems in terms of geomorphology and hydrology and maintaining the favourable conservation condition of the habitats present depends on allowing these processes to continue unhindered. Maintaining the favourable conservation condition of all of the sand dune habitats in Malahide Estuary SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

4.4.1 Physical structure: functionality and sediment supply

Coastlines naturally undergo a constant cycle of erosion and accretion. There are two main causes of erosion: (a) those resulting from natural causes and (b) those resulting from human interference. Natural causes include the continual tendency towards a state of equilibrium between coasts and environmental forces, climatic change (particularly an increase in the frequency of storms or a shift in storm tracks), relative sea level rise and natural changes in the sediment supply. Human interference is usually associated with changes in the sediment budget, either directly, through the removal of beach or inshore sediment, or indirectly, by impeding or altering sediment movement. It is important to recognise that the process of coastal erosion is part of a natural tendency towards equilibrium. Natural shorelines attempt to absorb the energy entering the coastal zone by redistributing sediment.

Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Sediment supply is especially important in the embryonic dunes and mobile dunes, as well as the strandline communities where accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. The construction of physical barriers such as sea defences can interrupt longshore drift, leading to beach starvation and increased rates of erosion. Sediment circulation and erosion also has a role to play in the more stabilised dune habitats. Cycles of erosion and stabilisation are part of a naturally functioning dune system, where the creation of new bare areas allows pioneer species and vegetation communities to develop, increasing biodiversity. The construction of physical barriers can interfere with the sediment circulation by cutting the dunes off from the beach resulting in fossilisation or overstabilisation of dunes.

The mobile dunes at Malahide Island are undergoing some erosion along the north and eastern edge of the site as well as some accretion to the south. Erosion due to overuse of the dunes is affecting all areas of the mobile and embryonic dunes at the site. Coastal protection works have been installed on the seaward side of the spit in the form of railway sleepers and chestnut paling. The installation of concrete filled plastic barrels and planting of sea buckthorn (*Hippophae rhamnoides*) are measures that have been used for coastal protection by the golf course (Ryle et al., 2009).

The target for this attribute is to maintain the natural circulation of sediment and organic matter throughout the entire dune system, without any physical obstructions.

4.4.2 Vegetation structure: zonation

The range of vegetation zones on a dune system should be maintained. Gaynor (2008) highlights the highly transitional nature of much of the vegetation; therefore, it is important that the transitional communities are also conserved, including those to the saltmarsh communities.

As well as transitions between sand dune habitats, the fixed dune habitat at Malahide Island is closely associated with saltmarsh habitat that has recently developed over the gravel material at the southern tip of the spit. This is one of the more intact sand dune-saltmarsh complexes on the northeastern coastline (Ryle et al., 2009).

The target is to maintain the range of coastal habitats, including transitional zones, subject to natural processes, including erosion and succession.

4.4.3 Vegetation structure: bare ground

This target only applies to fixed dunes. It does not apply to the other habitats present where high levels of bare sand are a natural component of the habitat (*e.g. mobile dunes). In the fixed areas some degree of instability is vital. Constant cycles of erosion and stabilisation provide the necessary conditions for the establishment of pioneer species and species that favour open conditions including invertebrates, helping to increase biodiversity.

The target is to achieve up to 10% bare sand. This target is assessed subject to natural processes.

4.4.4 Vegetation structure: vegetation height

This attribute applies to the fixed dunes, where a varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. The ecological benefits of moderate levels of grazing on dunes have been well documented (Gaynor, 2008). Moderate grazing regimes lead to the development of a species-rich vegetation cover. The animals increase biodiversity by creating micro-habitats through their grazing, dunging and trampling activities. Grazing slows down successional processes and in some cases reverses them, helping to achieve a diverse and dynamic landscape. The effects of trampling assist the internal movement of sand through the development of small-scale blowouts, while dunging can eutrophicate those dune habitats whose nutrient-poor status is crucial for the survival of certain vegetation types. Many species, from plants to invertebrates, benefit immensely from the open and diverse system created by a sustainable grazing regime. Many dune species are small in size and have relatively low competitive ability.

Consequently, the maintenance of high species diversity on a dune system is dependent on the existence of some control to limit the growth of rank coarse vegetation (Gaynor, 2008).

Grazing by livestock is absent from Malahide Island (Ryle et al., 2009). The target for this attribute is to maintain structural variation within the sward.

4.4.5 Vegetation composition: plant health of dune grasses

This attribute applies to mobile dunes, where blown sand is a natural feature. The health of the dune grasses (particularly *Ammophila arenaria* and *Elytrigia juncea*) is assessed by the plant parts above the ground (they should be green) and the presence of flowering heads. This gives a clear indication of the status of the supply of blown sand, which is required for these species to thrive.

The target for this attribute is that more than 95% of the dune grasses should be healthy.

4.4.6 Vegetation composition: typical species & sub-communities

Species diversity and plant distribution in dunes is strongly controlled by a range of factors, including mobility of the substrate, grazing intensities, moisture gradients, nutrient gradients and human disturbance. In the younger, more mobile dunes, marram (*Ammophila arenaria*) is common, while groundsel (*Senecio vulgaris*), sea rocket (*Cakile maritima*) and dandelion (*Taraxacum* sp.) are also present. The fixed, more stable dune vegetation includes lady's bedstraw (*Galium verum*), common birdsfoot trefoil (*Lotus corniculatus*), wild thyme (*Thymus praecox*), kidney vetch (*Anthyllus vulneraria*), wild pansy (*Viola tricolor*) and biting stonecrop (*Sedum acre*).

The typical species of the mobile dunes at Malahide Island include marram (*Ammophila arenaria*), Lyme-grass (*Leymus arenarius*) and sea spurge (*Euphorbia paralias*). Sea holly (*Eryngium maritimum*) occurs occasionally throughout the mobile dunes (Ryle et al., 2009).

Typical species recorded in the fixed dunes at Malahide Island include red fescue (*Festuca rubra*), birdsfoot-trefoil (*Lotus corniculatus*), lady's bedstraw (*Galium verum*), wild thyme (*Thymus polytrichus*) and wild pansy (*Viola tricolor* sub sp. *cutisii*). Species typical of calcareous dunes such as eyebright (*Euphrasia officinalis*) and biting stonecrop (*Sedum acre*) were also recorded at the site by the CMP. The fixed dunes also contain a high cover of marram (*Ammophila arenaria*) attributed to the lack of grazing. The Irish Red Data book and Flora Protection Order (1999) species, hairy violet (*Viola hirta*) occurs at the site (Ryle et al., 2009).

The target for this attribute is to maintain a typical flora for the particular sand dune habitat.

4.4.7 Vegetation composition: negative indicator species

Negative indicators include non-native species (e.g. *Hippophae rhamnoides*), species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled.

The main invasive species identified in Gaynor (2008) were bracken (*Pteridium aquilinum*) and sea buckthorn (*Hippophae rhamnoides*). The invasion of non-native species compromises the typical plant community structure. Bracken (*Pteridium aquilinum*) is becoming increasingly dominant, particularly

where sites have been abandoned or where grazing levels have been significantly reduced. The vegetation retains many elements of the original vegetation cover, but there is a reduction in biodiversity. As the canopy becomes taller and ranker, many of the low-growing species disappear. In this case, the vegetation is treated as a sub-community of the original community that was invaded. This is always the case unless the original vegetation cover has been completely destroyed, as can happen with *H. rhamnoides*, which can form dense impenetrable thickets.

Sea buckthorn (*Hippophae rhamnoides*) has been planted at the western edge of the golf course and is extending into the fixed dune. Other negative indicators recorded by the CMP in the fixed dune include creeping thistle (*Cirsium arvense*), bracken (*Pteridium aquilinum*), ragwort (*Senecio jacobaea*) and bramble (*Rubus fruticosus*). Creeping thistle (*Cirsium arvense*) also occurs within the mobile dune habitat at Malahide Island (Ryle et al., 2009).

The target is that negative indicators (including non-native species) should represent less than 5% of the vegetation cover.

4.4.8 Vegetation composition: scrub/trees

This attribute only applies to the fixed dunes. Scrub encroachment leads to reduction in dune biodiversity and needs to be controlled.

Within Malahide Estuary, the fixed dune area has been invaded by dog-rose (*Rosa canina*), privet (*Ligustrum sp.*) as well as single trees of turkey oak (*Quercus cerris*) (Ryle et al., 2009)

The target for this attribute therefore is that the cover of scrub and tree species should be under control or make up less than 5% of the vegetation cover.'

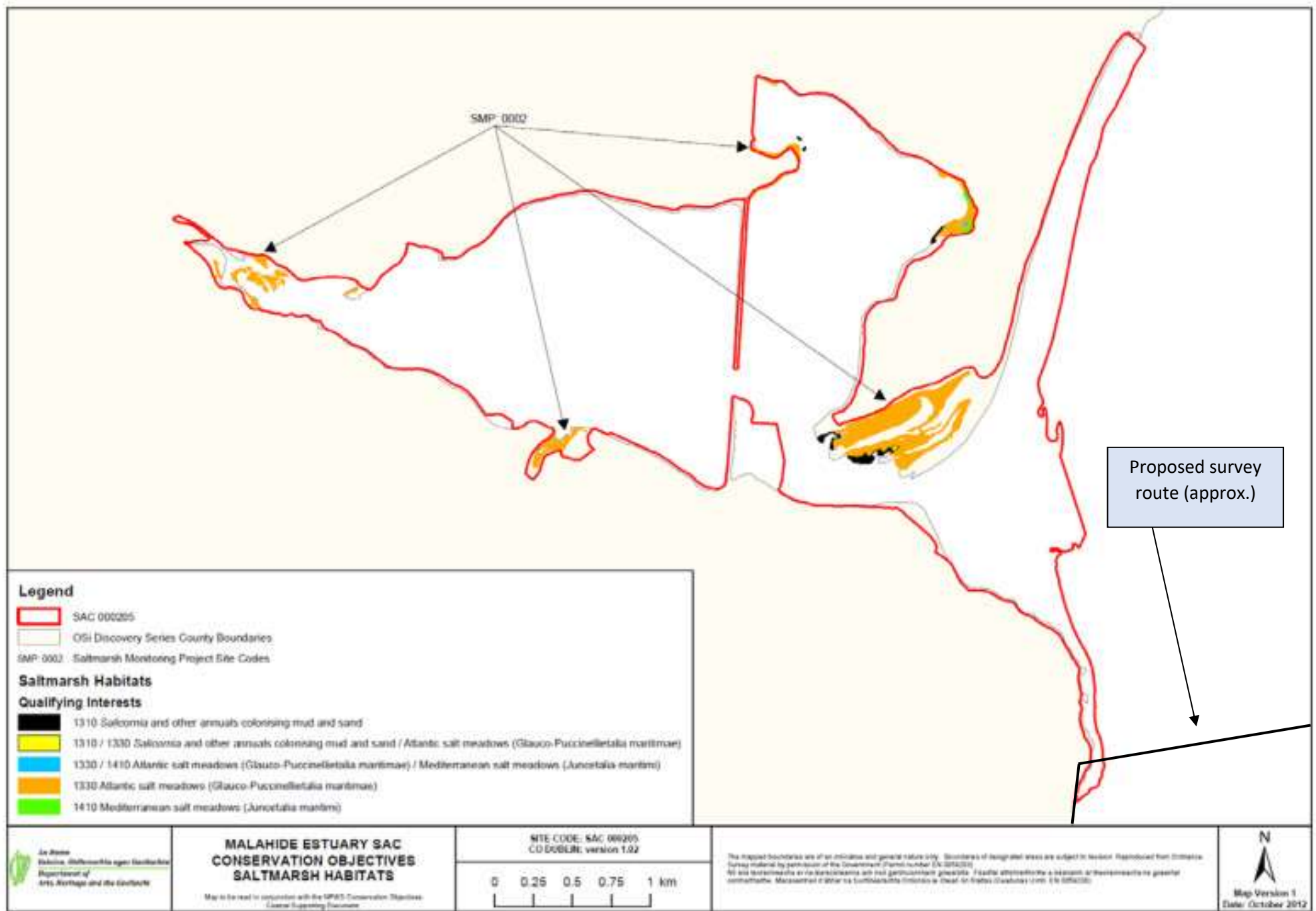


Figure 41. Distribution map of saltmarsh habitats within Malahide Estuary SAC

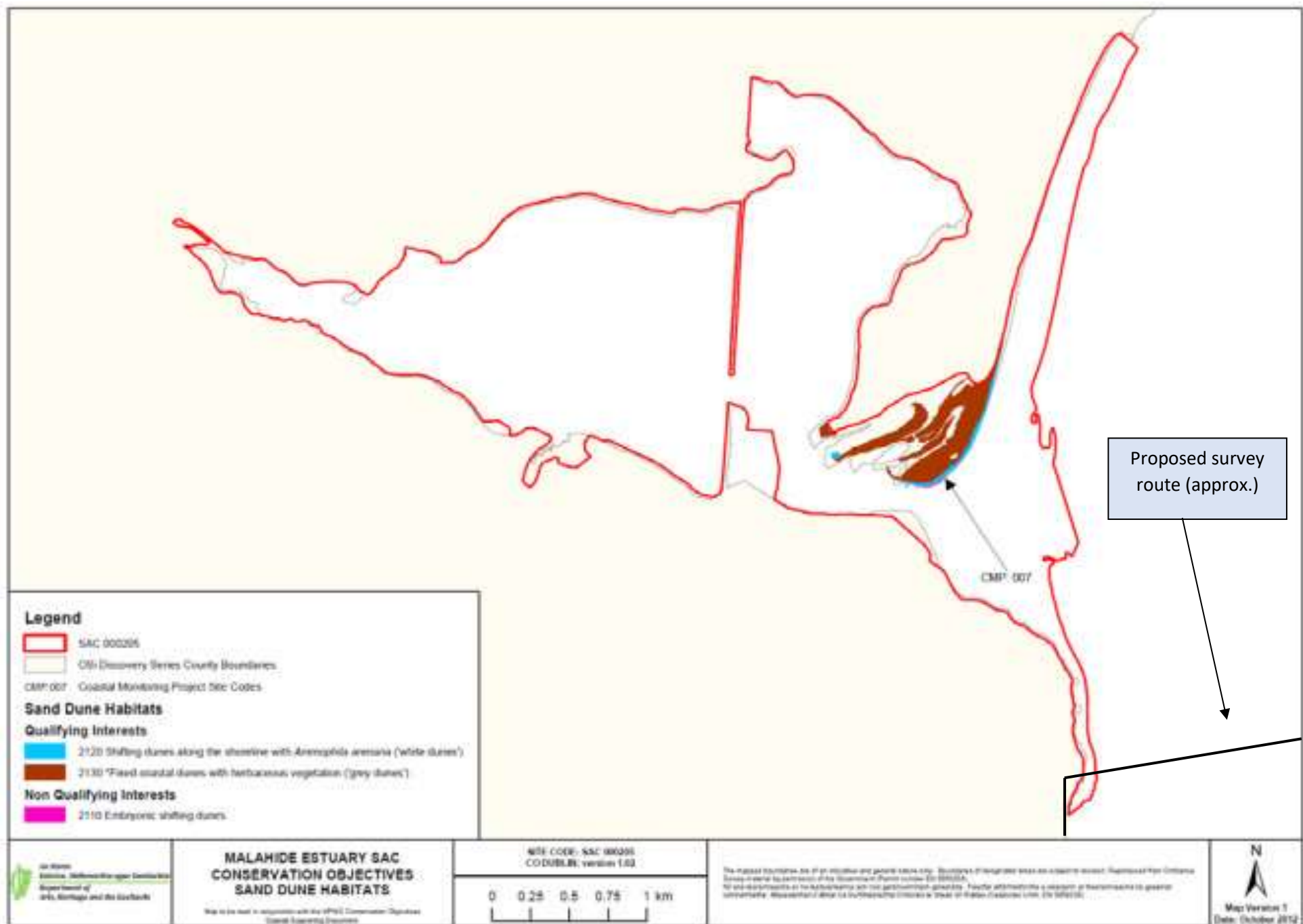


Figure 42. Distribution map of sand dune habitats within Malahide Estuary SAC

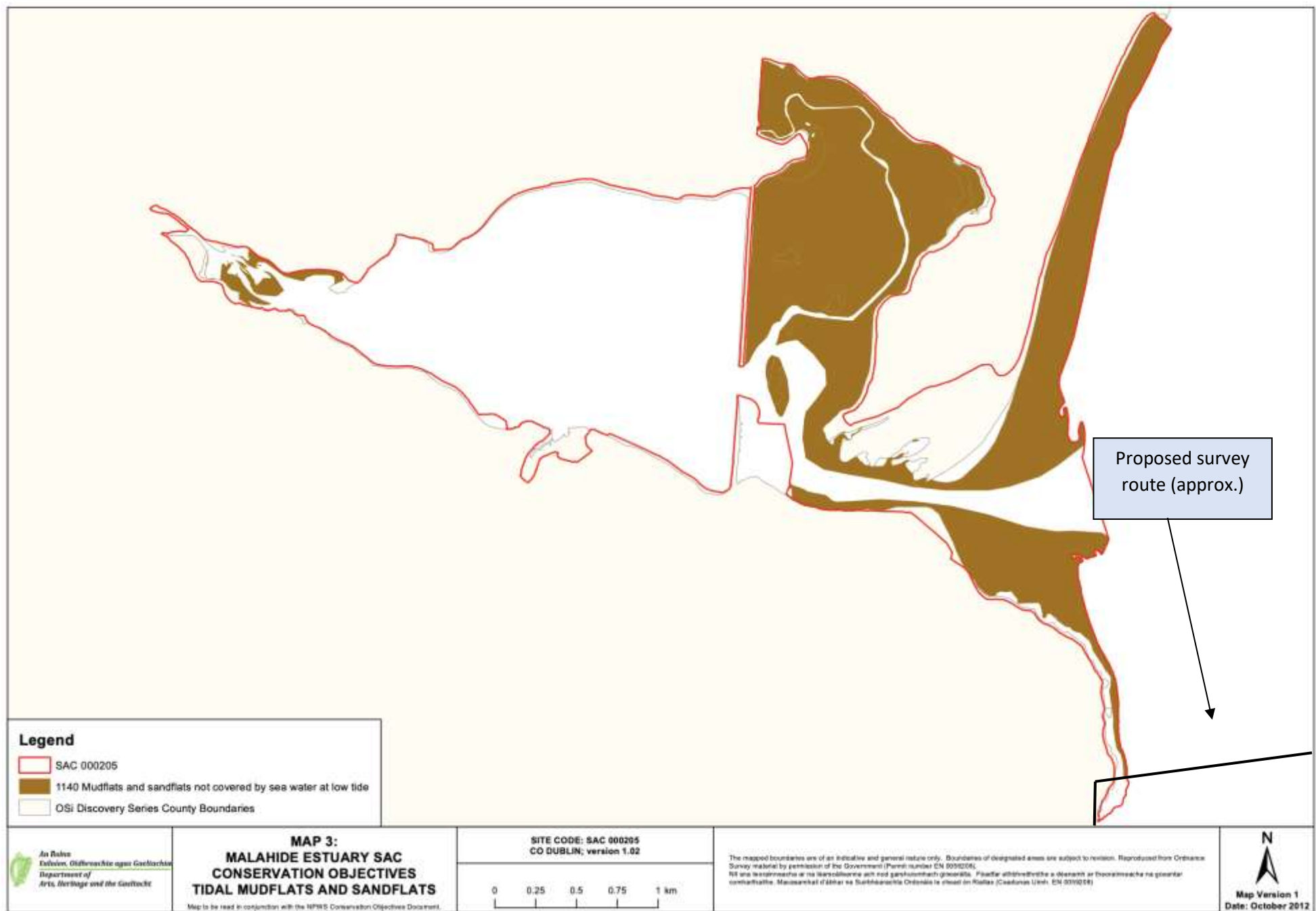


Figure 43. Distribution map of mudflats and sandflats within Malahide Estuary SAC

5.1.1 Conservation Objectives of Malahide Estuary SAC 000205 (All Habitats and Species)

The qualifying interests, their attributes, targets and the potential impact of the proposed fibre-optic cable survey on each of the qualifying interests of Malahide Estuary SAC are seen in Table 12.

Table 12. The site-specific Conservation Objectives, overall status of species and habitats and the potential impact of the proposed works on the qualifying interests and conservation objectives of Malahide Estuary SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
[1140] Mudflats and sandflats not covered by seawater at low tide	Inadequate	To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat area.</i> The permanent habitat area is stable or increasing, subject to natural processes. <i>Community extent.</i> Maintain the extent of the <i>Zostera</i>-dominated community and the <i>Mytilus edulis</i>-dominated community complex, subject to natural processes. <i>Community Structure: Zostera density:</i> Conserve the high quality of the <i>Zostera</i> -dominated community, subject to natural processes. <i>Community Structure: Mytilus edulis density:</i> Conserve the high quality of the <i>Mytilus edulis</i>-dominated community, subject to natural processes. <i>Community Distribution.</i> Conserve the following community types in a natural condition: Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex; Estuarine sandy mud with Chironomidae and <i>Hediste diversicolor</i> community complex; and Sand to muddy sand with <i>Peringia ulvae</i>, <i>Tubificoides benedii</i> and <i>Cerastoderma edule</i> community complex. Potential Effect The proposed cable survey route on Portmarnock Beach is located adjacent to this habitat (Figure 43). The proposed survey works involve Landfall Site Investigations, which will be undertaken to establish the depth and nature of the sediment. The focus of the site investigations will be on the upper layers of sediment to assess the feasibility of cable burial and installation techniques. The following may be undertaken at the landfall: • Bar probes on the intertidal at 10m spacing (approx. 8 to 10 at the landfall). • Bar probes from the Low Water Line to the 3m water depth contour at 30m spacing. (approx. 8 to 10 at the landfall) • 3 Trial Pits on the beach (target depth 2.5m). The bar probes on the intertidal are manually driven to a depth of 2 metres simply to prove the depth of upper layers of sand, gravel or soft material. The Trial Pits will be positioned at approximately 30 to 50m centres starting seaward of the High Water Mark. The Trial Pits will be

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
		excavated, logged, photographed and backfilled in a single tidal cycle. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated. Access to the beach and intertidal zone at the landfall for vehicles or equipment will be via the concrete public slipway off the R106 Coast Road. During the Altemar survey of the proposed landfall area, <i>Arenicola marina</i> appeared frequently on the lower shore. In the absence of mitigation, the proposed survey works could result in the temporary disturbance of mudflat and sandflat habitats within this SAC due to site access, the digging of trial pits, and the utilisation of bar probes. Any potential impacts on this habitat would be short-term and would not significantly impact the community within the medium or long term. However, out of an abundance of caution, mitigation measures are required to minimise potential minor adverse impacts.
[1310] <i>Salicornia</i> and other annuals colonising mud and sand	Bad	To maintain the favourable conservation condition of <i>Salicornia</i> and other annuals colonizing mud and sand in Malahide Estuary SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat area:</i> Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary- 1.93ha. <i>Habitat distribution:</i> No decline, or change in habitat distribution, subject to natural processes. <i>Physical structure: sediment supply:</i> Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions. <i>Physical structure: creeks and pans:</i> Maintain creek and pan structure, subject to natural processes, including erosion and succession. <i>Physical structure: flooding regime:</i> Maintain natural tidal regime. <i>Vegetation structure: zonation:</i> Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. <i>Vegetation structure: vegetation height.</i> Maintain structural variation within sward. <i>Vegetation structure: vegetation cover.</i> Maintain more than 90% of area outside creeks vegetated. <i>Vegetation composition: typical species and subcommunities:</i> Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009). <i>Vegetation structure: negative indicator species – <i>Spartina anglica</i>.</i> No significant expansion of common cordgrass (<i>Spartina anglica</i>). No new

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
		sites for this species and an annual spread of less than 1% where it is already known to occur. Potential Effect The cable survey route is located within intertidal & subtidal habitats at Velvet Strand, Portmarnock and not within, or proximal to, <i>Salicornia</i> and other annuals colonising mud and sand. However, out of an abundance of caution there is potential for pollution from machinery / vessel activity during the survey works and mitigation measures are required.
[1330] Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)	Bad	To restore the favourable conservation condition of Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) in Malahide Estuary SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Habitat area:</i> Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary - 25.33ha. <i>Habitat distribution:</i> No decline or change in habitat distribution, subject to natural processes. <i>Physical structure: sediment supply:</i> Maintain natural circulation of sediments and organic matter, without any physical obstructions. <i>Physical structure: creeks and pans:</i> Allow creek and pan structure to develop, subject to natural processes, including erosion and succession. <i>Physical structure: flooding regime:</i> Maintain natural tidal regime. <i>Vegetation structure: zonation:</i> Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. <i>Vegetation structure: vegetation height.</i> Maintain structural variation within sward. <i>Vegetation structure: vegetation cover.</i> Maintain more than 90% area outside creeks vegetated. <i>Vegetation composition: typical species and subcommunities:</i> Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009). <i>Vegetation structure: negative indicator species – Spartina anglica.</i> No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is known to occur.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
		Potential Effect The cable survey route is located within intertidal & subtidal habitats at Velvet Strand, Portmarnock and not within, or proximal to, Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>). No significant impacts are foreseen on Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>). However, out of an abundance of caution there is potential for pollution from machinery / vessel activity during the survey works and mitigation measures are required.
[1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	Inadequate	To maintain the favourable conservation condition of Mediterranean salt meadows (<i>Juncetalia maritimi</i>) in Malahide Estuary SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Habitat area:</i> Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary - 0.64ha. <i>Habitat distribution:</i> No decline, subject to natural processes. <i>Physical structure: sediment supply:</i> Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions. <i>Physical structure: creeks and pans:</i> Maintain creek and pan structure, subject to natural processes, including erosion and succession. <i>Physical structure: flooding regime:</i> Maintain natural tidal regime. <i>Vegetation structure: zonation:</i> Maintain range of saltmarsh habitats including transitional zones, subject to natural processes including erosion and succession. <i>Vegetation structure: vegetation height.</i> Maintain structural variation in the sward. <i>Vegetation structure: vegetation cover.</i> Maintain more than 90% of area outside creeks vegetated. <i>Vegetation composition: typical species and subcommunities:</i> Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009). <i>Vegetation structure: negative indicator species – Spartina anglica.</i> No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1% where it is already known to occur. Potential Effect The cable survey route is located within intertidal & subtidal habitats at Velvet Strand, Portmarnock and not within, or proximal to, Mediterranean salt meadows (<i>Juncetalia maritimi</i>). No significant impacts are foreseen on Mediterranean salt meadows (<i>Juncetalia</i>

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
		<i>maritimi</i>). However, out of an abundance of caution there is potential for pollution from machinery / vessel activity during the survey works and mitigation measures are required.
[2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)	Inadequate	To restore the favourable conservation condition of Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat area:</i> Area stable or increasing, subject to natural processes including erosion and succession. Total area mapped: 1.80ha. <i>Habitat distribution:</i> No decline, or change in habitat distribution, subject to natural processes. <i>Physical structure: functionality and sediment supply:</i> Maintain the natural circulation of sediment and organic matter, without any physical obstructions. <i>Vegetation structure: zonation:</i> Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. <i>Vegetation composition: plant health of dune grasses:</i> 95% of marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present). <i>Vegetation composition: typical species and subcommunities:</i> Maintain the presence of species-poor communities dominated by marram grass (<i>Ammophila arenaria</i>) and/or lymegrass (<i>Leymus arenarius</i>). <i>Vegetation composition: negative indicator species:</i> Negative indicator species (including non-natives) to represent less than 5% cover. Potential Impact The cable survey route is located within intertidal & subtidal habitats at Velvet Strand, Portmarnock and not within officially mapped Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) habitat within the SAC that forms the area of official habitat. Access to the beach and intertidal zone at the landfall for vehicles or equipment will be via the concrete public slipway off the R106 Coast Road. No significant impacts are foreseen on Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes). However, out of an abundance of caution mitigation measures are required to protect the dune habitat.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
[2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)	Bad	To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat area.</i> Area stable or increasing, subject to natural processes including erosion and succession. Total area mapped: 21.42ha. <i>Habitat distribution.</i> No decline, or change in habitat distribution, subject to natural processes. <i>Physical structure: functionality and sediment supply:</i> Maintain the natural circulation of sediment and organic matter, without any physical obstructions. <i>Vegetation structure: zonation:</i> Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. <i>Vegetation structure: bare ground:</i> Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes. <i>Vegetation structure: sward height:</i> Maintain structural variation within sward. <i>Vegetation composition: typical species and subcommunities:</i> Maintain range of subcommunities with typical species listed in Ryle et al. (2009). <i>Vegetation composition: negative indicator species (including Hippophae rhamnoides):</i> Negative indicator species (including non-natives) to represent less than 5% cover. <i>Vegetation composition: scrub/trees:</i> No more than 5% cover or under control. Potential Impact The cable survey route is located within intertidal & subtidal habitats at Velvet Strand, Portmarnock and not within officially mapped Fixed coastal dunes with herbaceous vegetation (grey dunes) habitat within the SAC that forms the area of official habitat. Access to the beach and intertidal zone at the landfall for vehicles or equipment will be via the concrete public slipway off the R106 Coast Road. No significant impacts are foreseen on Fixed coastal dunes with herbaceous vegetation (grey dunes). However, out of an abundance of caution mitigation measures are required to protect the dune habitat.

5.2 Rockabill to Dalkey Island SAC (Site code: 003000)

***Phocoena Phocoena* (Harbour porpoise)**

As outlined in the Rockabill to Dalkey Island SAC: Conservation objectives supporting document - Marine Habitats and Species (2013), *“this small toothed cetacean species (from the mammal Order Cetacea - whales, dolphins and porpoises) occurs in estuarine, coastal and offshore waters in which it carries out breeding, foraging, resting, social activity and other life history functions. Its distribution extends predominantly throughout continental shelf waters and the species may range over many hundreds or thousands of kilometres. As air-breathing mammals, harbour porpoises must return to the water surface to breathe but they are otherwise wholly aquatic. Individual porpoises of all ages use sound as their primary sensory tool in order to navigate, communicate, avoid predators, or locate and facilitate the capture of prey under water. Group sizes tend to be small (i.e. in single figures, more commonly 2 to 3 individuals) although larger aggregations may occasionally be recorded, particularly in the summer months.*

Harbour porpoise breed annually in Ireland, predominantly during the months of May to September. The principal calving period in Irish waters is thought to occur in the months of May and June, although it may extend throughout the summer months and into early autumn. Newborn calves are weaned before they are one year old. Mating commonly occurs several weeks after the calving season.

The occurrence of harbour porpoises within a prescribed marine area can be estimated using visual observation and passive acoustic methods in order to deliver an assessment of community or population size (i.e. relative abundance or absolute abundance), density and distribution. The size, community structure and distribution or habitat use of harbour porpoise inhabiting Rockabill to Dalkey Island SAC are not fully understood. In acknowledging limitations in the understanding of aquatic habitat use by the species within the site, it should be noted that all suitable aquatic habitat (Figure 15) is considered relevant to the species range and ecological requirements at the site and is therefore of potential use by harbour porpoises.

Survey effort targeting the 2008 summer-autumn season delivered initial estimates of 0.54-6.93 animals per km² within the northern half of the site (overall estimate across four surveys: 2.03 individuals per km², N=211±47 individuals, 95% Confidence Intervals: 137-327, Coefficient of Variation=0.23) and 0.48-2.05 animals per km² within the southern half of the site, including outer Dublin Bay (overall estimate across four surveys: 1.19 individuals per km², N=138±33 individuals, 95% Confidence Intervals: 86-221, Coefficient of Variation=0.24). While the numbers of harbour porpoise encountered during any survey within the site are variable, additional acoustic data plus casual and effort-related sighting rates from coastal observation stations are significant for the east coast of Ireland and, comparatively high group sizes (>5 individuals) have been recorded from this area. The species is present at the site in all seasons, while important cohorts within the harbour porpoise community such as adults juveniles and newborn calves have also been recorded within the site, including during the calving/breeding season.

Harbour porpoise is a successful aquatic predator that feeds on a wide variety of fish, cephalopod and crustacean species occurring in the water column or close to the seabed. Dive depths in excess of 200m have been recorded for the species. Foraging areas for harbour porpoise are often associated with areas of strong tidal current and associated eddies; therefore the occurrence of porpoises close to shore or adjacent to islands and prominent headlands is commonly reported. However gaps remain in the knowledge of the species foraging ecology within Rockabill to Dalkey Island SAC and the available data may be biased toward particular locations due to the nature of survey effort and opportunistic reports from a range of sources. No detailed information is currently available on individual or group movements by harbour porpoise within or into and out of the site, nor is it known whether individuals or groups of the species demonstrate any faithfulness to the site (i.e. site fidelity or residency). Nevertheless, the consistent annual and seasonal occurrence of the species at the site, its occurrence during the calving/breeding period and density/population estimates available to date all indicate the importance of this coastal site for the species.”

According to Berrow & O'Brien (2013) who carried out six surveys in Rockabill to Dalkey Island SAC between July and September 2013, estimates in Rockabill to Dalkey Island SAC ranged from 1.13 porpoises per km² to a maximum of 2.61, with an overall density of 1.44±0.09 porpoises per km² with a very low CV of 0.06. Harbour porpoise abundance for Rockabill to Dalkey Island SAC was around 400 individuals (391±25 with 95% CI of 344-445). The proportion of young harbour porpoises (i.e., juveniles +calves) recorded on survey days ranged from c. 4-19% of all animals seen and was c. 7% overall using the combined dataset. The proportion of calves recorded on each survey ranged from 0 to c. 8% of all animals seen and was c. 2% overall using the combined dataset.

The following technical clarification is provided in relation to specific conservation objectives and targets for Annex II species to facilitate the appropriate assessment process (outlined in the Rockabill to Dalkey Island SAC: Conservation objectives supporting document - Marine Habitats and Species (2013)):

Harbour Porpoise

Objective: To maintain the favourable conservation condition of harbour porpoise in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets

Target 1 *Species range within the site should not be restricted by artificial barriers to site use.*

This target may be considered relevant to proposed activities or operations that will result in the permanent exclusion of harbour porpoise from part of its range within the site, or will permanently prevent access for the species to suitable habitat therein. It does not refer to short-term or temporary restriction of access or range. Early consultation or scoping with the Department in advance of formal application is advisable for proposals that are likely to result in permanent exclusion.

Target 2 *Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site.*

Proposed activities or operations should not introduce man-made energy (e.g. aerial or underwater noise, light or thermal energy) at levels that could result in a significant negative impact on individuals and/or the community of harbour porpoise within the site. This refers to the aquatic habitats used by the species in addition to important natural behaviours during the species annual cycle. This target also relates to proposed activities or operations that may result in the deterioration of key resources (e.g. water quality, feeding, etc) upon which harbour porpoises depend. In the absence of complete knowledge on the species ecological requirements in this site, such considerations should be assessed where appropriate on a case-by-case basis. Proposed activities or operations should not cause death or injury to individuals to an extent that may ultimately affect the harbour porpoise community at the site.

As seen from Table 13, based on predicted time taken to complete overall survey efforts, and based on a vessel speed of 4kn, the time within the SAC carrying out acoustic surveys would be approximately 63.3 hrs (33.1 hrs inshore, 30.2 hrs offshore), excluding any groundtruthing time.

Table 13: Approximate length of time the proposed survey will be within the Rockabill to Dalkey SAC (excluding groundtruthing).

	Depth Range	Survey Corridor Width	Min. # of Lines	Typical Survey Speed	Total Foot Print (ha)	Total Time for SI	Footprint Within SAC	Time Within SAC
Survey (Inshore)	3m to 15m	400 - 500m	9	4 knots	560 ha	3 to 4 days (weather and sea state dependent)	Approx. 193 ha	Approx. 33.1 hrs
Survey (Offshore)	> 15m	500m	7	4 knots	2441 ha	10 to 12 days (weather and sea state dependent)	Approx. 257 ha	Approx. 30.2 hrs

Reef

This site is of conservation importance for reefs, listed on Annex I, and Harbour Porpoise, listed on Annex II, of the E.U. Habitats Directive.’

As outlined in the Conservation objectives supporting document – Marine Habitats and Species⁸ (NPWS, 2013):

‘INTERTIDAL REEF COMMUNITY COMPLEX

This reef community complex is recorded on the islands within this site and on the south coast of Howth. The exposure regime of the complex ranges from exposed to moderately exposed reef (Figure 2). Exposed reef is recorded on the east side of Dalkey Island, on the east and southern shores of Ireland’s Eye and on all shores of Rockabill and the Muglins. Moderately exposed reef occurs on the western shores of Dalkey and at Howth and Ireland’s Eye.

The substrate here is that of flat and sloping bedrock; around Rockabill cobbles and boulders occur on bedrock. Vertical cliff faces are found on the north and northeast shores of Ireland’s Eye; steep shorelines are a feature of Rockabill, Muglins and the eastern shore of Dalkey Island.

The species associated with this community complex include the fucoids *Fucus serratus*, *F. vesiculosus*, *F. spiralis*, *Ascophyllum nodosum* and *Pelvetia canaliculata*, the barnacle *Semibalanus balanoides* and the bivalve *Mytilus edulis* (Table 2). In the more exposed areas *Semibalanus balanoides* and *Mytilus edulis* dominate while in the more moderately exposed areas it is the fucoid species that are more abundant. The gastropods *Patella vulgata* and *Littorina* sp. are also recorded here. In all area the kelp species *Laminaria digitata* is recorded at the low water mark.

Species associated with the Intertidal reef community complex	
<i>Fucus serratus</i>	<i>Fucus spiralis</i>
<i>Fucus vesiculosus</i>	<i>Semibalanus balanoides</i>
<i>Ascophyllum nodosum</i>	<i>Mytilus edulis</i>
<i>Pelvetia canaliculata</i>	<i>Patella vulgata</i>
<i>Laminaria digitata</i>	<i>Littorina</i> sp.

Table 2 Species associated with the Intertidal reef community complex.

SUBTIDAL REEF COMMUNITY COMPLEX

This community complex is recorded off the islands within the site and also off the coast between Lambay Island and Rush Village (Figure 2). The exposure regime here ranges from moderately exposed reef at the Muglins to exposed reef over the remainder of the site.

The substrate ranges from that of flat and sloping bedrock, to bedrock with boulders and also a mosaic of cobbles and boulders. Vertical rock walls occur on the north and east of Ireland’s Eye and to the east of Lambay Island where they give way to sloping bedrock at c.20m. In the northern reaches of the site, at Rockabill and Ireland’s Eye, areas of both sediment scouring and a thin veneer of silt were observed on the reefs; the veneer of silt was also recorded at Lambay Island. In the south of the site, strong currents were experienced in the channel between Dalkey Island and the Muglins.

In the shallow reaches of this community complex (10m) the anemone *Alcyonium digitatum* occurs in moderate abundances and *Metridium senile* also being recorded here (Table 3). Faunal crusts of bryozoans such as *Flustra foliacea* and *Chartella papyracea* and hydroids including *Nemertesia antennina* are recorded in deeper water (>20m) along with the ascidian *Aplidium punctum*. The asteroid *Asterias rubens* is recorded throughout the site while the barnacle *Balanus crenatus*, the echinoderms *Echinus esculentus* and *Antedon bifida* also occur here.

⁸https://www.npws.ie/sites/default/files/publications/pdf/003000_Rockabill%20to%20Dalkey%20Island%20SAC%20Marine%20Supporting%20Doc_V1.pdf

In general, it was noted that where the reef was subjected to the effects of sediment, either through scouring or settlement of silt, low numbers of species and individuals occurred.

Species associated with the Subtidal reef community complex	
<i>Alcyonium digitatum</i>	<i>Echinus esculentus</i>
<i>Asterias rubens</i>	<i>Brongniartella byssoides</i>
<i>Metridium senile</i>	<i>Pomatoceros triqueter</i>
<i>Necora puber</i>	<i>Chartella papyracea</i>
<i>Laminaria hyperborea</i>	<i>Antedon bifida</i>
<i>Nemertesia antennina</i>	<i>Flustra foliacea</i>
<i>Balanus crenatus</i>	<i>Membranoptera alata</i>
<i>Aplidium punctum</i>	<i>Phycodrys rubens</i>
<i>Hypoglossum hypoglossoides</i>	<i>Delesseria sanguinea</i>
<i>Sagartia elegans</i>	

Table 3 Species associated with the Subtidal reef community complex.

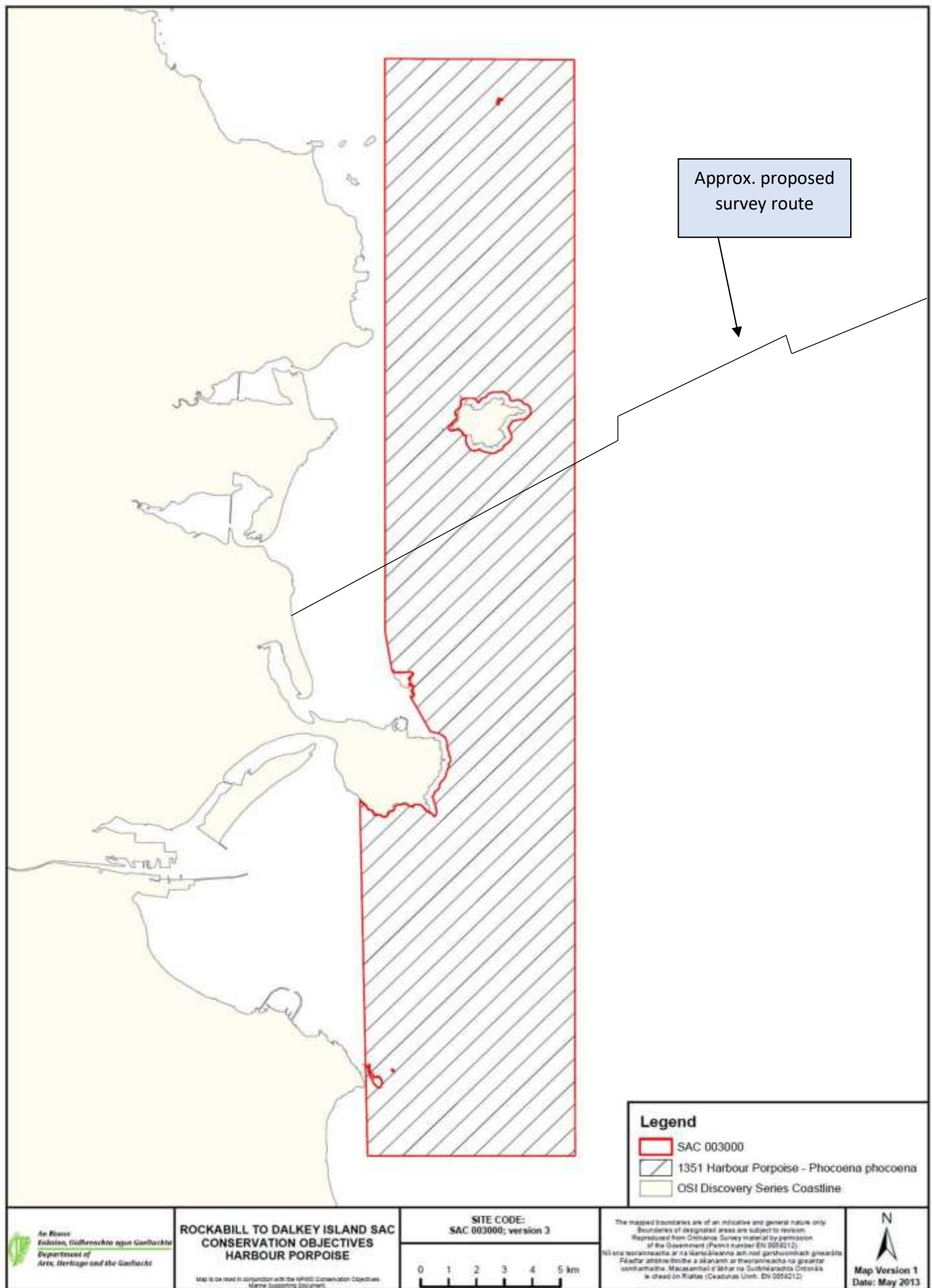


Figure 44. Harbour Porpoise – Rockabill to Dalkey Island SAC

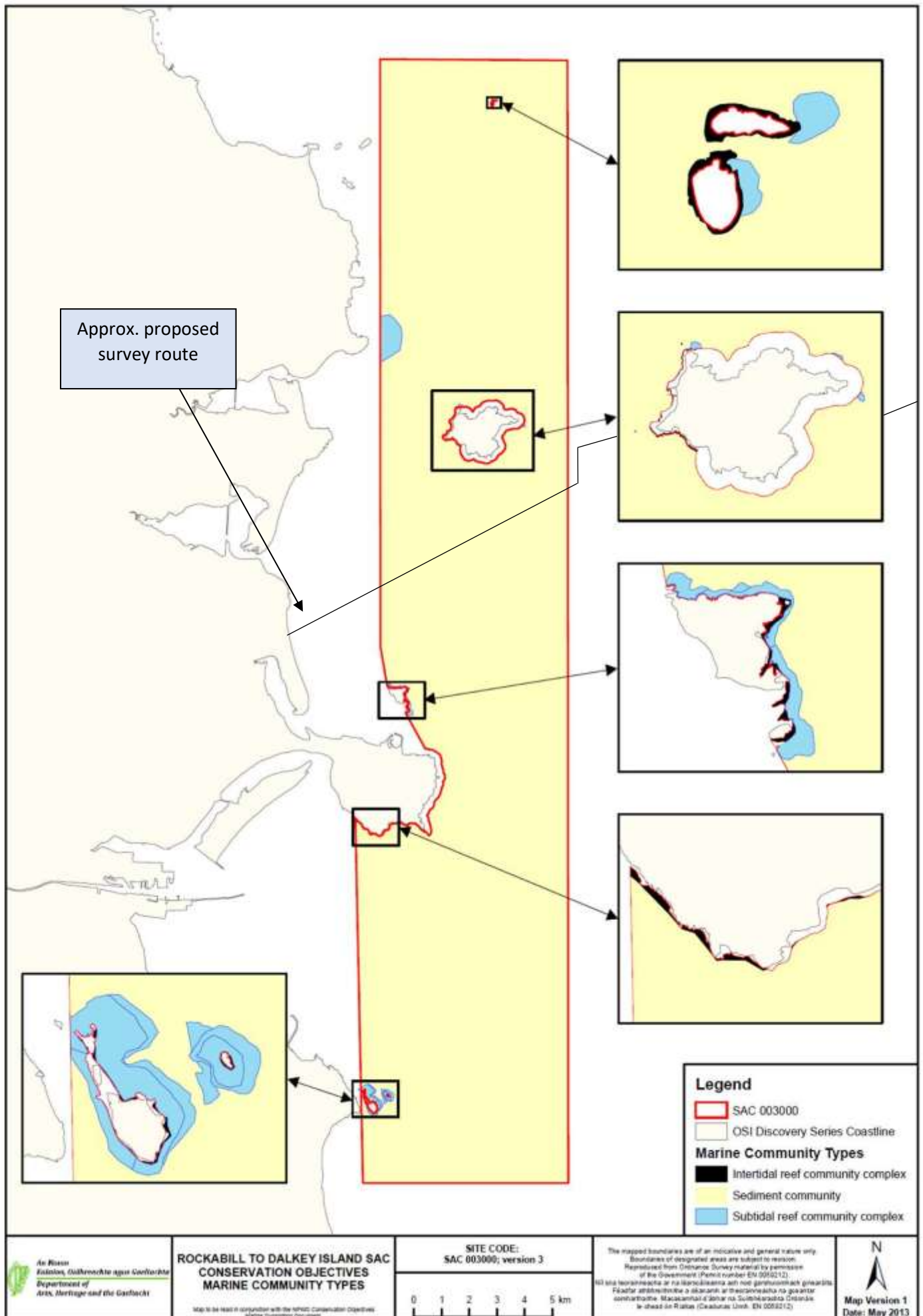


Figure 45. Marine Community Types – Rockabill to Dalkey Island SAC

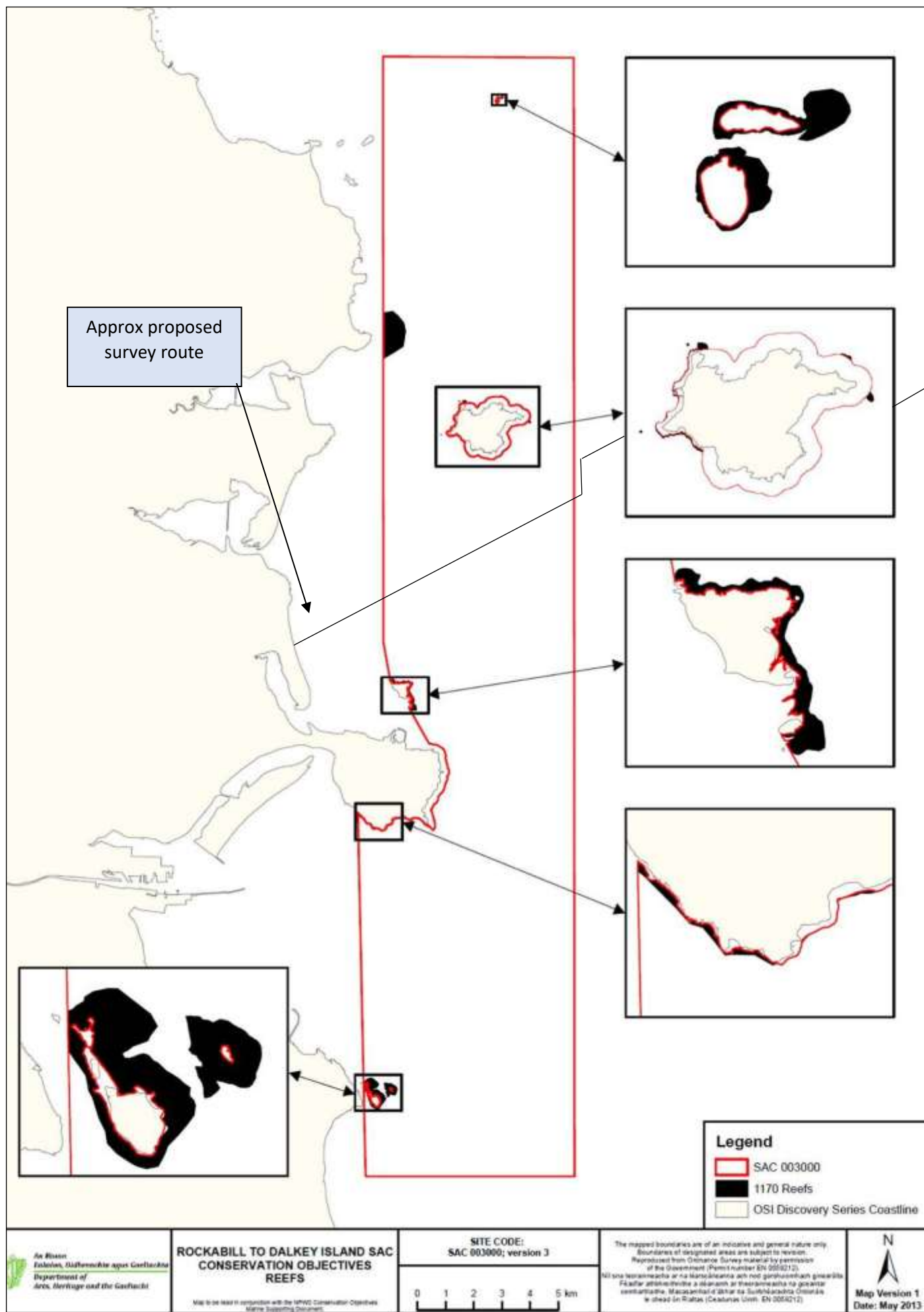


Figure 46. Reefs – Rockabill to Dalkey Island SAC

The qualifying interests, their attributes, targets and the potential impact of the proposed fibre-optic cable survey on each of the features of interest of Rockabill to Dalkey Island SAC are seen in Table 14.

Table 14. The site-specific Conservation Objectives, overall status of species and habitats and the potential impact of the proposed works on the qualifying interests and conservation objectives of Rockabill to Dalkey Island SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
[1170] Reefs	Bad	To maintain the favourable conservation condition of Reefs in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat area.</i> The permanent area is stable or increasing, subject to natural processes. <i>Habitat distribution.</i> Distribution is stable or increasing, subject to natural processes. <i>Community Structure:</i> Conserve the following community types in a natural condition: Intertidal reef community complex; and Subtidal reef community complex. Potential Effect The cable survey route has been provisionally assessed and optimised in consultation with Altamar through the use of existing multibeam and backscatter data from the Irish National Seabed Survey, in addition to examination of habitat maps, Admiralty Charts, existing buried cables, to select a route that allows for burial throughout the cable length. As a result, it is the intention to avoid areas of reef within the SAC. In addition, subtidal SI have been chosen to take place in areas of sediment and to avoid areas of reef where burial to 1.5m would not be possible. Further information is seen in Figures 47 & 48 in relation to the habitats within the SAC, as observed in the backscatter (based on Infomar data) and MSFD Predominant Habitat Types. No reef is located within the proposed sampling areas within the SAC. Reef habitat within the SAC will not be impacted by the proposed marine survey.
[1351] Harbour Porpoise (<i>Phocoena phocoena</i>)	Inadequate	To maintain the favourable conservation condition of Harbour porpoise in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment and within the SAC. Detailed assessment is required in relation to the potential effects on Harbour Porpoise (see Section 7). Mitigation measures are required.

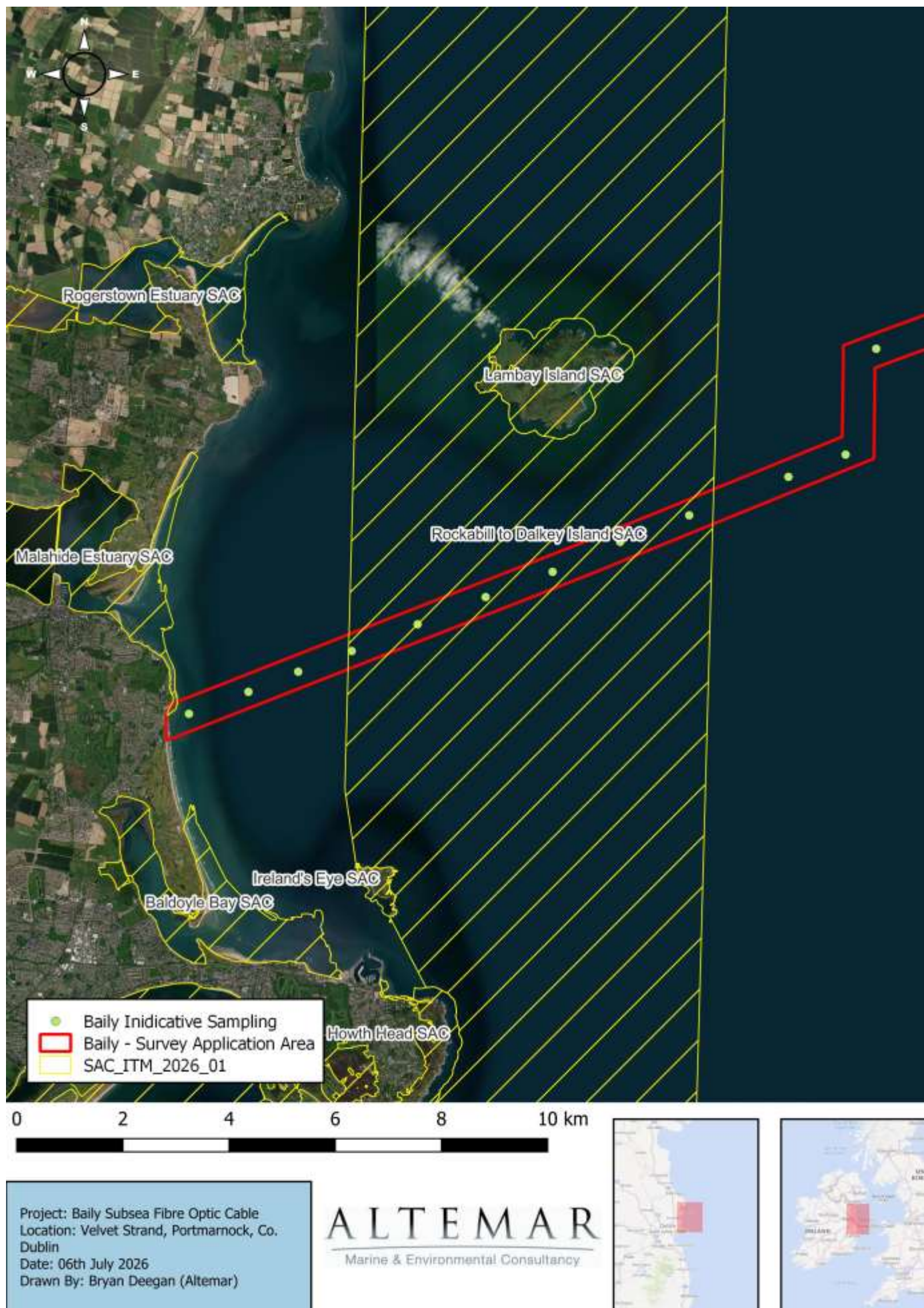


Figure 47. Proposed sampling within Rockabill to Dalkey SAC (Informar backscatter)

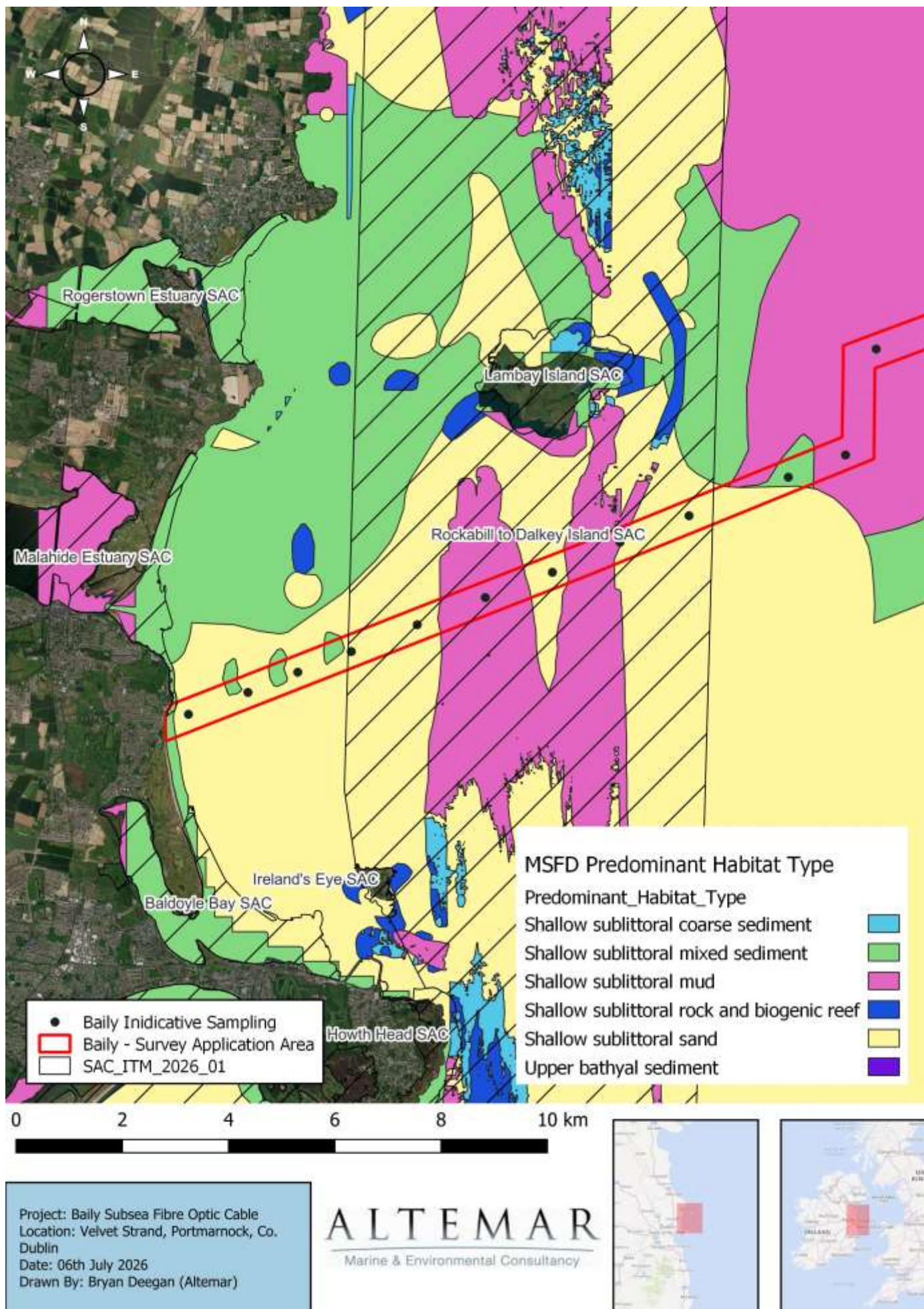


Figure 48. Proposed sampling within Rockabill to Dalkey SAC (MSFD Predominant Habitat Type)

5.3 Lambay Island SAC (Site code: 000204)

As outlined in the Lambay Island SAC Site Synopsis⁹ (NPWS, version date 20.03.2024):

'Annex II Marine mammals

Phocoena phocoena (Harbour Porpoise)

Lambay Island is a large (250 ha) inhabited island lying 4 km off Portrane on the north Co. Dublin coast. It is privately owned and is accessible by boat from Rogerstown Quay. The island rises to 127 m and is surrounded by steep cliffs on the north, east and south slopes. These cliffs contain good diversity in height, slope and aspect. The west shore is low-lying and the land slopes gently eastwards to the summit in the centre of the island. The underlying geology is varied, but is dominated by igneous rocks (of andesitic type) and ash. Also present are shales and limestones of Silurian origin, limestone conglomerates, and shales from the Old Red Sandstone era. The bedrock is exposed on the fringing cliffs and in rocky outcrops; elsewhere it is overlain by varying depths of glacial drift.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1170] Reefs

[1230] Vegetated Sea Cliffs

[1364] Grey Seal (*Halichoerus grypus*)

[1365] Common (Harbour) Seal (*Phoca vitulina*)

[1351] Harbour Porpoise (*Phocoena phocoena*)

Much of the western third of the island is intensively farmed (mostly pasture), and there are small areas of parkland, deciduous and coniferous woodland, buildings, walled gardens and the harbour. The rest of the island is a mixture of less intensively grazed land, rocky outcrops, patches of Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruticosus* agg.), and cliff slopes with typical maritime vegetation e.g. Thrift (*Armeria maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Rock Sea-spurrey (*Spergularia rupicola*) and Spring Squill (*Scilla verna*). Some sheltered gullies have small areas of scrub woodland dominated by Elder (*Sambucus nigra*).

Lambay Island is flanked by extensive areas of reef habitat. Typical species in the intertidal include *Ascophyllum nodosum*, *Fucus* spp., *Laminaria* spp., *Dynamena pumila*, *Actinia equina*, *Littorina littorea*, *L. saxatilis*, *Patella vulgata* and *Semibalanus balanoides*. In the subtidal reef the following algal species are frequently encountered – *Palmaria palmata*, *Cystoclonium purpureum*, *Delesseria sanguinea*, *Membranoptera alata*, *Hypoglossum hypoglossoides*, *Chorda filum*, *Laminaria saccharina* and *Halidrys siliquosa*. Invertebrate species commonly recorded include the typical shallow reef species *Obelia geniculata*, *Alcyonium digitatum*, *Caryophyllia smithii*, *Pomatoceros triqueter*, *Helcion pellucidum*, *Balanus crenatus*, *Echinus esculentus* and *Asterias rubens*.

Lambay supports the principal breeding colony of Grey Seal on the east coast of Ireland, numbering 196-252 seals, across all ages. It also contains regionally significant numbers of Common Seal, of which up to 47 individuals have been counted at the site. Grey Seals and Common Seals occur year-round and the island's intertidal shorelines, coves and caves are used by resting and moulting seals.

A herd of Fallow Deer (approx. 80) roams the higher parts of the island, and a small number of wallabies (approx. 10) survive in a feral state. This island may also hold the last Irish population of the Ship Rat, a species listed in the vertebrate Red Data Book.

Lambay Island is internationally important for its breeding seabirds. The most numerous species is the Guillemot, with almost 52,000 individuals on the cliffs. Razorbills (3,646 individuals), Kittiwakes (5,102 individuals), Herring Gulls (2,500 pairs), Cormorants (605 pairs), Shags (1,164 pairs), Puffins (235 pairs), and small numbers of Great and Lesser Black-backed Gulls also breed (all figures from 1995). Between 1991 and 1995 Fulmar numbers varied between 573-737 pairs. There is a small colony (<100 pairs) of the nocturnal Manx Shearwater on the island and up to 20 pairs of Common Terns have bred in recent years. A few Black Guillemots

⁹<https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000204.pdf>

have been recorded on Lambay, but it is not clear if they breed. A pair of Peregrines are known to breed on the island.

In winter the most notable bird species on Lambay Island is the Greylag Goose with numbers peaking at 1,000, though in recent winters there has been a decline to 400-700 individuals. There is also a small wintering flock of Barnacle Goose (up to 50), and recently Brent Goose (up to 100) have started to occur regularly. Small numbers of Great Northern Diver and Red-throated Diver are also present in winter.

An intensive survey of the natural history of Lambay Island was carried out in 1906 and published in the *Irish Naturalist*. A similar, comparative survey has been carried out in the early 1990s. With this background, Lambay Island is an excellent site for studies of marine biology, terrestrial fauna and flora, geology, geomorphology and ecology.

The island has been maintained as a wildlife sanctuary by its owners and no threats are envisaged should the present land use continue. Rodents may be causing some damage to the populations of burrow-nesting seabirds.

Lambay Island has good examples of vegetated sea cliffs, a habitat listed on Annex I of the E.U. Habitats Directive, and these cliffs hold internationally important populations of seabirds. The site is also of conservation importance for the populations of Grey Seal and Common Seal, species listed on Annex II of this Directive, that it supports.'

As outlined in the Conservation objectives supporting document – Harbour Porpoise¹⁰ (NPWS, 2013):

'This small toothed cetacean species (from the mammal Order Cetacea - whales, dolphins and porpoises) occurs in estuarine, coastal and offshore waters in which it carries out breeding, foraging, resting, social activity and other life history functions. Its distribution extends predominantly throughout continental shelf waters and the species may range over many hundreds or thousands of kilometres. The Harbour Porpoise is widely distributed across the north-east Atlantic, forming a continuous population from the northern Bay of Biscay to northern Norway, although some genetic structuring has been reported in the form of isolation by distance (Lah et al., 2016; Fontaine et al., 2007, 2014; Ben Chehida et al., 2021). The population structure of Harbour Porpoise is currently under investigation, as some evidence of genetic differentiation from the North Atlantic population has been observed in western Greenland (Ben Chehida et al., 2021) and the Baltic Sea (Autenrieth et al., 2023). As air-breathing mammals, Harbour Porpoise must return to the water surface to breathe but they are otherwise wholly aquatic. Individual porpoise of all ages use sound as their primary sensory tool in order to navigate, communicate, avoid predators, or locate and facilitate the capture of prey under water, for example. Group sizes tend to be small (i.e. in single figures, more commonly 2-3 individuals) although larger aggregations may occasionally be recorded, particularly in the summer months.

Harbour Porpoise breeds annually in Ireland, predominantly during the months of May to September. The principal calving period in Irish waters is thought to occur in the months of May and June, although it may extend throughout the summer months and early autumn. Newborn calves are weaned before they are one year old. Mating commonly occurs several weeks after the calving season.

The occurrence of Harbour Porpoise within a prescribed marine area can be estimated using visual observation and passive acoustic methods in order to deliver an assessment of community or population size (i.e. relative abundance or absolute abundance), density and distribution. The size, community structure and distribution or habitat use of Harbour Porpoise inhabiting Lambay Island SAC are not fully understood. In acknowledging limitations in the understanding of aquatic habitat use by the species within the site, it should be noted that all suitable aquatic habitat (Figure 1) is considered relevant to the species range and ecological requirements at the site and is therefore of potential use by Harbour Porpoise.

Large scale surveys have frequently recorded Harbour Porpoise in coastal shelf waters of less than 200m with a small number reported in very deep waters, highlighting its widespread nature. Recent studies of cetacean distribution and abundance in the Irish exclusive economic zone (EEZ) reported the Irish Sea as having the greatest abundance and density estimates for Harbour Porpoise across all seasons (Rogan, et al., 2018; Giralt Paradell et al., 2024). Predicted density maps highlight the Irish Sea, particularly the northern part, as an

¹⁰[https://www.npws.ie/sites/default/files/publications/pdf/Lambay%20Island%20SAC%20\(0000204\)%20Conservation%20objectives%20supporting%20document%20-%20Harbour%20Porpoise%20\[Version%201\].pdf](https://www.npws.ie/sites/default/files/publications/pdf/Lambay%20Island%20SAC%20(0000204)%20Conservation%20objectives%20supporting%20document%20-%20Harbour%20Porpoise%20[Version%201].pdf)

important area for Harbour Porpoise (Giralt Paradell et al., 2024). Broad scale aerial surveys targeting the 2021 summer across an area covering Dundalk Co. Louth extending south to Carnsore Point Co. Wexford delivered a corrected design-based approach for Harbour Porpoise abundance estimate of 10,655 (95% Confidence Intervals: 7548-15040, Coefficient of Variation=49.92) (Giralt Paradell et al., 2024). During the summer of 2022, abundance from SCANS-IV Irish Sea survey block (Block CS-D) was estimated as 9,773 (CV 0.316) (corrected for availability bias) (Gilles et al., 2023). Several surveys targeting waters surrounding Lambay Island SAC in order to derive local summer- autumn density and abundance estimates have been carried out between 2008 and 2021. The most recent (Berrow et al., 2021) delivered overall density estimate of 0.83 ± 0.14 individuals per km² (95% Confidence Intervals: 0.59-1.17, Coefficient of Variation=0.17) and abundance estimate of 227 ± 39 individuals (95% Confidence Intervals: 161-321). However, these recent estimations must be taken with caution as small changes in local distribution, driven by the distribution of their preferred prey can have effects on density estimates within a relatively small SAC compared to individual's home range. While the numbers of Harbour Porpoise encountered during any survey within the site are variable, additional acoustic data plus casual and effort-related sighting rates from coastal observation stations are significant for the east coast of Ireland and comparatively high group sizes (>5 individuals) have been recorded from surveys on land and at sea. The species is present at the site in all seasons, while important cohorts within the Harbour Porpoise community such as adults, juveniles and newborn calves have been recorded within the site including during the calving/breeding season.

Harbour Porpoise is a successful aquatic predator that feeds on a wide variety of fish, cephalopod and crustacean species occurring in the water column or close to the seabed. Dive depths in excess of 200m have been recorded for the species. Foraging areas for Harbour Porpoise are often associated with areas of strong tidal current and associated eddies; therefore, the occurrence of porpoise close to shore or adjacent to islands and prominent headlands is commonly reported. However, gaps remain in the knowledge of the species foraging ecology within Lambay Island SAC and the data available may be biased toward particular locations due to the nature of survey effort and opportunistic reports from a range of sources. There is currently no detailed information available on individual or group movements by Harbour Porpoise within or into/out of the site, nor is it known whether individuals/groups of the species demonstrate any faithfulness to the site (i.e. site fidelity or residency). Nevertheless, the consistent annual and seasonal occurrence of the species at the site, its occurrence during the 3calving/breeding period and density/population estimates available to date all indicate the importance of this coastal site for the species.'

'Annex II Species

The following technical clarification is provided in relation to the specific conservation objective and targets for the Annex II species identified below in order to facilitate the analysis required for the appropriate assessment process and overall site planning and management:

Objective To maintain the Favourable conservation condition of Harbour Porpoise in Lambay Island SAC, which is defined by the following list of attributes and targets:

Target 1 Species range within the site should not be restricted by artificial barriers to site use

- This target may be considered relevant to proposed activities or operations that will result in the permanent exclusion of Harbour Porpoise from part of its range within the site, or will permanently prevent access for the species to suitable habitat therein.
- It does not refer to short-term or temporary restriction of access or range.
- Early consultation or scoping with the Department in advance of formal application is advisable for proposals that are likely to result in permanent exclusion.

Target 2 Human activities should occur at levels that do not adversely affect the Harbour Porpoise community at the site

- Proposed activities or operations should not introduce man-made energy (e.g. aerial or underwater noise, light or thermal energy) at levels that could result in a significant negative impact on individuals and/or the community of Harbour Porpoise within the site. This refers to the aquatic habitats used by the species in addition to important natural behaviours during the species annual cycle.

- This target also relates to proposed activities or operations that may result in the deterioration of key resources (e.g. water quality, feeding, etc.) upon which Harbour Porpoise depend. In the absence of complete knowledge on the species ecological requirements in this site, such considerations should be assessed where appropriate on a case-by-case basis. Proposed activities or operations should not cause death or injury to individuals to an

extent that may ultimately affect the Harbour Porpoise community at the site.’

As outlined in the Conservation objectives supporting document – Marine Habitats and Species¹¹ (NPWS, 2013):

‘INTERTIDAL REEF COMMUNITY COMPLEX

This community complex is recorded extensively on all shores of the island with the exception of the sandy beach around the quay on the western shore (Figure 2).

The substrate here is that of boulders and cobbles with some bedrock outcrops in the northwest and southwest.

The species associated with this community are the gastropods *Littorina littorea* and *Patella vulgata*, the brown alga *Ascophyllum nodosum*, the red algae *Lomentaria articulata*, *Vertebrata lanosa*, *Mastocarpus stellatus* and species of the family Corallinaceae.

The brown alga *Fucus serratus* and *Laminaria digitata*, the red alga *Chondrus crispus*, the hydroid *Dynamena pumila* and the barnacle *Semibalanus balanoides* are also recorded from this community complex.

Species associated with the Intertidal reef community complex	
<i>Littorina littorea</i>	<i>Vertebrata lanosa</i>
<i>Patella vulgata</i>	<i>Mastocarpus stellatus</i>
<i>Lomentaria articulata</i>	<i>Ascophyllum nodosum</i>
Corallinaceae	

Table 1 Species associated with the Intertidal reef community complex.

LAMINARIA-DOMINATED COMMUNITY COMPLEX

This community complex occurs on the broad expanse of hard substrate in the north, east and southern shores of the island and in a narrow band on its western shore. It is recorded in water depths of between 0m and 20m. The exposure regime is that of exposed to moderately exposed reef.

The substrate of this community is primarily that of bedrock. In the northeast of the site large boulders, cobble and pebbles overly the bedrock. Vertical or near vertical faces are recorded throughout the community but are more prominent in shallower water (0m to 10m). In deeper water (ca. 20m) boulders and bedrock have a veneer of silt.

The species associated with this community are the kelp *Laminaria hyperborea*, the red algae *Phycodrys rubens* and *Delesseria sanguinea*, the barnacle *Balanus crenatus*, the echinoderm *Asterias rubens*, the crustacean *Necora puber* and the cnidarian *Alcyonium digitatum*. The density of *Laminaria hyperborea* exhibits a gradation with depth becoming less dense with increasing depth.

¹¹https://www.npws.ie/sites/default/files/publications/pdf/000204_Lambay%20Island%20SAC%20Marine%20Supporting%20Doc_V1.pdf

The red algae *Hypoglossum hypoglossoides* and *Membranoptera alata*, *Palmaria palmata* and *Corallinaceae*, the bryozoan *Membranipora membranacea* and bryozoan crusts are also recorded from this community complex.

Species associated with the <i>Laminaria</i> -dominated community complex	
<i>Laminaria hyperborea</i>	<i>Delesseria sanguinea</i>
<i>Phycodrys rubens</i>	<i>Alcyonium digitatum</i>
<i>Balanus crenatus</i>	<i>Asterias rubens</i>
<i>Necora puber</i>	

Table 1 Species associated with the *Laminaria*-dominated community complex.

Annex II Marine mammals

HALICHOERUS GRYPUS (GREY SEAL)

This marine mammal species occurs in estuarine, coastal and offshore waters but also utilises a range of intertidal and terrestrial habitats for important life history functions such as breeding, moulting, resting and social activity. Its aquatic range for foraging and inter-site movement extends predominantly into continental shelf and slope waters. Grey seal occupies both aquatic and terrestrial habitats in Lambay Island SAC, including intertidal shorelines and skerries that become exposed during the tidal cycle. It is present at the site throughout the year during all aspects of its annual life cycle which includes breeding (August to December approx.), moulting (December to April approx.) and non-breeding, foraging and resting phases. In acknowledging the limited understanding of aquatic habitat use by the species within the site, it should be noted that all suitable aquatic habitat is considered relevant to the species range and ecological requirements at the site and is therefore of potential use by grey seals.

Grey seals are vulnerable to disturbance during periods when time is spent ashore by individuals or groups of animals. This occurs immediately prior to and during the annual breeding season, which takes place predominantly during the months of August to December. Pups are born on land, usually on remote beaches and uninhabited islands or in sheltered caves. While there may be outliers in any year, specific established sites are used annually for breeding-associated behaviour by adult females, adult males, newborn and weaned pups. Such habitats are critical to the maintenance of the species within any site since pups are nursed there for a period of several weeks by the mother prior to weaning and abandonment. During this period, adult females also mate with adult males at, or adjacent to, breeding sites. In addition to delivering information on breeding dynamics, pup production (i.e. the number of pups born each year) can be measured or estimated in order to deliver an assessment of population size. However, the relationship between pup production and total population size is not well known. An estimated 56 pups were born in Lambay Island SAC in 2005. The corresponding minimum population estimate for the site numbered between 196 and 252 grey seals of all ages. Known and suitable habitats for the species in Lambay Island SAC during the breeding season are indicated in figure 3. Current breeding sites in Lambay Island SAC are broadly distributed around the island among its numerous gullies, caves, beaches, rock ledges and coves where access for seals to intertidal shorelines and the area above high water mark is possible.

Grey seal also occurs at the site during the annual moult (i.e. hair shedding and replacement), a protracted period during which individual animals spend significant periods of days or weeks on the shore. Moulting is considered an intensive, energetically-demanding process that all seals must undergo, incurring further vulnerability for individuals during this period. Terrestrial or intertidal sites where seals can be found ashore are known as haul-out sites. Moult locations may be preferentially selected by the species. Those currently described in Ireland are remote from human habitation and interference, being on uninhabited islands or remote beaches, with specific established sites used annually by moulting adult females, adult males and juveniles. In Ireland the moulting phase in the annual life cycle occurs predominantly during the months of December to April. A minimum estimate of 110 grey seals was recorded at this site during the moult season in 2007. Known moult haul-out locations at this site are indicated in figure 4, broadly consisting of numerous gullies, caves, rock ledges, beaches and coves where access for seals to intertidal shorelines and the area above high water mark is possible.

Grey seal is a successful aquatic predator that feeds on a wide variety of fish and cephalopod species. For individual grey seals of all ages, intervals between foraging trips in coastal or offshore waters are spent resting ashore at terrestrial or intertidal haul-out sites, or in the water. Resting locations selected by grey seals may

be more variable and dispersed than those used during the breeding or moulting seasons. While outliers may occur, there is nevertheless a tendency for recurrent selection by grey seal of particular habitats and sites for terrestrial/intertidal resting behaviour (e.g. low-lying rocks and skerries). Known and suitable habitats for resting by the species are indicated in figure 5. Current sites described in Lambay Island SAC broadly consist of its numerous gullies, caves, rock ledges, beaches and coves where access for seals to intertidal shorelines and the area above high water mark is possible.

PHOCA VITULINA (HARBOUR SEAL)

This marine mammal species occurs in estuarine, coastal and offshore waters but also utilises a range of intertidal and terrestrial habitats for important life history functions such as breeding, moulting, resting and social activity. Its aquatic range for foraging and inter-site movement extends into continental shelf waters. When hauling out ashore, harbour seals tend to prefer comparatively sheltered locations where exposure to wind, wave action and precipitation, for example, are minimised. Thus in Ireland the species is more commonly found ashore in sheltered bays, inlets and enclosed estuaries.

Harbour seals in Lambay Island SAC occupy both aquatic habitats and intertidal shorelines that become exposed during the tidal cycle. The species is present at the site throughout the year during all aspects of its annual life cycle which includes breeding (May to July approx.), moulting (August to September approx.) and non-breeding foraging and resting phases. In particular, comparatively limited information is available from the last period in the annual cycle spanning the months of October to May. In acknowledging the limited understanding of aquatic habitat use by the species within the site it should be noted that all suitable aquatic habitat is considered relevant to the species range and ecological requirements at the site and is therefore of potential use by harbour seals.

Harbour seals are vulnerable to disturbance during periods in which time is spent ashore, or in shallow waters, by individuals or groups of animals. This occurs immediately prior to and during the annual breeding season, which takes place predominantly during the months of May to July. Pups are born on land, usually on sheltered shorelines, islets or skerries and uninhabited islands removed from the risk of predation and human interference. While there may be outliers in any year, specific established locations tend to be used annually for breeding-associated behaviour by adult males, adult females and their newborn pups. Such habitats are critical to the maintenance of the species within any site. Pups are able to swim soon after birth and may be observed accompanying their mother close to shore in the early days or weeks of life. They are nursed for a period of several weeks by the mother prior to weaning and abandonment. During this period adult females mate with adult males, an activity that takes place in the water. Current information on breeding locations selected by harbour seals in Lambay Island SAC is comparatively limited. Known and suitable habitats for the species in Lambay Island SAC during the breeding season are indicated in figure 6.

The necessity for individual seals to undergo an annual moult (i.e. hair shedding and replacement), which generally results in seals spending more time ashore during a relatively discrete season, provides an opportunity to record the minimum number of harbour seals occurring in a given area (i.e. minimum population estimate). Moulting is considered an intensive, energetically-demanding process which incurs further vulnerability for individuals during this period. Terrestrial or intertidal locations where seals can be found ashore are known as haul-out sites. The harbour seal moult season takes place predominantly during the months of August to September. A total of 31 harbour seals were recorded ashore within Lambay Island SAC in August 2003 during a national aerial survey for the species, while maximum counts of 38-47 harbour seals were recorded more recently during the moult season. Suitable habitat for the species along with known moult haul-out locations in Lambay Island SAC are indicated in figure 7.

Harbour seal is a successful aquatic predator that feeds on a wide variety of fish, cephalopod and crustacean species. For individual harbour seals of all ages, intervals between foraging trips in coastal or offshore waters are spent resting ashore at terrestrial or intertidal haul-out sites, or in the water. Outside the breeding and moulting seasons (i.e. from October to April) the location and composition of haul-out groups and individual seals may be different to those normally observed during breeding or moulting. Current information on resting locations selected by harbour seals in Lambay Island SAC outside the moulting season is comparatively limited. Known and suitable habitats for resting by the species are indicated in figure 8.'

Further, this document outlines the following conservation objectives and targets for Lambay Island SAC:

'Objective: To maintain the favourable conservation condition of Reefs in Lambay Island SAC, which is defined by the following list of attributes and targets:

Target 1 - The permanent area is stable or increasing, subject to natural processes.

- The area of this habitat represents the minimum estimated area of reef at this site and underestimates the actual area due to the many areas of sheer and steeply sloping rock within the reef habitat.
- This target refers to activities or operations that propose to permanently remove habitat from the site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 2 - The distribution of reefs is stable or increasing, subject to natural processes.

- The likely distribution of reef habitat in this SAC is indicated in figure 1.
- This target refers to activities or operations that propose to permanently remove reef habitat, thus reducing the range over which this habitat occurs within the site. It does not refer to long or short term disturbance of the biology of reef habitats.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 3 - Conserve the following community types in a natural condition: Intertidal reef community complex and Laminaria-dominated community complex.

- A semi-quantitative description of the communities has been provided in Section 1.
- An interpolation of their likely distribution is provided in figure 2.
- The estimated areas of the communities within the Reefs habitat given below are based on spatial interpolation and therefore should be considered indicative. In addition, as this habitat contains significant areas of sheer and steeply sloping rock, the mapped community extents will be underestimated:
 - Intertidal reef community complex - 11ha
 - Laminaria-dominated community complex - 47ha
- This target relates to the structure and function of the reef and therefore it is of relevance to those activities that may cause disturbance to the ecology of the habitat.
- Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities.
- Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.'

'Objective: To maintain the favourable conservation condition of grey seal in Lambay Island SAC which is defined by the following list of attributes and targets

Target 1 - Species range within the site is not restricted by artificial barriers to site use.

- *This target may be considered relevant to proposed activities or operations that will result in the permanent exclusion of grey seal from part of its range within the site, or will permanently prevent access for the species to suitable habitat therein.*
- *It does not refer to short-term or temporary restriction of access or range.*
- *Early consultation or scoping with the Department in advance of formal application is advisable for proposals that are likely to result in permanent exclusion.*

Target 2 - Conserve the breeding sites in a natural condition.

- *This target is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) breeding behaviour by grey seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used during the annual breeding season.*
- *Operations or activities that cause displacement of individuals from a breeding site or alteration of natural breeding behaviour, and that may result in higher mortality or reduced reproductive success, would be regarded as significant and should therefore be avoided.*

Target 3 - *Conserve the moult haul-out sites in a natural condition.*

- *This target is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) moulting behaviour by grey seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used during the annual moult.*
- *Operations or activities that cause displacement of individuals from a moult haul-out site or alteration of natural moulting behaviour to an extent that may ultimately interfere with key ecological functions would be regarded as significant and should therefore be avoided.*

Target 4 - *Conserve the resting haul-out sites in a natural condition.*

- *This target is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) resting behaviour by grey seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used for resting.*
- *Operations or activities that cause displacement of individuals from a resting haul-out site to an extent that may ultimately interfere with key ecological functions would be regarded as significant and should therefore be avoided.*

Target 5 - *Human activities should occur at levels that do not adversely affect the grey seal population at the site.*

- *Proposed activities or operations should not introduce man-made energy (e.g. aerial or underwater noise, light or thermal energy) at levels that could result in a significant negative impact on individuals and/or the population of grey seal within the site. This refers to both the aquatic and terrestrial/intertidal habitats used by the species in addition to important natural behaviours during the species annual cycle.*
- *This target also relates to proposed activities or operations that may result in the deterioration of key resources (e.g. water quality, feeding, etc) upon which grey seals depend. In the absence of complete knowledge on the species ecological requirements in this site, such considerations should be assessed where appropriate on a case-by-case basis.*
- *Proposed activities or operations should not cause death or injury to individuals to an extent that may ultimately affect the grey seal population at the site.*

Objective: *To maintain the favourable conservation condition of harbour seal in Lambay Island SAC which is defined by the following list of attributes and targets*

Target 1 - *Species range within the site should not be restricted by artificial barriers to site use.*

- *This target may be considered relevant to proposed activities or operations that will result in the permanent exclusion of harbour seal from part of its range within the site, or will permanently prevent access for the species to suitable habitat therein.*
- *It does not refer to short-term or temporary restriction of access or range.*
- *Early consultation or scoping with the Department in advance of formal application is advisable for proposals that are likely to result in permanent exclusion.*

Target 2 - *Conserve the breeding sites in a natural condition.*

- *This target is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) breeding behaviour by harbour seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used during the annual breeding season.*
- *Operations or activities that cause displacement of individuals from a breeding site or alteration of natural breeding behaviour, and that may result in higher mortality or reduced reproductive success, would be regarded as significant and should therefore be avoided.*

Target 3 - *Conserve the moult haul-out sites in a natural condition.*

- This target is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) moulting behaviour by harbour seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used during the annual moult.
- Operations or activities that cause displacement of individuals from a moult haul-out site or alteration of natural moulting behaviour to an extent that may ultimately interfere with key ecological functions would be regarded as significant and should therefore be avoided.

Target 4 - Conserve the resting haul-out sites in a natural condition.

- This target is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) resting behaviour by harbour seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used for resting.
- Operations or activities that cause displacement of individuals from a resting haul-out site to an extent that may ultimately interfere with key ecological functions would be regarded as significant and should therefore be avoided.

Target 5 - Human activities should occur at levels that do not adversely affect the harbour seal population at the site.

- Proposed activities or operations should not introduce man-made energy (e.g. aerial or underwater noise, light or thermal energy) at levels that could result in a significant negative impact on individuals and/or the population of harbour seal within the site. This refers to both the aquatic and terrestrial/intertidal habitats used by the species in addition to important natural behaviours during the species annual cycle.
- This target also relates to proposed activities or operations that may result in the deterioration of key resources (e.g. water quality, feeding, etc) upon which harbour seals depend. In the absence of complete knowledge on the species' ecological requirements in this site, such considerations should be assessed where appropriate on a case-by-case basis.
- Proposed activities or operations should not cause death or injury to individuals to an extent that may ultimately affect the harbour seal population at the site.'

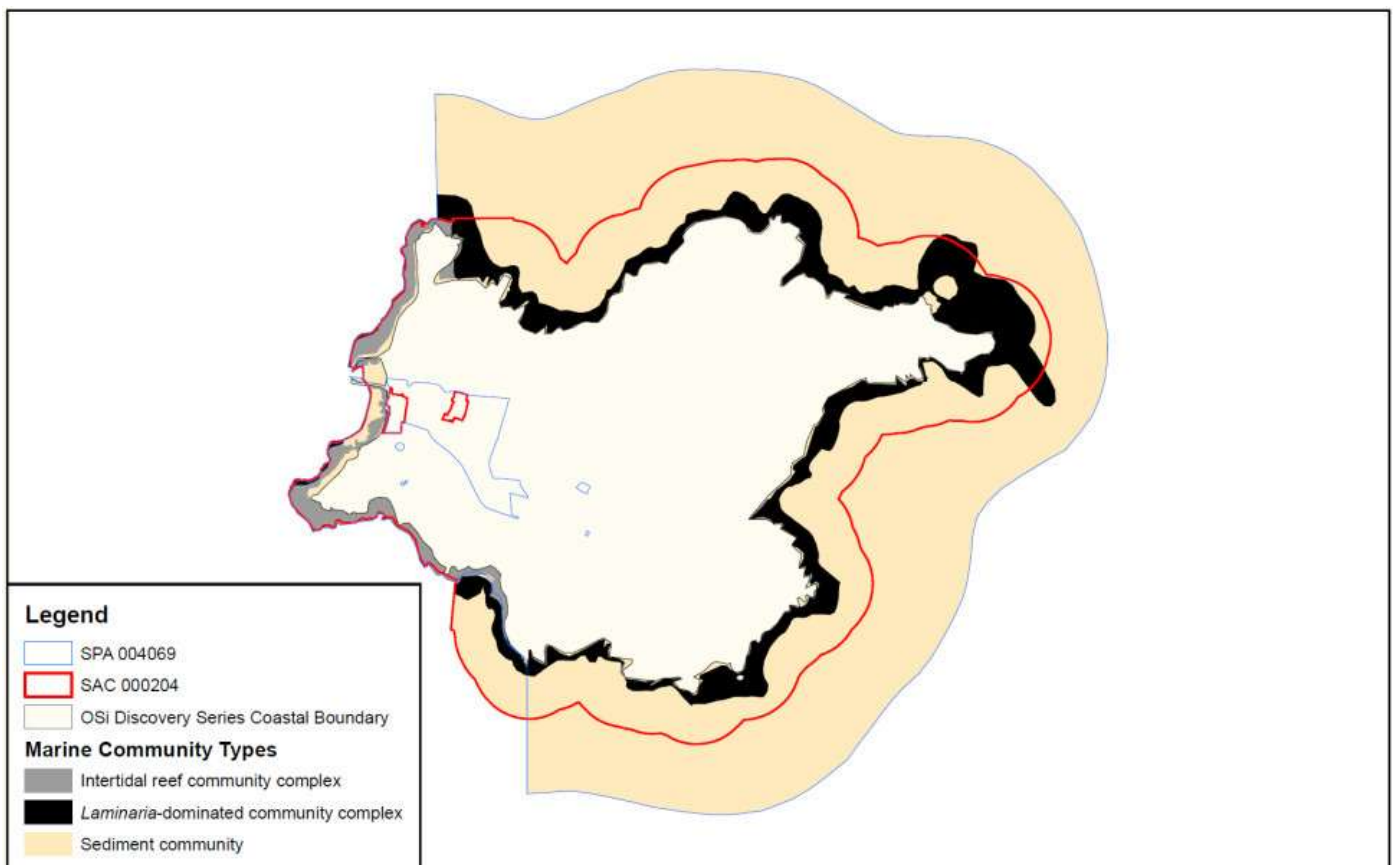
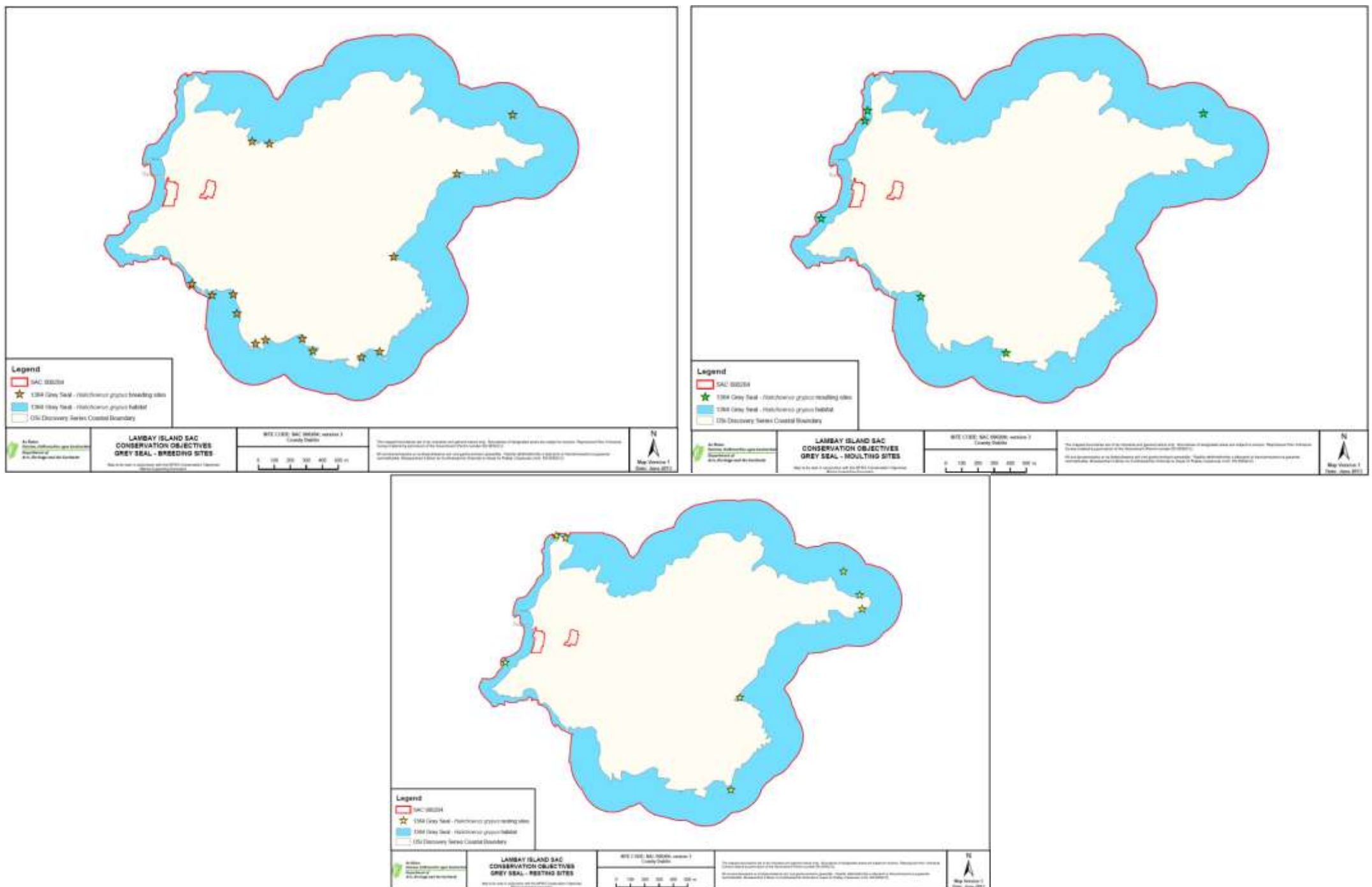
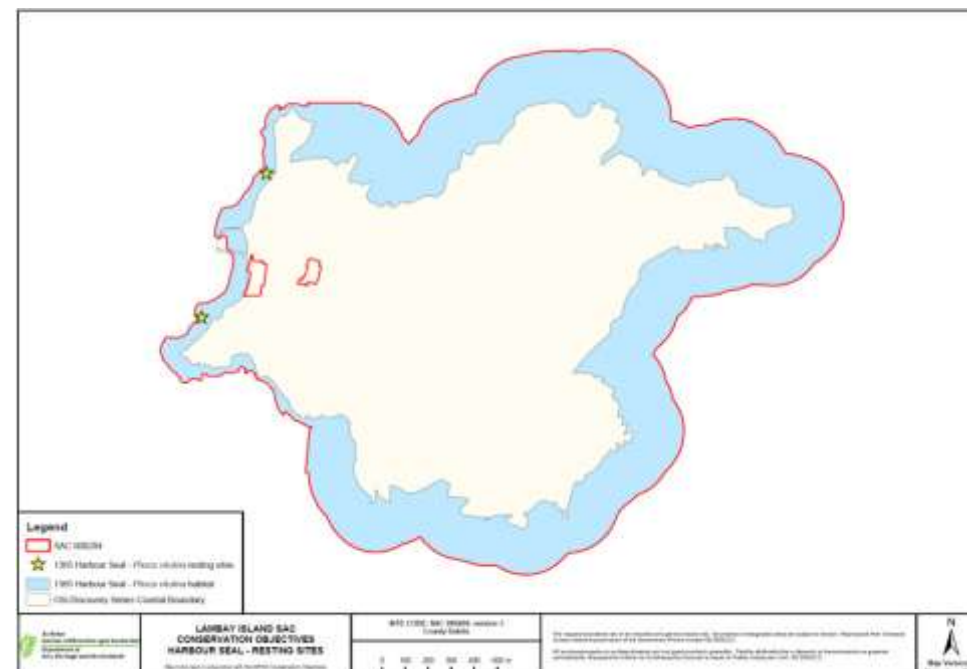
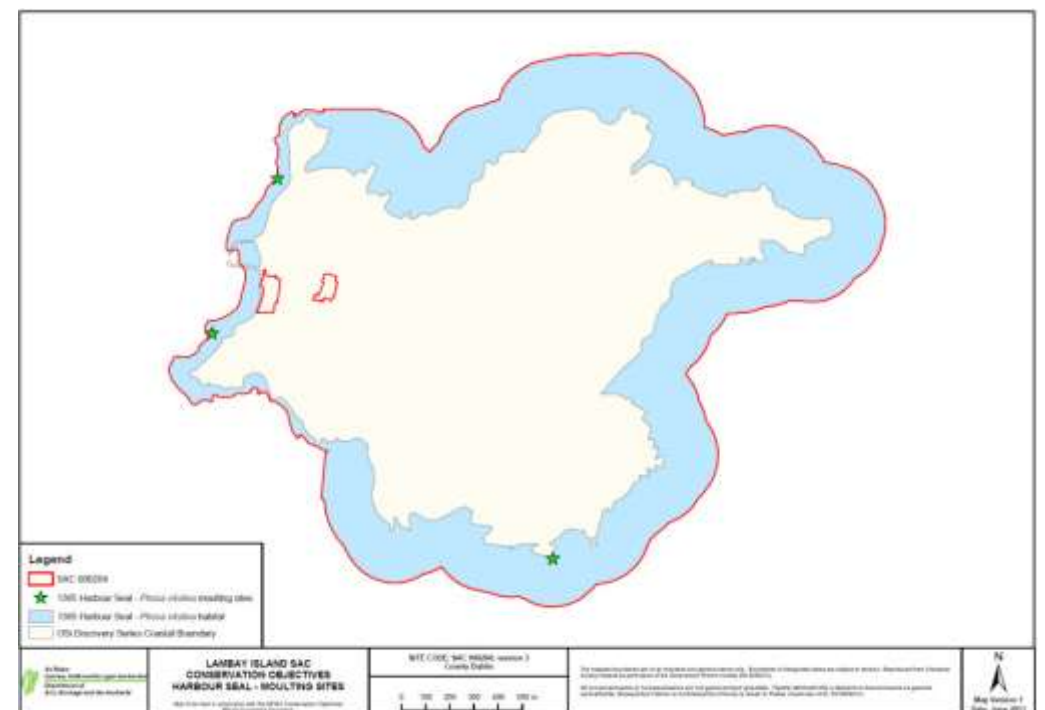
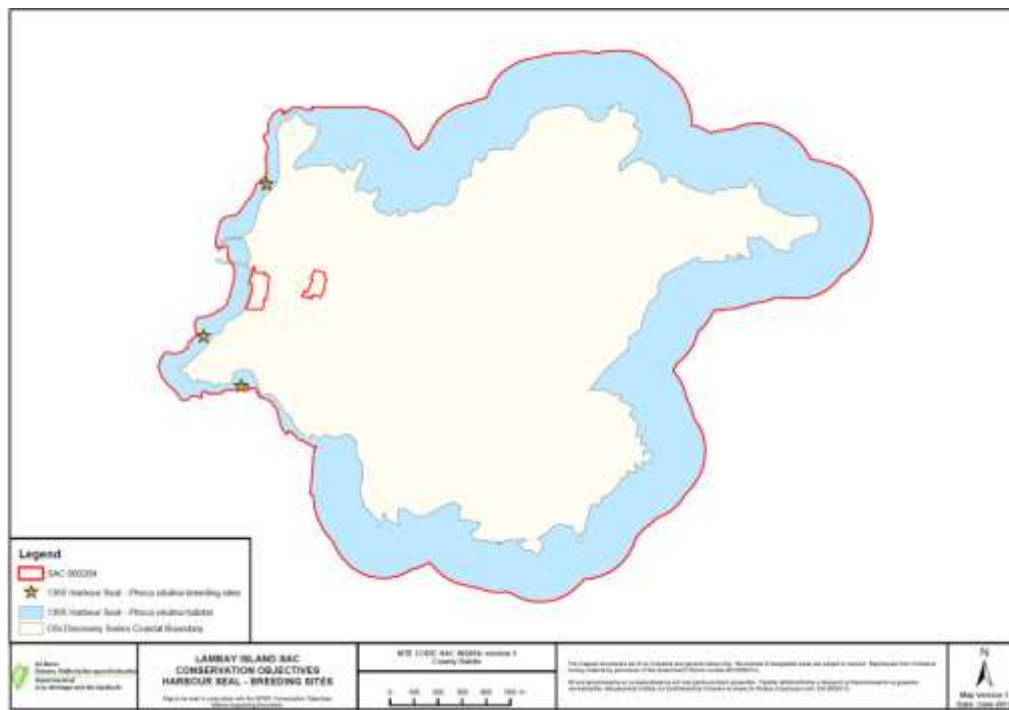


Figure 49. Distribution of marine community types in Lambay Island SAC



Figures 50 - 52. Distribution of Grey seal breeding, moulting, and resting sites on Lambay Island SAC



Figures 53 - 55. Distribution of Harbour seal breeding, moulting, and resting sites on Lambay Island SAC

5.3.1 Conservation Objectives of Lambay Island SAC 000204 (All Habitats and Species)

All habitats and non-marine mammal species that are qualifying interests of Lambay Island SAC have been screened out in relation to potential effect in Table 11. However, grey seal and harbour seal within Lambay Island SAC have been included in the NIS as individuals from the SAC may be within the survey area and standard marine mammal mitigation measures are required. All other qualifying interests have been screened out as there is a significant distance between the proposed survey and Lambay Island SAC, and no effects are foreseen on these qualifying interests. However, as standard mitigation will be in place in relation to marine mammals, and it is considered that grey seal and harbour seal from this SAC have the potential to be in the vicinity of the proposed survey and are therefore screened in for NIS.

The qualifying interests, their attributes, targets and the potential impact of the proposed fibre-optic cable survey on each of the features of interest of Lambay SAC are seen in Table 15.

Table 15. The site-specific Conservation Objectives, overall status of species and habitats and the potential impact of the proposed works on the features of interest and conservation objectives of Lambay Island SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
[1170] Reefs	Bad	To maintain the favourable conservation condition of Reefs in Lambay Island SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat area.</i> The permanent area is stable or increasing, subject to natural processes. <i>Distribution.</i> The distribution of reefs is stable or increasing, subject to natural processes. <i>Community Structure:</i> Conserve the following community types in a natural condition: Intertidal reef community complex; Laminaria-dominated community complex. Potential Effect The cable survey route is not within or proximal to reef habitat protected within this SAC. No significant effects are foreseen on Reef habitat.
[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts	Inadequate	To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Lambay Island SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Habitat length.</i> Area stable, subject to natural processes, including erosion. Total length of cliff section mapped: 7.27km. <i>Habitat distribution.</i> No decline, subject to natural processes. <i>Physical structure: functionality and hydrological regime:</i> No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
		<i>Vegetation structure: zonation:</i> Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession. <i>Vegetation structure: vegetation height:</i> Maintain structural variation within sward. <i>Vegetation composition: typical species and subcommunities:</i> Maintain range of subcommunities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011). <i>Vegetation composition: negative indicator species:</i> Negative indicator species (including non-natives) to represent less than 5% cover. <i>Vegetation composition: bracken and woody species:</i> Cover of bracken (<i>Pteridium aquilinum</i>) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20%. Potential Effect The cable survey route is not within, or proximal to, Vegetated sea cliffs of the Atlantic and Baltic coasts habitat protected within this SAC. No significant effects are foreseen on Vegetated sea cliffs of the Atlantic and Baltic coasts habitat.
Grey Seal (<i>Halichoerus grypus</i>) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in Lambay Island SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey corridor is 2km from this SAC. Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in Lambay Island SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey corridor is 2km from this SAC. Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.4 Malahide Estuary SPA (site code: 004025)

As outlined in the Malahide Estuary SPA Site Synopsis (NPWS 2013)¹²:

*'The site encompasses the estuary, saltmarsh habitats and shallow subtidal areas at the mouth of the estuary. A railway viaduct, built in the 1800s, crosses the site and has led to the inner estuary becoming lagoonal in character and only partly tidal. Much of the outer part of the estuary is well-sheltered from the sea by a large sand spit, known as "The Island". This spit is now mostly converted to golf-course. The outer part empties almost completely at low tide and there are extensive intertidal flats exposed. Substantial stands of eelgrass (both *Zostera noltii* and *Z. angustifolia*) occur in the sheltered part of the outer estuary, along with Tasselweed (*Ruppia maritima*). Green algae, mostly *Ulva* spp., are frequent on the sheltered flats. Common Cord-grass (*Spartina anglica*) is well established in the outer estuary and also in the innermost part of the site. The intertidal flats support a typical macro-invertebrate fauna, with polychaete worms (*Arenicola marina* and *Hediste diversicolor*), bivalves such as *Cerastoderma edule*, *Macoma balthica* and *Scrobicularia plana*, the small gastropod *Hydrobia ulvae* and the crustacean *Corophium volutator*. Salt marshes, which provide important roosts during high tide, occur in parts of the outer estuary and in the extreme inner part of the inner estuary. These are characterised by such species as Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Arrowgrass (*Triglochin maritima*) and Common Saltmarsh-grass (*Puccinellia maritima*).*

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Great Crested Grebe, Light-bellied Brent Goose, Shelduck, Pintail, Goldeneye, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit and Redshank. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

This site is of high importance for wintering waterfowl and supports a particularly good diversity of species. It has internationally important populations of Light-bellied Brent Goose (1,104 individuals or 5% of the all-Ireland total) and Black-tailed Godwit (409 individuals or 2.9% of the all-Ireland total) - figures given here and below are mean peaks for the five winters 1995/96-1999/2000. Furthermore, the site supports nationally important populations of an additional 12 species: Great Crested Grebe (63), Shelduck (439), Pintail (58), Goldeneye (215), Red-breasted Merganser (99), Oystercatcher (1,360), Golden Plover (1,843), Grey Plover (201), Knot (915), Dunlin (1,594), Bar-tailed Godwit (156) and Redshank (581). The high numbers of diving ducks reflects the lagoon-type nature of the inner estuary, and this is one of the few sites in eastern Ireland where substantial numbers of Goldeneye can be found.

A range of other species occurs, including Mute Swan (37), Pochard (36), Ringed Plover (86), Lapwing (1,542), Curlew (548), Greenshank (38) and Turnstone (112).

The estuary also attracts other migrant wader species such as Ruff, Curlew Sandpiper, Spotted Redshank and Little Stint. These occur mainly in autumn, though occasionally in spring and winter.

Breeding birds of the site include Ringed Plover, Shelduck and Mallard. Up to the 1950s there was a major tern colony at the southern end of Malahide Island. Grey Herons breed nearby and feed regularly within the site.

Malahide Estuary SPA is a fine example of an estuarine system, providing both feeding and roosting areas for a range of wintering waterfowl. The lagoonal nature of the inner estuary is of particular value as it increases the diversity of birds which occur. The site is of high conservation importance, with internationally important populations of Light-bellied Brent Goose and Black-tailed Godwit, and nationally important populations of a further 12 species. Two of the species which occur regularly (Golden Plover and Bar-tailed Godwit) are listed on Annex I of the E.U. Birds Directive. Malahide Estuary (also known as Broadmeadow Estuary) is a Ramsar Convention site."

¹² <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004025.pdf>

The European Standard Data Form (2020)¹³ states that:

“The site is situated in north Co. Dublin, between the towns of Malahide and Swords. It comprises the estuary of the River Broadmeadow. A railway viaduct, built in the 1800s, crosses the site and has led to the inner estuary becoming lagoonal in character and only partly tidal. Much of the outer part of the estuary is well-sheltered from the sea by a large sand spit, known as “the island”. This spit is now mostly converted to golf-course. The outer part empties almost completely at low tide and there are extensive intertidal flats. Salt marshes occur in parts of the outer estuary and in the extreme inner part of the inner estuary.

*The site is of high importance for wintering waterfowl and supports a particularly good diversity of species. It has an internationally important population of *Branta bernicla hrota* (4.8% of national total), and nationally important populations of a further 12 species. Of particular note are the populations of *Tadorna tadorna* (3.0% of national total), *Anas acuta* (2.9% of national total), *Mergus serrator* (2.8% of national total), *Pluvialis squatarola* (2.7% of national total) and *Calidris canutus* (3.7% of national total). The site is one of the few in eastern Ireland where substantial numbers of *Bucephala clangula* occur. It has a regionally important population of *Limosa lapponica*. The site is an important and regular site for a range of autumn passage migrants, especially *Calidris ferruginea* and *Philomachus pugnax*. It supports a regular flock of non-breeding *Cygnus olor*.’*

5.4.1 Conservation Objectives of Malahide Estuary SPA 004025 (All Habitats and Species)

The special conservation interests (SCIs), their attributes, targets and the potential impact of the proposed fibre-optic cable survey on each of the SCIs of Malahide Estuary SPA are seen in Table 16.

Table 16. The site-specific Conservation Objectives, overall status of species and habitats and the potential impact of the proposed works on the SCIs and conservation objectives of Malahide Estuary SPA.

Annex Species/Habitats- Qualifying Interest / Special Conservation Interests	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Great Crested Grebe (<i>Podiceps cristatus</i>) [A005], Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046], Shelduck (<i>Tadorna tadorna</i>) [A048], Pintail (<i>Anas acuta</i>) [A054], Goldeneye (<i>Bucephala clangula</i>) [A067], Red-breasted Merganser (<i>Mergus serrator</i>) [A069], Oystercatcher (<i>Haematopus ostralegus</i>) [A130], Golden Plover (<i>Pluvialis apricaria</i>) [A140], Grey Plover (<i>Pluvialis squatarola</i>) [A141], Knot (<i>Calidris canutus</i>) [A143], Dunlin (<i>Calidris alpina alpina</i>) [A149], Black-tailed Godwit (<i>Limosa limosa</i>) [A156], Bar- tailed Godwit (<i>Limosa lapponica</i>) [A157], Redshank (<i>Tringa totanus</i>) [A162] Wetland and Waterbirds [A999]	[A005] Amber ; [A046] Amber ; [A048] Amber ; [A054] Red ; [A067] Red ; [A069] Green ; [A130] Amber ; [A140] Red ; [A141] Amber ; [A143] Amber ; [A149] Red ; [A156] Amber ; [A157] Amber ; [A162] Red ;	To maintain the favourable conservation condition of the qualifying interests in Malahide Estuary SPA, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Population Trend.</i> Long term population trend stable or increasing. <i>Distribution.</i> No significant decrease in the range, timing and intensity of use of areas by all of the above named species, other than that occurring from natural patterns of variation. Potential Effect The proposed survey and landfall area is located 500m from Malahide Estuary SPA. Birds in the vicinity of the cable route survey will be accustomed to disturbance and activity on the shore. All proposed works on Portmarnock Beach will be carried out when the tide is out and is not covered by water. However, out of an abundance of caution there is potential for pollution and disturbance (visual and noise). Mitigation measures are required to protect bird species that may be located proximate to the proposed survey works.

¹³ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004025.pdf>

Annex Species/Habitats- Qualifying Interest / Special Conservation Interests	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
[A999] Wetlands	N/A	To maintain the favourable conservation condition of the wetland habitat in Malahide Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target: <i>(Attribute. Target)</i> <i>Habitat area.</i> The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 765 hectares, other than that occurring from natural patterns of variation. Potential Effect The proposed cable survey route on Portmarnock Beach is located 500m south of this SPA. No survey works are proposed within wetlands protected within this SPA. In the absence of mitigation measures, no significant impacts on the conservation objectives of [A999] Wetlands within this SPA are foreseen as a result of the proposed survey works.

5.5 North-west Irish Sea SPA 004236

As outlined in the North-west Irish Sea Synopsis¹⁴ (NPWS, version date 17.7.2023)

“The North-west Irish Sea cSPA constitutes an important resource for marine birds. The estuaries and bays that open into it along with connecting coastal stretches of intertidal and shallow subtidal habitats, provide safe feeding and roosting habitats for waterbirds throughout the winter and migration periods. These areas, along with more pelagic marine waters further offshore, provide additional supporting habitats (for foraging and other maintenance behaviours) for those seabirds that breed at colonies on the north-west Irish Sea’s islands and coastal headlands. These marine areas are also important for seabirds outside the breeding period.

This SPA extends offshore along the coasts of counties Louth, Meath and Dublin, and is approximately 2,333km² in area. This SPA is ecologically connected to several existing SPAs in this area.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Common Scoter, Red-throated Diver, Great Northern Diver, Fulmar, Manx Shearwater, Shag, Cormorant, Little Gull, Kittiwake, Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull, Great Black-backed Gull, Little Tern, Roseate Tern, Common Tern, Arctic Tern, Puffin, Razorbill and Guillemot.

The breeding seabird species listed for those SPAs, which abut the North-West Irish Sea SPA are: Fulmar (Lambay Island SPA); Cormorant (Skerries Island SPA; Ireland's Eye SPA; Lambay Island SPA); Shag (Skerries Island SPA; Lambay Island SPA); Lesser Black-backed Gull (Lambay Island SPA); Herring Gull (Skerries Island SPA; Ireland's Eye SPA; Lambay Island SPA); Kittiwake (Lambay Island SPA; Ireland's Eye SPA; Howth Head SPA); Roseate Tern (Rockabill SPA); Common Tern (Rockabill SPA); Arctic Tern (Rockabill SPA); Little Tern (Boyne Estuary SPA); Guillemot (Lambay Island SPA, Ireland's Eye SPA); Razorbill (Lambay Island SPA, Ireland's Eye SPA); and Puffin (Lambay Island SPA). The Common Tern population that is listed for the nearby South Dublin Bay and River Tolka Estuary SPA is also likely to use this SPA as a foraging resource.

Informed by two surveys of the western Irish Sea region in 2016 an estimated 120,232 and 34,626 individual marine birds occurred in this SPA during autumn and winter respectively. Those marine bird species whose estimated abundances equalled or exceeded 1% of the total estimated size of the winter assemblage are: Red-throated Diver (538), Fulmar (506), Little Gull (391), Kittiwake (944), Black-headed Gull (508), Common Gull (2,866), Herring Gull (6,893), Great Black-backed Gull (2,096), Razorbill (4,638) and Guillemot (13,914).

The estimated 2016 summer abundance of Manx Shearwater in the North West Irish Sea SPA is 13,010 and is of international importance. The estimated 2016 autumn and winter abundances of Great Northern Diver in the North West Irish Sea SPA is 248 and 230 respectively and are of international importance. The estimated abundances of Common Scoter over parts of this SPA can reach significant numbers (e.g. 14,567 in December 2018) which is also of international importance.”

5.5.1 Conservation Objectives of North-west Irish Sea SPA 004236 (All Habitats and Species)

The Special Conservation Interests (SCIs), their attributes, targets and the potential impact of the proposed fibre-optic cable survey on each of the SCIs of North-west Irish Sea SPA 004236 are seen in Table 17.

Table 17. The site-specific Conservation Objectives, overall status of species and habitats and the potential impact of the proposed works on the SCIs and conservation objectives of North-west Irish Sea SPA.

Annex Species/Habitats- Qualifying Interest / Special Conservation Interests	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Common Scoter (<i>Melanitta nigra</i>) [A065]	[A065] Red ; [A001] Amber ;	To maintain the favourable conservation condition of the qualifying interests in North-west Irish Sea SPA, which is defined by the following list of attributes and targets:

¹⁴ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004236.pdf>

Annex Species/Habitats- Qualifying Interest / Special Conservation Interests	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Red-throated Diver (<i>Gavia stellata</i>) [A001] Great Northern Diver (<i>Gavia immer</i>) [A003] Fulmar (<i>Fulmarus glacialis</i>) [A009] Manx Shearwater (<i>Puffinus puffinus</i>) [A013] Cormorant (<i>Phalacrocorax carbo</i>) [A017] Little Tern (<i>Sterna albifrons</i>) [A195] Kittiwake (<i>Rissa tridactyla</i>) [A188] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Common Gull (<i>Larus canus</i>) [A182] Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] Herring Gull (<i>Larus argentatus</i>) [A184] Roseate Tern (<i>Sterna dougallii</i>) [A192] Arctic Tern (<i>Sterna paradisaea</i>) [A194] Puffin (<i>Fratercula arctica</i>) [A204] Razorbill (<i>Alca torda</i>) [A200] Guillemot (<i>Uria aalge</i>) [A199] Little Gull (<i>Hydrocoloeus minutus</i>) (A862) Common Tern (<i>Sterna hirundo</i>) (A193)	[A003] Amber; [A009] Amber; [A013] Amber; [A017] Amber; [A195] Amber; [A188] Red; [A179] Amber; [A182] Amber; [A183] Amber; [A184] Amber; [A192] Amber; [A194] Amber; [A204] Red; [A200] Amber; [A199] Amber; [A862] Amber; [A193] Amber;	(Attribute. Target) <i>Population Size.</i> Long term SPA population trend is stable or increasing <i>Spatial Distribution.</i> Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population <i>Forage spatial distribution, extent, abundance and availability.</i> Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target <i>Disturbance across the site.</i> The intensity, frequency, timing and duration of disturbance occurs at levels that do not significantly impact the achievement of targets for population size and spatial distribution. <i>Barriers to connectivity.</i> The number, location, shape and area of barriers do not significantly impact the site population's access to the SPA or other ecologically important sites outside the SPA. Potential Effect The proposed cable survey route on Portmarnock Beach is within a portion of this SPA. The proposed survey works involve Landfall Site Investigations, which will be undertaken to establish the depth and nature of the sediment. The focus of the site investigations will be on the upper layers of sediment to assess the feasibility of cable burial and installation techniques. The following may be undertaken at the landfall: • Bar probes on the intertidal at 10m spacing (approx. 8 to 10 at the landfall). • Bar probes from the Low Water Line to the 3m water depth contour at 30m spacing. (approx. 8 to 10 at the landfall) • 3 Trial Pits on the beach (target depth 2.5m). The bar probes on the intertidal are manually driven to a depth of 2 metres simply to prove the depth of upper layers of sand, gravel or soft material. The Trial Pits will be positioned at approximately 30 to 50m centres starting seaward of the High Water Mark. The Trial Pits will be excavated, logged, photographed and backfilled in a single tidal cycle. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated.

Annex Species/Habitats- Qualifying Interest / Special Conservation Interests	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
		Access to the beach and intertidal zone at the landfall for vehicles or equipment will be via the concrete public slipway off the R106 Coast Road. In the absence of mitigation, the proposed survey works could result in the temporary disturbance of habitats within this SPA due to site access, the digging of trial pits, and the utilisation of bar probes. Any potential impacts on this habitat would be short-term and would not significantly impact the community within the medium or long term. However, out of an abundance of caution, mitigation measures are required to minimise potential minor adverse impacts. Waters within this SPA constitutes an important resource for marine birds. The estuaries and bays that open into it, along with connecting coastal stretches of intertidal and shallow subtidal habitats, provide safe feeding and roosting habitats for waterbirds throughout the winter and migration periods. These areas, along with more pelagic marine waters further offshore, provide additional supporting habitats (for foraging and other maintenance behaviours) for those seabirds that breed at colonies on the north-west Irish Sea's islands and coastal headlands¹⁵. Given the minimal nature of the proposed survey works, no significant impacts on water quality are foreseen. However, out of an abundance of caution, despite the limited temporal and geographic scale of the proposed project, it is considered that there is the potential for visual and acoustic disturbance (via the works vessel and intertidal works) impacts on seabirds protected as SCIs of this SPA which may be foraging / resting in intertidal / subtidal waters along the proposed survey corridor in the absence of mitigation. Impacts on the SPA from the proposed survey works have the potential to impact on SCIs of this SPA. In the absence of mitigation measures, there is the potential for disturbance impacts on available foraging habitats for the following SCIs: – Great Northern Diver (<i>Gavia immer</i>) [A003] – Fulmar (<i>Fulmarus glacialis</i>) [A009] – Manx Shearwater (<i>Puffinus puffinus</i>) [A013] – Cormorant (<i>Phalacrocorax carbo</i>) [A017] – Little Tern (<i>Sterna albifrons</i>) [A195] – Kittiwake (<i>Rissa tridactyla</i>) [A188] – Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] – Common Gull (<i>Larus canus</i>) [A182] – Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183] – Herring Gull (<i>Larus argentatus</i>) [A184] – Roseate Tern (<i>Sterna dougallii</i>) [A192]

¹⁵ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004236.pdf>

Annex Species/Habitats- Qualifying Interest / Special Conservation Interests	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
		– Arctic Tern (<i>Sterna paradisaea</i>) [A194] – Puffin (<i>Fratercula arctica</i>) [A204] – Razorbill (<i>Alca torda</i>) [A200] – Guillemot (<i>Uria aalge</i>) [A199] – Little Gull (<i>Hydrocoloeus minutus</i>) (A862) – Common Tern (<i>Sterna hirundo</i>) (A193) Mitigation measures are required.

5.6 Slaney River Valley SAC 000781

5.6.1 Conservation Objectives of Slaney River Valley SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Slaney River Valley SAC 000781 are seen in Table 18. All other QIs were screened out at the initial screening.

Table 18. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Slaney River Valley SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Slaney River Valley SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 53.9 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.7 Saltee Islands SAC 000707

5.7.1 Conservation Objectives of Saltee Islands SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Saltee Islands SAC 000707 (Screened in) are seen in Table 19. All other qualifying interests were screened out at initial screening.

Table 19. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Saltee Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Saltee Islands SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 140.7 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.8 Ballysadare Bay SAC 000622

5.8.1 Conservation Objectives of Ballysadare Bay SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Ballysadare Bay SAC 000622 are seen in Table 20. All other qualifying interests were screened out at the initial screening.

Table 20. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Ballysadare Bay SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Ballysadare Bay SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 179.4 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.9 Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC 000627

5.9.1 Conservation Objectives of Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC 000627 are seen in Table 21. All other qualifying interests were screened out at the initial screening.

Table 21. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 180.6 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.10 Donegal Bay (Murvagh) SAC 000133

5.10.1 Conservation Objectives of Donegal Bay (Murvagh) SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Donegal Bay (Murvagh) SAC 000133 are seen in Table 22. All other qualifying interests were screened out at the initial screening.

Table 22. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Donegal Bay (Murvagh) SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Donegal Bay (Murvagh) SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 184.6 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.11 Galway Bay Complex SAC 000268

5.11.1 Conservation Objectives of Galway Bay Complex SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Galway Bay Complex SAC 000268 are seen in Table 23. All other qualifying interests were screened out at the initial screening.

Table 23. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Galway Bay Complex SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Galway Bay Complex SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 185.7 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.12 West of Ardara/Maas Road SAC 000197

5.12.1 Conservation Objectives of West of Ardara/Maas Road SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of West of Ardara/Maas Road SAC 000197 are seen in Table 24. All other qualifying interests were screened out at the initial screening.

Table 24. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of West of Ardara/Maas Road SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the West of Ardara/Maas Road SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 201.5 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.13 Slieve Tooley/Tormore Island/Loughros Beg Bay SAC 000190

5.13.1 Conservation Objectives of Slieve Tooley/Tormore Island/Loughros Beg Bay SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Slieve Tooley/Tormore Island/Loughros Beg Bay SAC 000197 (Screened in) are seen in Table 25. All other qualifying interests were screened out at initial screening.

Table 25. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Slieve Tooley/Tormore Island/Loughros Beg Bay SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Slieve Tooley/Tormore Island/Loughros Beg Bay SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 210.3 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.14 Killala Bay/Moy Estuary SAC 000458

5.14.1 Conservation Objectives of Killala Bay/Moy Estuary SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Killala Bay/Moy Estuary SAC 000458 are seen in Table 26. All other qualifying interests were screened out at the initial screening.

Table 26. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Killala Bay/Moy Estuary SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 213 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.15 Rutland Island and Sound SAC 002283

5.15.1 Conservation Objectives of Rutland Island and Sound SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Rutland Island and Sound SAC 002283 are seen in Table 27. All other qualifying interests were screened out at the initial screening.

Table 27. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Rutland Island and Sound SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Rutland Island and Sound SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 223.5 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.16 Kilkieran Bay and Islands SAC 002111

5.16.1 Conservation Objectives of Kilkieran Bay and Islands SAC (Harbour Seal & Harbour Porpoise)

The attributes and targets of the harbour seal and Harbour Porpoise (screened in), and the potential impact of the proposed fibre-optic cable survey on these features of interest of Kilkieran Bay and Islands SAC 002111 are seen in Table 28. All other features of interest were screened out at the initial screening.

Table 28. The site-specific Conservation Objectives, the overall status of the harbour seal, harbour porpoise and the potential impact of the proposed works on these features of interest and the conservation objectives of Kilkieran Bay and Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Kilkieran Bay and Islands SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 227.8 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.
Harbour Porpoise (<i>Phocoena phocoena</i>) [1351]	Inadequate	To maintain the favourable conservation condition of Harbour Porpoise in Kilkieran Bay and Islands SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise, which includes this SAC (JNCC, 2023). Detailed assessment is required in relation to the potential effects on Harbour Porpoise (see Section 7). Mitigation measures are required.

5.17 Clew Bay Complex SAC 001482

5.17.1 Conservation Objectives of Clew Bay Complex SAC (Harbour Seal)

The attributes and targets of the harbour seal (screened in), and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Clew Bay Complex SAC 001482 are seen in Table 29. All other qualifying interests were screened out at the initial screening.

Table 29. The site-specific Conservation Objectives, the overall status of the harbour seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Clew Bay Complex SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Harbour seal (<i>Phoca vitulina</i>) [1365]	Favourable	To maintain the favourable conservation condition of Harbour Seal in the Clew Bay Complex SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 230 km from this SAC, which is within the foraging range (273km) of harbour seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Harbour Seal (see Section 7). Mitigation measures are required.

5.18 Inishbofin and Inishshark SAC 000278

5.18.1 Conservation Objectives of Inishbofin and Inishshark SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Inishbofin and Inishshark SAC 000278 (Screened in) are seen in Table 30. All other qualifying interests were screened out at initial screening.

Table 30. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Inishbofin and Inishshark SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
Grey Seal (<i>Halichoerus grypus</i>) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Inishbofin and Inishshark SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 265.2 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.19 Horn Head and Rinclevan SAC 000147

5.19.1 Conservation Objectives of Horn Head and Rinclevan SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Horn Head and Rinclevan SAC 000147 (Screened in) are seen in Table 31. All other qualifying interests were screened out at initial screening.

Table 31. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Horn Head and Rinclevan SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Horn Head and Rinclevan SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 266.5 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.20 Slyne Head Islands SAC 000328

5.20.1 Conservation Objectives of Slyne Head Islands SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Slyne Head Islands SAC 000328 (Screened in) are seen in Table 32. All other qualifying interests were screened out at initial screening.

Table 32. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Slyne Head Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> , attributes, targets and perceived impacts.
Grey Seal (<i>Halichoerus grypus</i>) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Slyne Head Islands SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 266.6 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.21 Duvillaun Islands SAC 000495

5.21.1 Conservation Objectives of Duvillaun Islands SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Duvillaun Islands SAC 000495 (Screened in) are seen in Table 33. All other qualifying interests were screened out at initial screening.

Table 33. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Duvillaun Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Duvillaun Islands SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 273.8 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.22 Inishkea Islands SAC 000507

5.22.1 Conservation Objectives of Inishkea Islands SAC (Grey Seal)

The attributes and targets of grey seal, and the potential impact of the proposed fibre-optic cable survey on this qualifying interest of Inishkea Islands SAC 000507 (Screened in) are seen in Table 34. All other qualifying interests were screened out at initial screening.

Table 34. The site-specific Conservation Objectives, overall status of the grey seal, and the potential impact of the proposed works on this qualifying interest and the conservation objectives of Inishkea Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in the Inishkea Islands SAC, which is defined by the following list of attributes and targets: <i>(Attribute. Target)</i> <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 277.2 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.

5.23 Roaringwater Bay and Islands SAC 000101

5.23.1 Conservation Objectives of Roaringwater Bay and Islands SAC (Grey Seal & Harbour Porpoise)

The attributes and targets of grey seal and harbour porpoise, and the potential impact of the proposed fibre-optic cable survey on these qualifying interests of Roaringwater Bay and Islands SAC are seen in Table 35. All other qualifying interests were screened out at the initial screening.

Table 35. The site-specific Conservation Objectives, overall status of grey seal and harbour porpoise, and the potential impact of the proposed works on these qualifying interests and the conservation objectives of Roaringwater Bay and Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in Roaringwater Bay and Islands SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Population composition:</i> The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 304.9 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.
[1351] Harbour Porpoise (Phocoena phocoena)	Inadequate	To maintain the favourable conservation condition of Harbour Porpoise in Roaringwater Bay and Islands SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise, which includes this SAC (JNCC, 2023). Detailed assessment is required in relation to the potential effects on Harbour Porpoise (see Section 7). Mitigation measures are required.

5.24 Blasket Islands SAC 002172

5.24.1 Conservation Objectives of Blasket Islands SAC (Grey Seal & Harbour Porpoise)

The attributes and targets of grey seal and harbour porpoise, and the potential impact of the proposed fibre-optic cable survey on these qualifying interests of Blasket Islands SAC are seen in Table 36. All other qualifying interests were screened out at the initial screening.

Table 36. The site-specific Conservation Objectives, overall status of grey seal and harbour porpoise, and the potential impact of the proposed works on these qualifying interests and the conservation objectives of Blasket Islands SAC.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives, attributes, targets and perceived impacts.
Grey Seal (Halichoerus grypus) [1364]	Favourable	To maintain the favourable conservation condition of Grey Seal in Blasket Islands SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Breeding behaviour:</i> The breeding sites should be maintained in a natural condition. <i>Moulting behaviour:</i> The moult haul-out sites should be maintained in a natural condition. <i>Resting behaviour:</i> The resting haul-out sites should be maintained in a natural condition. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the grey seal population at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The survey is 325.9 km from this SAC, which is within the foraging range (448km) of grey seal (Carter et al., 2022). Detailed assessment is required in relation to the potential effects on Grey Seal (see Section 7). Mitigation measures are required.
[1351] Harbour Porpoise (Phocoena phocoena)	Inadequate	To maintain the favourable conservation condition of Harbour Porpoise in Blasket Islands SAC, which is defined by the following list of attributes and targets: (Attribute. Target) <i>Access to suitable habitat:</i> Species range within the site should not be restricted by artificial barriers to site use. <i>Disturbance:</i> Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise, which includes this SAC (JNCC, 2023). Detailed assessment is required in relation to the potential effects on Harbour Porpoise (see Section 7). Mitigation measures are required.

5.25 UK SACs Designated for Harbour Porpoise

5.25.1 Conservation Objectives of UK Sites Designated for Harbour Porpoise

The potential impact of the proposed fibre-optic cable survey on the qualifying interests (screened in) of the following sites designated for harbour porpoise is seen in Table 37:

- North Anglesey Marine/Gogledd Môn Forol (**UK0030398**)
- North Channel (**UK0030399**)
- West Wales Marine / Gorllewin Cymru Forol (**UK0030397**)
- Bristol Channel Approaches/Dynesfeydd Môr Hafren (**UK0030396**)

Table 37. The site-specific Conservation Objectives, overall status of harbour porpoise, and the potential impact of the proposed works on qualifying interest and conservation objectives of the above sites.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives and perceived impacts.
[1351] Harbour Porpoise (Phocoena phocoena)	Unknown	Ensuring: 1. Harbour porpoise are a viable component of the site. 2. There is no significant disturbance of the species. 3. The condition of supporting habitats and processes, and the availability of prey is maintained. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise, which includes the following SACs (JNCC, 2023): • North Anglesey Marine/Gogledd Môn Forol (UK0030398) • West Wales Marine / Gorllewin Cymru Forol (UK0030397) • North Channel (UK0030399) • Bristol Channel Approaches/Dynesfeydd Môr Hafren (UK0030396) Detailed assessment is required in relation to the potential effects on Harbour Porpoise. Mitigation measures are required.

5.26 UK SACs Designated for Bottlenose Dolphin

5.26.1 Conservation Objectives of UK Sites Designated for Bottlenose Dolphin

The potential impact of the proposed fibre-optic cable survey on these qualifying interests (screened in) of the following sites designated for common bottlenose dolphin are seen in Table 38:

- Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau (**UK0013117**)
- Cardigan Bay / Bae Ceredigion (**UK0012712**)

Table 38. The site-specific Conservation Objectives, overall status of common bottlenose dolphin, and the potential impact of the proposed works on this qualifying interest and conservation objectives of the above sites.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives and perceived impacts.
[1349] Common Bottlenose Dolphin (<i>Tursiops truncatus</i>)	Unknown	To maintain / restore the favourable conservation condition of Bottlenose Dolphin. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the Irish Sea MU for Bottlenose Dolphin, which includes the following SACs (JNCC, 2023): • Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau (UK0013117) • Cardigan Bay / Bae Ceredigion (UK0012712) Detailed assessment is required in relation to the potential effects on Bottlenose Dolphin. Mitigation measures are required.

5.27 UK SACs Designated for Grey Seal

5.27.1 Conservation Objectives of UK Sites Designated for Grey Seal

The potential impact of the proposed fibre-optic cable survey on these qualifying interests (screened in) of the following sites designated for grey seal are seen in Table 39:

- Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau (**UK0013117**)
- The Maidens (**UK0030384**)
- Lundy (**UK0013114**)
- Pembrokeshire Marine / Sir Benfro Forol (**UK0013116**)
- Isles of Scilly Complex (**UK0013694**)

Table 39. The site-specific Conservation Objectives, overall status of grey seal, and the potential impact of the proposed works on this qualifying interest and conservation objectives of the above sites.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives and perceived impacts.
[1364] Grey Seal (<i>Halichoerus grypus</i>)	Favourable	To maintain / restore the favourable conservation condition of Grey Seal. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the 448km foraging range of grey seal (Carter et al., 2022), which includes the following SACs: • Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau (UK0013117) • The Maidens (UK0030384) • Lundy (UK0013114) • Pembrokeshire Marine / Sir Benfro Forol (UK0013116) • Isles of Scilly Complex (UK0013694) Detailed assessment is required in relation to the potential effects on Grey Seal. Mitigation measures are required.

5.28 UK SACs Designated for Harbour Seal

5.28.1 Conservation Objectives of UK Sites Designated for Harbour Seal

The potential impact of the proposed fibre-optic cable survey on these qualifying interests (screened in) of the following sites designated for harbour seal are seen in Table 40:

- Murlough (**UK0016612**)
- Strangford Lough (**UK0016618**)
- South-East Islay Skerries (**UK0030067**)

Table 40. The site-specific Conservation Objectives, overall status of harbour seal, and the potential impact of the proposed works on this qualifying interest and conservation objectives of the above sites.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives and perceived impacts.
[1365] Harbour Seal (<i>Phoca vitulina</i>)	Unfavourable - Inadequate	To maintain / restore the favourable conservation condition of Harbour Seal. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the 273km foraging range of harbour seal (Carter et al., 2022), which includes the following SACs: • Murlough (UK0016612) • Strangford Lough (UK0016618) • South-East Islay Skerries (UK0030067) Detailed assessment is required in relation to the potential effects on Harbour Seal. Mitigation measures are required.

5.29 French SACs Designated for Harbour Porpoise

5.29.1 Conservation Objectives of French Sites Designated for Harbour Porpoise

The potential impact of the proposed fibre-optic cable survey on the following sites designated for harbour porpoise is seen in Table 41:

- Nord Bretagne DH (**FR2502022**)
- Récifs et landes de la Hague (**FR2500084**)
- Mers Celtiques – Talus du golfe de Gascogne (**FR5302015**)
- Anse de Vauville (**FR2502019**)
- Banc et récifs de Surtainville (**FR2502018**)
- Côte de Granit rose-Sept-Iles (**FR5300009**)
- Trégor – Goëlo (**FR5300010**)
- Baie de Morlaix (**FR5300015**)
- Abers – Côtes des legends (**FR5300017**)
- Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay (**FR5300008**)
- Ouessant-Molène (**FR5300018**)
- Cap d’Erquy-Cap Fréhel (**FR5300011**)
- Chausey (**FR2500079**)
- Baie de Saint-Brieuc – Est (**FR5300066**)
- Côtes de Crozon (**FR5302006**)
- Baie du Mont Saint-Michel (**FR2500077**)
- Baie de Lancieux, Baie de l’Arguenon, Archipel de Saint Malo et Dinard (**FR5300012**)
- Estuaire de la Rance (**FR5300061**)
- Chaussée de Sein (**FR5302007**)
- Récifs du talus du golfe de Gascogne (**FR5302016**)

Table 41. The site-specific Conservation Objectives, overall status of harbour porpoise, and the potential impact of the proposed works on this qualifying interest (screened in) and conservation objectives of the above sites.

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	Site Specific Conservation Objectives and perceived impacts.
[1351] Harbour Porpoise (Phocoena phocoena)	Poor	To maintain (or restore where appropriate) the qualifying interests to favourable condition. Potential Effect The proposed survey will introduce underwater noise into the marine environment. The proposed survey area is located within the Celtic and Irish Seas MU for Harbour Porpoise, which includes the following SACs (JNCC, 2023): • Nord Bretagne DH (FR2502022) • Récifs et landes de la Hague (FR2500084) • Mers Celtiques – Talus du golfe de Gascogne (FR5302015) • Anse de Vauville (FR2502019) • Banc et récifs de Surtainville (FR2502018) • Côte de Granit rose-Sept-Iles (FR5300009) • Trégor – Goëlo (FR5300010) • Baie de Morlaix (FR5300015) • Abers – Côtes des legends (FR5300017) • Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay (FR5300008) • Ouessant-Molène (FR5300018) • Cap d’Erquy-Cap Fréhel (FR5300011) • Chausey (FR2500079)

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	<i>Site Specific Conservation Objectives</i> and perceived impacts.
		• Baie de Saint-Brieuc – Est (FR5300066) • Côtes de Crozon (FR5302006) • Baie du Mont Saint-Michel (FR2500077) • Baie de Lanceloux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard (FR5300012) • Estuaire de la Rance (FR5300061) • Chaussée de Sein (FR5302007) • Récifs du talus du golfe de Gascogne (FR5302016) Detailed assessment is required in relation to the potential effects on Harbour Porpoise. Mitigation measures are required.

6. Site visit

A site visit was carried out to the proposed landfall area in Portmarnock on the 10th July 2026. As seen in Plate 1 there is an existing formal slipway entrance to the beach which allows good access to the beach at all tides. Blow lugworm (*Arenicola marina*) was prominent in the lower shore area of the beach, as demonstrated in Plate 5.



Plate 1. Access Ramp to Portmarnock Beach



Plate 2. Portmarnock Beach



Plate 3. Portmarnock Beach



Plate 4. Portmarnock Beach



Plate 5. Blow lugworm(*Arenicola marina*) present along the lower shore



Plate 6. Portmarnock Beach - High Water Mark

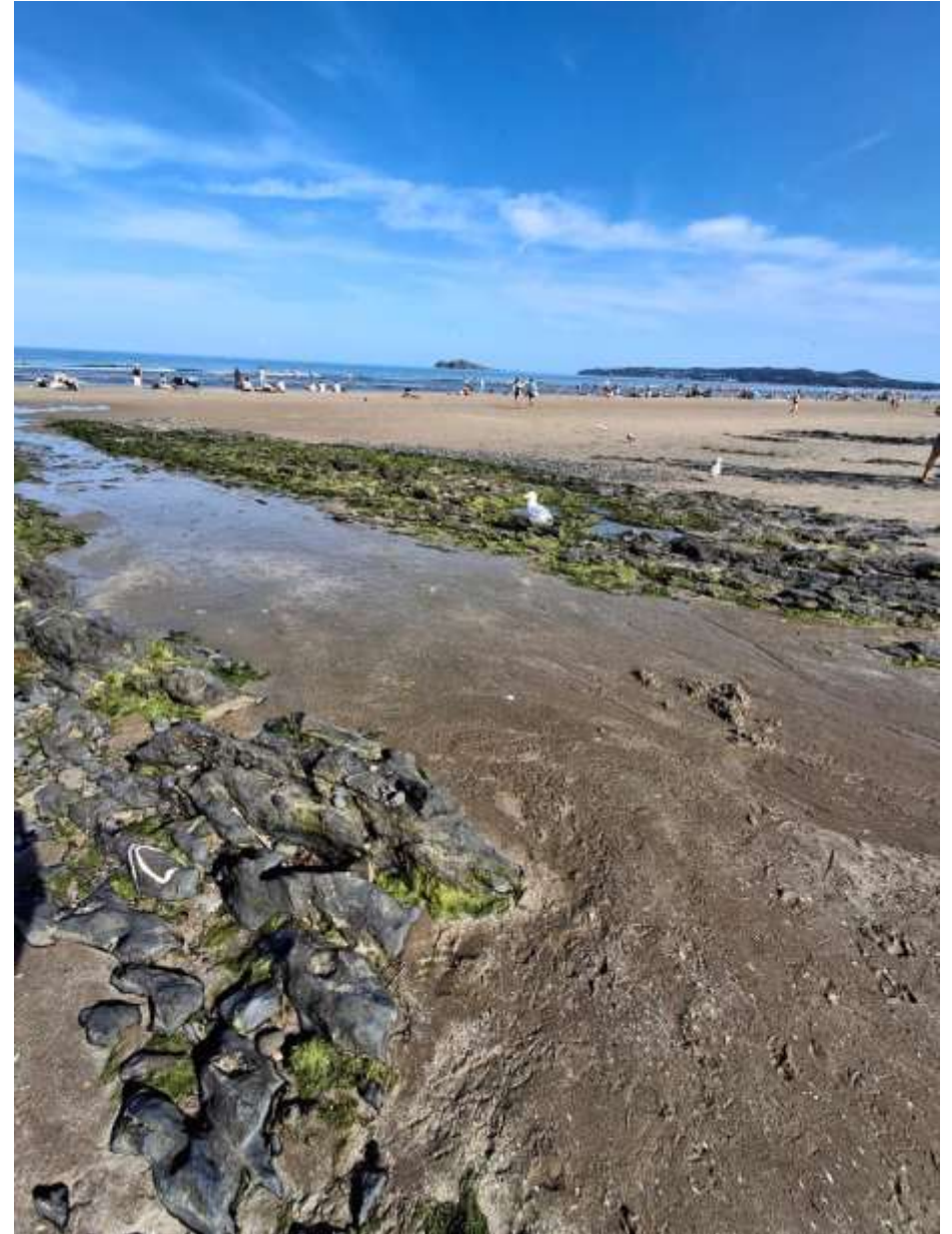


Plate 7. Portmarnock Beach - Rocks Covered at High Tide

7. Further information on the potential impacts on Cetaceans and Pinnipeds

All cetaceans are listed under Annex IV of the Habitats Directive, which means that they are protected wherever they occur. Bottle-nosed Dolphin and Harbour Porpoise are also listed under Annex II of the Directive. Annex II species require that core areas of their habitat be designated as sites of Community importance. Grey seals and Harbour seals are also listed under Annex II & Annex V of the Habitats Directive.

The proposed survey would be expected to impact on marine mammals primarily through the emission of noise due to the vessel and from survey equipment, including multibeam. It should be noted that, given the slow speed (4 knots) of the vessel, no collision impacts with the proposed works vessel and equipment are foreseen as a result of the proposed works.

As outlined by O'Brien (2005), 'sound travels 4.5 times faster in water than in air and low frequency sounds travel farther underwater than high frequency sounds.' Multi-beam can be defined as Low frequency (<1 kHz), Mid-frequency (1-10 kHz) and High Frequency (>10 kHz).

Southall *et al.* (2019), in their publication "Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects" revised the marine mammal hearing groups, which are seen in Table 42.

Table 42. Marine Mammal Functional Hearing Groups and Estimated Functional Hearing groups Proposed by Southall *et al.* (2019)

Marine mammal hearing group	Auditory weighting function	Genera (or species) included
Low-frequency cetaceans	LF	<i>Balaenidae</i> (<i>Balaena</i> , <i>Eubalaenidae</i> spp.); <i>Balaenopteridae</i> (<i>Balaenoptera physalus</i> , <i>B. musculus</i>)
		<i>Balaenopteridae</i> (<i>Balaenoptera acutorostrata</i> , <i>B. bonaerensis</i> , <i>B. borealis</i> , 1 <i>B. edeni</i> , <i>B. omurai</i> ; <i>Megaptera novaeangliae</i>); <i>Neobalenidae</i> (<i>Caperea</i>); <i>Eschrichtiidae</i> (<i>Eschrichtius</i>)
High-frequency cetaceans	HF	<i>Physeteridae</i> (<i>Physeter</i>); <i>Ziphiidae</i> (<i>Berardius</i> spp., <i>Hyperoodon</i> spp., <i>Indopacetus</i> , <i>Mesoplodon</i> spp., <i>Tasmacetus</i> , <i>Ziphius</i>); <i>Delphinidae</i> (<i>Orcinus</i>)
		<i>Delphinidae</i> (<i>Delphinus</i> , <i>Feresa</i> , <i>Globicephala</i> spp., <i>Grampus</i> , 2 <i>Lagenodelphis</i> , <i>Lagenorhynchus acutus</i> , <i>L. albirostris</i> , <i>L. obliquidens</i> , <i>L. obscurus</i> , <i>Lissodelphis</i> spp., <i>Orcaella</i> spp., <i>Peponocephala</i> , <i>Pseudorca</i> , <i>Sotalia</i> spp., <i>Sousa</i> spp., <i>Stenella</i> spp., <i>Steno</i> , <i>Tursiops</i> spp.); <i>Montodontidae</i> (<i>Delphinapterus</i> , <i>Monodon</i>); <i>Plantanistidae</i> (<i>Plantanista</i>)
Very high frequency cetaceans	VHF	<i>Delphinidae</i> (<i>Cephalorhynchus</i> spp.; <i>Lagenorhynchus cruciger</i> , <i>L. australis</i>); <i>Phocoenidae</i> (<i>Neophocaena</i> spp., <i>Phocoena</i> spp., <i>Phocoenoides</i>); <i>Iniidae</i> (<i>Inia</i>); <i>Kogiidae</i> (<i>Kogia</i>); <i>Lipotidae</i> (<i>Lipotes</i>); <i>Pontoporiidae</i> (<i>Pontoporia</i>)
Phocid carnivores in water	PCW	<i>Phocidae</i> (<i>Cystophora</i> , <i>Erignathus</i> , <i>Halichoerus</i> , <i>Histriophoca</i> , <i>Hydrurga</i> , <i>Leptonychotes</i> , <i>Lobodon</i> , <i>Mirounga</i> spp., <i>Monachus</i> , <i>Neomonachus</i> , <i>Ommatophoca</i> , <i>Pagophilus</i> , <i>Phoca</i> spp., <i>Pusa</i> spp.)

The Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NOAA, 2018) outlined the hearing groups of marine mammals, including the generalised hearing range of these cetacean groups (Table 43). They also noted that "Exposures exceeding the specified respective criteria level for any exposure metric are interpreted as resulting in predicted temporary threshold shift (TTS) or permanent threshold shift (PTS) onset." The onset of PTS in marine mammals was also outlined in NOAA 2018 (Table 44). The updated figures for PTS and TTS are outlined in Table 45.

The hearing ranges and sensitivity of marine mammals differ from one species to another depending on their audiogram. "For example, harbour porpoises are sensitive from 3 kHz to 130 kHz, with peak sensitivity at 125-130 kHz, and bottlenose dolphins from 5-110 kHz, with peak sensitivity at 40 and 60-116 kHz" (Southall *et al.*, 2007).

Common seals are sensitive 4-45 kHz (peak sensitivity at 32 kHz) and grey seals 8-40 kHz. Humans are sensitive only to frequencies from 20 Hz to 16-18 kHz but with peak sensitivity from 2-4 kHz.

Table 43. Hearing Groups of Marine Mammals (NOAA, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, Lagenorhynchus cruciger & L. australis)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

* Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007) and PW pinniped (approximation).

Table 44. Onset of PTS in Marine mammals

Hearing Group	PTS Onset Thresholds (Received Level)	
	Impulsive ¹	Non-impulsive ²
Low-Frequency (LF) Cetaceans	Cell 1 <i>Lpk,flat</i> : 219 dB <i>LE,LF,24h</i> : 183 dB	Cell 2 <i>LE,LF,24h</i> : 199 dB
Mid-Frequency (MF) Cetaceans	Cell 3 <i>Lpk,flat</i> : 230 dB <i>LE,MF,24h</i> : 185 dB	Cell 4 <i>LE,MF,24h</i> : 198 dB
High-Frequency (HF) Cetaceans	Cell 5 <i>Lpk,flat</i> : 202 dB <i>LE,HF,24h</i> : 155 dB	Cell 6 <i>LE,HF,24h</i> : 173 dB
Phocid Pinnipeds (PW) (Underwater)	Cell 7 <i>Lpk,flat</i> : 218 dB <i>LE,PW,24h</i> : 185 dB	Cell 8 <i>LE,PW,24h</i> : 201 dB
Otariid Pinnipeds (OW) (Underwater)	Cell 9 <i>Lpk,flat</i> : 232 dB <i>LE,OW,24h</i> : 203 dB	Cell 10 <i>LE,OW,24h</i> : 219 dB

¹Impulsive: produce sounds that are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI 1986; NIOSH 1998; ANSI 2005).

²Non-impulsive: produce sounds that can be broadband, narrowband or tonal, brief or prolonged, continuous or intermittent) and typically do not have a high peak sound pressure with rapid rise/decay time that impulsive sounds do (ANSI 1995; NIOSH 1998).

Table 45. Southall *et al.* (2019) TTS- and PTS-onset thresholds for marine mammals exposed to impulsive noise: SEL thresholds in dB re 1 $\mu\text{Pa}^2\text{s}$ under water and dB re (20 μPa)²s; and peak SPL thresholds in dB re 1 μPa under water.

Hearing Group	Impulsive Noise		Non-impulsive Noise
	Unweighted SPL _{peak} (dB re 1 μPa)	Weighted SEL _{cum} (dB re 1 $\mu\text{Pa}^2\text{s}$)	Weighted SEL _{cum} (dB re 1 $\mu\text{Pa}^2\text{s}$)
PTS Criteria			
Low-frequency (LF) cetaceans	219	183	199
High-frequency (HF) cetaceans	230	185	198
Very-frequency cetaceans (VHF)	202	155	173
Phocid carnivores in water (PCW)	218	185	201
TTS Criteria			
Low-frequency cetaceans	213	168	179
High-frequency cetaceans	224	170	178
Very high-frequency cetaceans	196	140	153
Phocid carnivores in water	212	170	181

Most small cetaceans, excluding harbour porpoise, have an auditory bandwidth of 150 Hz to – 160 kHz, while harbour porpoise have an auditory bandwidth within 200 Hz to 180 kHz. Pinnipeds in water are thought to have an auditory bandwidth of between of 75 Hz to 75 kHz and from 75 Hz to 30 kHz in air (Southall et al. 2007)."

The proposed survey equipment and the noise frequency emissions are seen in Table 46.

Equipment Type	Purpose	Frequency Range	Duration	Maximum Source Pressure Level (re 1µPa at 1 m)	Reference
Multibeam Echo Sounder (MBES)	Measure detailed bathymetry by transmitting sound pulses (active sonar).	200 kHz to 500 kHz	0.05 - 10 ms	210 - 245 dB.	Danson 2005, Hopkins 2007, DECC 2011, Lurton and DeReutier 2011, Lurton 2016, BEIS 2020, Crocker & Fratantonio 2016
Side Scan Sonar (SSS)	Determine surficial nature of the seabed and detect objects by transmitting sound pulse.	200 kHz to 700 kHz	0.4 - 1.0 ms	200 - 240 dB.	BOEM 2016, BEIS 2020, DAHG 2014, Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Pinger	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 15 kHz	0.5 - 30 ms	214 dB.	Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Chirper	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 13 kHz	5 - 40 ms	185 - 215 dB.	Crocker & Fratantonio 2016, Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Boomer	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	500 Hz to 15 kHz	0.5 - 1.0 ms	205 - 215 dB.	Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Parametric	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	4 to 15 kHz, 85 to 115 kHz	0.2 - 30 ms	238 - 247 dB. 200 - 206 dB.	Hartley Anderson 2020
Ultra-Short Base Line (USBL)	Subsea positioning.	20 kHz to 50 kHz	5 - 10 ms	194 - 207 dB.	Kongsberg
Magnetometer	Identify ferrous anomalies for metal obstructions, shipwrecks, etc. on and under the seabed.	Passive	N/A	Passive	N/A
Survey Vessels	Carry out the survey and deploy the equipment.	50 Hz to 300 Hz	N/A	160 - 190 dB.	DECC 2011

Table 46a. Details of the proposed types of acoustic equipment which emit sound.

Equipment Type	Purpose	Number of locations within Licence Application Area (up to)	Frequency Range	Maximum Source Pressure Level (re 1µPa at 1 m)	Reference
Cone Penetration Test (CPT)	Determine geotechnical engineering properties of seabed sediments.	15	28 Hz	118 - 145 dB.	BOEM 2012, EIRGRID 2014
Gravity Corer	Retrieve a seabed sediment sample by penetrating seabed with a steel core barrel under self-weight	12	N/A	N/A	N/A
Vibrocorer	Retrieve a seabed sediment sample by penetrating seabed with a vibrating steel core barrel	12	30 Hz	187.4 dB.	LGL 2010
Grab Samples	Collect small sediment samples from seabed surface with clamshell mechanism	11	N/A	N/A	N/A

Table 46b. Details of the proposed types of geophysical equipment which emit sound.

Activity	Typical Time Period Required for Activity	Total Number of SI Locations	Total Time for SI	Foot Print Affected per SI	Foot Print Affected per SI (ha)	Total Foot Print (ha)	Area Directly Affected as % of Licence Application Area
Inshore Geophysical Survey	3 to 4 days (weather and sea state dependent)	400 - 500 m cable route corridor	3 to 4 days (weather and sea state dependent)	N/A	N/A	560 ha	18.66667%
Offshore Geophysical Survey	8 to 10 days (weather and sea state dependent)	500 m cable route corridor	10 to 12 days (weather and sea state dependent)	N/A	N/A	2441 ha	81.3667%
CPT	30 minutes - 2 hours in any one location	15	30 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	8m ²	0.0008 ha	0.012 ha	0.000004%
Gravity Corer	30 minutes - 2 hours in any one location	12	24 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	1m ²	0.0001 ha	0.0012 ha	0.0000004%
Vibro Corer	30 minutes - 2 hours in any one location	12	24 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	8m ²	0.0008 ha	0.0096 ha	0.000032%
Grab Samples	20 minutes - 45 minutes in any one location	11	9 hours within total 8 days of Site Investigations campaign (weather and sea state dependent)	0.5m ²	0.00005 ha	0.0006 ha	0.00000002%

Table 46c. Estimated Time and Duration of Survey Activities (Source: MDM)

The cetacean species observed in the survey area are high-frequency, mid-frequency and low-frequency cetaceans. Grey and Common Seals may also be present. The proposed survey equipment and the noise frequency emissions are seen in Table 46. The high frequencies emitted from the equipment are above the auditory range of mid-frequency (150Hz-160 kHz) but within the hearing range of high-frequency cetaceans (275Hz- 160 kHz)- observed in and on the proposed survey area.

The Multibeam Echo Sounder (MBES) (200 kHz to 500 kHz) and Side Scan Sonar (SSS)(200 kHz to 700 kHz), single beam echo sounder and Multibeam Echo Sounder (MBES) will emit noise above the hearing frequency of marine mammals. The hull-mounted Sub-bottom Profiler (SBP) – Pinger (2 kHz to 15 kHz), Sub-bottom Profiler (SBP) - Chirper (2 kHz to 13 kHz), Sub-bottom Profiler (SBP) – Boomer (500 Hz to 15 kHz), Sub-bottom Profiler (SBP) – Parametric (4 to 15 kHz, 85 to 115 kHz) and Ultra-Short Base Line (USBL) Subsea positioning. (20 kHz to 50 kHz) emits low and mid-frequency noise, within the auditory range of all marine mammals, including harbour porpoise, grey seal and harbour seal. However, all of the equipment (peak noise) at 1m from the source emits noise above the onset of PTS for non-impulsive sounds for high, medium, low frequency cetaceans and Phocid Pinnipeds outlined by NOAA (2018) was 173 dB, 198 dB, 199 dB and 219 dB, respectively, and the 198dB proposed injury levels indicated by Southall et al. (2019). As a result, negative impacts may be foreseen if marine mammals are close enough to the equipment to receive sound levels above this indicative threshold. As outlined in Table 7, the inshore Geophysical Survey is predicted to take 3 to 4 days (weather and sea state dependent), and the offshore Geophysical Survey 10 to 12 days (weather and sea state dependent).

Lurton (2016) modelled the sound field radiated by multibeam echosounders for acoustical impact assessment. He stated that *“considering the injury criteria, the results illustrate that injury hazards are possible only at very short distances from the source: e.g. about 5 m for maximum Sound Pressure Level and 12 m for cumulative Sound Exposure Level in the case of a 240-dB source level, considering cetaceans. For behavioural response criteria, the corresponding values are 9 m and 70 m.”*

As previously outlined, the estimated time that the survey would take (excluding SI) within the Rockabill to Dalkey SAC would be approx. 63.3 hrs. The operations would comply with the NPWS (2014) *“Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters”*.

These guidelines would be deemed adequate to mitigate the negative impacts of the proposed works. Cetaceans in the vicinity of the vessel during start-up procedures would be given ample time to leave the site with the soft start procedures outlined in the guidelines. In addition, vessel speeds are extremely slow, which would give marine mammals ample opportunity to move from the area.

Note: in relation to consistency between Southall (2019) and NOAA (2018)

The Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NOAA, 2018) (or National Marine Fisheries Service, 2018 (as quoted in Southall 2019)), outlines the hearing groups of marine mammals, including the generalised hearing range of these cetacean groups (Annex II). NOAA (2018) also noted that *“Exposures exceeding the specified respective criteria level for any exposure metric are interpreted as resulting in predicted temporary threshold shift (TTS) or permanent threshold shift (PTS) onset.”* The thresholds for the onset of PTS in marine mammals were also outlined in NOAA 2018. The updated Southall (2019) figures for PTS and TTS are outlined in Annex IV.

Southall (2019) outlined the main differences between their publication and previous publications, including NOAA (2018), which was referenced as NMFS (2018) in Southall (2019). Southall (2019) states that *“The noise criteria here represent the next step in a sequential process of evolution of the criteria proposed by Southall et al. (2007), substantially modified with new analytical methods by Finneran (2016), and recently adopted as U.S. regulatory guidance by the NMFS (2016, 2018). While the quantitative process described herein and the resulting exposure criteria here are based on, and in many respects are identical to, those derived by Finneran (2016) and adopted by the NMFS (2016, 2018), there are a number of significant distinctions. The exposure criteria here appear in a peer-reviewed publication and include all marine mammal species for all noise exposures, both underwater and in air for amphibious species. NMFS (2016, 2018) provides regulatory guidance only for the subset of marine mammals under their jurisdiction and does not include criteria for aerial noise exposures, an important consideration in many locations for which some earlier assessments were made (Finneran & Jenkins, 2012). The exposure criteria here, while based on the Finneran (2016) quantitative method and consistent with the NMFS (2016, 2018) guidance where they overlap, are thus more broadly relevant, peer-reviewed, and less subject to potential changes in national regulatory policy.”*

Southall (2019) also stated that *“It should be noted that this results in some proposed differences in the terminology of hearing groups relative to those used in Finneran (2016) and NMFS (2016, 2018). These proposed differences in nomenclature may be confusing, but we believe they are justified (see the “Marine Mammal Hearing Groups and Estimated Group Audiograms” section and Appendices 1-6) and will support future criteria as new information emerges.”*

The difference in nomenclature between NOAA 2018 and Southall (2019) is that NOAA (2018) classified cetaceans as Low-frequency (LF) cetaceans (baleen whales), Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales) and High-frequency (HF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, Lagenorhynchus cruciger & L. australis) while Southall reclassified these groups to Low-frequency cetaceans, High-frequency cetaceans, Very high-frequency cetaceans. As outlined in Southall (2019) *“The distinction between HF and VHF cetacean groups (as opposed to mid- and high-frequency) reflects the regions of best hearing sensitivities within these groups, often including frequencies approaching or exceeding 100 kHz; these frequencies would be more appropriately described within marine bioacoustics as high to very high. Further, as discussed in more detail below, a number of anatomical and sound production properties suggest a potential distinction of very low-(VLF) and LF cetaceans among mysticetes. Some evidence also suggests a potential segregation of mid-frequency (MF) and HF cetaceans in addition to the distinction of HF and VHF cetaceans.”* This is, in effect, a relabelling of Mid-Frequency (MF) Cetaceans and High-Frequency (HF) Cetaceans to High-frequency cetaceans and Very high-frequency cetaceans, respectively. It should be clearly noted that the PTS values within the updated groups were identical between NOAA, 2018 and Southall, 2019, and it was, in effect, a renaming of the groups.

8. In Combination Effects

As outlined by (OSPAR, 2012) “Cumulative effects, the combined effect of more than one activity, may reinforce the impacts of a single activity due to temporal and/or spatial overlaps”. The potential for in-combination effects within the ZOI that may occur as a result of the proposed project, during and post works has been assessed. The following cumulative impact assessment has been guided by the EC 2021 AA guidance document^p, with particular reference to “Table 2. Cumulative impact assessment”.

8.1 Geographic Boundaries and the Timeline for Assessment

The proposed project is primarily located within the intertidal and subtidal elements of Portmarnock Beach (Velvet Strand) and within the Irish EEZ. The potential ZOI for in-combination effects for this assessment has been deemed to be projects located proximate to the landfall and intertidal elements of the survey works, in addition to subtidal elements relating to underwater noise. Terrestrial planning applications have been examined for the potential for in-combination effects. Given that the proposed survey works extend to the offshore subtidal in the Irish Sea, the geographic boundaries of assessment were expanded to include coastal and offshore marine projects located within the Irish Sea.

MARA licensing in Ireland relates to licence applications out to the Irish EEZ limit. In order to assess the potential transboundary effects, details of designated sites within UK waters were investigated. The survey works within UK waters are subject to this UK permitting process, and the potential impacts on designated sites are subject to a separate application process assessed by UK authorities. For the UK element of the proposed survey works to proceed, it has to be approved by UK authorities, and the reporting concludes that, following the implementation of appropriate mitigation, the proposed project would not adversely affect the integrity of UK designated sites, alone or in combination with other projects.

In relation to the timeline for assessment, given the short temporal nature of the proposed survey works and the fact that the proposed works will be isolated to the survey corridor extents with potential for noise to extend beyond the survey area, the most recent projects located in the vicinity of the proposed survey works area have been examined for potential in-combination effects.

8.2 Identification of Plans/Projects that could act In-Combination

Fingal County Council planning permissions, Foreshore Applications, Maritime Area Consent (MAC) Applications, Maritime Usage Licence (MUL) Applications, EIA portal, and An Coimisiún Pleanála (ACP) Applications were examined for projects in proximity to the proposed Baily survey works route. Projects within the potential ZOI of the proposed survey works are outlined in Tables 47-52.

Table 47. Fingal County Council Planning Permissions.

Ref. No.	Address	Proposal
F24A/0082	Martello Tower, Portmarnock, Co. Dublin	(Protected Structure Ref. 476) Mary Nagle intends to apply for Planning Permission for the following :- a) To repair the fabric of the building and to replace existing windows, b) To raise the parapet wall to the ground floor extension, c) To extend by approx. 8 sq.m. the single storey part of the building, d) To infill the space at the eastern end of the existing sheds located close to the main building by way of a 2.6m ² corner extension, e) To provide a new steel spiral staircase from the ground floor to the second floor, f) To extend the area of the existing sheds located close to the main building by a total of 20.12m ² including the infill corner as above,

^p [Official Journal C 437/2021 \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2021/1755/oj)

		g) To convert the existing four apartments and extension into a single four bed residence (220.1m²), h) To open a new vehicular entrance to the site and close up the existing one, i) To repair the existing boundary walls and erect a small railing on top, j) To include a landscape plan for the site including all siteworks necessary to complete the development, all at the Martello Tower, Portmarnock Co. Dublin.
F24A/0894	Sea Scape, 4b Strand Road, Portmarnock, Co Dublin	Planning Permission is sought for i) 2-storey extension to the rear, and additional 2-storey extension to the front elevation ii) framed structure forming patio area to the North elevation iii) internal alterations, together with all engineering works necessary to facilitate the development.
F24A/0131	57 Portmarnock Crescent, Portmarnock, County Dublin	The development will consist of (a) Demolition of existing single storey conservatory and existing boiler house/garden shed at rear. (b) Construction of two storey extension at rear (South East Elevation) containing new kitchen/lounge area at ground level and 1 no. bedroom at first floor level with feature corner window (South East and North East Facing), (c) Construction of first floor extension over existing single storey structure at side (South West Elevation) containing new bathroom with 1 no. opaque window at front (North West Elevation) and new pitched roof over to match existing house. (d) Removal of existing external door at first floor landing area and build-up of opening to form 1 no. opaque window at side (South West Facing Elevation). (e) New replacement flat roof with parapet finish to existing single storey structure at front and side, including new smooth sand and cement painted plaster finish at front (North West Elevation). Together with internal alterations and associated site works.
F24A/1127E	37, Strand Road, Portmarnock, Dublin, D13 HK58	To make alterations and extensions to existing house to include demolition of existing back kitchen return with all associated and ancillary site works, drainage and landscaping works.
F25A/1042E	Portmarnock Hotel and Golf Links, Strand Road, Portmarnock, Co. Dublin, D13V2X7	The Development will consist of the construction of an outdoor freshwater swimming pool, plant room, changing rooms, showers, sauna and steam room, a new door from the existing spa within the hotel, a new pedestrian access path from hotel to the pool area, a new wall separating the pool and changing rooms from the adjacent car park, and all associated landscaping and site works.
F23A/0215	Portmarnock Golf Club, Golf Links Road, Portmarnock, Co. Dublin, D13 KD96	The proposed development will consist of: i) Maintenance and repair of the existing rock armour revetment (c. 490 metres in length) north of Hole 15, ii) Provision of a temporary access approximately 20 metres in length to facilitate transport of materials to the repair works area, within a planning application area of c. 0.2 hectares. The proposed works will take place over 5 to 10 working days (Monday to Friday only) within a time window from mid-September to end October each year, for up to 5 years. The works will necessitate the transport of machinery and materials along a section of Portmarnock Beach on a daily basis for the duration of the works. A Natura Impact Statement (NIS) will be submitted with the application.
F24A/0935E	Portmarnock Golf Club, Golf Links Road, Portmarnock, D13KD96	Permission is sought for The proposed development that will consist of: i) Maintenance and repair of the existing rock armour revetment (c. 560 metres in length) south of Hole 15, ii) Provision of a temporary access approximately 20 metres in length to facilitate transport of materials to the repair works area (as already permitted for maintenance and repair works under Plan. Ref. F23A/0215),

		within a planning application area of c. 0.34 hectares. The proposed works will take place over 5 to 10 working days (Monday to Friday only) within a time window from mid-September to end October each year, for up to 5 years. The works will necessitate the transport of machinery and materials along a section of Portmarnock Beach on a daily basis for the duration of the works.
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Table 48. Foreshore/Marine licence applications proximate to the proposed survey corridor

Reference	Applicant	Year	Location	Activity	Status
FS006984	Rush Sailing Club	2022	Rush Sailing Club, Rogerstown, Rush, Co. Dublin, K56 RH52	Foreshore lease application for the construction of a new disability access landing pontoon to include new floating pontoon, access gangway, landing area, and alterations to existing boundary sea wall, boundary wall, and footpath to accommodate same, and associated site works.	Consultation
FS007546	Codling Wind Park Limited	2022	Off County Wicklow and County Dublin.	The main aims and objectives of the proposed activities are to: • Provide up to date detailed bathymetric mapping of the seabed; • Provide further information on the soil stability and morphology of the seabed; • Provide detailed information on ground conditions and geology; • Obtain up to date wind resource and metocean data for the site; and • To generate environmental and ecological data to inform the EIA and AA for the Codling Wind Park project.	Determination
FS006909	Fingal County Council	2021	Malahide Demesne to Newbridge Demesne	Fingal County Council proposes to develop the Broadmeadow Way, a new greenway (shared footpath and cycleway) between Malahide Demesne and Newbridge Demesne via the railway causeway across the Malahide Estuary. The proposed greenway would be c. 6km in length. Much of the the proposed greenway follows existing pathways and roads.	Determination
FS007358	North Irish Sea Array (NISA) Windfarm Limited, which is a fully owned subsidiary of Statkraft Ireland Ltd.	2021	Off the coast of County Louth, County Meath, County Dublin.	This Foreshore Licence application is for site investigation surveys necessary to determine the seabed and sub-sea conditions to establish the optimum location for and design of the export cable(s) to shore, and to establish the most appropriate route corridor and landfall location for the export cable(s) from the proposed North Irish Sea Array (NISA) offshore wind farm,	Determination

Reference	Applicant	Year	Location	Activity	Status
				located off the coasts of Dublin, Meath and Louth. The application includes for geophysical surveys (mutli-beam echo sounder, sub bottom profiling, side-scan sonar and magnetometer), geotechnical surveys (cone penetration tests and vibrocores along the potential routes and boreholes at the landfalls) and ecological surveys (fisheries surveys, benthic grab samples, intertidal benthic sampling).	
FS007383	Oriel Windfarm Limited	2021	Off the coast of County Louth, to the east of Dundalk Bay.	Oriel Windfarm Limited (Oriel) is an Irish renewable energy company developing the proposed Oriel offshore wind farm located in the North-West Irish Sea, 22km off the coast of Dundalk, County Louth. The proposed Oriel offshore wind farm will include wind turbines mounted onto a foundation installed into the seabed, an offshore substation and interlinking cabling between the turbines and the substation and an export cable between the substation and the shore. Oriel has applied for a Foreshore Licence to undertake detailed geotechnical and geophysical investigations, ecological surveys and metocean surveys. The purpose of the geotechnical investigation is to investigate the stability of the soil for the design of foundations and the detailed routing of the inter array and export cables. The purpose of the geophysical survey is to characterise the layers of sediment/rock underneath the seafloor and to achieve a detailed seabed morphology and seafloor mapping. Further ecological surveys and measurements of the wind, wave and currents (metocean) will also be undertaken. This Foreshore Licence application is for permission to undertake these survey works on the proposed development site. Oriel proposes to apply for a licence for a duration of 36 months.	Determination
FS007359	Drogheda Port Company	2021	River Boyne, Co. Louth	Foreshore temporary licence application for maintenance dredging of the commercial	Determination

Reference	Applicant	Year	Location	Activity	Status
				estuary and seaward approaches to the River Boyne	
FS007290	Dun Laoghaire Rathdown County Council	2021	Dun Laoghaire, Co. Dublin	Foreshore application in respect of the replacement of the existing fendering system at Carlisle Pier.	Determination
FS007188	RWE Renewables Ireland Ltd.	2021	Off the coast of County Dublin & County Wicklow.	Foreshore Licence to undertake geotechnical and geophysical site investigations and ecological, wind, wave and current monitoring to provide further data to refine wind farm design, cable routing, landfall design and associated installation methodologies for the proposed Dublin Array offshore wind farm.	Determination
FS007164	Dublin Port Company	2021	Dublin Port	Foreshore application in respect of Capital Dredging at various locations around Dublin Port	Determination
FS007406	Islandbridge Bellevue Developments Limited (In Receivership)	2021	Bellevue, Islandbridge, Dublin 8	Foreshore licence application for emergency remedial works to the river wall at Bellevue, Islandbridge, Dublin 8	Determination
FS007223	Sean O'Hanlon (O'Hanlon and Sons Ltd)	2021	Dundalk Port, Dundalk, Co. Louth	Foreshore licence application for Maintenance dredging	Determination
FS007132	Dublin Port Company	2021	Dublin Port, Dublin	Foreshore application in respect of maintenance dredging at various locations in Dublin Port for the years 2022 to 2029.	Determination

Table 49. Maritime Area Consent (MAC) applications proximate to the proposed survey works within the Irish EEZ

Reference	Applicant	Year	Location	Activity	Status
MAC20240007 Site Ref: A-D	Fingal County Council	2024	Burrow Road, Marsh Lane and Portrane Beach, Fingal, Dublin	Coastal Protection including Flood Embankment, Flood Wall and other works	Consented
2022-MAC-005 Site Ref: A-B	North Irish Sea Array Windfarm Limited	2022	Off Dublin and Louth coast	Offshore Windfarm	Consented
MAC20230034 Site Ref: A-E	National Transport Authority	2024	Ringsend to City Centre	Proposed road development as part of Ringsend to City Centre Core Bus Corridor Scheme	Consented
MAC240028	Dublin City Council	2024	River Liffey, Dublin	Outfall at Sir John Rogerson's Quay as part of the Grand Canal Docks Storm Water Outfall Extension project	Consented
MAC240014 Site Ref: A-C	Dublin City Council	2024	Tom Clarke Bridge, Dublin City	Construction of a pedestrian and cyclist bridge (Point Bridge) to the west of Tom Clarke Bridge, widening of Tom Clarke Bridge, dismantling of existing and construction of a new control room building, dismantling of existing vessel collision structures and construction of new vessel collision structures to the west of the proposed Point Bridge.	Consented
2022-MAC-006 Site Ref: A-C	Codling Wind Park, c/o Cooney	2022	Off Wicklow coast	Offshore Windfarm	Consented

Reference	Applicant	Year	Location	Activity	Status
	Carey Consulting Limited				
MAC240013	Electricity Supply Board (ESB)	2024	North Wall to Poolbeg	Replacement of high voltage underground cables.	Consented
2022-MAC-003 and 004 Site Ref: A - C	Bray Offshore Wind Limited and Kish Offshore Wind Limited	2022	Off Dublin and Wicklow coast	Offshore Windfarm	Consented
MAC20230009	Iarnród Éireann (IÉ)	2025	Merrion Gates to Seapoint Beach	Coastal Protection	Consented
MAC250050 Site Ref: A-D	Dun Laoghaire Rathdown County Council	2026	Dun Laoghaire Harbour	The installation of slipways, a pontoon and the creation of areas of reclaimed land within designated zones.	Consented
MAC20230015	DunLaoghaire Rathdown County Council	2024	DunLaoghaire Harbour	Inflatable Waterpark	Consented
MAC250061-A	Dun Laoghaire Rathdown County Council	2026	Dun Laoghaire Harbour	Extension of the MAC area granted under MAC250061 and the installation of a multi-user pontoon alongside the Old Quay at Dun Laoghaire Rathdown, Co. Dublin.	Consented
MAC250056	Dun Laoghaire Rathdown County Council	2025	Dun Laoghaire Harbour	Regularisation of two existing areas of reclaimed foreshore, currently used as car park.	Consented
MAC250050	Dun Laoghaire Rathdown County Council	2026	Dun Laoghaire Harbour	The installation of slipways, a pontoon and the creation of areas of reclaimed land within designated zones.	Consented
MAC240020	Dun Laoghaire Rathdown County Council; Kish Offshore Wind Limited; Bray Offshore Wind Limited, Dublin	2024	Dun Loghaire Harbour, Dublin	Removal of existing Roll-on Roll off structure and provision of an Operations and Maintenance Facility for Dublin Array Offshore Wind Farm	Consented

Table 50. Maritime Usage Licence (MUL) applications proximate to the proposed survey works within the Irish EEZ (Accessed 20/07/2026)

Reference	Applicant	Year	Location	Activity	Status
LIC230018	Microsoft Ireland Operations Ltd	2023	Portmarnock, Dublin	Geophysical survey and site investigations for a proposed subsea fibre optic cable having a landfall in Portmarnock, County Dublin to evaluate options for the route traversing the Irish Sea to Abergele, Wales	Licensed
LIC230001	North Irish Sea Array Windfarm Limited	2023	Off the coasts of counties Dublin, Meath and Louth	Site investigation activities to inform the development of the North Irish Sea Array (NISA) offshore windfarm (OWF) and export cable, off the coasts of counties Dublin, Meath and Louth	Licensed
MUL240008	MaresConnect Ltd	2024	Portmarnock to Ardgillan, Dublin	The proposed maritime usage involves conducting site investigation surveys to assess various factors, including seabed suitability and stability for routing cables and other electrical infrastructure associated with the interconnector	Licensed

Reference	Applicant	Year	Location	Activity	Status
				project from the 12 nautical mile (nm) limit to the EEZ	
MUL250013 Site Ref: A-B	Uisce Eireann	2025	Baldoyle Bay and the Irish Sea	Site investigation to inform detailed engineering design for the Greater Dublin Drainage Project.	Licensed
LIC230016	Microsoft Ireland Operations Ltd	2023	Dublin Port	Geophysical survey and site investigations for a proposed subsea fibre optic cable having a landfall in Dublin Port, County Dublin and to evaluate options for the route traversing Dublin Bay, across the Irish Sea to Anglesey, Wales	Licensed
LIC230007	Dublin City Council	2024	Point Bridge and Tom Clarke	Environmental survey and ground investigation works in order to inform the design of proposed Point Bridge and Tom Clarke Widening Project	Licensed
MUL230034 Site Ref: B	Codling Wind Park Limited (CWPL)	2024	East Coast of Ireland	CWPL intends to undertake survey mobilisations at the proposed Licence Area to inform the location and detailed design of the proposed CWP OWF, export cable route, potential operations and maintenance base, potential land reclamation area at the potential onshore substation location, and additional buffer zones	Licensed
MUL240010	EirGrid PLC	2024	Dublin Bay from Blackrock Park to Shellybanks	Site investigation works to inform the engineering design and environmental assessments of a proposed electrical cable circuit crossing Dublin Bay.	Licensed
MUL230034	Codling Wind Park Limited (CWPL)	2024	East Coast of Ireland	CWPL intends to undertake survey mobilisations at the proposed Licence Area to inform the location and detailed design of the proposed CWP OWF, export cable route, potential operations and maintenance base, potential land reclamation area at the potential onshore substation location, and additional buffer zones	Licensed
MUL250003	Dun Laoghaire Rathdown County Council	2025	Dún Laoghaire Harbour	Schedule 7 (3): Marine environmental surveys for the purposes of site investigation – to undertake a suite of marine site investigation activities to assess the feasibility of potential future dredging within the harbour.	Licensed

Table 51. Developments identified on the EIA Portal – Directive 2014/52/EU proximate to the proposed survey works

Reference	Applicant	Year	Location	Activity	Status
2025125	Portmarnock Real Estate Developments Limited	2025	At lands in the townland of Maynetown, Portmarnock, County Dublin, and partially in the townland of Stapolin, Baldoyle, Co. Dublin.	LRD proposal comprising 296no. residential units, public open space, vehicular access and assoc. works, new temporary rising main of c. 1.7km.	Consented

Table 52. Developments identified on the An Coimisiún Pleanála Portal proximate to the proposed survey works

Reference	Applicant	Year	Location	Activity	Status
312131	Irish Water	2025	Townlands of Clonshagh, Dubber and Newtown, County Fingal and Dublin City	Greater Dublin Drainage Project consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility	Grant Perm. w/ Conditions

In relation to **Planning Ref No. F23A/0215**, an NIS was prepared for the development by SLR Consulting Ireland, which concludes the following: *‘Based on the available scientific information and project details, we submit that the competent authority has sufficient information to allow it to determine that the proposed activities and rock armour revetment maintenance and repair works, individually or in combination with other plans or projects, will not have an adverse effect on the integrity of or pose a risk of likely significant effects on Baldoyle Bay SAC or Baldoyle Bay SPA, or any other European (Natura 2000) sites.’*

In relation to EIA **Ref No. 2025125 (Planning Ref No. LRD0058/S3E)**, an NIS was prepared for the development by Brady Shipman Martin, which concludes the following: *‘This report concludes on the best scientific evidence that it can be clearly demonstrated that no elements of the project will result in any impact on the integrity or Qualifying Interests/Special Conservation Interests of any relevant European site, either on their own or in-combination with other plans or projects, in light of their conservation objectives.’*

In relation to The Greater Dublin Drainage Project (**ACP Ref No. 312131**), an NIS was prepared by RPS. The NIS concludes the following: *‘It is therefore concluded, beyond reasonable scientific doubt, that the proposed project with the implementation of the prescribed mitigation measures will not give rise to significant impacts, either individually or in combination with other plans and projects, in a manner which adversely affects the integrity of any designated site within the Natura 2000 network.’*

In addition to the above projects, the following plans and policies were reviewed and considered for possible in-combination effects with the Proposed Development:

- The South Coast Designated Maritime Area Plan for Offshore Renewable Energy (SC-DMAP)
- Project Ireland 2040: National Marine Planning Framework
- Project Ireland 2040: National Planning Framework

8.3 Pathway Identification

The proposed cable survey route is in an area that experiences existing vessel activity (due to proximity to Malahide Marina and Howth Harbour). Given that intertidal elements of the proposed survey works are located within the intertidal of Portmarnock Beach (Velvet Strand), there is a potential hydrological pathway from the research vessel to designated conservation sites located within Malahide Estuary. These conservation sites are located downstream of a number of terrestrial planning applications outlined in Table 46. In the marine offshore subtidal of Malahide Estuary and the Irish Sea, there is a potential hydrological pathway from the research vessel to marine-based conservation sites within the Irish Sea. No Foreshore applications are within the corridor of the proposed survey works. The survey corridor partially overlaps with the approved **MUL240008 & LIC230018**, and is proximate to the approved **MUL250013**.

There are no other projects, identified within the Foreshore Licence applications, EIA portal, ACP or MARA planning records, that have been granted planning or currently under construction, located within the ZOI of the proposed survey works.

8.4 Impact Identification

The potential impacts of the proposed survey works are Temporary (i.e. Effects lasting less than a year) and primarily to occur during the brief survey period (with the presence of boats, machinery and personnel in the vicinity of the works) as sediments redistribute over sampling areas. Impacts on infauna would be deemed to be temporary (i.e. Effects lasting less than a year). No maintenance or decommissioning works are associated with the proposed survey works.

It is noted that there is the remote potential for proposed plans and projects within the offshore subtidal waters off Co. Dublin to have cumulative disturbance impacts on marine mammals and seabirds. However, the core strategy, policies and objectives of relevant Planning Frameworks have been developed to anticipate and avoid the need for developments that would be likely to significantly affect the integrity of any European site. Furthermore, such developments are required to conform to the relevant regulatory provisions and implement mitigation for the prevention of pollution, nuisance or other environmental effects likely to significantly affect the integrity of European sites. In addition, sustainable development is inherent in the objectives of all development plans within Irish waters in addition to compliance within the Habitats and Birds Directives. As a result, there are no projects identified within Fingal County Council, Foreshore Licence applications records, or MARA planning records that have been granted planning permission or are currently under construction, proximate to the proposed survey works, that could potentially cause significant in-combination effects on European sites.

8.5 Prediction

The survey works would not be seen to have a significant impact on the water quality of the area, including affecting the water quality status. Given the scale and the temporal nature of the proposed survey works, no significant in-combination effects with other identified plans or projects are foreseen. Any potential impacts from a pathway that the research vessel may share with projects identified in Tables 46 - 50 are considered to be minimal, and no significant in-combination effects on designated conservation sites are foreseen.

8.6 Assessment

The projects outlined above are either completed or are currently going through planning stages and are not expected to be carried out concurrently, or are not at a scale or location, where significant in-combination effects are foreseen with the proposed project. This report pertains to survey works for the proposed route for a marine fibre optic cable in subtidal and intertidal habitats. As can be seen from the use of the Best Available Techniques and mitigation measures during survey works, considerable effort has gone into minimising the potential environmental impact of the project. *“Generally all mitigation measures applied for individual cables also contribute to reduction of cumulative impacts”* (OSPAR, 2012).

No likely in-combination effects are foreseen from the project in conjunction with other projects.

9. Mitigation Measures & Monitoring

Specific controls will be incorporated into the proposed project to minimise the potential negative effects on the Qualifying Interests of the Natura 2000 sites screened in for NIS. These measures are outlined below.

Minor short-term impacts may result as a consequence of the survey phase of the project, but these are not believed to be at a scale to impact on the integrity of the Natura 2000 sites, their protected species or site-specific conservation objectives. However, following the precautionary principle, mitigation measures have been developed to minimise the ecological impacts of the project, in relation to Natura 2000 Annex habitats and species. This is primarily as a result of potential disturbance impacts to marine mammals and protected seabirds, potential physical impacts on intertidal / subtidal habitats within Natura 2000 sites, and the potential for pollution within the marine environment.

Intertidal Works

As was seen during the fieldwork, the beach on which the intertidal works are proposed to be carried out on is moderately exposed with coarse sand, proximate to public car park areas. Human activity and canine (off-leash) activity was noted on-site. The site is a popular coastal walking site. It would be expected that increased human activity on the beach and the proposed access route to the beach for a single tidal cycle would not significantly impact on bird populations due to the high levels of existing activity on site. However, there is potential to impact on habitats in the absence of mitigation. As a result, the following mitigation measures will be implemented:

Disturbance

The proposed survey routes are within a popular beach with existing high levels of canine and human activity and vehicular access. As a result, the presence of additional personnel/machinery on the shore would not be thought to cause a significant additional disturbance. However, there is potential for physical disturbance of the intertidal habitat, and as a result, the following mitigation measures would be carried out:

1. An ecologist would be on-site during the surveys in order to minimise disturbance and ensure site integrity is maintained. Prior to the commencement of the works (min 1 week's notice), the NPWS will be informed of the proposed works.
2. If access is required, the ecologist will supervise the access across the beach to ensure matting is in place and the machinery does not stray from the existing informal vehicular track.
3. A track will be marked out by the ecologist prior to machinery accessing the beach. This will be marked out prior to access of personnel and machinery to the shore to avoid the qualifying interests of the SAC.
4. Drift lines and vegetation on the shore in close proximity to the proposed route would contain the highest proportion of potential food sources for bird species. If present, these should be avoided by machinery and personnel.
5. The surveys should commence on a receding tide. This is to ensure all operations are done within one tide. Operations must be completed before an incoming tide when many of the birds return to feed. This should result in the site investigations being imperceptible following a single or several tidal cycles.
6. Any temporary access arrangements or structures that are put in place to allow machinery access to the beach area should be prepared in consultation with an ecologist, and the site should be fully reinstated post-works.
7. Roosting birds, if present in the vicinity of the works, will not be disturbed. The ecologist will ensure that roosting birds are not impacted by the works.

Reinstatement

Reinstatement of the terrestrial and intertidal habitat will be carried out to pre-survey conditions. Any concerns in relation to the survey process or resulting reinstatement of the habitat to pre-survey conditions will be raised with NPWS by the project ecologist prior to the removal of personnel from the site.

Subtidal

1. A certified Marine Mammal Observer (MMO) will be onboard the vessel at all times in Irish waters to implement standard NPWS marine mammal mitigation measures. “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters” (NPWS, 2014) will be applied to ensure noise introduced into the marine environment have minimum effect.
2. Mitigation measures will include the presence of a MMO onboard the vessel. The purpose of the MMO is to ensure that there is no disturbance of seal /cetacean or other Annex IV species e.g. marine turtles, to ensure that project anthropogenic noise is minimised.
3. In line with “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters” (NPWS, 2014) “Sound-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible” and “in waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO”.
4. A project ecologist (separate to the MMO) with sufficient ornithological expertise in the identification of diving seabirds will be onboard. Where the ecologist observes a significant cluster of actively diving birds in the works corridor, within 500 m of the vessel works will be mitigated based on the instruction of the ecologist. This could include slowing vessel speed or pausing works if there is potential for significant effect on birds.
5. Sufficient resources will be made immediately available on the vessel to deal with accidental oil spills, including hydraulic hoses bursting etc. and reported to the on board ecologist.

10. Natura Impact Statement Conclusions

The conservation objectives of Natura 2000 sites within and beyond 15km where there is a potential for significant effects of the proposed cable survey route were assessed.

In the absence of mitigation, it was determined that the project may cause localised disturbance to the habitats within Malahide Estuary SAC, Rockabill to Dalkey Island SAC, and North-west Irish Sea SPA. In addition, there is potential for minor localised disturbance to birds within Malahide Estuary SPA and North-west Irish Sea SPA that may be proximate to the works vessel during the proposed works. Additionally, there is the potential for disturbance impacts on harbour porpoise, harbour seals, bottlenose dolphin, and grey seals via underwater noise during the survey periods, in the absence of mitigation. However, these impacts are deemed to be short-term for the period of works (1 tidal cycle per beach and 3-4 days for inshore marine survey). Mitigation measures, including ecological supervision and compliance with “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (NPWS, 2014), will be carried out.

This NIS has involved the examination, analysis and evaluation of all relevant information, including a description of the proposed project, its survey methodology, the environment in which the project will be placed, Natura 2000 sites within 15 km, and has applied the precautionary principle in the preparation of the conclusion. It is the professional opinion of the author of this report that there will be no adverse effects on the integrity of any Natura 2000 sites following the implementation of the mitigation measures outlined. The implementation of standard mitigation measures, including onsite monitoring and the presence of an MMO, will be sufficient to prevent adverse effects on the integrity of Natura 2000 sites.

The mitigation measures detailed in this NIS have been carefully considered to ensure no adverse effects on the integrity of the following NATURA 2000 sites in light of the site's conservation objectives and status:

- Malahide Estuary SAC and North-west Irish Sea SPA from intertidal survey works
- Rockabill to Dalkey Island SAC and North-west Irish Sea SPA from subtidal survey works
- North-west Irish Sea SPA and Malahide Estuary SPA (potential disturbance impacts to seabirds) and,
- Rockabill to Dalkey Island SAC, Lambay Island SAC, Slaney River Valley SAC, Saltee Islands SAC, Ballysadare Bay SAC, Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, Donegal Bay (Murvagh) SAC, Galway Bay Complex SAC, West of Ardara/Maas Road SAC, Slieve Tooley/Tormore Island/Loughros Beg Bay SAC, Killala Bay/Moy Estuary SAC, Rutland Island and Sound SAC, Kilkieran Bay and Islands SAC, Clew Bay Complex SAC, Inishbofin and Inishshark SAC, Horn Head and Rinclevan SAC, Slyne Head Islands SAC, Duvillaun Islands SAC, Inishkea Islands SAC, Roaringwater Bay and Islands SAC, Blasket Islands SAC, North Anglesey Marine/Gogledd Môn Forol, Murlough, North Channel, West Wales Marine / Gorllewin Cymru Forol, Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau, Strangford Lough, Cardigan Bay / Bae Ceredigion, Pembrokeshire Marine / Sir Benfro Forol, The Maidens, Bristol Channel Approaches/Dynesfeydd Môr Hafren, South-East Islay Skerries, Lundy, Isles of Scilly Complex, Nord Bretagne DH, Mers Celtiques – Talus du golfe de Gascogne, Côte de Granit rose-Sept-Iles, Abers – Côtes des legends, Trégor – Goëlo, Baie de Morlaix, Ouessant-Molène, Récifs et landes de la Hague, Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay, Anse de Vauville, Banc et récifs de Surtainville, Côtes de Crozon, Chaussée de Sein, Cap d'Erquy-Cap Fréhel, Baie de Saint-Brieuc – Est, Chausey, Baie du Mont Saint-Michel, Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard, Estuaire de la Rance, and Récifs du talus du golfe de Gascogne (potential impact on harbour porpoise, bottlenose dolphin, grey seal, harbour seal).

Based on the assessment of the proposed survey works alone and in combination with other projects and plans, including the implementation of mitigation measures, it can be concluded that no adverse effects on the sites' integrity will arise, in view of the sites' conservation objectives.

This report presents a Stage II Natura Impact Statement for the proposed survey, outlining the information required for the competent authority to screen for appropriate assessment and to determine whether or not the proposed survey works, either alone or in combination with other plans and projects, in view of best scientific knowledge, will adversely affect the integrity of European sites.

On the basis of the content of this report, the competent authority is enabled to conduct an Appropriate Assessment and consider whether, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites conservation objectives, will adversely affect the integrity of the European site

No significant effects will arise on Natura 2000 sites, their features of interest or conservation objectives. The proposed project will not will adversely affect the integrity of European sites.

11. Data used for the NIS

NPWS site synopses and Conservation objectives of sites within 15km were assessed. The most recent SAC and SPA boundary shapefiles were downloaded and overlaid on Bing road maps and satellite imagery. A site visit was carried out on the 10th July 2026 in the landfall area.

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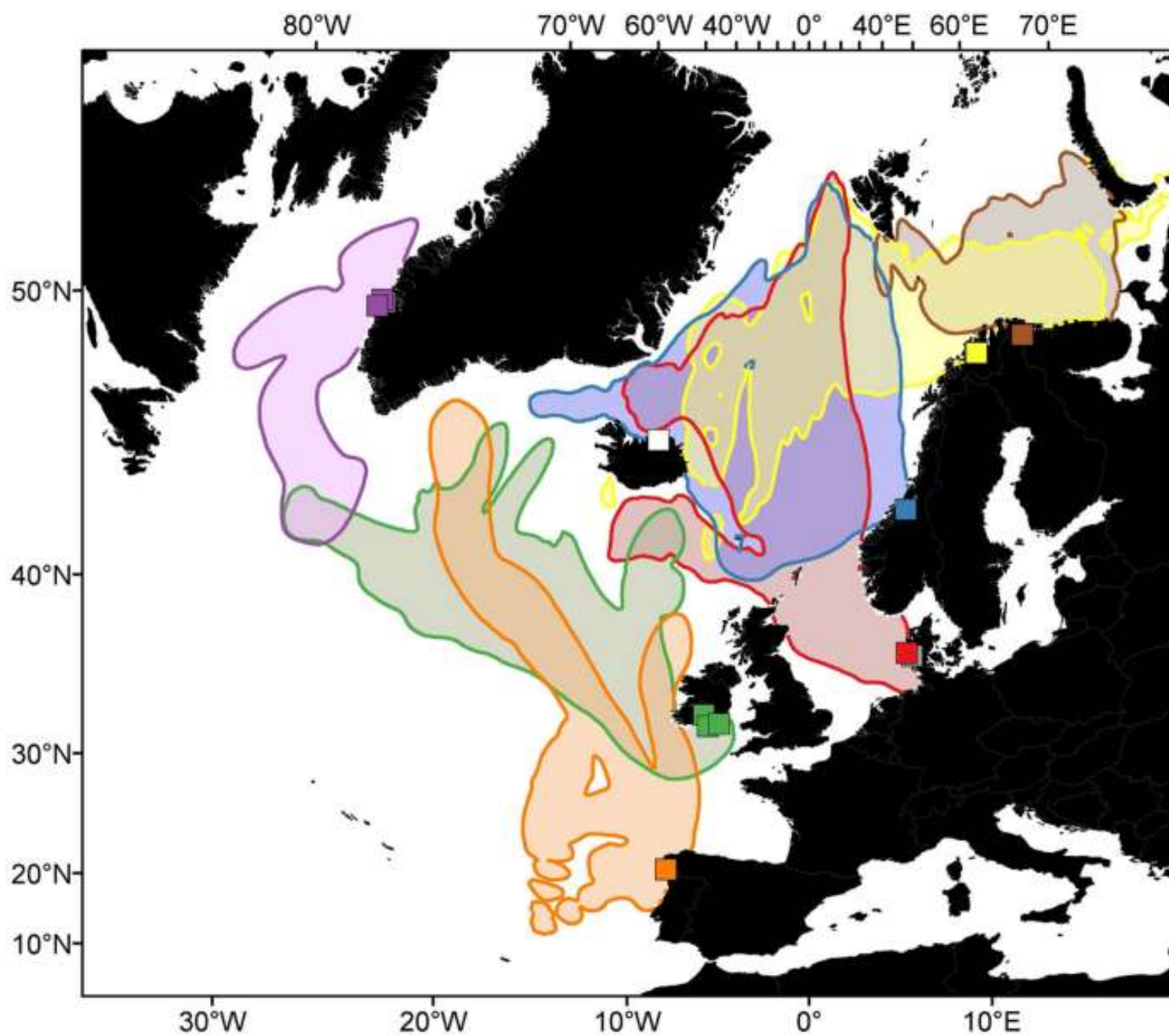


Figure A.1. Area use during the ocean migration of tagged Atlantic salmon (Ireland = Green) (Source: Rikardsen et al., 2021).