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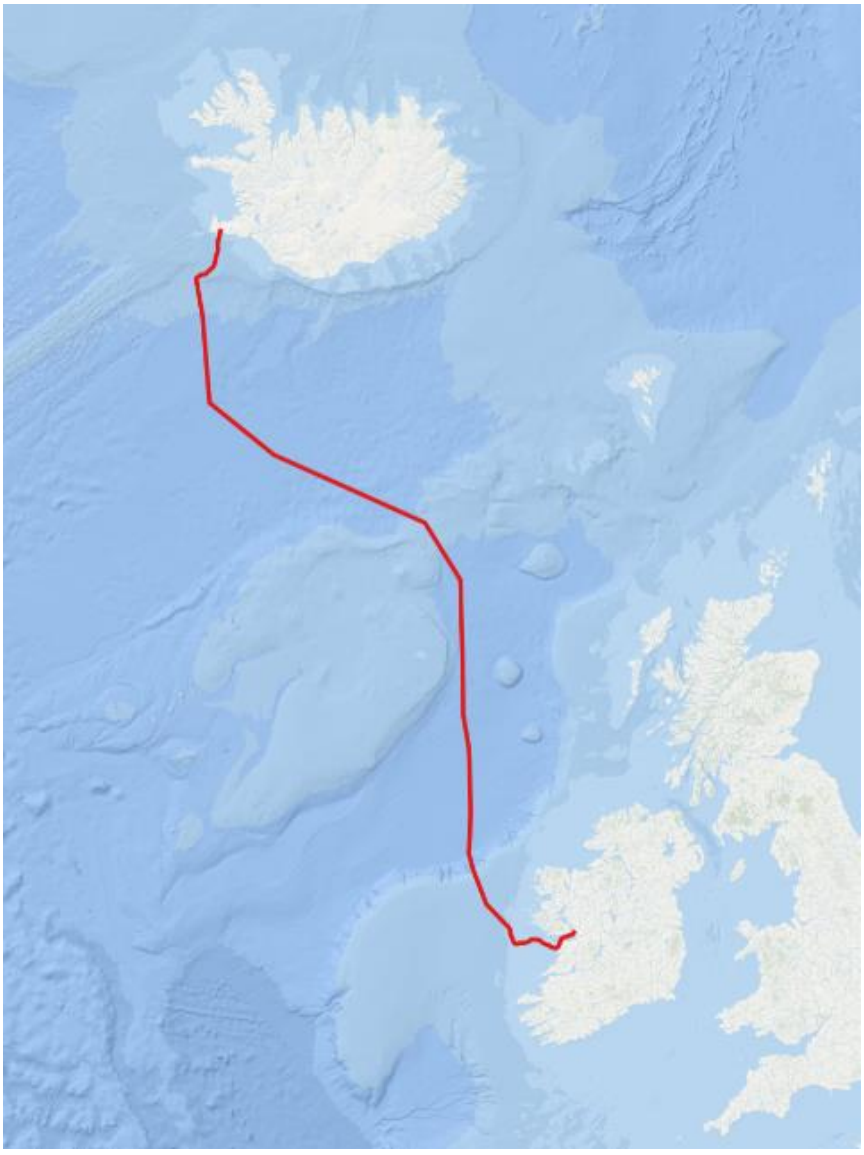
AA Screening and Natura Impact Statement for a Foreshore Licence Application for main lay for the Iris fibre optic cable with a landfall at Ballyloughane Strand, Galway Bay.



15th December 2021

Prepared by: [redacted] f Altemar Ltd.
On behalf of: Parice eni (Ltd.)

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1. Introduction

A Natura Impact Statement (NIS) is an assessment of the potential adverse effects of a proposed project or plan, on its own, or in combination with other plans or projects, on one or more NATURA 2000 sites (Special Areas of Conservation (SAC) or Special Protection Areas (SPA)).

The following Natura Impact Statement has been prepared by **Altemar Ltd.** at the request of McMahon Design & Management Ltd. on behalf of Farice ehf (Ltd) as part of the application for a Foreshore Licence. The Foreshore Licence application relates to the installation operations for the proposed fibre optic cable from Iceland to the west coast of Ireland, at Ballyloughane Strand, Galway Bay.

The proposed project will make landfall in Galway Bay Complex SAC and Inner Galway Bay SPA. The Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs have been consulted and requested a Natura Impact Statement, on potential impact of the main lay on Natura 2000 sites. Further discussions took place with NPWS in relation to further optimising the route at survey stage due to the finding of previously unrecorded subtidal sensitive communities, that are not features of interest of Galway Bay SAC, in the vicinity of the cable route. Following consultation, specific subtidal surveys were carried out in 2021 to map the distribution of the Slender sea pen (*Virgularia mirabilis*) in the vicinity of the proposed cable route. Following analysis of these survey data the project did modify the alignment of the route to minimise impact on these sensitive subtidal communities within Galway Bay.

The purpose of this AA Screening and NIS is to determine the impact, if any, of the installation of the proposed fibre-optic cable along the cable route and at the landing site in Galway Bay, individually or in combination with other plans or projects, on Natura 2000 sites. Following discussions with the National Parks and Wildlife Service (NPWS) an Ecological Impact Assessment (EcIA) was also requested in addition to this NIS. The EcIA is a standalone document and accompanies the NIS. However, it refers to sections within the NIS, so as to avoid unnecessary repetition e.g. methodology section.

Terrestrial elements of the project, extending inland from the beach manhole will form part of a separate application. The cable routing from the beach manhole will comprise the use of existing cable infrastructure (ducting) supplemented by sections of infill or linking infrastructure.

1.1 Altemar Ltd.

Since its inception in 2001, Altemar 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. [redacted] the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 26 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. [redacted] 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). [redacted] arried out all elements of this Appropriate Assessment Screening and NIS. He also carried out the cable surveys in relation to the presence of Slender sea pen (*Virgularia mirabilis*) in the vicinity of the proposed cable route. [redacted] vas part of the scientific diving team that mapped sensitive subtidal communities within Galway Bay for the NPWS in 2006. [redacted] as been involved in seven marine fibre optic projects in Ireland and UK. Many of these projects involved Horizontal Directional Drills and all works required ecological supervision.

2 Background to the Appropriate Assessment

The Habitats Directive (92/43/EEC), together with the Birds Directive (2009/147/EC), forms the cornerstone of European nature conservation policy. The Directive protects over 1000 animals and plant species and over 200 *"habitat types"* which are of European importance. In the 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 NATURA 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment:

"Any plan or project not directly connected with or necessary to the management of the [NATURA 2000] 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."

Furthermore, 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 NATURA 2000 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;*

[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.

- *Role of the site within the biographical region and in the coherence of the NATURA 2000 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 NATURA 2000 assets which must also be useful to monitor the plan or project implementation."*

3 Methodology

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 and the provision of Article 6 of the Habitats Directive 92/43/EEC (European Commission, 21 November 2018).

In order to comply with the above Guidelines and legislation, this Appropriate Assessment Screening and Natura Impact Statement must be structured as follows:

1) Screening Stage
   - Description of the proposed project or plan;
   - Identification of NATURA 2000 sites potentially affected;
   - 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 NATURA 2000 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;
   • Identification and description of in combination effects likely to result from other plans and projects;
   • 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"; and,
   • Conclusions.

4 Stage 1 Screening Assessment

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 Zone of Influence.

As outlined in 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*". In order to define the extent of the study area for ecological 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, conservatively it is not considered that the impacts of the proposed works would extend beyond 1km of the intertidal, primarily extended beyond the project footprint due to noise generation and 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*." During the cable laying process vessel speeds are slow (0.5kn). In light of this and based on the localised nature of the cable laying impacts the Zone of Influence in the subtidal was extended to 2 km either side of the cable route to take into account localised resuspension due to cable laying activity. However, a search area of 15 km was used for the gathering of information for nationally and internationally designated sites and marine mammal species.

4.2 Relevance to the County Development Plan

As outlined in the Galway City Development Plan 2017-2023 the proposed landfall is in land zoned "G1 - Open space, park" which is "To provide for recreational and amenity uses". Specific relevant objectives of the Galway City Development Plan 2017-2023 include:

Policy 9.13 Telecommunications: Support the development and expansion of telecommunication infrastructure (including the broadband network) within the city where appropriate, subject to environmental, visual and residential considerations.

Policy 4.2 Protected Spaces: Sites of European, National and Local Ecological Importance

Protect European sites that form part of the Natura 2000 network (including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC) and associated national legislation.

Ensure that plans or projects within the Plan area will only be authorised and /or supported after the competent authority has ascertained based on scientific evidence, screening for appropriate assessment and /or a Habitats Directive Assessment that:

1. The plan or project will not give rise to an adverse direct, indirect or secondary effect on the integrity of any European site (either individually or in combination with other plans or projects); or

2. The plan or project will have an adverse effect on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or

3. The plan or project will have an adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.

- Protect, conserve and promote the nationally designated sites of ecological importance, including existing and proposed Natural Heritage Areas (NHAs and pNHAs) in the city.
- Protect, conserve and support the development of an ecological network throughout the city which will improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive.
- Protect from inappropriate development the County Geological Sites in the city.
- Protect Local Biodiversity Areas, wildlife corridors and stepping stones identified in the Galway City Habitat Inventory 2005 and Galway Biodiversity Action Plan 2014-2024 in supporting the biodiversity of the city and in the Council's role/responsibilities, works and operations, where appropriate.
- Encourage, in liaison with the NPWS, the sustainable management of features which are important for the ecological coherence of the network of European Sites and essential, by their linear or continuous nature or as stepping stones for the migration, dispersal and genetic exchange of wild species.
- Support the actions of the Galway City Heritage Plan 2016-2021 and Biodiversity Action Plan 2014-2024 relating to the promotion of ecological awareness and biodiversity, the protection of wildlife corridors and the prevention of wildlife habitat fragmentation.
- Co-operate with the NPWS, landowners and stakeholders in the preparation and implementation of management plans for designated sites.
- Protect and conserve rare and threatened flora and fauna and their key habitats, (wherever they occur) listed on Annex I and Annex IV of the EU Habitats Directive (92/43EEC) and listed for protection under the Wildlife Acts 1976-2000.
- Ensure that plans and projects with the potential to have a significant impact on European Sites (SACs or SPAs) whether directly, indirectly or in combination with other plans or projects are subject to Appropriate Assessment under Article 6 of the Habitats Directive (92/43 EEC) and associated legislation and guidelines to inform decision making.
- Achieve a sustainable balance between meeting future recreational needs (both passive and active) and the protection of the city's ecological heritage.
- Support the inclusion of natural features, such as trees, hedgerows, stones walls, ponds and the use of green design features in development layouts.
- Support and implement measures to control and manage alien/invasive species within the city boundary, where appropriate.
- Protect the ecological integrity of Statutory Nature Reserves, refuges for fauna and Annex 1 Habitats.

Policy 4.3 Blue Spaces: Coast, Canals and Waterways

- Protect and maintain the integrity of the coastal environment and waterways by avoiding significant impacts and meeting the requirements of statutory bodies, national and European legislation and standards.

- Conserve and protect natural conservation areas within the coastal area and along waterways and ensure that the range and quality of associated habitats and the range and populations of species are maintained.
- Ensure development and uses adhere to the principles of sustainable development and restrict any development or use, which negatively impact on water quality.
- Have regard to European and national best practice guidance when assessing development in or near coastal areas which is likely to have significant effects on the integrity, defined by the structure and function, of any designated European Sites, protected coastal and marine fauna and flora.
- Maintain and extend the achievement of the Blue Flag Beach status in co-operation with IW.
- Ensure any development within the aquatic environment shall be carried out in consultation with prescribed bodies and with adherence to their guidelines.
- Ensure that development does not have a significant adverse impact, incapable of satisfactory mitigation, on protected species.

4.3 Description of the Proposed Project

4.3.1 Background

It is planned to construct a new sub-sea telecoms cable system, IRIS, linking Iceland to Ireland. The system is to extend from a landfall on the Reykjanes Peninsula in the south west of Iceland to a landfall at Galway on the west coast of Ireland as shown in Figure 1 below.

Route

The IRIS cable system extends from a landfall at Galway to the 12 Mile Limit off the south west corner of Connemara. The landfall at Galway is proposed to be at Ballyloughane in Renmore, to the east of the City. The route follows a westerly course from the landfall through the inner section of Galway Bay before swinging southwest towards Black Head where it turns at Kp 26 to a southerly direction to traverse the South Sound between the Clare Coast and Inis Oirr. The route turns on to a north westerly course at KP 44 and runs parallel to the Aran Islands with an offset of approximately 4.6 km. It then takes a heading west before dipping slightly south west to cross the 12 Mile Limit at KP 102.01.

The route of the cable to the EEZ boundary is presented in Figure 2 and it shows the cable staying on a westerly course for a short distance beyond the 12 Mile Limit to a turning point at KP 125 where it swings to the north west to traverse the Continental Shelf. At KP 200 it turns to a more northerly course to KP 276 at the edge of the Rockall Trough. The route then proceeds to traverse the down-slope of the Continental Shelf and on to the floor of the Rockall Trough where it turns on to a northerly course at KP 315. The cable runs northwards through the Rockall Trough to cross the EEZ boundary at Kp 561 and continues from there to the Icelandic coast and the landfall at KP1695 on the Reykjanes Peninsula.

Alternative Sites

The project has previously investigated many landfall sites on the south west and west coast of Ireland. Following a desk based and visual review, Ballyloughane Strand was selected as the optimal route. As part of the route selection process a route has been selected targeting soft sediments, allowing for burial of the cable. Burial is the preferred option in order to ensure that the cable is protected from anthropogenic activities including fishing, shipping lanes, dredged channels, anchoring etc. A foreshore licence for marine survey was granted and surveys carried out to optimise the proposed route.

Seabed Sediments

The route has been selected to primarily facilitate burial of a cable, with the cable being laid passively over reef/bedrock when required. No destructive methods are proposed in reef areas. In the area from the Ballyloughane Strand to the mouth of Galway Bay sediments are soft allowing for burial.

It should be noted that the sediments in Galway Bay (Galway Bay Complex SAC (site code: 0268)) were examined for sensitive subtidal communities. A detailed diving survey of the site was carried out in 2006 for NPWS as part of the Surveys of Sensitive Subtidal Benthic Communities in SAC's (MERC, 2006). The GIS outputs of these surveys included a detailed geospatial inventory of the dives and the boundaries of habitats encountered. This project used this geospatial habitat data to refine the cable routing within the SAC to avoid known sensitive communities. Following this routing revision, two drop-down video camera survey were carried out in 2021, to further fine tune and ground truth the cable routing, particularly in areas outside the surveys carried out in 2006 and other surveys in 2018. Fine tuning the route of the cable in relation to the distribution of the Slender sea pen (*Virgularia mirabilis*) in the vicinity of the proposed cable route out took place in February 2021. Further details of the communities encountered are detailed further in the EcIA.

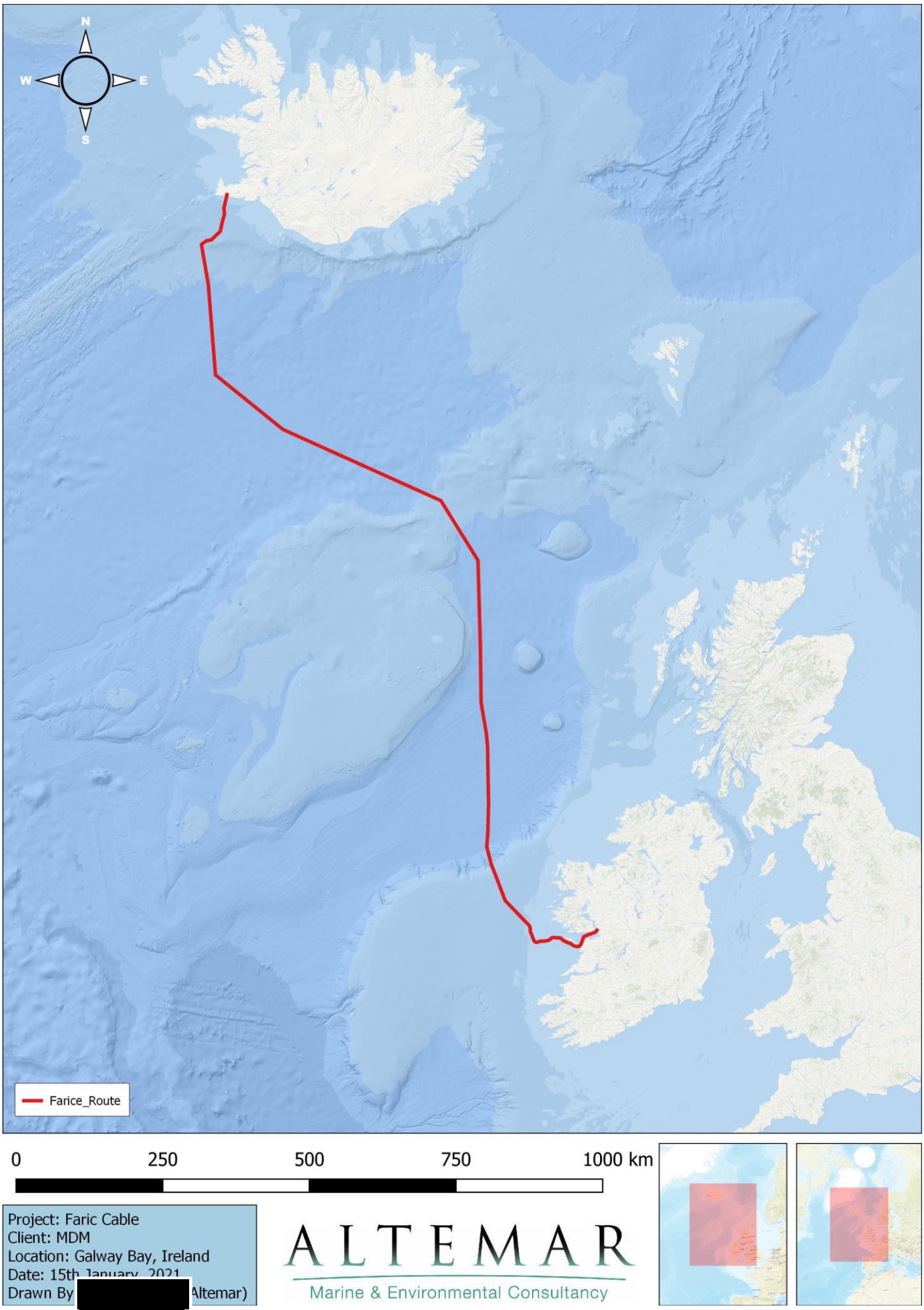


Figure 1. Schematic of the proposed network

Figure 2. Proposed route through territorial waters and into Galway Bay

Dates of proposed works

The high-level programme for the project is as follows:

- Submit Main-Lay Application: February 2021
- Contracts for Main-Lay & Cable: March 2021
- Shore-end Installation: April 2022
- Main-Lay: May – August 2022

This is the proposed overall programme but may be subject to change arising from the Licensing/Permitting process.

4.3.2 Subsea Cable Installation

The cable system is comprised of a number of specific installations as follows;

- The Landfall at Galway (Ballyloughane Strand)
- Cable Installation on the Beach
- Subsea Cable Installation

The inshore approach to the landfall is shown in Figure 25 on an Admiralty Chart base. The beach is gently sloping and extends over a distance of 560 metres to the Low Water Line (Mean Springs).

Seaward of the Low Water Line the seabed continues its gentle slope to cross the 5 metre water depth contour at 1.43 kilometres metres from the shore-line. The gently sloping sea-extends for a further 4.3 kilometres before it reaches the 10m water depth contour.

The line of the planned route on the approach to the landfall has been developed and agreed in consultation with the Harbour Master at Galway Port with respect to navigation and future expansion of the port. This has in effect resulted in a narrow corridor in which optimal burial conditions can be achieved in the vicinity of the future Galway Port Extension.

4.3.3 Cable Landfall at Ballyloughane Strand

The proposed landfall is located at Ballyloughane Strand at Renmore in Galway City (Figure 3). Ballyloughane Strand is sheltered by Mutton Island and causeway from sea conditions generated by westerly winds. It is sheltered from the south by Hare Island and the causeway connecting it to the shoreline. The beach is exposed to sea conditions generated by south westerly winds but the fetch is quite short and the water depths are quite shallow.

The proposed landfall is located approximately mid-way along Ballyloughane Strand. The shoreline (Figure 4) is in the form of a stable sandy beach with a low stub wall protecting a footway which defines the land-sea boundary. Inland of the footway there is a grass strip which separates the footway from end-on parking bays and a local road. This is a popular amenity area with a high level of existing disturbance.

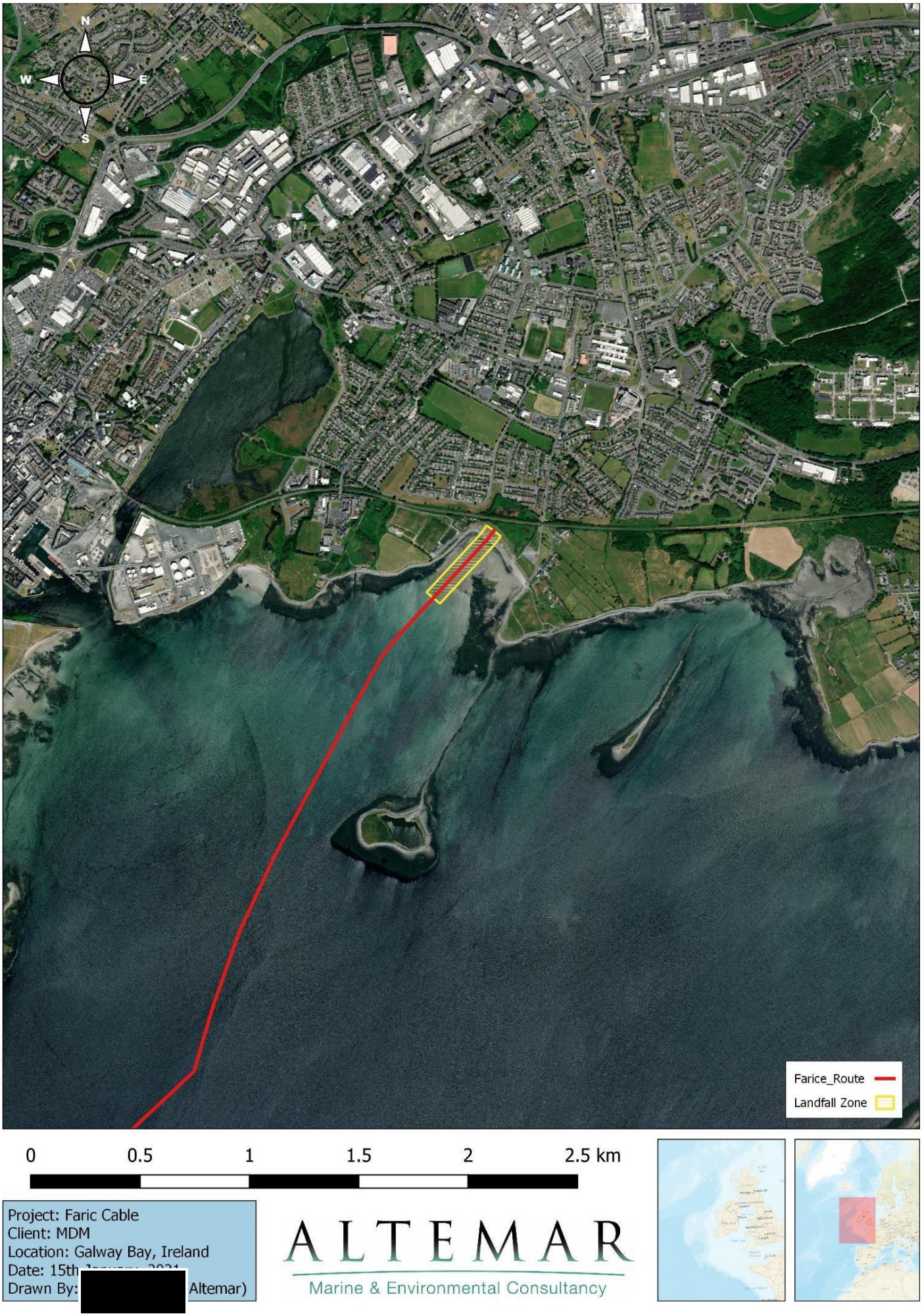


Figure 3. Landfall location at Ballyloughane, Co. Galway.

Figure 4. High and Low water marks

Cable Installation at the Beach

Horizontal Directional Drill

Taking the features of the shoreline into account, it is planned that the landfall will be installed by means of a Horizontal Directional Drill which will be carried out in advance of the main-lay, i.e. Advance Marine Works. It is planned that the drill rig will be located in the "green" immediately north of the car park. The drill-casing will commence in a pit 1.5m below ground level and this will enable it to cross at 2.5m depth below the road and well below the existing beach level at the shoreline. This form of installation will avoid any excavation or damage to the shoreline and will ensure that nothing is done which would impact on the stability of the shoreline.

The drill-casing will extend 170 metres beyond the shoreline and the shelving beach adjacent to it and will terminate in the flat sandy foreshore at a depth of 1.5m below beach level. Drilling seaward to that extent will ensure that there will be no impairment of use of the upper section of the beach. A schematic of the Horizontal Directional Drill is presented in Figure 5.

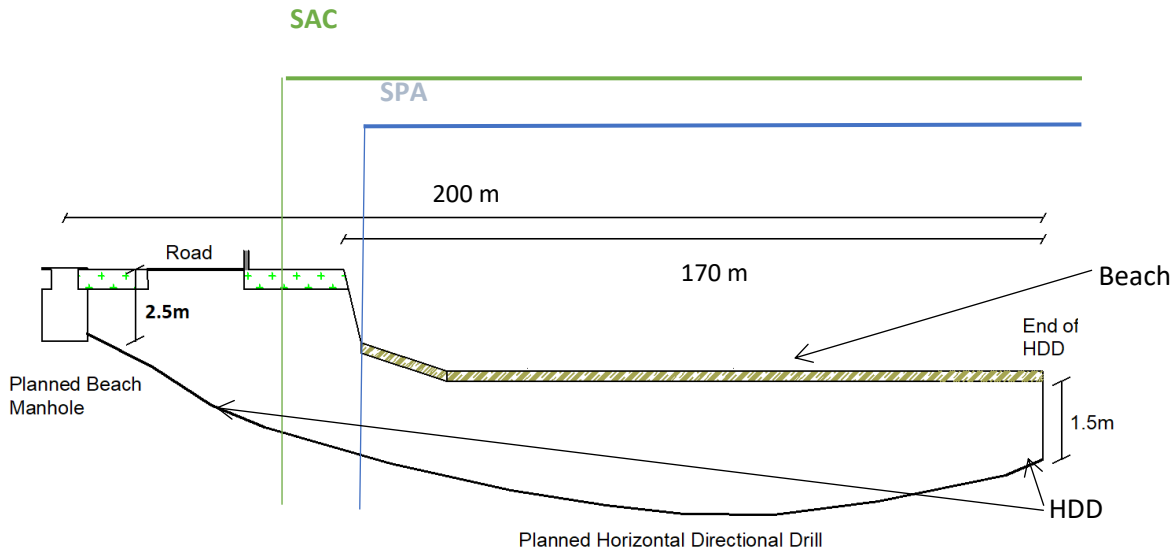


Figure 5. Schematic of the proposed HDD

The selected HDD rig for this project is a complete unit, with all the necessary equipment required for the drill formation. All consumables for the operation will be transported to the site using flatbed and closed trucks. The HDD rig will be set up in the "green" at the landward end of the cable detailed in Figure 5.

The procedure to be followed consists of three stages. First, a perimeter will be set and the site will be clearly signposted informing the general public of the work in progress, while also limiting access to the site. All the equipment necessary for the pit excavation and drill rig installation will be transported to the site. The pit will be dug and lined with geotextile and PE sheet to avoid seepage of drilling fluids in the surrounding soil. An ecologist will be on site during all beach works to highlight sensitive species or habitats in proximity to the site and to ensure there will be no likely significant effects on the integrity of these habitats/species, including the Natura 2000 sites.

The HDD rig will be placed in position and prepared for operations while rod placement will be conducted by a crane truck stationed next to the drill rod case. The produced sediment does not constitute harmful substance to the environment and the surrounding area as bentonite is a naturally occurring substance whilst all the additives employed for salt water tolerance are biodegradable. It is planned to clean out and flush the steel drill casing with water before finishing the drill. The drill will stop at the required distance and there will be no punch-out. Accordingly, no bentonite is expected to escape form the HDD bore. No machinery will be placed on the intertidal sand during the HDD. After the HDD is complete a digger will excavate the hole 1.5m deep at the site of the termination of the HDD.

Drilling Fluids

Drilling Mud Mixing and Preparation

The preparation of drilling mud requires the use water, drilling additives and a mixing unit. The drilling additives to be used contain 98% bentonite in the form of small particles. There are three components to be added to the drilling mud with different functions regarding borehole stabilization, cuttings removal and fluid characteristics. All components are biodegradable and environmentally safe. However, if released in large quantities to the aquatic environment it could potentially impact fish and or invertebrate species by impacting on the oxygen transfer on gills by coating the membrane surface. In case of the landfall at Ballyloughane the total volume of the HDD casing will only amount to 1.90 cu metres.

The main components are:

1) *Soda Ash:* In case that the freshwater available in the area has a relatively high concentration of Ca and Mg ions (to be assessed prior to commencement), soda ash, i.e. sodium carbonate, is added to the mix to help raise pH and reduce ionic content, countering in such way the effects on the other additives.

2) *HEADS Teqgel Special*: This is the main bentonite component that is designed for environments rich in calcium, and will provide the bentonite necessary to form the borehole wall. It is an effective viscosifier and stabilizer in low consolidate, porous formations resulting in low water loss levels and excellent carrying capacity at low annular velocities. It also provides effective lubricity for the drill head.

3) *HEADS Teqbio XC:* This is an additive designed for maintaining better cutting suspension and borehole consolidation in salt and brackish water environments. As a biodegradable polymer, it is the chief moderator of the rheological characteristics of the drilling mud and content will be adjusted based on the returning mud's characteristics and the derived hole-cleaning rate.

Noise Generation

During the HDD there are 5 potential sources of noise. The following noise levels at distance were calculated using the formula*:

Sound level L and Distance r

$$L_2 = L_1 - |20 \cdot \log\left(\frac{r_1}{r_2}\right)| \qquad L_2 = L_1 - |10 \cdot \log\left(\frac{r_1}{r_2}\right)^2|$$

$$r_2 = r_1 \cdot 10^{\left(\frac{|L_1 - L_2|}{20}\right)} \qquad r_1 = \frac{r_2}{10^{\left(\frac{|L_1 - L_2|}{20}\right)}}$$

Sound Source	dB@ 2m	dB @ 1km
HDD Rig	80	26
4 No. Pumps	65	11.02
Mud Pump	85	31.02
Shale Shaker	80	26
Generator	75	21.02

* However, it should be noted that this formula does not take into account weather which may increase or decrease perceived sound levels at distance. However, this is expected to be negligible, especially when considering ambient noise levels.

Data pertaining to the Horizontal Directional Drill is as follows;

- Length of Horizontal Directional Drill – Approximately 200m
- Internal diameter of Drill-Casing – 109mm.
- Drill-Casing Material S-135 High Strength Steel.
- Length of individual Drill-Casing Pipes – 6.1m.
- Entry Angle – Less than 10°.
- Descent Angle – Less than 15°
- Ascent Angle – Less than 15°.
- Exit Angle – Less than 10°.
- Composition of drilling fluid – 60 to 70kg Bentonite per 1m³ of water.

- Max volume of drilling fluid in HDD will be 1.9 m³.
- Expected drilling rate – Approx. 100m/day.
- Planned working hours – 12 hours/day.

Site Preparation & HDD Rig Set Up
The procedure to be followed consists of four stages;

1. A perimeter will be set up and the site will be clearly signposted informing the general public of the work in progress while limiting access to the site.
2. The minimum area necessary will be utilised to reduce the impact of the works.
3. All the equipment necessary for the drill pit and drill rig installation will be transported to the site by public road pending the excavation of the pit and the final positioning of all necessary tools and equipment.
4. The pits will be dug and lined with geotextile and polyethylene sheet to prevent any seepage of drilling fluids into the surrounding soil.

HDD Operations
The drilling process will be closely monitored and logs will be kept over the entire duration of the operations. The drill design will be followed so that the achievable drill will be within acceptable tolerances. The bore alignment will follow the reference alignment shown on the plans and will be accurate to within the following tolerances:

- The bore entry angle will not exceed fifteen (15) degrees
- Installation of the horizontal directional drill will be within 1 m of the centreline of the bore indicated on the drawings at the bore entry.
- Installation of the horizontal directional drill will be within 3 m of the centreline of the bore indicated on the drawings for the entire length of the bore.
- The bore exit angle will be maintained at ten (10) degrees or flatter.

Drill Head Tracking System
The method employed to monitor the progress of the HDD necessitates the use of a wire-line connected transmitter system in order to provide sufficient data so that the drill bit's relative position is recorded in real-time throughout the entire drilling operation. A non-magnetic sonde will be installed on an adaptor casing following the mud motor attachment in the bore and wire-lined back to the HDD Rig.

This sonde is responsible for transmitting a signal to provide real-time information regarding the drill bit's azimuth, vertical distance from the receiver (which is translated as depth) as well as its coordinates (Latitude – Longitude). All information transmitted is constantly displayed in a remote monitor mounted on the HDD machine so that the operator is always aware of the precision of the bore's progress.

Drilling Fluid/Bentonite
Bentonite is commonly used as drilling mud to lubricate and cool cutting tools, to remove cuttings and help prevent blowouts. Bentonite is a ground naturally occurring clay. It is inorganic, non-toxic and non-irritating. It has a specific gravity of approximately 2.4 and comes in the form of a grey powder. It expands when wet and, when mixed with water at a concentration of the order of 60-70kg of bentonite powder per m³ of water, it takes on the characteristics of a gel. Bentonite is widely used in the construction industry as a drilling fluid, as a lining for the base of landfills and for the construction of curtain walls to waterproof below-grade excavations.

Drilling Fluid Containment
It is planned to clean out and flush the steel drill casing with water when it reaches its target length and a temporary pit will then be excavated at the exit location using a JCB or similar mechanical excavator. Whilst it is anticipated that no bentonite will escape from the HDD bore which will be 1.5 m below the sand surface, any residue which may escape will be very little and will be contained in the exit pit.

When the HDD reaches its target length the steel drill casing will be cleaned and flushed with water prior to terminating the drilling. There will be no punch-out. Drilling will stop and a small excavation made on the beach using a JCB or similar mechanical excavator to reach the end of the pipe. The drill head will be removed, a messenger line inserted and a cap placed on the end of the pipe. Whilst it is anticipated that no bentonite will escape from the

HDD bore which will be 1.5m below the sand surface, any residue which may escape will be very little and will be contained in the excavation hole and removed. The drill will be timed so that there will be no water will be over the drill head during intertidal HDD operations. All necessary precautions shall be put in place to protect other foreshore users in accordance with relevant Health and Safety Legislation with temporary fencing, barriers and signage in place around the location of the reception pit. A project ecologist will be on site for the entire duration of the HDD and beach operations.

On-Shore Bentonite Removal

The volume of fluids and cuttings produced during the HDD process will be removed from the on-shore drilling pit at regular intervals by way of sludge pumps and sent to the recycling unit positioned alongside the drilling pit. Solids can be optically assessed with accuracy after the fluid turbidity clears and the volume of fluids can be also calculated. All residue will be disposed of in accordance with the requirements of Galway City Council.

Completion of Advance Works

The installation of the messenger line marks the completion of the Advance Works seaward of the High Water Line. The small reception pit on the beach will be backfilled carefully using the excavated material in the presence of a marine ecologist.

Site Restoration

On completion of the HDD Works, the site will be restored to its prior condition. All materials and equipment will be removed and the site area will be cleaned and reinstated to its original condition. This will include the following:

- Remove all debris and project-related material from the site at the completion of the work.
- Remove of all evidence of machinery presence and reinstatement of the ground to its original condition.
- Replant any and all vegetation damaged during the drilling operations.
- Repair any damage to structures such as kerbs, fences, walls, gates, etc.

Beach Manhole

The beach manhole is to be constructed onshore in the gravel car park east of the road at Ballyloughane, above the High Water Mark and outside the Foreshore Limits. (Figure 5b.) The BMH will be connected to the landward end of the HDD via a 100mm HDPE duct installed in a narrow slit trench along the grass verge.

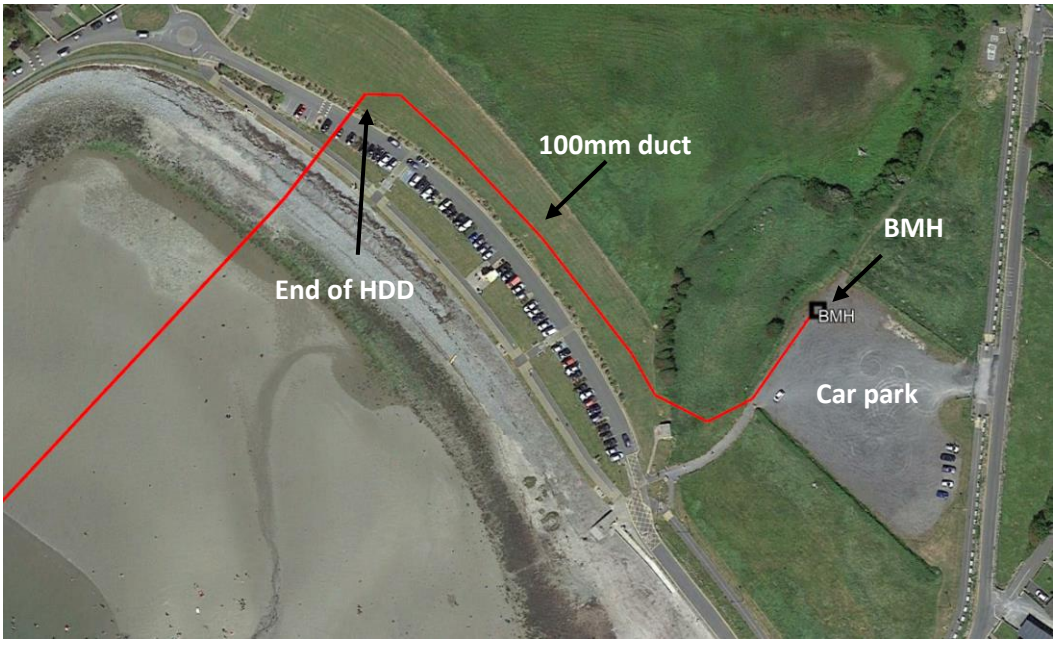


Figure 5b. Location of BMH

The beach manhole will be excavated using a JCB or similar mechanical excavator. The surface gravel will be stripped and stored to one side for reinstatement over the beach manhole and the subsoil will be removed. The Beach Manhole will be 3m long x 2m wide x 2m deep and is to be constructed in reinforced concrete using timber shuttering or formwork to build the manhole in-situ or alternatively, a pre-cast reinforced concrete manhole will be installed. Only the manhole cover will be visible at the surface once the construction is complete and the gravel car parking reinstated.

Ocean Ground Bed

An ocean ground bed is a set of electrodes which provides the return path for the electrical circuit that powers the repeaters (amplifiers) in the submarine cable system. The Environmental Characteristics of Repeater and PSBU Housing Material are seen in Appendix II. The ocean ground bed is typically buried at least 2m below ground level. The plan dimensions of the ground bed will be 6m in length and 1m in width – it is effectively a 6m long trench. This will be covered and the ground reinstated.

Inshore Cable Installation

The cable installation from the end of the HDD out to the low water line will be installed at low tide. The cable will be floated ashore from a Shallow-Draft Lay Vessel using rigid inflatable boats (ribs) and buoys at high tide. Once the tide ebbs, the end of the HDD duct will be exposed and the cable will be inserted in the HDD duct and pulled from there into the Beach Manhole where it will be secured.

The section of cable from the end on the HDD to the low water line on the intertidal will then be trenched to a target depth of 1.5m on a receding tide. Trenching beyond the low water line will be achieved by the Shallow-Draft Lay Vessel with an appropriate trenching tool such as the Sandpiper Jetsled (Figure 6). The deployment and burial of the cable will continue to the 15 metre water depth at which point the Main-Lay vessel will take over to plough-bury the cable.

Figure 6. Sandpiper Jetsled

Beach Access

There will be a requirement for equipment access to the beach / foreshore for;

- Excavation and backfill of an exit pit at the end of the Horizontal Directional Drill.
- Pulling the cable ashore.
- Installation of the cable from the end of the Horizontal Directional Drill out to the Low Water Line.

The equipment will involve tracked excavators for the pit at the end of the Horizontal Directional Drill and for pulling the cable ashore.

It is proposed that the equipment will gain access to the beach via the existing concrete slipway approximately 130 metres southeast of the line of the cable, adjacent to the car parking area (Figure 7). Existing public access arrangements to the general foreshore area shall not be impeded by plant or materials used in connection with the works and all necessary precautions shall be put in place to protect foreshore users and the public in accordance with relevant Health and Safety Legislation. It should be noted that there is considerable existing footfall in this area and the proposed route avoids saltmarsh, cobble uppershore and the main drift line areas.

Figure 7. Beach access

Offshore Cable Installation

A Pre-Lay Grapnel Run (PLGR) will be undertaken prior to commencement of Main-Lay. This activity is to ensure that the planned line of the cable is clear of seabed debris which may include chains, steel cables, anchors, nets etc. The swathe of the grapnel is less than 1 metre wide and there will be minimal disturbance of the sea-bed during the debris clearance operation. All debris recovered from the sea-bed will be hauled on board and subsequently disposed of onshore in a safe and environmentally approved manner. The PLGR vessel will use a DGPS positioning system. The route followed by the PLGR will be as close as practicable to the selected Route Position List and always within the swathe of the route survey.

Cable Installation on the Continental Shelf

The Main Lay vessel will pick up the end of the cable from the Inshore Section at the 15 metre water depth and this will then be jointed to the main cable on board the Main Lay Vessel. The jointing process takes approximately 18-24 hours to complete including tests of the cable system. The Main Lay Vessel will then proceed to deploy and bury the cable in the seabed using a sea-plough. The sea-plough is towed by the Main Lay Vessel and is designed to bury the cable at a depth such that the cable will be secure from fishing activities.

The plough uses a minimally invasive plough-share to create a furrow in the seabed approximately 750mm in width. As the plough moves forward the cable is placed in the bottom of the furrow which backfills with the natural movement of sediment on the seafloor.

Typical ploughing speed is generally of the order of 0.5 knots and is dependent on the stiffness of the seabed sediment. There is no significant noise generation during ploughing operations. Cable installation by plough produces only a minor plume of suspension of seabed sediments in the water column and this is transient and localised due to the nature of the ploughing and natural backfill activities.

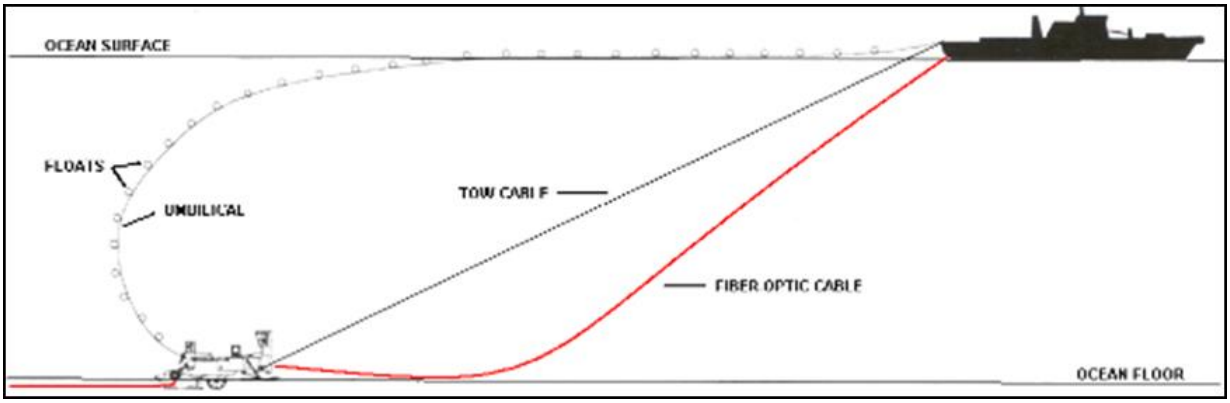


Figure 8. Offshore cable installation and plough burial

The target burial depth for the IRIS cable systems is 1.5 metres. In areas of stiff soil, the actual burial depth may be reduced but is planned to be still at a depth which will be protect the cable from fishing operations and not less than 0.7 to 0.9 metres.

Post Lay Operations

Following main lay operations, post-lay inspection and burial may be carried out in certain areas to inspect the proper laying and burial of the cable in the seabed. A post-lay burial operation may be performed in order to supplement the burial operations in the following instances:

- Planned recoveries of the burial tool, e.g. ploughshare change locations
- Initial and final splice positions within the buried sections – Post-Lay Inspection and Burial is planned for the initial splice location between the Pre-Lay Shore End and main lay section of the cable to 1.5 metre target burial depth
- Unplanned recoveries due to burial tool breakdown, weather delay, etc.
- Surface-laid sections due to sea-plough malfunction where the plough is not brought back on board.

ROV Operations

In limited areas requiring Post-Lay burial, a separate Remotely Operated Vehicle (ROV) is utilized. The ROV typically uses a jetting burial tool to bury the cable to the required depth. The seabed is emulsified in the localised region of the burial and a narrow trench is formed. The ROV burial system slowly moves along the seabed on the required cable track cutting a trench into which the cable is placed. The seabed sediment is displaced temporarily to form the trench during the burial operation and then naturally allowed to re-form and 'backfill' the trench after the passage of the ROV's burial tool. It should be noted that the surrounding seawater is used for the jetting system, i.e. nothing alien is introduced into the environment. The burial tool does not remove any seabed materials from the area. The ROV burial operation is controlled from the main vessel and monitored in real time using high definition video cameras mounted on the ROV.

Bedrock Areas

Following the initial site assessment it is proposed that geogenic reef/bedrock areas will be avoided within the Galway Bay (Inshore) SAC. Burial of the cable in sediment is possible along its entire length. Should any reef be encountered outside Galway Bay SAC, the cable will be laid passively on the reef surface.

Environmental Characteristics of SL Cable Operating Current

The SL 17 and SL 21 cables that are to be used in the project are designed to conduct system power for repeatered cable systems with a maximum operating DC current of up to 10 amps. The extremely high insulating properties of the outer polyethylene jacket prevent current leakage. Therefore, environmental effects associated with current leakage are negligible. Localized temperature effects in the vicinity of undersea cable systems have been evaluated based on the maximum powering characteristics of a cable system. The fundamental relation governing the maximum power dissipated P, in a length of cable with resistance R, and applied current I, defines the maximum value for heat dissipation. TE SubCom's SL cables exhibit very minimal temperature increase due to powering with

heat dissipation rates of less than 3 watts per kilometre of cable. As a point of reference, if a 3 watt power source is used to heat a tank containing 1,000 litres (1 cubic meter) of water, it would take more than 387 hours to heat the water one degree Celsius. The low heat output, large quantity of water surrounding the cable, and movement of water due to currents and tides result in a negligible environmental effect.

Double Armour Cable will be used in Irish waters. TE Subcom's SL cable is an industry standard core cable which is utilized in all present TE Subcom fibre optic telecommunications cable systems throughout the world. Information such as high-speed data and voice is transmitted via lightwave through the optical fibres contained within the central Unit Fibre Structure (UFS). A cut-away section of the Double Armour Cable is shown in Figure 7. The double armour, consisting of two layers of galvanised wire wrapped around the cable, is coated with hot-blown petroleum asphalt and wound with asphalt-soaked yarn. The finished DA Cable has an outer diameter of 35.9mm. The system line current will be of the order of 1 amp.

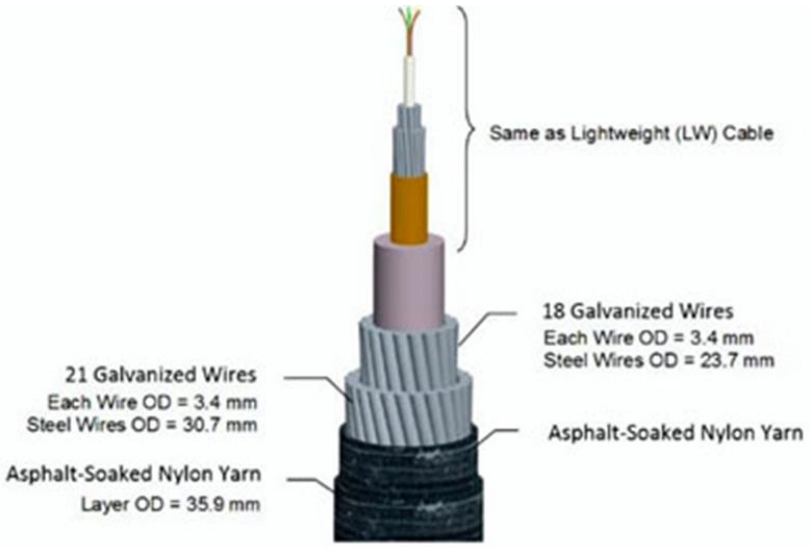


Figure 9. Cut-away section of double armour cable

The fibre-optic cable will have Repeaters approximately 80km apart. For details of the repeaters that are to be used see Appendix II. These are "Optical Amplifiers" whose primary purpose is to boost the optical signal along the route. The copper conductors inside the cable power these Repeaters. There will be a single repeater within the 12 mile limit at approximately Kp.80.

Environmental Characteristics from SL Cable Magnetic Fields

An extremely low magnetic field may be generated at the exterior of the SL cable surface during normal operation. The maximum magnetic field intensity is at the exterior cable surface and decreases inversely with distance from the cable. The magnetic fields induced by cable powering are on the order of 30 to 38 microtesla (µT) at the cable surface. These values are lower than the background magnetic field produced by the earth (60 µT). Scientific literature suggests that few species are able to detect and differentiate features of weak magnetic fields from background noise. Therefore, the magnetic fields produced by TE SubCom's SL undersea cables would not be expected to disrupt marine organisms. As an example of how the magnetic field decreases with distance from the cable, at 1 meter the magnetic field would be .30 to .38 µT or 1/100th of what it is at the surface of the cable.

Decommissioning

The projected lifespan of the cable is a minimum of 25-40 years. Once the cable has passed its operational lifespan the decommissioning procedure will follow best practice guidelines at that time. This may result in the cable being left in situ, partial recovery of complete recovery/dismantling. Subject to the best practice guidelines the appropriate consultations will take place with statutory authorities.

4.4 Identification of Relevant Natura 2000 Sites

Special Areas of Conservation within 15 km of the proposed cable route and landfall are seen in Figure 10. The locations of SPA's within 15km of the cable route are seen in Figure 11. The boundaries of the Natura 2000 sites at the proposed landfall location are seen in Figure 12. The cable route, Irish territorial waters and Irish Contiguous Zone, with a 15km buffer showing proximity to Offshore SAC's is seen in Figure 13. No offshore SACs are within 15km of the proposed route. The proximity to offshore SAC's, carbonate mounds in addition to offshore cetacean activity in vicinity of the proposed offshore cable route are seen in Appendix I. Table 1 outlines the NATURA 2000 sites within 15km of the proposed route and landfall. Due to the localised and minor nature of the impacts during the installation and operation of the fibre optic cable it is purely out of an abundance of caution that all Natura 2000 sites within 15km of the cable are assessed. No likely significant effects are foreseen on Natura 2000 sites beyond 15km due to the minor and localised nature of the works. An initial screening of NATURA 2000 sites within 15km of the proposed route can be seen in Table 2.

Table 1. Proximity to designated sites of conservation importance

Code	NATURA 2000 Site	Distance
Special Areas of Conservation		
000268	Galway Bay Complex SAC	Route passes through site
000213	Inishmore Island SAC	1.6 km
000297	Lough Corrib SAC	1.9 km
000020	Black Head-Poulsallagh Complex SAC	1.9 km
001275	Inisheer Island SAC	3.1 km
000212	Inishman Island SAC	3.3 km
002034	Connemara Bog Complex SAC	7.7 km
001926	East Burren Complex SAC	9.4 km
000054	Moneen Mountain SAC	9.6 km
000994	Ballyteige (Clare) SAC	10.5 km
000036	Inagh River Estuary SAC	10.6 km
000996	Ballyvaughan Turlough SAC	10.8 km
000606	Lough Fingall Complex SAC	11.2 km
002111	Kilkieran Bay and Islands SAC	11.8 km
001285	Kiltiernan Turlough SAC	14.3 km
Special Protection Areas		
004031	Inner Galway Bay SPA	Route passes through site
004152	Inishmore SPA	3.2 km
004005	Cliffs of Moher SPA	4.1 km
004042	Lough Corrib SPA	5.1 km
004142	Cregganna Marsh SPA	5.9 km
004181	Connemara Bog Complex SPA	9.7 km

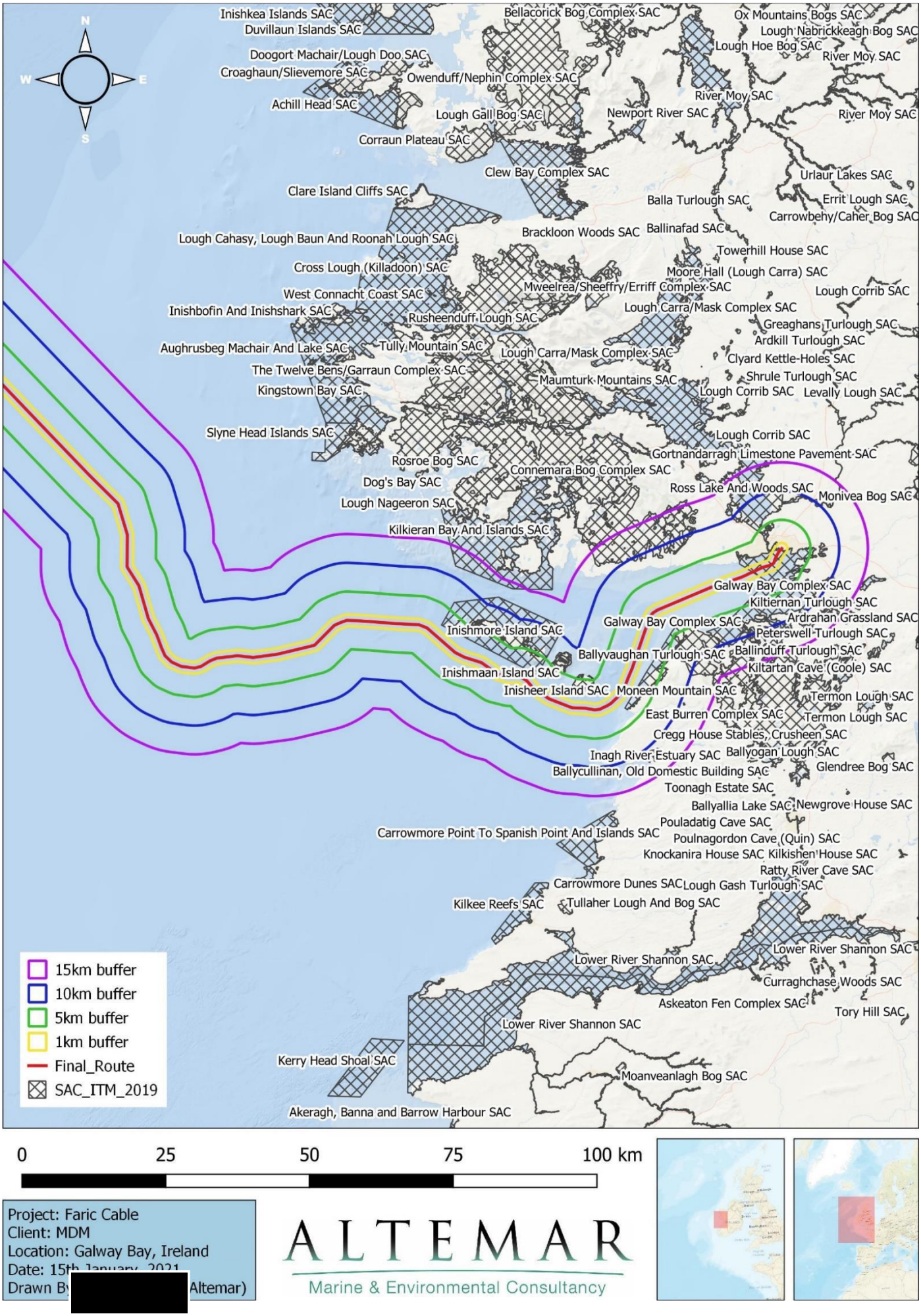


Figure 10. Special Areas of Conservation located within 15km of the proposed cable route

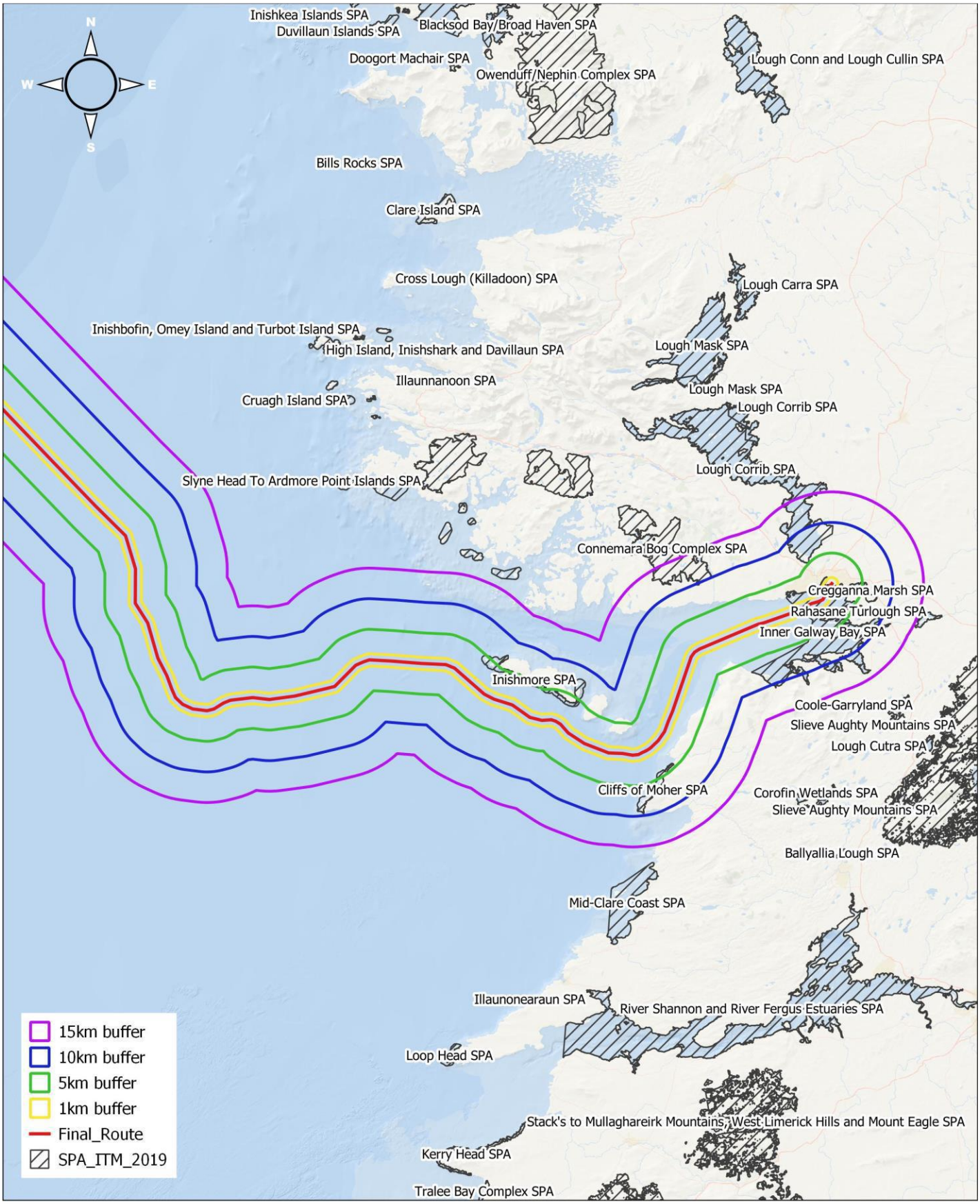


Figure 11. Special Protected Areas located within 15km of the proposed cable route

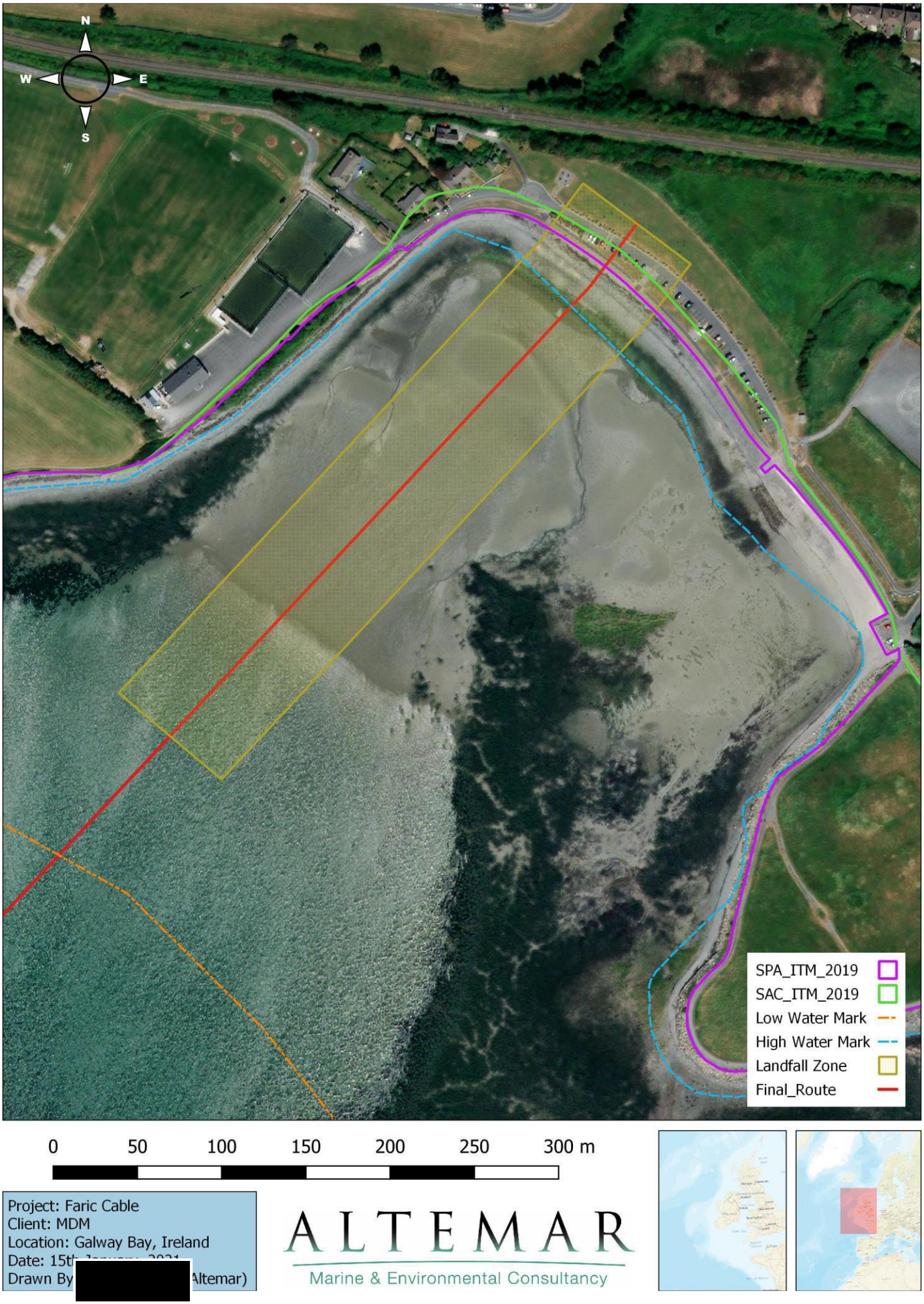


Figure 12. Natura 2000 boundaries at the landfall.

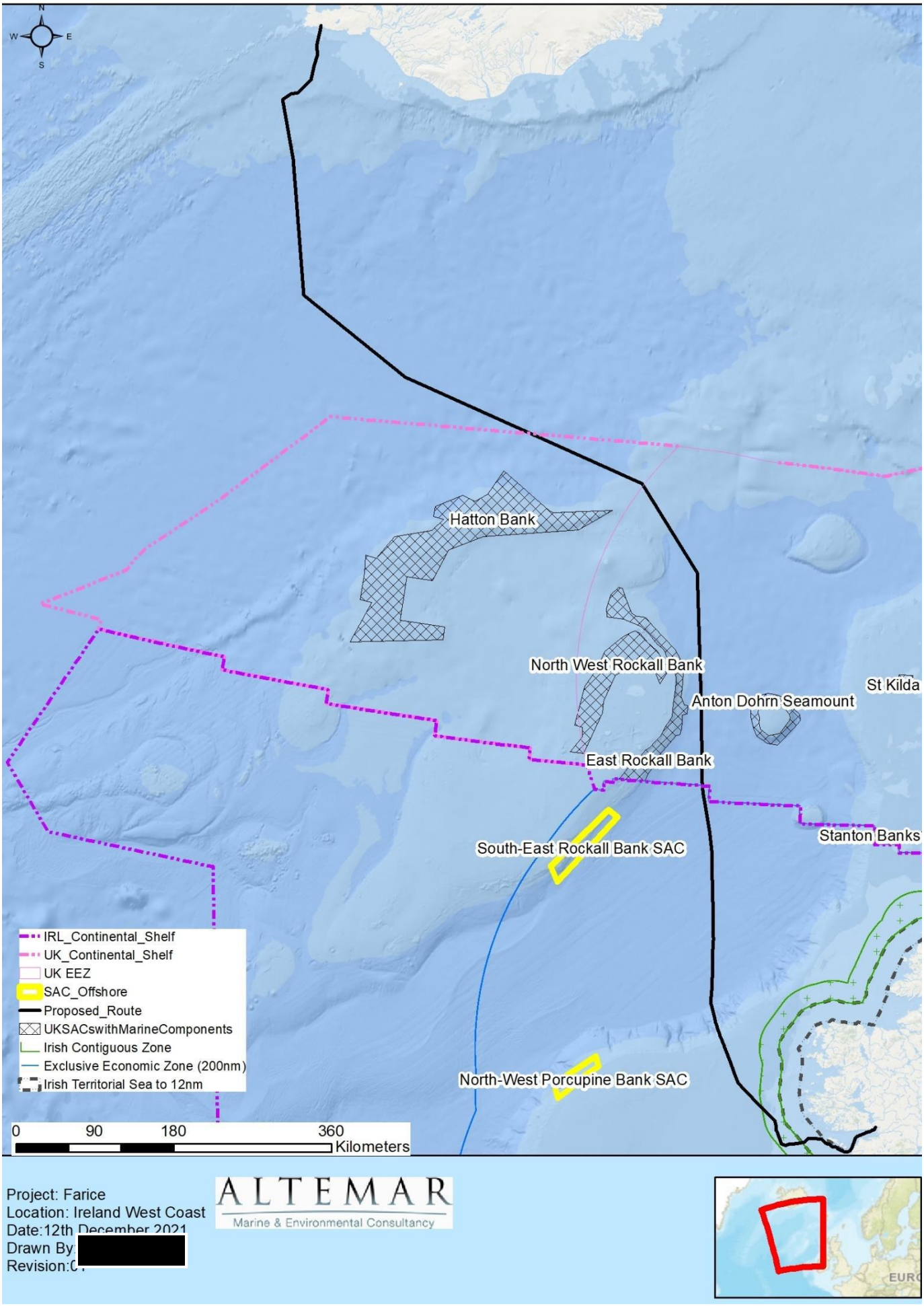


Figure 133. Fibre optic cable route in relation to EEZs, Designated Irish Continental shelf and Offshore SAC's (no offshore SAC's within ZoI or 15km).

Table 2. Initial screening of NATURA 2000 sites within 15km and NATURA 2000 sites within 15km with potential of hydrological connection to the proposed development – Screened OUT

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for likely significant effects.
Special Protection Areas			
IE004031	Inner Galway Bay SPA	**IN**	*Objective:* To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: A003 Great Northern Diver *Gavia immer* A017 Cormorant *Phalacrocorax carbo* A028 Grey Heron *Ardea cinerea* A046 Brent Goose *Branta bernicla hrota* A050 Wigeon *Anas penelope* A052 Teal *Anas crecca* A056 Shoveler *Anas clypeata* A069 Red-breasted Merganser *Mergus serrator* A137 Ringed Plover *Charadrius hiaticula* A140 Golden Plover *Pluvialis apricaria* A142 Lapwing *Vanellus vanellus* A149 Dunlin *Calidris alpina alpina* A157Bar-tailed Godwit *Limosa lapponica* A160 Curlew *Numenius arquata* A162 Redshank *Tringa totanus* A169 Turnstone *Arenaria interpres* A179 Black-headed Gull *Chroicocephalus ridibundus* A182 Common Gull *Larus canus* A191 Sandwich Tern *Sterna sandvicensis* A193Common Tern *Sterna hirundo* A999 Wetlands *Potential for likely significant effects.* The proposed landfall is within the SPA and cable route passes through this SPA. The works will be in the marine subtidal and in the intertidal element of Ballyloughane Strand, in addition to the terrestrial environment in the vicinity of the beach. The proposed works would involve machinery on a footprint of approximately 4m wide (maximum width of impact.) x 440m (distance from high tide to low tide) = 1760m^2 (0.176 ha) within which there would be a digging area within the corridor above, during a single tide of: a) End of the HDD on the beach (2m x 2m x 1.5m) i.e. 4m^2 b) Plough trench (max. 750cm x 440m) =330m^2 c) Access track (max 130m x 3m) = 390m^3 This would result in short term impacts on sediment and infauna in the immediate vicinity of the footprint of the beach works. The works are within an area of existing vessel traffic in Galway Bay and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. However, the initial assessment identifies that there may be potential for disturbance of the specific qualifying interests of this SPA through the installation activities, in the absence of mitigation measures, within the SPA. including physical impact on the intertidal and subtidal sediments within the SPA which could impact the qualifying interests of this SPA. Further information is required to assess the potential impact. **Natura Impact Statement Required**
IE0004152	Inishmore SPA	**Out**	Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for likely significant effects.
			Kittiwake (*Rissa tridactyla*) [A188] Arctic Tern (*Sterna paradisaea*) [A194] Little Tern (*Sterna albifrons*) [A195] Guillemot (*Uria aalge*) [A199] *Potential for likely significant effects.* This SPA is 3.2km from the proposed location of the cable laying. The cable laying will be in the marine subtidal and in the intertidal element of Ballyloughane Strand. The cable laying will be within an area of existing vessel traffic and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. The element of the works in proximity to the SPA will involve a cable laying vessel operating in the marine environment. The presence of a vessel 3km offshore in an area of significant vessel activity would not be deemed to have an impact on the conservation objectives of this SPA. The cable laying element nearest this site is in the marine subtidal and will not impact on the site specific conservation objectives of this site. **No likely significant effects.**
IE0004005	Cliffs of Moher SPA	**Out**	Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: Fulmar (*Fulmarus glacialis*) [A009] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200] Puffin (*Fratercula arctica*) [A204] Chough (*Pyrrhocorax pyrrhocorax*) [A346] *Potential for significant effects.* This SPA is 4.1km from the proposed location of the cable laying. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand.. The cable laying is within an area of existing vessel traffic and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. The element of the cable laying in proximity to the SPA will involve a cable laying vessel operating in the marine environment. The presence of a vessel 4km offshore in an area of significant vessel activity would not be deemed to have an impact on the conservation objectives of this SPA. The cable laying element nearest this site is in the marine subtidal and will not impact on the site specific conservation objectives of this site. **No likely significant effects.**
IE0004042	Lough Corrib SPA	**Out**	Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: A051Gadwall *Anas strepera* A056 Shoveler *Anas clypeata* A059Pochard *Aythya ferina* A061 Tufted Duck *Aythya fuligula* A065 Common Scoter *Melanitta nigra* A082Hen Harrier *Circus cyaneus* A125 Coot *Fulica atra* A140 Golden Plover *Pluvialis apricaria* A179 Black-headed Gull *Chroicocephalus ridibundus*

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for likely significant effects.
			A182 Common Gull *Larus canus* A193 Common Tern *Sterna hirundo* A194 Arctic Tern *Sterna paradisaea* A395 Greenland White-fronted Goose *Anser albifrons flavirostris* A999 Wetlands *Potential for significant effects.* This SPA is 5.1km from the proposed location of the cable laying. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand.. The cable laying is within an area of existing vessel traffic and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. The element of the cable laying in proximity to the SPA will involve a cable laying vessel operating in the marine environment. The presence of a vessel 4km offshore in an area of significant vessel activity would not be deemed to have an impact on the conservation objectives of this SPA. The cable laying element nearest this site is in the marine subtidal and will not impact on the site specific conservation objectives of this site. **No likely significant effects.**
IE0004142	Cregganna Marsh	**Out**	Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: A395: Greenland White-fronted Goose *Anser albifrons flavirostris* *Potential for significant effects.* This SPA is over 5.1km from the proposed location of the cable laying. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand.. The cable laying is within an area of existing vessel traffic and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. The element of the cable laying in proximity to the SPA will involve a cable laying vessel operating in the marine environment. The presence of a vessel 4km offshore in an area of significant vessel activity would not be deemed to have an impact on the conservation objectives of this SPA. The cable laying element nearest this site is in the marine subtidal and will not impact on the site specific conservation objectives of this site. **No likely significant effects.**

NATURA 2000 Site		Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for likely significant effects.
IE0004181	Connemara Bog Complex SPA		**Out**	Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: A017 Cormorant *Phalacrocorax carbo* A098 Merlin *Falco columbarius* A140 Golden Plover *Pluvialis apricaria* A182 Common Gull *Larus canus* *Potential for significant effects.* This SPA is over 9km from the proposed location of the cable laying. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand. The cable laying is within an area of existing vessel traffic and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. The element of the cable laying in proximity to the SPA will involve a cable laying vessel operating in the marine environment. The presence of a vessel 4km offshore in an area of significant vessel activity would not be deemed to have an impact on the conservation objectives of this SPA. The cable laying element nearest this site is in the marine subtidal and will not impact on the site specific conservation objectives of this site. **No likely significant effects.**

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
Special Areas of Conservation			
IE 000268	Galway Bay Complex SAC	**In**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: 1140 Mudflats and sandflats not covered by seawater at low tide 1150 Coastal lagoons* 1160 Large shallow inlets and bays 1170 Reefs 1220 Perennial vegetation of stony banks 1310 Salicornia and other annuals colonising mud and sand 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1355 Otter *Lutra lutra* 1365 Harbour seal *Phoca vitulina* 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 3180 Turloughs* 5130 *Juniperus communis* formations on heaths or calcareous grasslands 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(*important orchid sites) 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** 7230 Alkaline fens *Potential for significant effects.* The proposed landfall cable laying area is within the SAC and cable laying route passes through this SAC. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand. The proposed works would involve machinery on a footprint of approximately 4m wide (maximum width of impact.) x 440m (distance from high tide to low tide) = 1760m^2 (0.176 ha) within which there would be a digging area within the corridor above, during a single tide of: a) End of the HDD on the beach (2m x 2m x 1.5m) i.e. 4m^2 b) Plough trench (max. 750cm x 440m) =330m^2 c) Access track (max 130m x 3m) = 390m^2 The works would result temporary impacts on sediment and infauna within the qualifying habitat (1140 Mudflats and sandflats not covered by seawater at low tide) in the immediate vicinity of the footprint of the beach works. No physical loss of the Habitat area of 1140 Mudflats and sandflats not covered by seawater at low tide or would be foreseen. The proposed project will not cross reef habitat within the SAC. The proposed works could result in minor localised sedimentation if reef areas are adjacent to the works. However, these impacts would be localised and temporary. Harbour seal (*Phoca vitulina*) are a conservation interest of this SAC and mitigation measures are required in relation marine mammals during the proposed project.

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			The proposed cable route on Ballyloughane Beach is not within the area defined as Large shallow inlets and Bays in Galway Bay Complex SAC. However, subtidal elements of the project are within approximately 2km of the area. The sensitive communities Zostera-dominated community complex and the maërl-dominated community as outlined in and in MERC (2006) were avoided in the initial proposed cable route. However, groundtruthing of this route by video camera identified additional Maerl areas in addition to a *Virgularia mirabilis* habitat. The cable route was revised again to avoid maerl (Conservation Interest) areas. Additional video surveys have been carried out to further optimise the route in the vicinity of *Virgularia mirabilis* (not listed as a conservation interest). Rerouting of the cable has resulted following the subtidal surveys in 2021 so as to cause minimal impact on this sensitive subtidal community that is not a feature of interest of the SAC. The habitat area of the Large shallow inlets and Bays would not be impacted by the works and impacts would be temporary and in the immediate vicinity of the proposed works along the proposed cable route. The cable laying will be within an area of existing vessel traffic in Galway Bay and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. However, initial assessment identifies that in the absence of mitigation measures there may be potential for impact on the features of interest of this SAC through disturbance and the physical impact on the intertidal and subtidal sediments within the SAC and disturbance which could impact the Features of Interest of this SAC. Further information is required to assess the potential impact. **Natura Impact Statement Required**
IE 000213	Inishmore Island SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with *Salix repens* ssp. argentea (*Salicion arenariae*) [2170] Humid dune slacks [2190] Machairs (* in Ireland) [21A0] European dry heaths [4030] Alpine and Boreal heaths [4060]

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Limestone pavements [8240] Submerged or partially submerged sea caves [8330] *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] *Potential for significant effects.* This SAC is 1.6 km from the cable laying. The proposed cable laying will be in the marine environment will not impact on the conservation interests that are located in freshwater, intertidal or terrestrial habitats. In addition, in relation to the marine habitats, the proposed marine cable laying is within marine sediments in a very exposed marine environment that is subject to significant wave action. Impacts from the cable laying would be minor, localised and would not be expected to extend to the SAC 1.6km from the works. **No likely significant effects.**
IE 000297	Lough Corrib SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: **Habitats** 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites)* 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** 7220 Petrifying springs with tufa formation (Cratoneurion) 7230 Alkaline fens 8240 Limestone pavements* 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91D0 Bog woodland* **Species** 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* 1092 White-clawed Crayfish *Austropotamobius pallipes* 1095 Sea Lamprey *Petromyzon marinus* 1096 Brook Lamprey *Lampetra planeri*

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			1106 Salmon *Salmo salar* 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros* 1355 Otter *Lutra lutra* 1393 Slender Green Feather-moss *Drepanocladus vernicosus* 1833 Slender Naiad Najas flexilis *Potential for significant effects.* This freshwater SAC is 1.9 km from the proposed location of the landfall and cable laying. The proposed cable laying and will not impact on freshwater habitat, molluscan, crustacean or terrestrial conservation interests of this SAC as the proposed cable laying will be within the marine environment. In relation to anadromous fish species, sea lamprey and Atlantic salmon that utilise this SAC may be within Galway Bay at the time of cable laying. The cable laying is solely in the marine environment, vessel speeds are slow (0.5 kn) and impacts are localised in nature. Standard cable laying practice is to keep acoustic equipment on once the vessel is underway. Following commencement of the cable laying underwater noise levels would increase gradually as the vessel approaches fish species. Fish species would easily avoid the vessel as noise levels increase as speeds are slow. Minor and temporary disturbance may be caused at the mouth of the River Corrib, but at the vessel speeds proposed it would take 4 hours to reach the 10m contour, 2nm from the LWM at Ballyloughane Beach. It should also be noted that this area is beside Galway Port and biodiversity in the area is accustomed to vessels and underwater noise. This temporary disturbance would be deemed insignificant in relation to the several months over which a salmon run may occur and given the vessel activity already in the area. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. **No likely significant effects.**
IE 000020	Black Head-Poulsallagh Complex SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: 1170 Reefs 1220 Perennial vegetation of stony banks 1395 Petalwort *Petalophyllum ralfsii* 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 4060 Alpine and Boreal heaths 5130 *Juniperus communis* formations on heaths or calcareous grasslands 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(*important orchid sites) 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) 7220 Petrifying springs with tufa formation (*Cratoneurion*)

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			8240 Limestone pavements* 8330 Submerged or partially submerged sea caves *Potential for significant effects.* This SAC is 1.9 km from the cable laying. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand. The proposed cable laying will be in the marine environment will not impact on the conservation interests that are located in freshwater, intertidal or terrestrial habitats. In relation to subtidal reefs sediment disturbed by cable laying will be limited to the direct vicinity of the proposed cable laying and would not impact reefs 1.9km from the cable laying route. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. **No likely significant effects.**
IE 001275	Inisheer Island SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Coastal lagoons [1150] Reefs [1170] European dry heaths [4030] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) [6510] Limestone pavements [8240] *Potential for significant effects.* This SAC is 3.1 km from the cable laying. The proposed cable laying will be in the marine environment will not impact on the conservation interests that are located in freshwater, intertidal or terrestrial habitats. In relation to subtidal reefs sediment disturbed by cable laying will be limited to the direct vicinity of the proposed cable laying and would not impact reefs 3.1km from the cable laying route. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. **No likely significant effects.**
IE 000212	Inishmaan Island SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Embryonic shifting dunes [2110]

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Machairs (* in Ireland) [21A0] European dry heaths [4030] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510] Limestone pavements [8240] *Potential for significant effects.* This SAC is 3.3 km from the cable laying. The proposed cable laying will be in the marine environment will not impact on the conservation interests that are located in freshwater, intertidal or terrestrial habitats. In relation to subtidal reefs sediment disturbed by cable laying will be limited to the direct vicinity of the proposed cable laying and would not impact reefs 3.3km from the cable laying route. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. **No likely significant effects.**
IE 002034	Connemara Bog Complex SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: 1150 Coastal lagoons* 1170 Reefs 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) 3160 Natural dystrophic lakes and ponds 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 7130 Blanket bogs (* if active bog) 7140 Transition mires and quaking bogs 7150 Depressions on peat substrates of the *Rhynchosporion* 7230 Alkaline fens 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles **Species** 1065 Marsh Fritillary *Euphydryas aurinia* 1106 Salmon *Salmo salar* 1355 Otter *Lutra lutra* 1833 Slender Naiad *Najas flexilis* *Potential for significant effects.* *Potential for significant effects.*

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			This SAC is 7.7 km from the proposed location of the marine cable laying. The proposed cable laying will not impact on the conservation interests that are located in freshwater, intertidal or terrestrial habitats. Atlantic salmon is a conservation interest of this SAC. As outlined in the Site Synopsis "Atlantic Salmon, occurs in many of the rivers within the site. The Cashla and Ballynahinch systems are good examples of western acidic spate rivers which support the species. Good spawning and nursery grounds for the species occur in these systems. Arctic Char occurs in a number of lakes within the site: Ballynahinch Lake, Glenicmurrin Lough and Lough Shindilla. The species has also been reported from Lough Oorid and Lough Glendollagh in the past, but has not been recorded from these lakes in recent years. Arctic Char is listed as threatened in the Irish Red Data Book." The proposed cable laying will not impact on freshwater or terrestrial conservation interests of this SAC. In relation to anadromous fish species, Atlantic salmon that utilise this SAC may be within Galway Bay at the time of cable laying. The cable laying is solely in the marine environment, vessel speeds are slow (0.5 kn) for a period of 2-4 days in total and impacts are localised in nature. Standard cable laying practice is to keep acoustic equipment on once the vessel is underway. Following commencement of the cable laying underwater noise levels would increase gradually as the vessel approaches fish species. Fish species would easily avoid the vessel as noise levels increase as speeds are slow. Vessel activity in the region of this SAC is 7.7km offshore in the deeper water of Galway Bay. This temporary disturbance would be deemed insignificant in relation to the several months over which a salmon run may occur and given the vessel activity already in the area Galway Bay. It would be expected that vessels would be avoided by fish species. In relation to subtidal reefs sediment disturbed by cable laying will be limited to the direct vicinity of the proposed cable laying and would not impact reefs 7.7km from the cable laying route. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. **No likely significant effects.**
IE 001926	East Burren Complex SAC [001926]	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. 3180 Turloughs* 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 4060 Alpine and Boreal heaths 5130 *Juniperus communis* formations on heaths or calcareous grasslands

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)* 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** 7220 Petrifying springs with tufa formation (*Cratoneurion*)* 7230 Alkaline fens 8240 Limestone pavements* 8310 Caves not open to the public 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)* **Species** 1065 Marsh Fritillary *Euphydryas aurinia* 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros* 1355 Otter *Lutra lutra* *Potential for significant effects.* This SAC is 9.4 km from the proposed location of the marine cable laying. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand. The proposed cable laying will not impact on the conservation interests that are, or are located in, freshwater, intertidal or terrestrial habitats over 9km from the proposed cable laying which is in the marine environment. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. **No likely significant effects.**
IE 000054	Moneen Mountain SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: **Habitats** 3180 Turloughs* 4060 Alpine and Boreal heaths 5130 *Juniperus communis* formations on heaths or calcareous grasslands 6130 Calaminarian grasslands of the *Violetalia calaminariae* 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites)* 7220 Petrifying springs with tufa formation (*Cratoneurion*)* 8240 Limestone pavements* **Species** 1065 Marsh Fritillary *Euphydryas aurinia* 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros* *Potential for significant effects.*

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			This SAC is 9.6 km from the proposed location of the cable laying. The proposed cable laying will be in the marine environment and will not impact on the conservation interests of this SAC, which are located in freshwater and terrestrial habitats. There is no direct or indirect pathway to this SAC. **No likely significant effects.**
IE 000994	Ballyteige (Clare) SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] *Potential for significant effects.* This SAC is 10.5 km from the cable laying. The proposed cable laying will be in the marine environment and will not impact on the conservation interests of this SAC, which are located in the terrestrial. There is no direct or indirect pathway to this SAC. **No likely significant effects.**
IE 000036	Inagh River Estuary SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] This SAC is 10.6 km from the cable main lay. The proposed cable main lay will be in the marine environment and will not impact on the conservation interests of this SAC, which are terrestrial/intertidal habitats. **No likely significant effects.**
IE 000996	Ballyvaughan Turlough SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: 3180 Turloughs* * denotes a priority habitat *Potential for significant effects.* This SAC is 10.8 km from the cable laying. The proposed cable laying will be in the marine environment and will not impact on the conservation interests of this SAC, which are freshwater/terrestrial habitats. There is no direct or indirect pathway to this SAC **No likely significant effects.**

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
IE 000606	Lough Fingall Complex SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: **Habitats** 3180 Turloughs* 4060 Alpine and Boreal heaths 5130 *Juniperus communis* formations on heaths or calcareous grasslands 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (*important orchid sites)* 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** 8240 Limestone pavements* **Species** 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros* *Potential for significant effects.* This SAC is 11.2 km from the proposed location of the cable laying. There is no direct or indirect pathway to this SAC. The proposed cable laying in the marine will not impact on the conservation interests of this SAC. **No likely significant effects.**
IE 000036	Inagh River Estuary SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] *Potential for significant effects.* This SAC is 10.6 km from the cable laying. The proposed cable laying will be in the marine environment and will not impact on the conservation interests of this SAC, which are terrestrial/intertidal habitats. **No likely significant effects.**
IE 001021	Carrowmore Point To Spanish Point And Islands SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: Coastal lagoons [1150] Reefs [1170] Perennial vegetation of stony banks [1220] Petrifying springs with tufa formation (Cratoneurion) [7220] *Potential for significant effects.*

NATURA 2000 Site	Name	Screened In/Out	Conservation Objectives, Features of Interest and potential for significant effects.
			This SAC is 12.7 km from the cable laying. The proposed cable cable laying will be in the marine environment will not impact on the conservation interests that are located in freshwater, intertidal or terrestrial habitats. **No likely significant effects.**
IE 002111	Kilkieran Bay and Islands SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: 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 (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Machairs (* in Ireland) [21A0] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or Isoeto-Nanojuncetea [3130] Lowland hay meadows (Al*opecurus pratensis, Sanguisorba officinalis*) [6510] *Lutra lutra* (Otter) [1355] *Phoca vitulina* (Harbour Seal) [1365] *Najas flexilis* (Slender Naiad) [1833] *Potential for significant effects.* Vessel activity will be in the region of this SAC is 11.8km offshore in the deeper water of Galway Bay. Due to short term scale of the project, the distance from the cable laying to the SAC and the low level of impact there is no possibility of significant effects on the features of interest of this SAC. Should harbour seal from the SAC be in the vicinity of the cable laying vessel, cable laying operations will be on a 24hour basis and will be slow (0.5kn) and can be easily avoided by seals. **No likely significant effects.**
IE 000606	Kiltiernan Turlough SAC	**Out**	Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected: **Habitats** 3180 Turloughs* *Potential for significant effects.* This SAC is 14.3km from the proposed location of the cable laying. There is no direct or indirect pathway to this SAC. The proposed cable laying in the marine will not impact on the conservation interests of this SAC. **No likely significant effects.**

* denotes a priority habitat

4.5 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 were assessed. The proposed landfall cable laying is in a populated area and is a popular destination for the local community. It is a location with a regular stream of dog walkers and pedestrians on the shore. The cable laying would not be seen to have an impact on water quality of the area including impacting the water quality status. The intertidal section of this project will involve trenching (in SAC/SPA/pNHA & Ramsar site) and machinery that will enter the upper shore (within the conservation sites).

The terrestrial fibre optic cable routing from the beach manhole will comprise the use of existing cable infrastructure (ducting) supplemented by sections of infill or linking telecoms ducting of approximately 2km to connect to local and national fibre optic telecoms networks. The installation of the telecoms duct will be assessed and licenced by Galway City Council and installed in the public road or verge/footway in accordance with 'Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. (Dept. of Transport, Tourism and Sport, 2017). The terrestrial works will be carried out in advance of the marine works. There are no direct pathways from the terrestrial cable works to the European sites.

Galway City Council planning permissions, Foreshore Applications and EIA portal[2] were examined for potential cumulative impacts due to development in the area. Permission for the construction of a new playing pitch and public walkway/cycleway to the west of Ballyloughane Beach was granted on 30/05/2017. The development was to include a full-size GAA pitch with 6 no. floodlights and 2 no. ball stop nets; provision of a new public walkway and cycleway, incorporating a coastal path and circular route; extension to existing vehicle parking area; and all associated site and ground works. This application was accompanied by a Natura Impact Statement (NIS). This development was completed in the summer of 2021.

James & Breda O'Reilly have submitted a planning permission application (20221) for development to the east of the proposed landfall which "will consist of the construction of a new two storey dwelling and garage, with new access road plus wastewater treatment system and associated site works" at Ballyloughane, Renmore, Galway. The application is currently at FI stage.

No additional planning applications have been received in the past four years in the vicinity of the proposed cable laying route on Ballyloughane Beach.

DeepSea Fibre Networks Limited has applied for a Pre-installation cable laying, localised site investigations and installation of a subsea fibre optic cable also at Ballyloughane Strand, Renmore, Co Galway for the WINS cable. This project is at application stage and no works in relation to this project are planned at the same time as the Farice cable installation. An EcIA and NIS were submitted in relation to this application and no significant adverse effects were foreseen in relation to the proposed works, following the implementation of mitigation measures which includes ecological supervision. DeepSea Fibre Networks Limited was granted a foreshore licence for Pre-installation marine survey and localised site investigations for a subsea fibre optic cable at Ballyloughane Strand, Renmore, Co Galway for this proposed Farice cable to Iceland. A NIS was submitted in relation to this application and no significant adverse effects were foreseen in relation to the proposed works, following the implementation of mitigation measures which includes ecological supervision. On the 23/04/2021 the Health Service Executive submitted a Foreshore Application to deploy 6 swim buoys along Salthill promenade in support of Healthy Galway City programme which is the structure to implement Healthy Ireland at the local level (FS007100). The application is currently at Application Stage.

The potential impacts of the proposed cable laying are Temporary (i.e. Effects lasting less than a year) and primarily to occur during the brief construction period (with the presence of boats, machinery and personnel in the vicinity of the works) and over several tidal cycles as sediments redistribute over the cable. Impacts on infauna would be deemed to be temporary (i.e. Effects lasting less than a year). 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

[2] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

or location where in combination effects are foresee with the proposed project. This report pertains to the cable laying for a marine fibre optic cable in subtidal and intertidal habitats. As can be seen from using the Best Available Techniques and mitigation measures during cable laying 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.

4.6 Appropriate Assessment Screening Conclusions

An initial screening of the proposed works, using the precautionary principle (without the use of any mitigation measures) and Natura 2000 sites with the potential to result in likely significant effects on the conservation objectives and features of interest of the Natura 2000 sites was carried out in Table 2. Based on best scientific knowledge and objective information and assessment, the possibility of likely significant effects caused by the proposed project was excluded for the following Natura 2000 sites:

Special Areas of Conservation
000213 Inishmore Island SAC (1.6 km)
000297 Lough Corrib SAC (1.9 km)
000020 Black Head-Poulsallagh Complex SAC (1.9 km)
001275 Inisheer Island SAC (3.1 km)
000212 Inishman Island SAC (3.3 km)
002034 Connemara Bog Complex SAC (7.7 km)
001926 East Burren Complex SAC (9.4 km)
000054 Moneen Mountain SAC (9.6 km)
000994 Ballyteige (Clare) SAC (10.5 km)
000036 Inagh River Estuary SAC (10.6 km)
000996 Ballyvaughan Turlough SAC (10.8 km)
000606 Lough Fingall Complex SAC (11.2 km)
002111 Kilkieran Bay and Islands SAC (11.8 km)
001285 Kiltiernan Turlough SAC (14.3 km)

Special Protection Areas
004152 Inishmore SPA (3.2 km)
004005 Cliffs of Moher SPA (4.1 km)
004042 Lough Corrib SPA (5.1 km)
004142 Cregganna Marsh SPA (5.9 km)
004181 Connemara Bog Complex SPA (9.7 km)

The project is limited in scale and extent and the potential zone of influence is restricted to the immediate vicinity of the cable laying route, with the exception of underwater noise that may extend beyond the cable laying. The proposed intertidal cable laying is within Inner Galway Bay SPA and Galway Bay Complex SAC. Subtidal elements of the project are within Galway Bay Complex SAC and Inner Galway Bay SPA.

Acting on a strictly precautionary basis, NIS is required in respect of the effects of the project on the Inner Galway Bay SPA (potential disturbance to species and habitat impacts), Galway Bay Complex SAC (potential habitat and harbour seal impacts) 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.

A NIS or Stage 2 Appropriate Assessment is not required for the effects of the project on all other listed Natura sites above 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.

5 Stage II- Natura Impact Statement

A Natura Impact Statement (NIS) is Stage 2 of the Appropriate Assessment process. In the case of the proposed cable laying, acting on a strictly precautionary basis a NIS is required in respect of the effects of the project on:

- Inner Galway Bay SPA (potential disturbance of all qualifying interests (bird species) and habitat impacts and,
- Galway Bay Complex SAC (potential habitat impacts (all habitats) and mitigation measures used for harbour seal),

because it cannot be excluded on the basis of best objective scientific information, in the absence of control or mitigation measures, following screening, 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.

A Stage 2 Appropriate Assessment or NIS is not required for the effects of the project on all other listed Natura sites and those beyond 15km, 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.

The NIS evaluates the potential for direct, indirect effects, alone or in combination with other plans and projects having taken into account the use of mitigation measures. It outlines the information required for the competent authority to screen for appropriate assessment and to determine whether or not the proposed development, 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.

In order to provide sufficient objective information for the Natura Impact Statement a further review of the Conservation Objectives and features of interest, potential impacts and mitigation measures is necessary to determine if adverse effects are likely to impact on the outlined Natura 2000 sites.

5.1.1 Galway Bay Complex SAC (Site code: 000268)

The qualifying interests, their attributes, targets and the potential impact of the proposed fibre-optic cable main lay on the each feature of interest in Galway Bay Complex SAC are seen in Table 3.

Table 3. 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 Galway Bay Complex SAC.

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, 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 Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* The permanent habitat area is stable or increasing, subject to natural processes. Habitat area was estimated using OSI data as 744ha (Figure 14). *Community distribution.* Conserve the following community types in a natural condition: Intertidal sandy mud community complex; and Intertidal sand community complex. See (Figure 15) **Potential Impact** The proposed cable route on Ballyloughane Strand is within this habitat. The proposed works would involve machinery on a footprint of approximately 4m wide (maximum width of impact.) x 440m (distance from high tide to low tide) = 1760m^2 (0.176 ha) within which there would be a digging area within the corridor above, during a single tide of: a)End of the HDD on the beach (2m x 2m x 1.5m) i.e. 4m^2 b)Plough trench (max. 750cm x 440m) =330m^2 c)Access track (max 130m x 3m) = 390m^3 No intertidal infaunal species data was present in the Inner Galway Bay SPA Conservation Objectives which overlaps with a portion of this habitat in the SAC. During the Altemar survey *Arenicola marina* appeared abundant on the lower shore during on site survey. The access route and ploughing of a trench along the intertidal will result in a temporary compression of sediment due to machinery and remixing of sediment due to trenching. It would be seen that any impacts would be short-term and would not significantly impact the community within the medium or long term. The HDD would terminate in this habitat 1.5m below the surface, with no “punch out”. Mitigation measures will be in place (Section 6 of NIS) to minimise potential minor adverse impacts. No significant adverse effects are foreseen on the attributes or targets of Mudflats and sandflats not covered by seawater at low tide in Galway Bay Complex SAC.

Annex Species/Habitats-Qualifying Interest	Overall Conservation Status	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
[1160] Large shallow inlets and bays	**Inadequate**	**To maintain the favourable conservation condition of Large shallow inlets and bays in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* The permanent habitat area is stable or increasing, subject to natural processes. *Community extent.* Hectares Maintain the extent of the Zostera-dominated community complex and the maërl-dominated community, subject to natural processes. *Community structure:* Zostera density. Conserve the high quality of Zostera-dominated communities, subject to natural processes *Community structure:* Biological composition Conserve the high quality of the maërl-dominated community, subject to natural processes *Community distribution.* Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Intertidal sand community complex; Fine to medium sand with bivalves community complex; Sandy mud to mixed sediment community complex; Mixed sediment dominated by Mytilidae community complex; Shingle; Fucoid-dominated community complex; Laminaria-dominated community complex; and Shallow sponge-dominated community complex. **Potential Impact** The proposed cable route on Ballyloughane Beach is not within the area defined as Large shallow inlets and bays in Galway Bay Complex SAC (Figure 17). However, subtidal elements of the project are within the area. The sensitive communities Zostera-dominated community complex and the maërl-dominated community as outlined in (Figure 15) and in MERC (2006) were avoided in the initial proposed cable route. However, groundtruthing of this route by video camera identified additional Maerl areas in addition to a *Virgularia mirabilis* habitat. The cable route was revised again to avoid maerl (Conservation Interest) areas. Additional video surveys have been carried out to further optimise the route in the vicinity of *Virgularia mirabilis* (not listed as a qualifying interest of this SAC). Rerouting of the cable has resulted following the subtidal surveys in 2021 so as to cause minimal impact on this sensitive subtidal community that is not a feature of interest of the SAC. Minor sedimentation may occur in the vicinity of the cable route. Mearl distribution in the area was sparse, as observed by video surveys and given the shallow nature of the area within Galway Bay impacts of sedimentation would be temporary and not significant due to wave action within the shallow elements of Galway Bay. The proposed cable route will pass through Intertidal sandy mud community complex, Sandy mud to mixed sediment community complex, and Mixed sediment dominated by Mytilidae community complex within the SAC. The burial of the cable will be by marine

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		plough at a speed of 0.5kn. Short term disturbance of these habits will occur as a result of the burial of the cable which would result in compression and suspension of sediment within the immediate vicinity of the cable route corridor. Mitigation measures (Section 6 of NIS) will be in place to minimise potential minor adverse impacts. No significant adverse effects are foreseen on the attributes or targets of Large shallow inlets and bays in Galway Bay Complex SAC.
[1170] Reefs	**Bad**	**To maintain the favourable conservation condition of Reefs in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Distribution.* The distribution of reefs is stable or increasing, subject to natural processes. (Figure 16) for mapped distribution *Habitat area.* The permanent habitat area is stable, subject to natural processes. *Community extent.* Maintain the extent of the Mytilus-dominated reef community, subject to natural processes *Community structure:* Mytilus density Individuals per m² Conserve the high quality of the Mytilus-dominated reef community, subject to natural processes *Community structure Biological composition.* Conserve the following community types in a natural condition: Fucoid dominated community complex; Laminaria dominated community complex; and Shallow sponge-dominated community complex. **Potential Impact** The proposed landfall cable laying area is within the SAC and cable laying route passes through this SAC. The cable laying works will be in the marine subtidal and in the terrestrial/intertidal elements of Ballyloughane Strand. The methodology of cable laying is to bury the cable in inshore areas. Where this is not possible protection of the cable is required. The plotting of the cable route has been carried out to ensure burial based on available data including dropdown video within the SAC. It is proposed to avoid all areas of reef within Galway Bay (Figure 19). Based on an assessment of subtidal video, baseline survey information in addition to Infomar data, the proposed project will not cross reef habitat within the SAC. The proposed works could result in minor localised sedimentation where reef areas that are adjacent to the works. However, these impacts would be localised and temporary in the shallow areas of the SAC where reef areas are susceptible to wave action. Lager sediment particles would be expected to remain in the immediate vicinity of the works while finer particles may travel beyond the immediate vicinity of the cable route. It would be expected that these finer particles would be removed in the short term by wave action /currents within Galway

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Bay. The habitat are of reefs would not be impacted by the proposed project. No significant adverse effects are foreseen to attributes or targets of Reefs in Galway Bay Complex SAC.
[1220] Perennial vegetation of stony banks		**To maintain the favourable conservation condition of Perennial vegetation of stony banks in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable or increasing, subject to natural processes, including erosion and succession *Habitat distribution.* No decline, or change in habitat distribution, subject to natural processes. See Figure 18 for mapped locations *Physical structure:* Presence/ absence of physical barriers Maintain the natural circulation of sediment and organic matter, without any physical obstructions *Vegetation structure:* Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession *Vegetation composition:* typical species and sub-communities Percentage cover at a representative sample of monitoring stops Maintain the typical vegetated shingle flora including the range of subcommunities within the different zones. Typical species include sea sandwort (*Honckenya peploides*), sea beet (*Beta vulgaris ssp maritima*), rock samphire (*Crithmum maritimum*), sea mayweed (*Tripleurospermum maritimum*), yellow-horned poppy (*Glaucium flavum*) and sea campion (*Silene uniflora*) *Vegetation composition:* Percentage cover Negative indicator species (including non-natives) to represent less than 5% cover. **Potential Impact** As seen in Figure 20 Perennial vegetation of stony banks are not located in the vicinity of the cable route and were not observed during fieldwork at Ballyloughane Strand. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Perennial vegetation of stony banks in Galway Bay Complex SAC.
[1310] Salicornia and other annuals colonising mud and sand		**To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 0.067ha, Seaweed Point - 0.003ha, Roscam West and South -0.023ha, Kilcaimin - 0.015, Kileenaran - 0.007ha, Kinvara West - 0.017ha, Scanlan's Island - 0.117ha, Tawin Island - 1.098ha. See Figure 19.

Annex Species/Habitats- Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Habitat distribution. No decline, or change in habitat distribution, subject to natural processes. *Physical structure:* Maintain/restore, natural circulation of sediments and organic matter, without any physical obstructions. *Physical structure: creeks and pans.* Occurrence Maintain, or where necessary restore creek and pan structure, subject to natural processes, including erosion and succession *Physical structure: flooding regime.* Maintain natural tidal regime *Vegetation structure: zonation.* Occurrence Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. *Vegetation structure*. Maintain structural variation within sward *Vegetation structure:* Maintain more than 90% of area outside creeks vegetated *Vegetation composition: typical species and subcommunities* Maintain the range of species-poor communities with typical species listed in SMP (McCorry and Ryle, 2009) *Vegetation structure: negative indicator species – Spartina anglica* There is currently no common cordgrass (*Spartina anglica*) in this SAC. Prevent establishment of cordgrass **Potential Impact** As seen in Figure 21 Salicornia and other annuals colonising mud and sand are not located in the vicinity of the cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Salicornia and other annuals colonising mud and sand in Galway Bay Complex SAC.
1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		**To restore the favourable conservation condition of Atlantic salt meadows (Glauco- Puccinellietalia maritimae) in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) Habitat area Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 2.33ha, Seaweed Point - 1.41ha, Roscam West and South - 3.30ha, Oranmore North - 4.24ha, Kilcaimin - 6.82ha, Tawin Island - 53.85ha, Tyrone House- Dunbulcaun Bay - 9.83ha, Kileenaran - 15.37ha, Kinvara West - 13.33ha, Scanlan's Island - 4.13ha. See Figure 19 *Habitat distribution.* No decline or change in habitat distribution, subject to natural processes. *Physical structure: sediment supply.* Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions. *Physical structure: creeks and pans.* Maintain creek and pan structure, subject to natural processes, including erosion and succession. *Physical structure: flooding regime.* Maintain natural tidal regime.

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Vegetation structure: zonation. Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. *Vegetation structure: vegetation height.* Maintain structural variation within sward. *Vegetation structure: Percentage cover at a representative sample of monitoring stops*. Maintain more than 90% area outside creeks vegetated. *Vegetation composition: typical species and subcommunities* Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009). *Vegetation structure: negative indicator species – Spartina anglica* There is currently no common cordgrass (Spartina anglica) in this SAC. Prevent establishment of cordgrass. **Potential Impact** As seen in Figure 21 Atlantic salt meadows are not located in the vicinity of the cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Salicornia and other annuals colonising mud and sand in Galway Bay Complex SAC.
1410 Mediterranean salt meadows (Juncetalia maritimi)		**To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 0.282ha, Seaweed Point - 0.931ha, Kilcaimin - 0.005ha, Tawin Island - 1.799ha. Tyrone House- Dunbulcan Bay - 8.184ha, Kileenaran - 0.271ha. See Figure 19. *Habitat distribution.* Occurrence No decline, subject to natural processes. Physical structure: sediment supply. Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions. *Physical structure: creeks and pans.* Maintain creek and pan structure, subject to natural processes, including erosion and succession *Physical structure: flooding regime.* Maintain natural tidal regime. *Vegetation structure: zonation.* Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession. *Vegetation structure: vegetation height.* Maintain structural variation in the sward. *Vegetation structure: vegetation cover.* Maintain more than 90% of area outside creeks vegetated.

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Vegetation composition: typical species and subcommunities. Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009) **Potential Impact** As seen in Figure 21 Mediterranean salt meadows are not located in the vicinity of the cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Mediterranean salt meadows (*Juncetalia maritimi*) in Galway Bay Complex SAC.
[3180] Turloughs		**To maintain the favourable conservation condition of Turloughs in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable at c.59ha or increasing, subject to natural processes. See Figure 16. *Habitat distribution.* No decline, subject to natural processes. *Hydrological regime: flood duration, frequency, area, depth; permanently flooded area.* Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat *Soil type: area.* Variety, area and extent of soil types necessary to support Turlough vegetation and other biota *Soil nutrient status: nitrogen and phosphorous*. Nutrient status appropriate to soil types. *Physical structure: bare ground*. Sufficient wet bare ground, as appropriate Chemical processes: Appropriate CaCO3 deposition rates and concentration in soil *Water quality: nutrients; colour; phytoplankton; epiphyton.* Appropriate water quality to support the natural structure and functioning of the habitat *Active peat formation.* Active peat formation, where appropriate *Vegetation composition: area of vegetation communities.* Maintain area of sensitive and high conservation value vegetation communities/units at each turlough *Vegetation composition: vegetation zonation.* Maintain vegetation zonation/mosaic characteristic of each turlough *Vegetation structure: sward height.* Sward heights appropriate to the vegetation unit, and a variety of sward heights across each turlough *Typical species: terrestrial, wetland and aquatic plants, invertebrates and birds.* Maintain typical species within and across all turloughs *Fringing habitats: area.* Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations

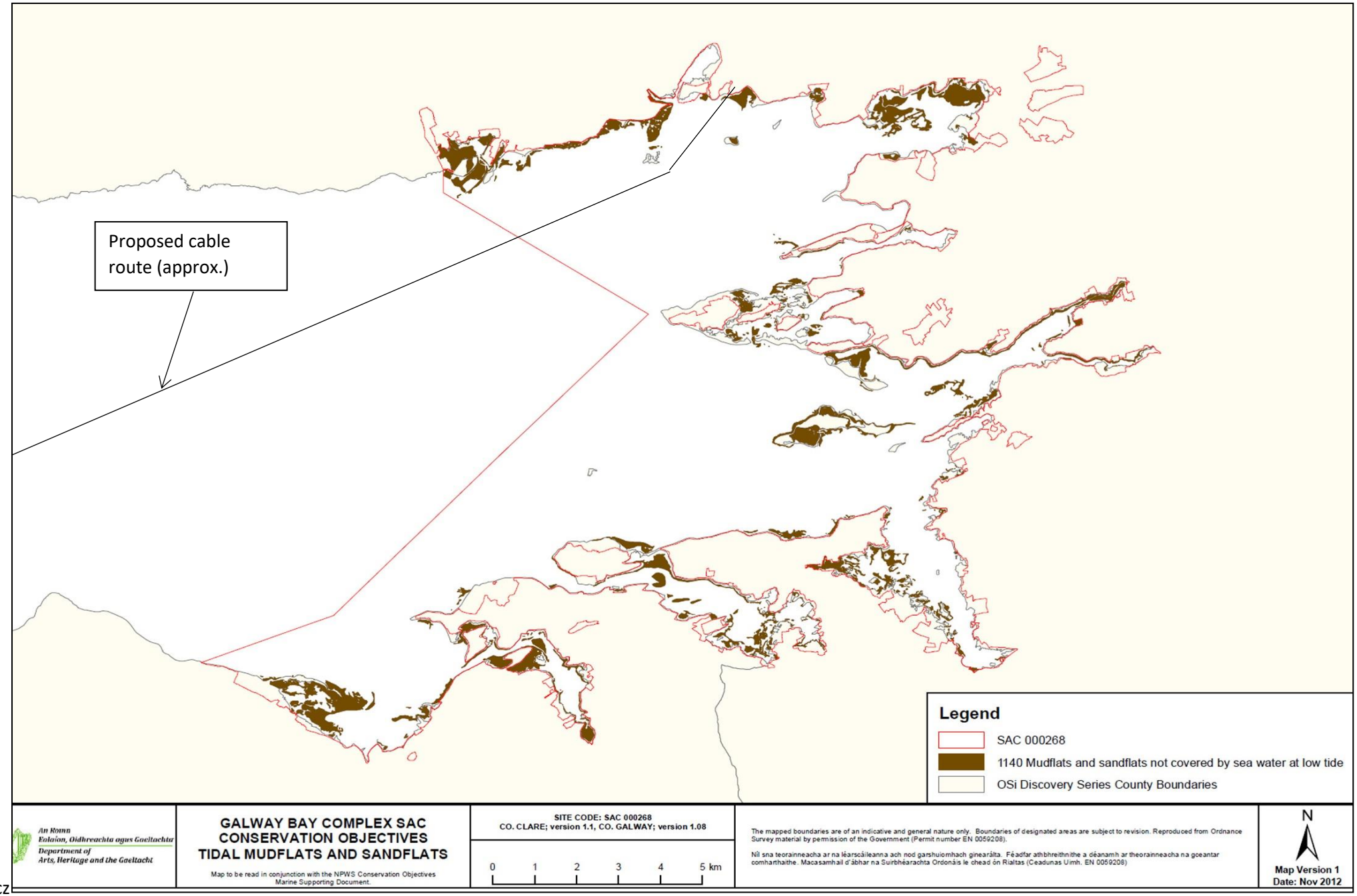
Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Vegetation structure: Turlough woodland. Maintain appropriate turlough woodland diversity and structure. **Potential Impact** As seen in Figure 16. Turloughs are not located in the vicinity of the cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Turloughs in Galway Bay Complex SAC.
[5130] *Juniperus communis* formations on heaths or calcareous grasslands		**To restore the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable or increasing, subject to natural processes. At least 1.4ha at mapped location. See Figure 14. *Habitat distribution.* No decline. *Juniper population size.* At least 50 plants *Formation structure: cover and height.* Well-developed structure with an open to closed cover of juniper up to or exceeding 0.5 m in height with associated species. *Formation structure: community diversity and extent*. Appropriate diversity and extent of formation. *Formation structure: cone bearing plants.* At least 10% of plants bearing cones. *Formation structure: seedling recruitment.* At least 10% of juniper plants within the formation are seedlings. *Formation structure: dead plants.* Not more than 10% of plants dead. *Vegetation composition: typical species.* A variety of typical native species with a minimum of 10 species present (excluding negative indicator species) *Vegetation composition: negative indicator species.* Negative indicator species, particularly non-native invasive species, absent or under control. **Potential Impact** As seen in Figure 16 *Juniperus communis* formations on heaths or calcareous grasslands are not located in the vicinity of the cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of *Juniperus communis* formations on heaths or calcareous grasslands in Galway Bay Complex SAC.
[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	**Bad**	**To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) in Galway Bay Complex, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable or increasing, subject to natural processes

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Habitat distribution. No decline, subject to natural processes *Vegetation composition: broadleaf herb: grass ratio*. Broadleaf herb component of vegetation between 40 and 90% *Vegetation composition: typical species.* At least 7 positive indicator species present, including 2 "high quality" species *Vegetation composition: negative indicator species.* Percentage Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%. Non native invasive species, absent or under control. *Vegetation structure: sward height*. 30-70% of sward 5-40cm high *Vegetation structure: woody species and bracken (Pteridium aquilinum).* Cover of bracken (*Pteridium aquilinum*) and woody species (except juniper (*Juniperus communis*)) not more than 5% cover. *Physical structure: bare ground.* Not more than 10% bare ground **Potential Impact** Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) are terrestrial and not located in the vicinity of the intertidal/marine cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) in Galway Bay Complex SAC.
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	**Bad**	**To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable or increasing, subject to natural processes. The full extent of this habitat within the SAC is currently unknown. Fen vegetation occurs in wetland areas to the east of Oranmore (Internal NPWS files). It has also been recorded in Ballindereen Lough. *Habitat distribution.* No decline, subject to natural processes *Hydrological regime.* Appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat. *Peat formation*. Active peat formation, where appropriate Water quality: nutrients. Appropriate water quality to support the natural structure and functioning of the habitat. *Vegetation composition: typical species.* Maintain vegetation cover of typical species including brown mosses and vascular plants *Vegetation composition: trees and shrubs.* Cover of scattered native trees and shrubs not more than than 10% *Physical structure: disturbed bare ground*. Percentage Cover of disturbed bare ground not more than 10%. *Physical structure: drainage*. Areas showing signs of drainage as a result of drainage ditches or heavy trampling not more than 10%.

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Potential Impact Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* not located in the vicinity of the intertidal/marine cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in Galway Bay Complex SAC.
7230 Alkaline fens	**Bad**	**To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *Habitat area.* Area stable or increasing, subject to natural processes *Habitat distribution.* No decline, subject to natural processes. Full distribution of this habitat in this SAC is currently unknown. Hydrological regime. Appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat Peat formation. Active peat formation, where appropriate Water quality: nutrients. Appropriate water quality to support the natural structure and functioning of the habitat *Vegetation composition: typical species.* Maintain vegetation cover of typical species including brown mosses and vascular plants. Vegetation composition: trees and shrubs. Cover of scattered native trees and shrubs less than 10% *Physical structure: disturbed bare ground.* Cover of disturbed bare ground less than 10%.Where tufa is present, disturbed bare ground less than 1% *Physical structure: drainage.* Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10% **Potential Impact** Alkaline fens not located in the vicinity of the intertidal/marine cable route. Impacts would be restricted to the immediate vicinity of the cable route. No significant adverse effects are foreseen on attributes or targets of Alkaline fens in Galway Bay Complex SAC.
[1150] Coastal lagoons	**Bad**	**To restore the favourable conservation condition of Coastal lagoons in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *(Attribute.* Target) *Habitat area.* Area stable, subject to slight natural variation. Favourable reference area 76.7ha. *Habitat distribution.* No decline, subject to natural processes. *Salinity regime.* Median annual salinity and temporal variation within natural ranges

Annex Species/Habitats- Qualifying Interest	Overall Conservation Status	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		Hydrological regime. Annual water level fluctuations and minima within natural ranges *Barrier: connectivity between lagoon and sea*. Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management. *Water quality: Chlorophyll a.* Annual median chlorophyll a within natural ranges and less than 5ug/L *Water quality:* Molybdate Reactive Phosphorus (MRP). Annual median MRP within natural ranges 0.1mg/L *Water quality:* Dissolved Inorganic Nitrogen (DIN): Annual median DIN within natural ranges and less than 0.15mg/L Depth of macrophyte colonisation. Macrophyte colonisation to at least 2m depth. *Typical plant species.* Maintain number and extent of listed lagoonal specialists, subject to natural variation *Typical animal species.* Maintain listed lagoon specialists, subject to natural variation *Number and % cover.* Negative indicator species absent or under control **Potential Impact** The cable route is not within or proximal to Coastal Lagoons (Figure 22). No significant adverse effects are foreseen on attributes or targets of Coastal Lagoons in Galway Bay Complex SAC.
[1355] Otter *Lutra lutra*	**Favourable**	**To restore the favourable conservation condition of Otter in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** *Distribution.* No significant decline. *Extent of terrestrial habitat.* No significant decline. Area mapped and calculated as 262ha above high water mark (HWM); 14ha along river banks/around ponds. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007) (Figure 23) *Extent of marine habitat.* No significant decline. *Extent of freshwater (lake/lagoon) habitat.* No significant decline. *Couching sites and holts*. No significant decline *Fish biomass available.* No significant decline *Barriers to connectivity.* No significant increase. **Potential Impact** Otters may be present within the proposed landfall and shallow intertidal area. Short term disturbance may occur but it should be noted, as outlined in the SPA conservation objectives supporting document that significant human disturbance occurs at Ballyloughane Beach. Disturbance in this area would be limited to approximately 3-4 days for main lay in an area of human disturbance and in close proximity to Galway Port where there is marine vessel activity. No holts or couches were noted during fieldwork. The works will not significantly impact fish biomass or

Annex Species/Habitats-Qualifying Interest	**Overall Conservation Status**	*Site Specific Conservation Objectives*, attributes, targets and perceived impacts.
		introduce barriers to connectivity. Mitigation measures are proposed (Section 6 of NIS), including having an ecologist on site during intertidal/shallow subtidal works.
[1365] Harbour seal *Phoca vitulina*	**Favourable**	**To maintain the favourable conservation condition of Harbour Seal in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:** Access to suitable habitat. Species range within the site should not be restricted by artificial barriers to site use. See Figures 24-26. *Breeding behaviour.* Conserve breeding sites in a natural condition. *Moulting behaviour.* Conserve moult haul-out sites in a natural condition. *Resting behaviour.* Conserve resting haul-out sites in a natural condition. *Disturbance*. Human activities should occur at levels that do not adversely affect the harbour seal population at the site. **Potential Impact** Harbour seal may be present within the proximity of the cable route. Short term disturbance may occur but it should be noted, as outlined in the SPA conservation objectives supporting document that significant human disturbance occurs at Ballyloughane Beach. The proposed cable route is not proximal to resting and moulting sites. The proposed route is at least 1.5km from the nearest breeding sites at Earls Rock and Kilcolgan Point. Disturbance in this area would be limited to approximately 3-4 days for main lay (intertidal and subtidal) within the SAC in an area of human disturbance and in close proximity to Galway Port where there is marine vessel activity. The works will not significantly impact on haul out, resting or breeding sites. Mitigation measures are required (Section 6 of the NIS) in relation Marine Mammals during the project.



CZ

Figure 14. Location of Tidal Mudflats and Sandflats in Galway Bay Complex SAC.

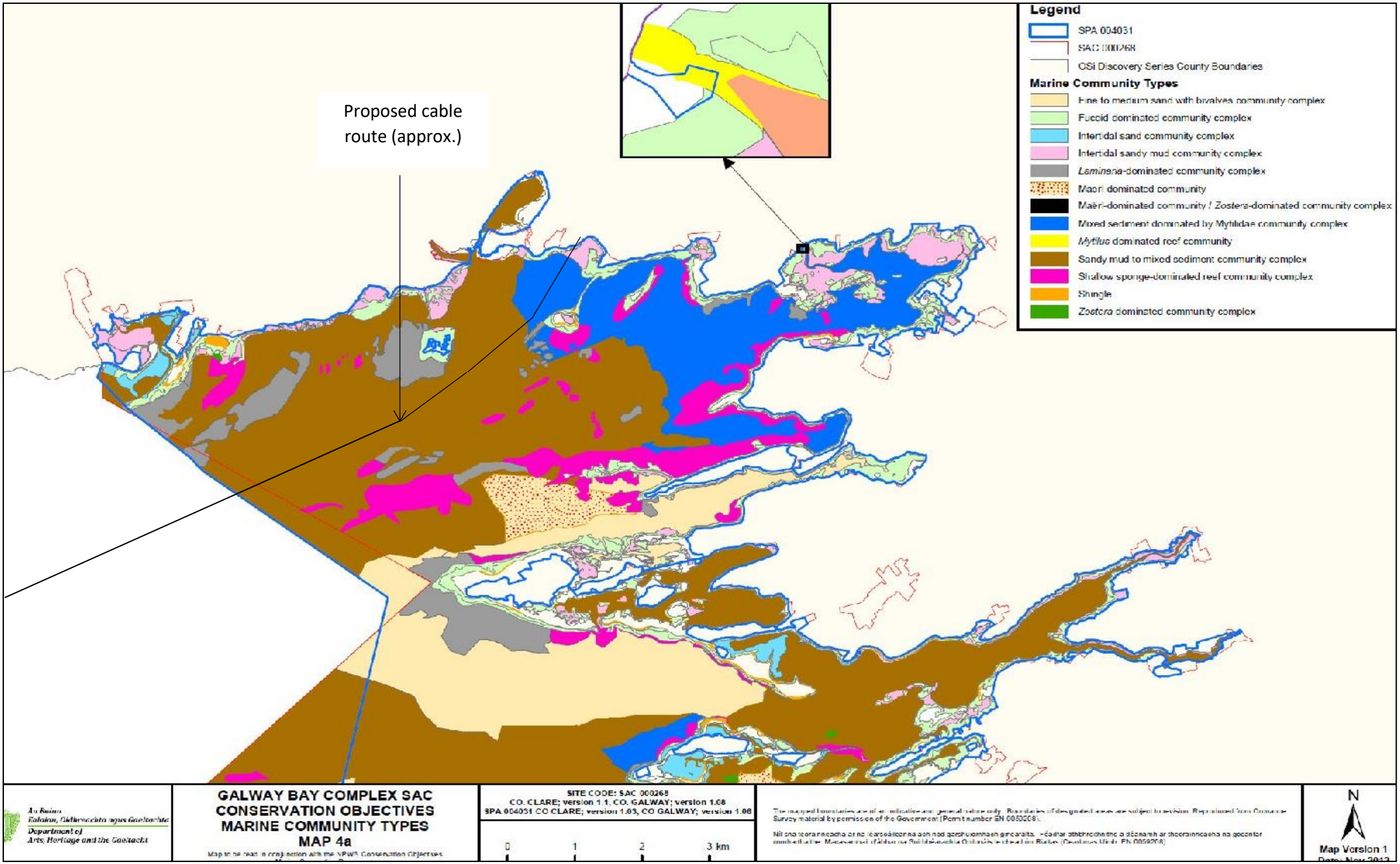


Figure 15. Marine Community Types (NPWS, 2013).

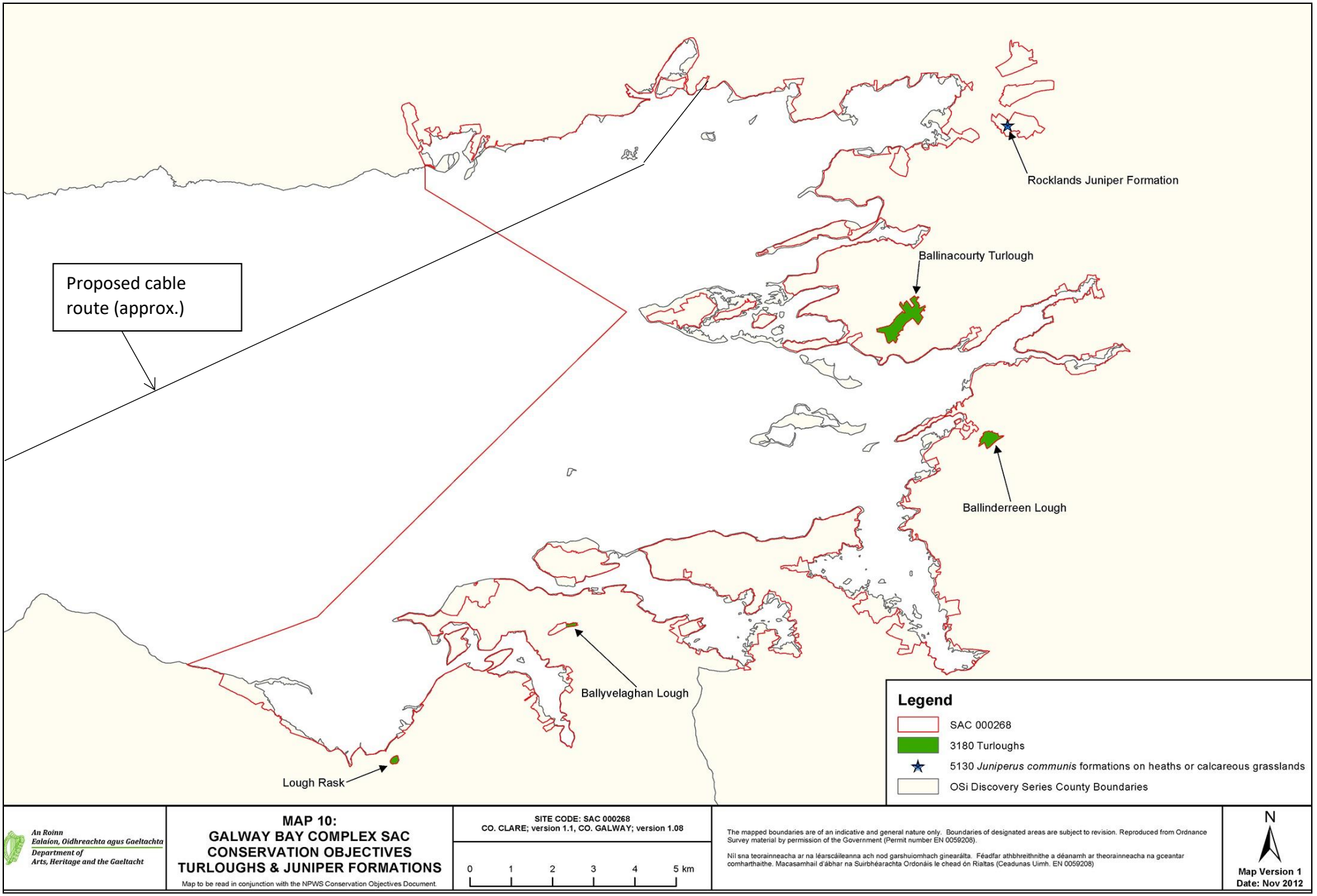


Figure 16. Location of Turloughs and Juniper formations in Galway Bay Complex SAC.

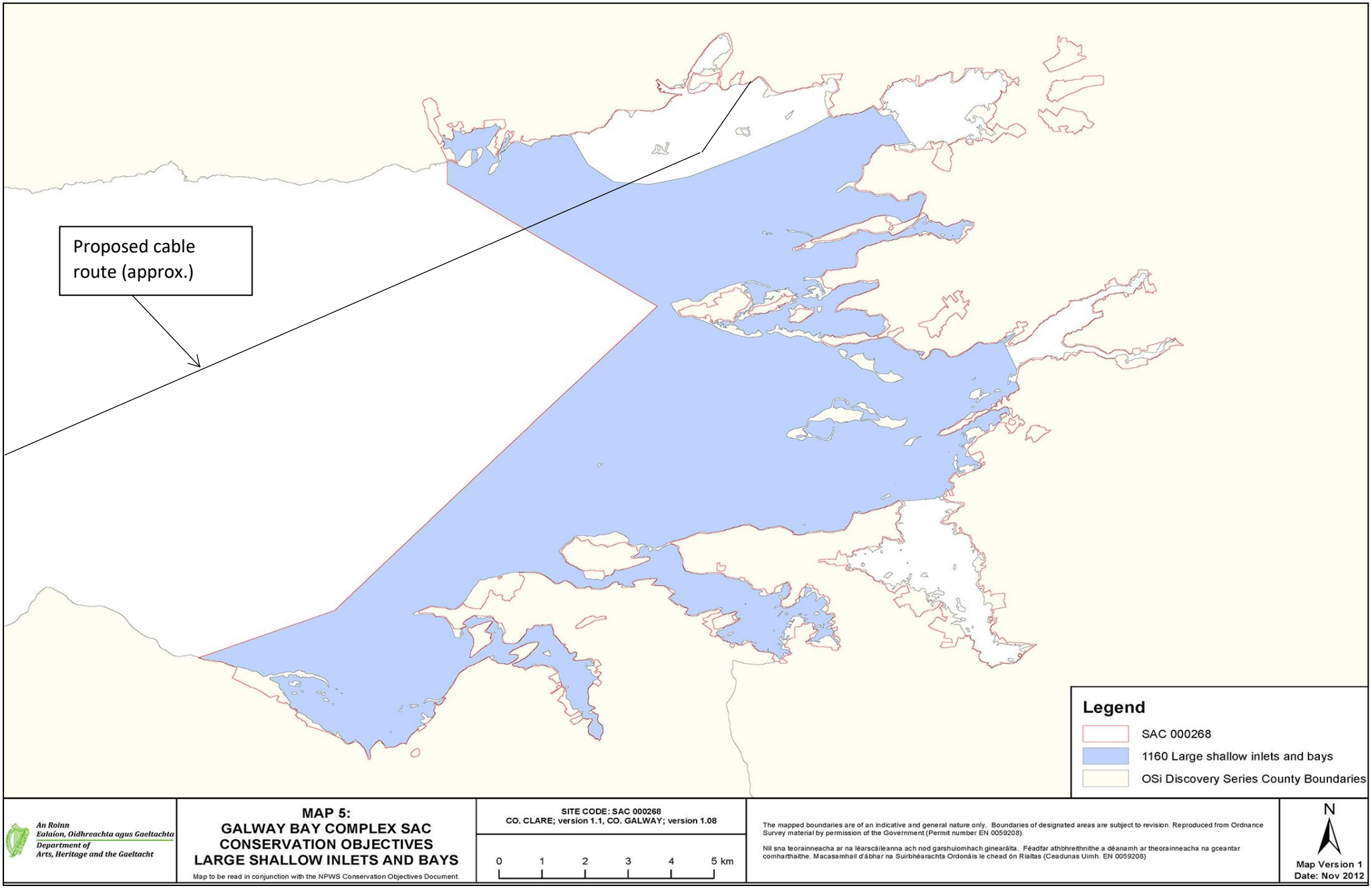


Figure 17. Location of Large Shallow inlets and Bays in Galway Bay Complex SAC.

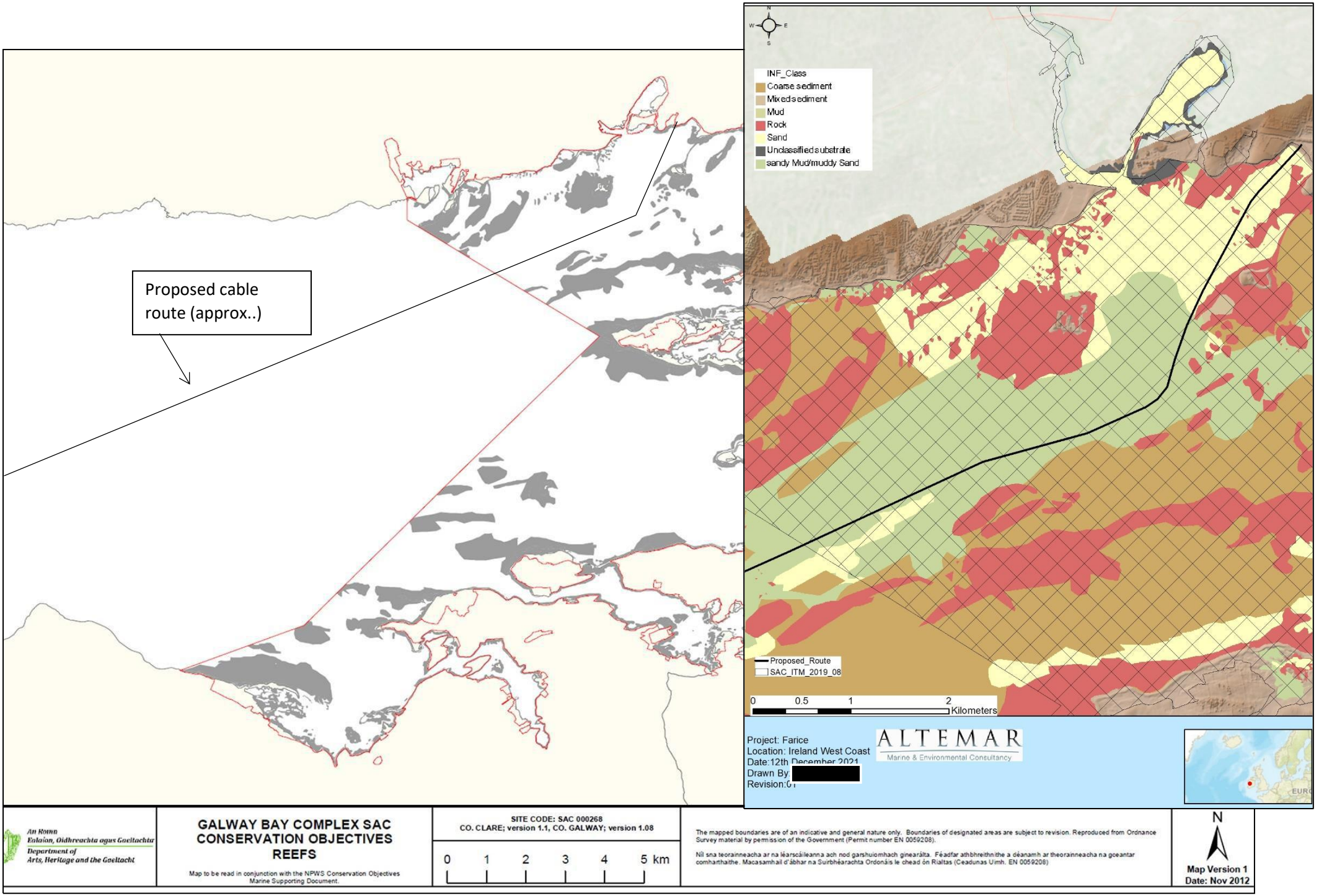


Figure 18. Location of Reefs in Galway Bay Complex SAC. (Inset location of proposed route accurately plotted in relation to "Rock" (red) habitat (i.e. reef).

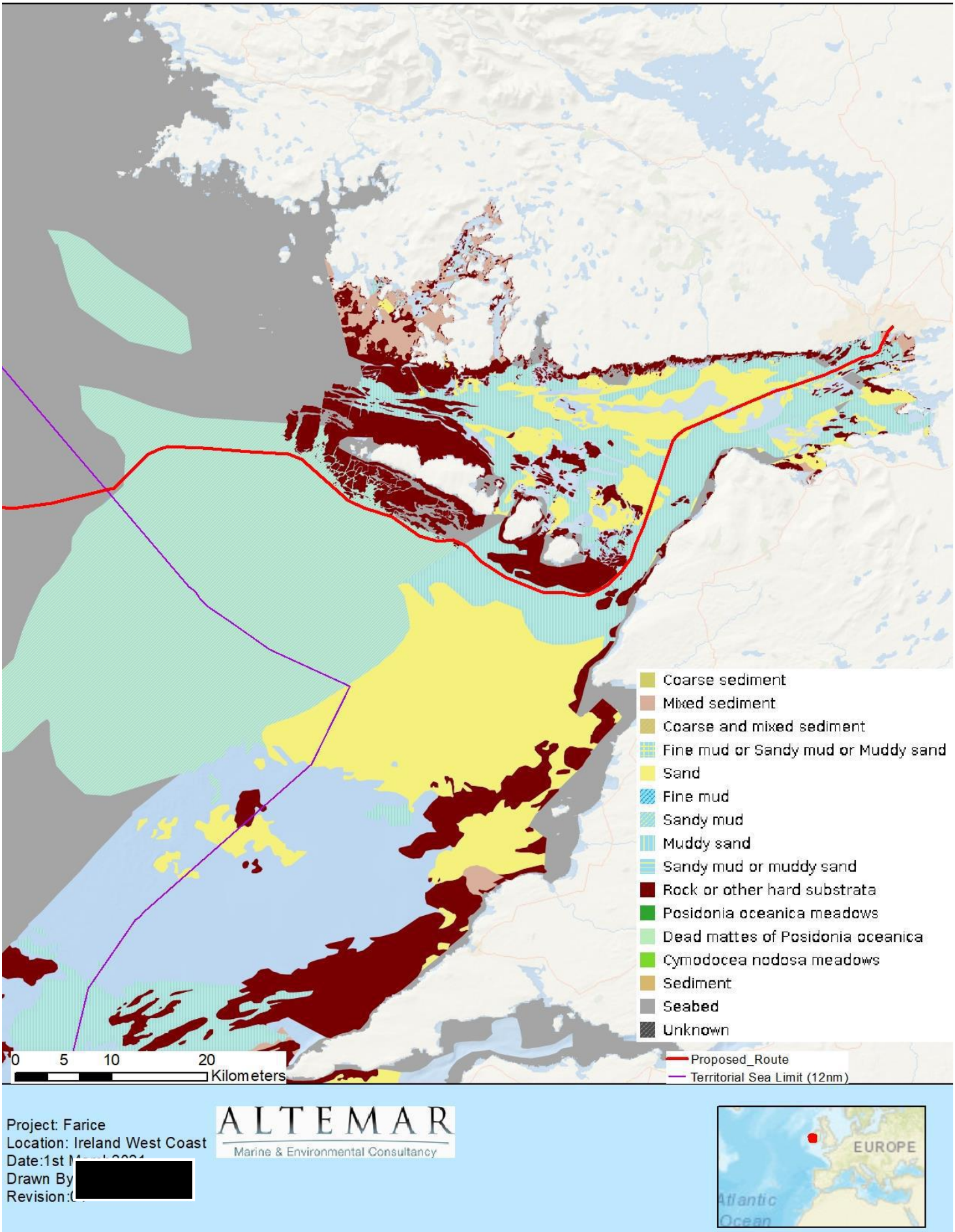


Figure 19. Predicted marine habitat data for the inshore section of the fibre optic cable route (Source EU Seamap (2019).

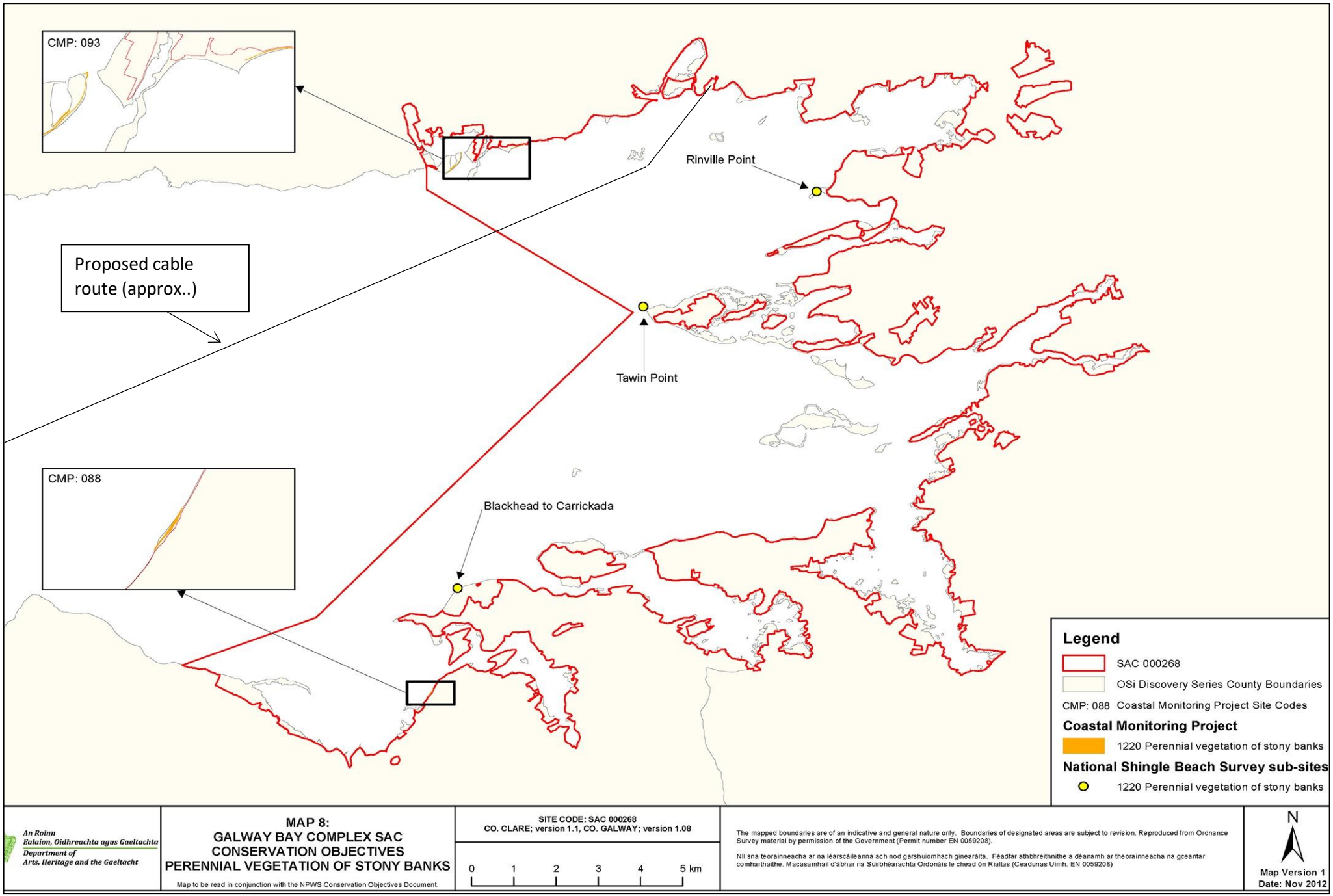


Figure 20. Location of Perennial vegetation of stony banks in Galway Bay Complex SAC.

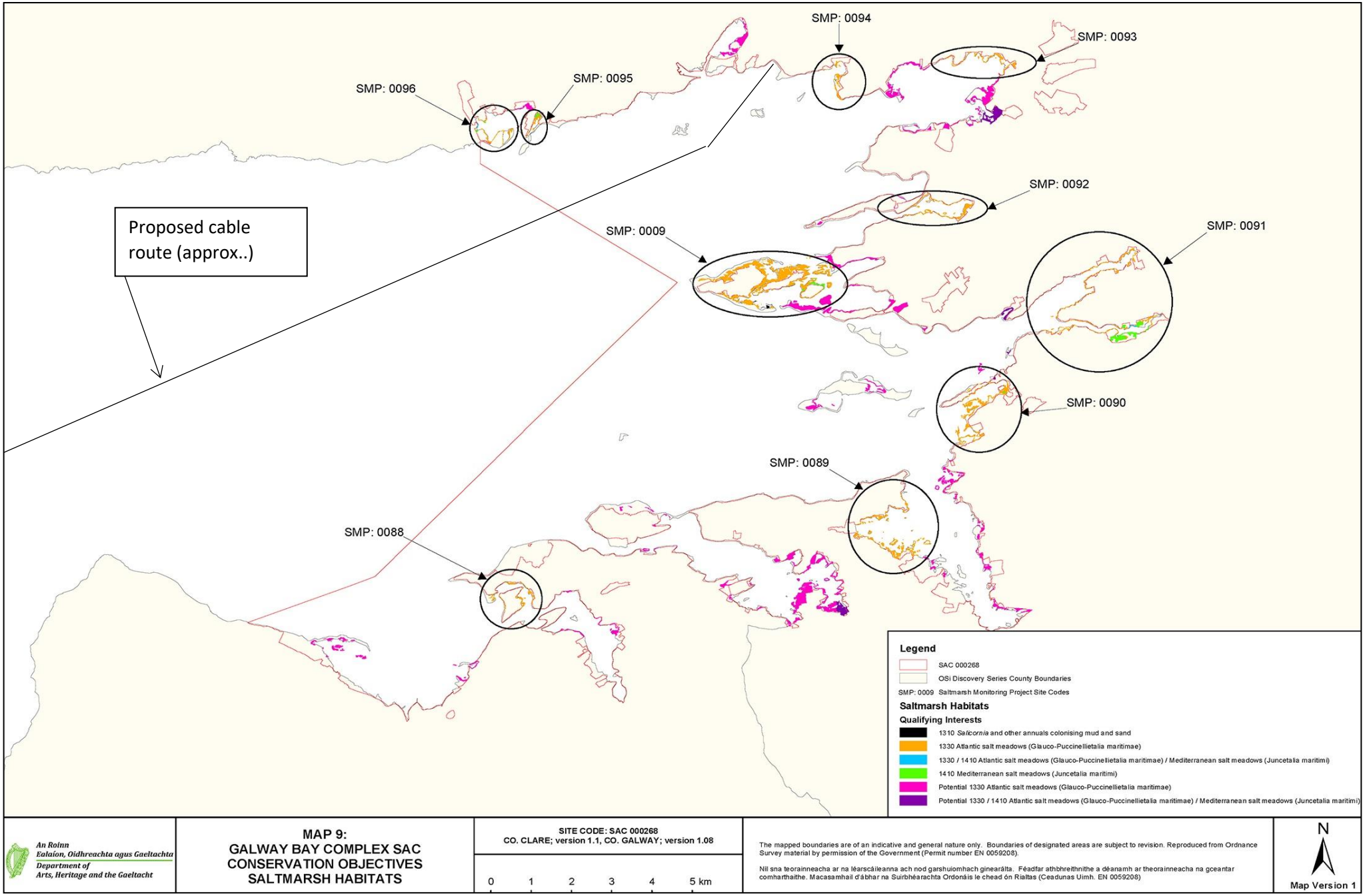


Figure 21. Location of Saltmarsh Habitats in Galway Bay Complex SAC.

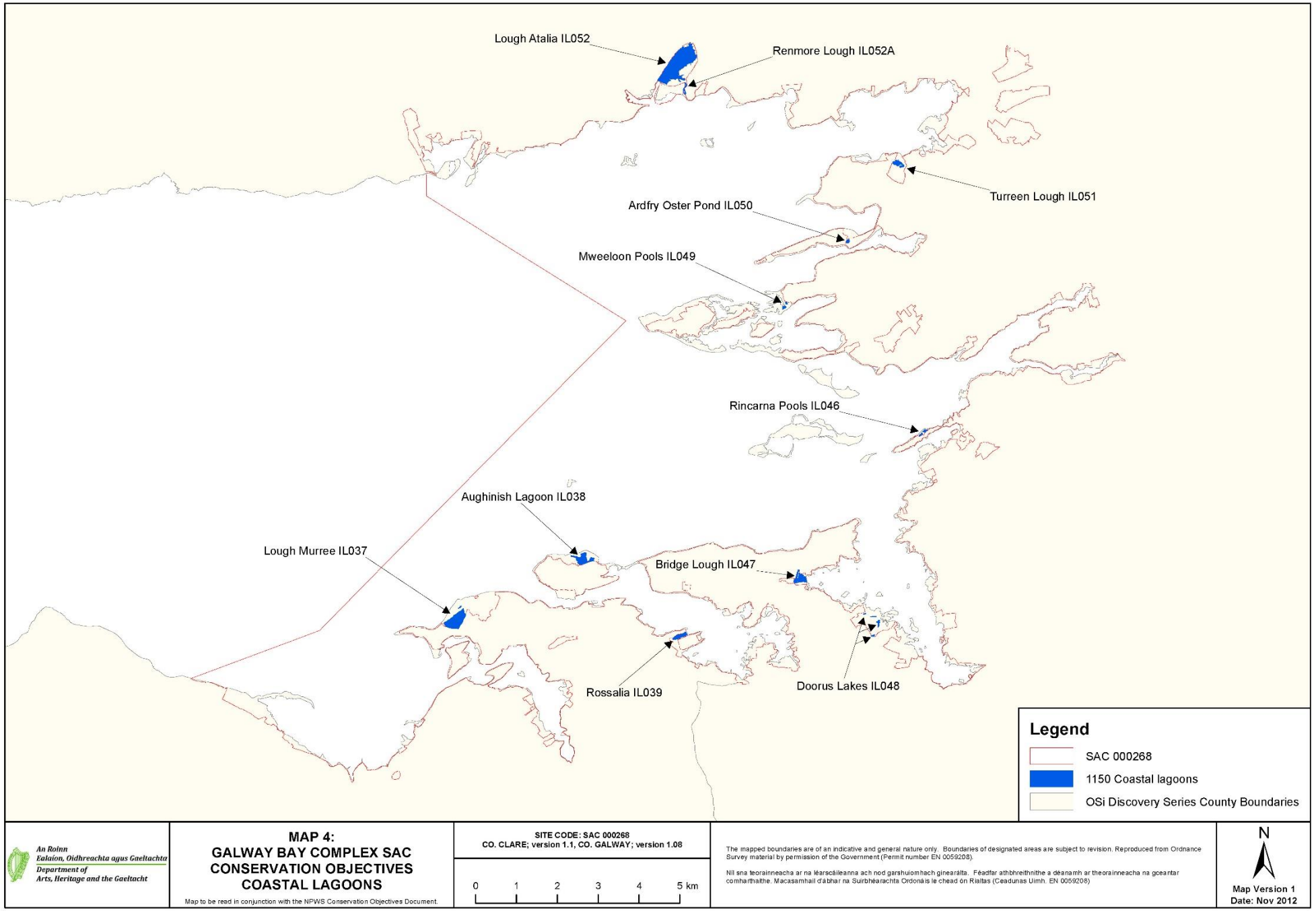


Figure 22. Coastal Lagoon Habitats in Galway Bay Complex SAC.

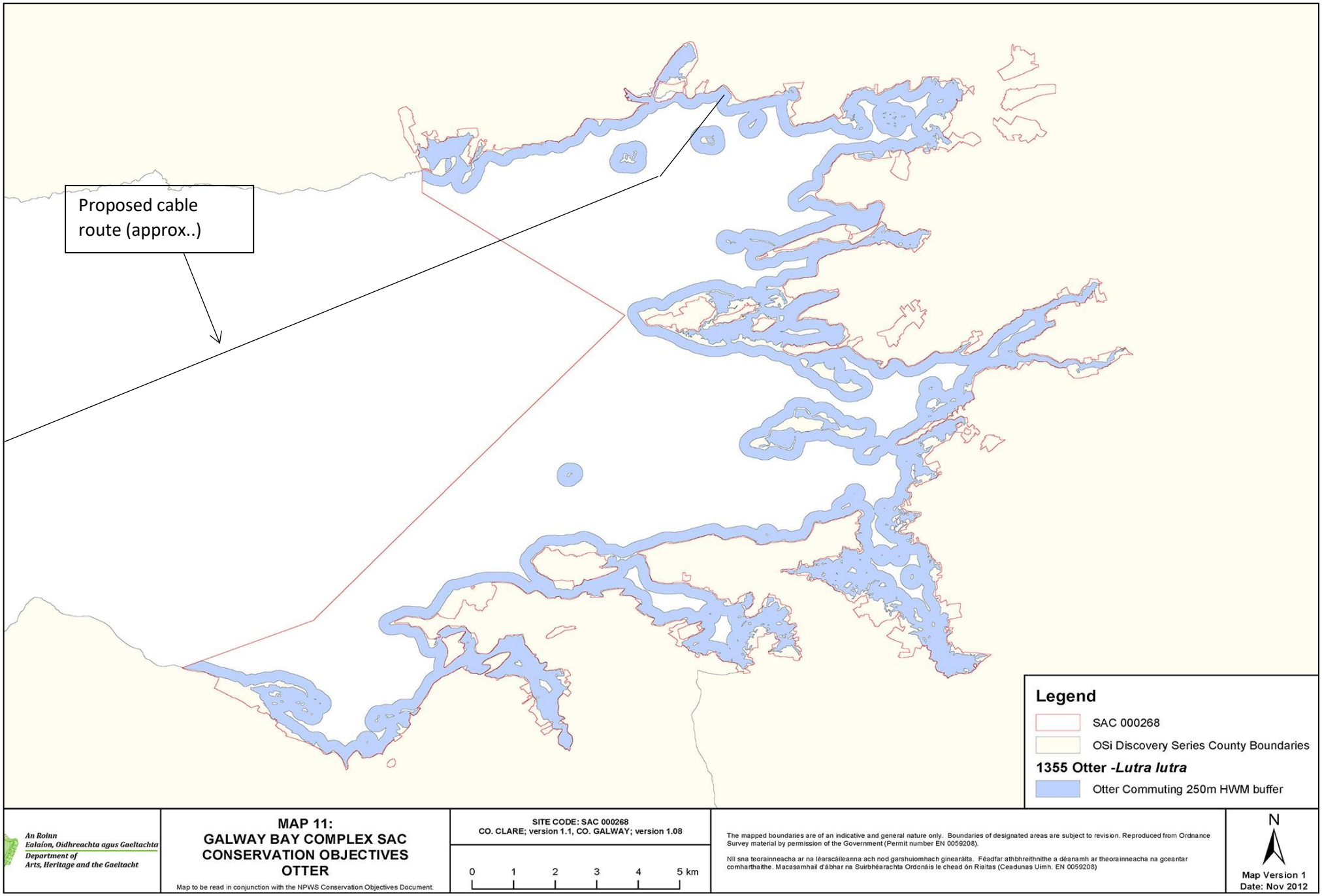


Figure 23. Location of otters in Galway Bay Complex SAC.

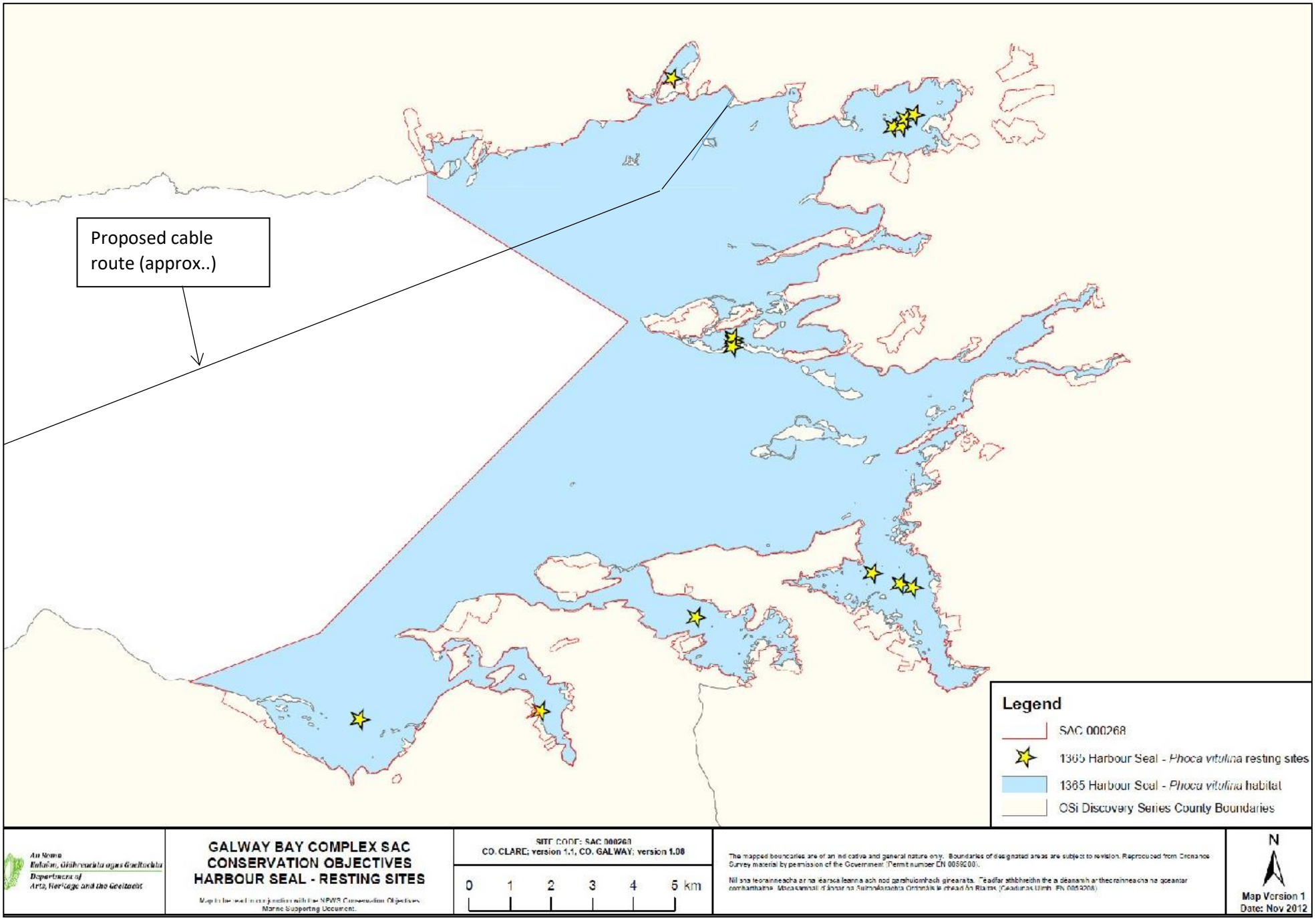


Figure 24. Harbour seal resting sites (NPWS, 2013).

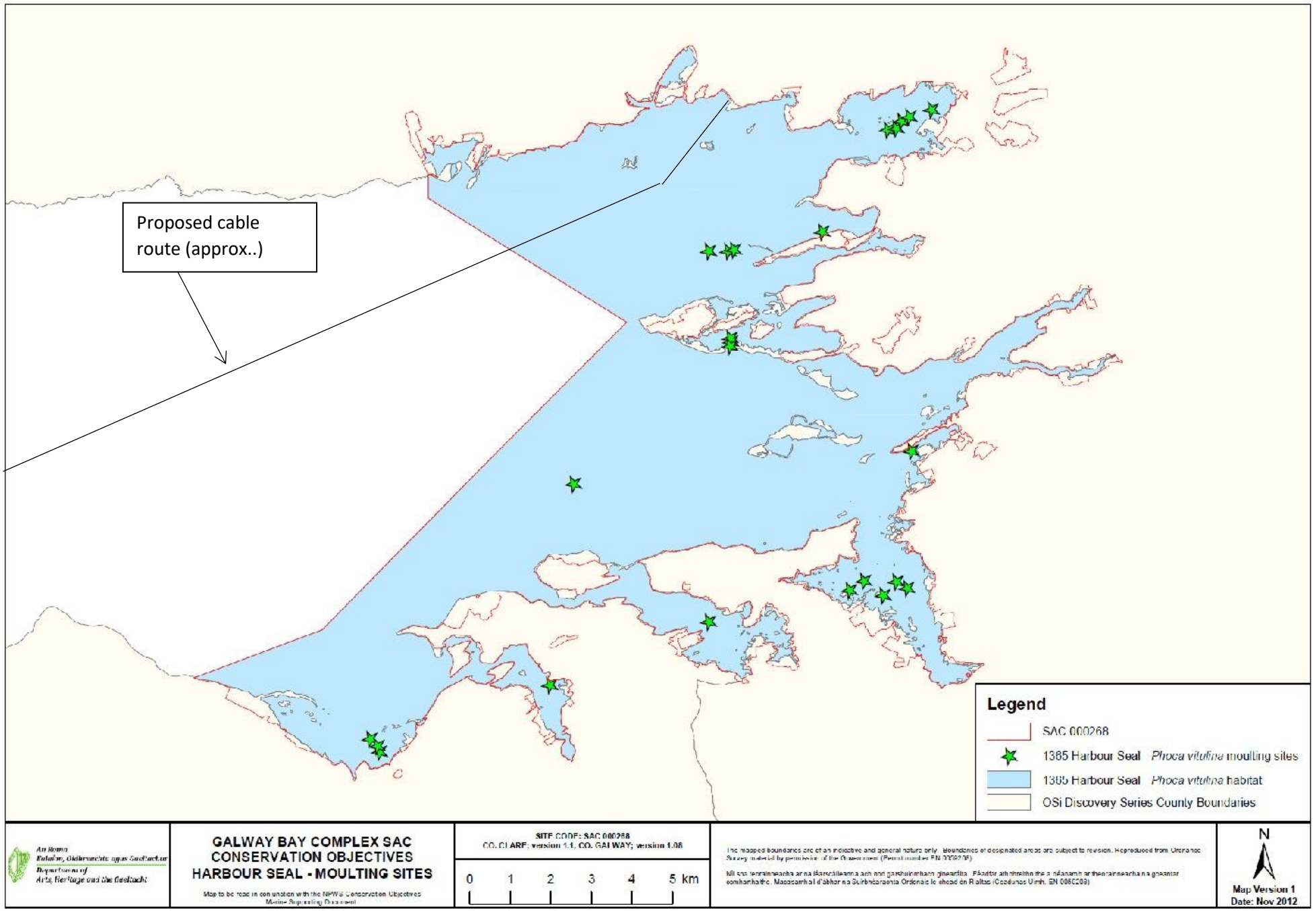


Figure 25. Harbour seal moulting sites (NPWS, 2013).

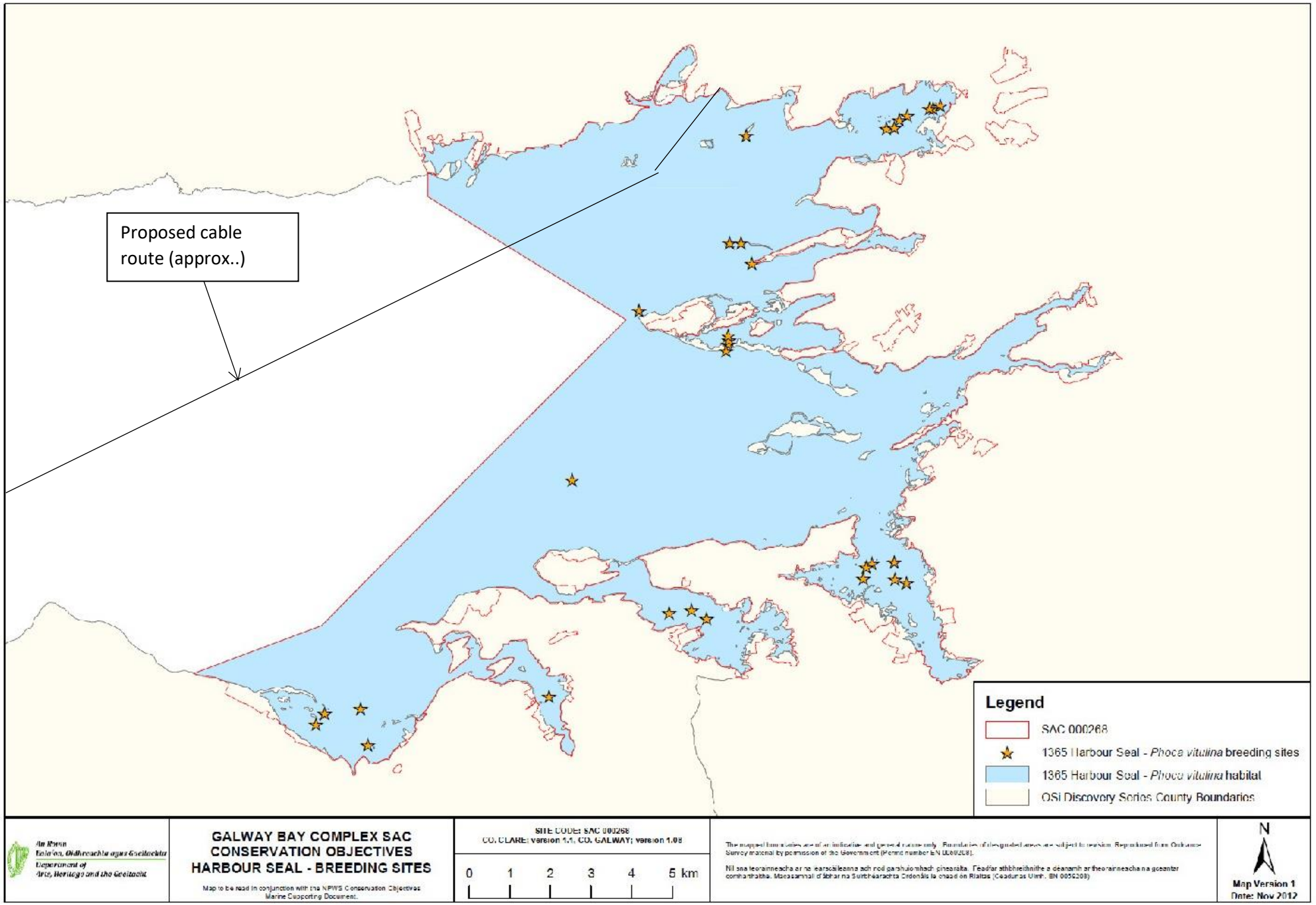


Figure 26. Harbour seal breeding sites (NPWS, 2013).

5.1.2 Additional information on species/habitats

Harbour Seals

Inner Galway Bay is an important site for harbour seals but not for grey seals (Figure 24-26). As outlined in the Galway Bay Complex SAC (site code: 0268) Conservation objectives supporting document - Marine habitats and species, "*harbour seals in Galway Bay Complex 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.*

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." "*Current known sites are broadly within the following areas: Oranmore Bay, Kinvarra Bay, Aughinish Bay, Poulnaclogh Bay, Ballyvaghan Bay, Rabbit Island, Earl's Rock, St. Brendan's Island, Ardfry Point, Tawin Island, Glasheen Island and Deer Island.*

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 317 harbour seals were recorded ashore within Galway Bay Complex SAC in August 2003 during a national aerial survey for the species. Suitable habitat for the species along with known moult haul-out locations in Galway Bay Complex SAC are indicated in figure 24. This broadly consists of Oranmore Bay, Kinvarra Bay, Aughinish Bay, Poulnaclogh Bay, Ballyvaghan Bay and on Black Rock, Earl's Rock and St. Brendan's Island, Tawin Island and Glasheen Island, Ringeelaun Point and Deer Island."

As can be seen from figure 24-27, the proposed location of the cable main lay is not in the vicinity of resting, moulting or breeding sites. However, it is noted that as outlined in NPWS 2013 "*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*." As a result, despite the location cable laying outside key activity areas, the cable lay teams will need to be cognisant of this and take into account due diligence in relation to seal disturbance when deploying and recovering equipment.

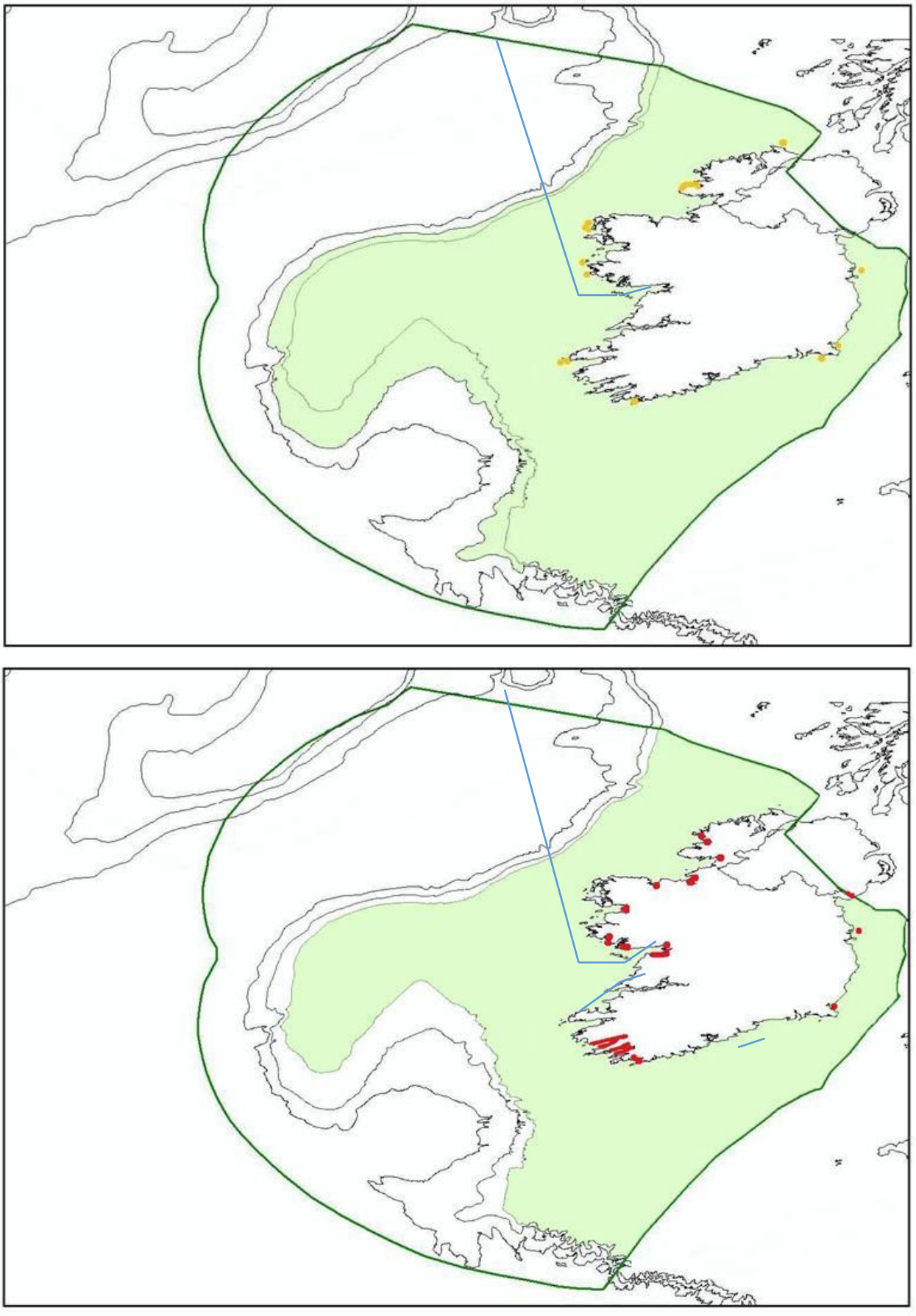


Figure 27. Harbour seal (red) and grey seal (yellow) distribution (green) and haul-out sites in the inshore area. (NPWS). Proposed cable route (approx..) is the blue line.

5.1.2.1 Sensitive Subtidal Communities

As seen in Figure 15 from the Conservation Objectives document (NPWS 2013) mixed sediment dominated by Mytilidae community complex and Sandy mud to mixed sediment community complex are predicted along the proposed cable route within the SAC.

Data from the NPWS 2006 Surveys of sensitive subtidal benthic communities in Slyne Head Peninsula SAC, Clew Bay Complex SAC and Galway Bay Complex SAC (MERC, 2006) was interrogated. Cable main lay are not in the vicinity of recorded *Zostera marina* sites (Figure 15). The raw GIS data from this survey was overlaid on the initial proposed cable route. This route was deemed proximal to recorded mearl sites (Figure 25). Following this assessment the route was modified northwards, towards the navigation channel, to avoid recorded sensitive communities(See EcIA). A follow up drop down video survey of the revised route was carried out within the SAC and 1km beyond the SAC, to identify the communities present and fine tune the proposed routing to avoid sensitive communities. *Virgularia mirabilis* and mearl communities (sprinkling on mixed sediment) were noted in several locations (Plates 3 & 4). Two additional dropdown video surveys were carried out in 2021 to map the distribution of Virgularia in the vicinity of the proposed cable route. The proposed cable route was revised to avoid these sensitive communities where possible. Maerl beds are listed as a conservation interest of Galway Bay Complex SAC (Large Shallow Inlets and Bays community) while *Virgularia mirabilis* is a relatively rare subtidal community that has been mapped previously by NPWS in other SAC's. As outlined in MERC (2006) "*The over-riding feature of many of the maërl communities in this part of Galway Bay appears to be their nature. Rather than forming large beds of dense living and non-living maërl, in many cases the communities form a thin and broken veneer on top of various sedimentary seabed types, including fine and coarse sand, gravels, cobbles and muds in some instances. Where the veneer of maërl occurs with coarse gravel and cobbles, the maërl tends to occupy the spaces between grains. The covering frequently is only one layer thick (i.e. the thickness of a single rhodolith). Within these communities, the surface area covering of maërl can vary from 100% to as little as 10% and they were seen to stretch over very large areas of the seabed. Within these areas significant variability in the nature of the underlying sediments was also recorded. However the covering of maërl can be seen to extend throughout all such variability in sediments. In many cases it is perhaps questionable as to whether the occurrence of maërl in this manner actually constitutes a maërl community or not*." Despite this, the route was revised to avoid areas where maerl was found on the video survey.

MERC 2006 also stated that the "*species of maërl recorded included the discoidal form of Lithothamnion corallioides to the north of Finavarra and to the east and north of Aughinish Island. Also recorded was Phymatolithon calcareum in Muckinish Bay. Further deposits of the finely branched form of Lithothamnion coralloides were recorded in Doorus Strait, as well as to north of Tawin Peninsula*" (in the vicinity of the proposed cable route) "*where maërl communities formed an extensive veneer over underlying muddy and muddy sand sediments. No Lithophyllum dentatum was recorded during the survey of Galway Bay Complex SAC*."

In relation to the *Virgularia mirabilis* MERC 2006 stated that "*despite conducting a number of specific dives in order to investigate other 'known' sensitive communities – most notably for Neopentadactyla mixta and the Sea Pen Virgularia mirabilis in the area to the north of Tawin Peninsula and south of Mutton Island, no such communities were recorded. Indeed, other than very occasional individual Lanice conchilega no other significant subtidal species or communities were encountered during the survey at this site*."

The habitats present, the proposed cable laying methodologies, the routing of the cable and the future dredging of the navigation channel by Galway Port in this area and was discussed with David Lyons of NPWS. It was agreed that further video drops and habitat/*Virgularia mirabilis* density mapping would be carried out at survey stage to seek to further optimise the route of the cable in this area so as to select a route of minimal impact on *Virgularia mirabilis* communities. These surveys were carried out in 2021.

The area where the *Virgularia mirabilis* was noted during the 2018 and 2021 camera surveys, were not covered by the 2006 surveys. No *Neopentadactyla mixta* was noted during these surveys. As stated previously the proposed cable route was modified to avoid these sensitive areas where possible. However, the survey area included some of the Galway Port future expansion. This area of future expansion needs to be avoided by the proposed cable due to the potential for future dredging operations. Therefore in order to ensure burial the

cable must follow a very tight corridor in this area on the eastern boundary of the future expansion, as there is reef to the east.

It should be stated that the camera survey carried out as part of the EcIA/NIS extends the current distribution of Maerl but has now identified an area of *Virgularia mirabilis* within Galway Bay Complex SAC.

Predicted marine habitat data for the inshore section of the fibre optic cable route is shown in Figure 28 (EUSensMap2019). The survey is incomplete for the proposed route, but it should be noted that reef/rock is not noted on the route. The predicted habitats along the cable route, based on Infomar data, as the cable comes out of Galway is in the order of coarse sediment, sand and the mud.

Plate 3. *Virgularia mirabilis* noted during this camera survey.

Plate 4. *Mearl* noted during the 2018 camera survey.

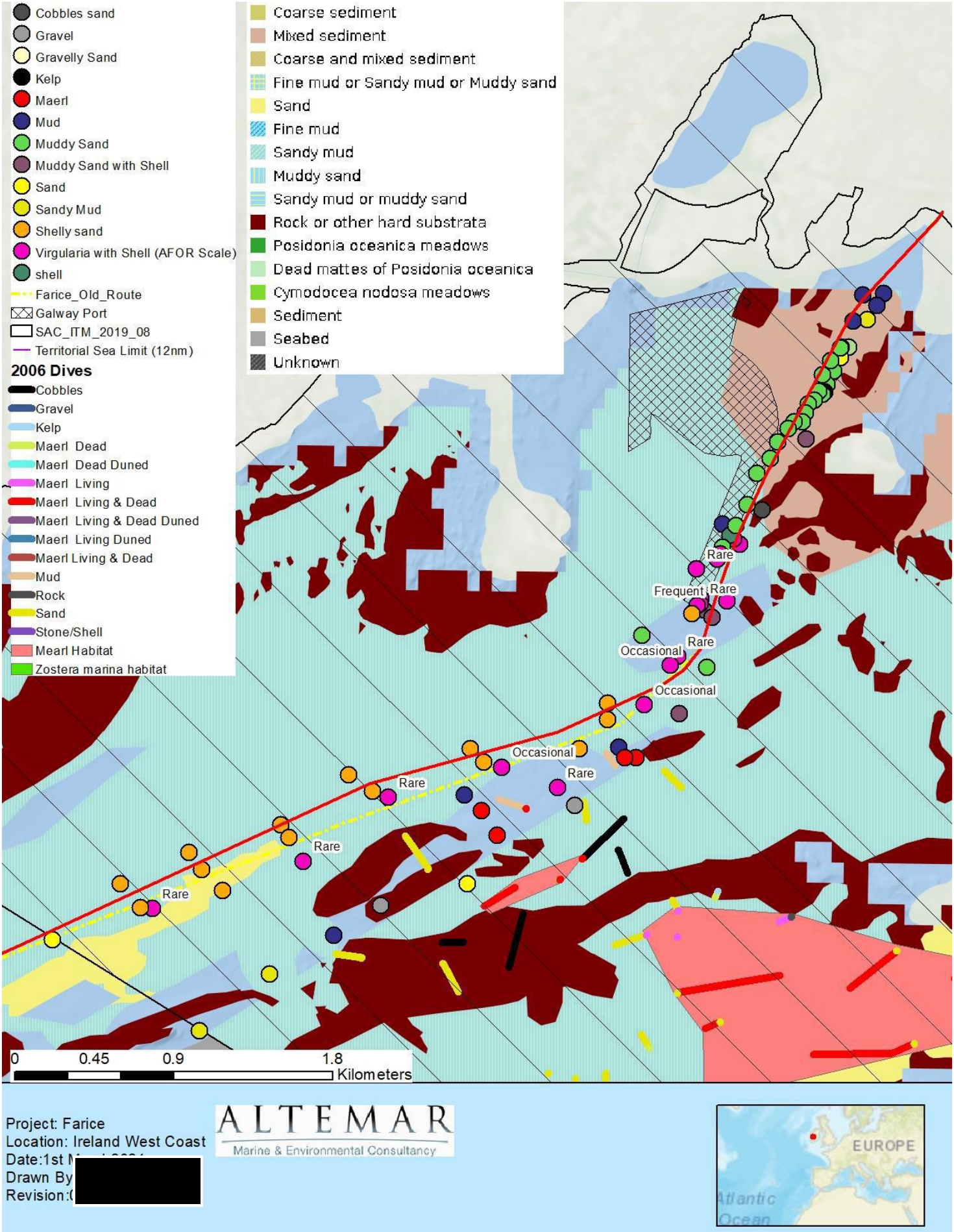


Figure 28. Data showing marine habitats (EUSensmap 2019), 2006,2018 and 2021 surveys and change in route to minimise impact on Virgularia mirabilis communities.

5.2 Inner Galway Bay SPA (Site code: 004031)

As outlined in the SPA Site Synopsis, Inner Galway Bay SPA is also a Ramsar Convention site and part of the Inner Galway Bay SPA is a Wildfowl Sanctuary. The site is a SPA for the following species: Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Shoveler, Red- breasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar -tailed Godwit, Curlew, Redshank, Turnstone, Black- headed Gull, Common Gull, Sandwich Tern and Common Tern. 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.

As outlined in the SPA supporting document "the Selection Species listed for Inner Galway Bay SPA are as follows:-

1. During winter the site regularly supports 1% or more of the biogeographical population of Light-bellied Brent Goose (*Branta bernicla hrota*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 676 individuals.
2. During winter the site regularly supports 1% or more of the all-Ireland population of Red-breasted Merganser (*Mergus serrator*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 249 individuals.
3. During winter the site regularly supports 1% or more of the biogeographical population of the Annex I species Great Northern Diver (*Gavia immer*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 94 individuals.
4. During winter the site regularly supports 1% or more of the all-Ireland population of Cormorant (*Phalacrocorax carbo*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 266 individuals. The site is also selected for its breeding population of Cormorant. In 2000, as part of the Seabird 2000 survey, 200 pairs of Cormorant (based on apparently occupied nests) were estimated on Deer Island; exceeding the all-Ireland 1% threshold and making the site of national importance for this species.
5. During winter the site regularly supports 1% or more of the all-Ireland population of Grey Heron (*Ardea cinerea*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 102 individuals.
6. During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover (*Charadrius hiaticula*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 335 individuals.
7. During winter the site regularly supports 1% or more of the all-Ireland population of Bar-tailed Godwit (*Limosa lapponica*). The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 447 individuals.
8. During winter the site regularly supports 1% or more of the all-Ireland population of Turnstone (*Arenaria interpres*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 182 individuals. 9. In 1995, as part of the All-Ireland Tern survey, the breeding population of Sandwich Tern (*Sterna sandvicensis*) of Inner Galway Bay was surveyed and 81 pairs (based on apparently occupied nests) were recorded. This exceeds the All-Ireland 1% threshold for this Annex I species.
9. In 1995, as part of the All-Ireland Tern survey, 98 pairs of Common Tern (*Sterna hirundo*) (based on apparently occupied nests) were recorded on Green Island in Ballyvaughan Bay in Co. Clare. The Seabird 2000 Survey recorded 46 pairs of Common Tern (based on apparently occupied nests) on Mutton Island in Co. Galway in 2001. Both counts exceed the All-Ireland 1% threshold for this Annex I species.

The following species are identified as additional Special Conservation Interests (SCIs) for Inner Galway Bay SPA as they were recorded in numbers of all-Ireland importance during the baseline period (1995/96 – 1999/00) Wigeon (*Anas penelope*), Teal (*Anas crecca*), Shoveler (*Anas clypeata*), Golden Plover (*Pluvialis apricaria*), Lapwing (*Vanellus vanellus*), Dunlin (*Calidris alpina*), Curlew (*Numenius arquata*), Redshank (*Tringa totanus*), Black-headed Gull (*Chroicocephalus ridibundus*) and Common Gull (*Larus canus*).

The wetland habitats contained within Inner Galway Bay SPA are identified of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore the wetland habitats are considered to be an additional Special Conservation Interest."

The overarching Conservation Objective for Inner Galway Bay Special Protection Area is to ensure that waterbird populations and their wetland habitats are maintained at, or restored to, favourable conservation condition. This includes, as an integral part, the need to avoid deterioration of habitats and significant disturbance; thereby ensuring the persistence of site integrity.

Conservation Interest species listed for Inner Galway Bay SPA.
Objective 1: To maintain the favourable conservation condition of the waterbird Special Conservation Interest species listed for Inner Galway Bay SPA.

This objective is defined by the following attributes and targets:-

- To be favourable, the long term population trend for each waterbird Special Conservation Interest species should be stable or increasing. Waterbird populations are deemed to be unfavourable when they have declined by 25% or more, as assessed by the most recent population trend analysis.
- To be favourable, there should be no significant decrease in the range, timing or intensity of use of areas by the waterbird species of Special Conservation Interest, other than that occurring from natural patterns of variation.

Factors that can adversely affect the achievement of Objective 1 include:

- Habitat modification: activities that modify discrete areas or the overall habitat(s) within the SPA in terms of how one or more of the listed species use the site (e.g. as a feeding resource) could result in the displacement of these species from areas within the SPA and/or a reduction in their numbers.
- Disturbance: anthropogenic disturbance that occurs in or near the site and is either singular or cumulative in nature could result in the displacement of one or more of the listed waterbird species from areas within the SPA, and/or a reduction in their numbers
- Ex-situ factors: several of the listed waterbird species may at times use habitats situated within the immediate hinterland of the SPA or in areas ecologically connected to it. The reliance on these habitats will vary from species to species and from site to site. Significant habitat change or increased levels of disturbance within these areas could result in the displacement of one or more of the listed waterbird species from areas within the SPA, and/or a reduction in their numbers.

Objective 2: To maintain the favourable conservation condition of the wetland habitat at Inner Galway Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

This objective is defined by the following attributes and targets:-

• To be favourable, the permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 13,267 ha, other than that occurring from natural patterns of variation

The proposed area of work is within OG497- Ballyloughan (Figure 29). Inner Galway Bay Subsite assessment – total numbers during LT surveys (across all behaviours and habitats) (L Low, M Moderate; H High V Very high) (Table 4).

Table 4. Inner Galway Bay Subsite assessment – total numbers during LT surveys

Species ► Subsites ▼	*n*	PB	RM	ND	CA	H.	RP	BA	TT	WN	T.	SV	GP	L.	DN	CU	RK	BH	CM
0G497	4	L	H	M	H	L	M	H	M	M					M	L	M	H	L

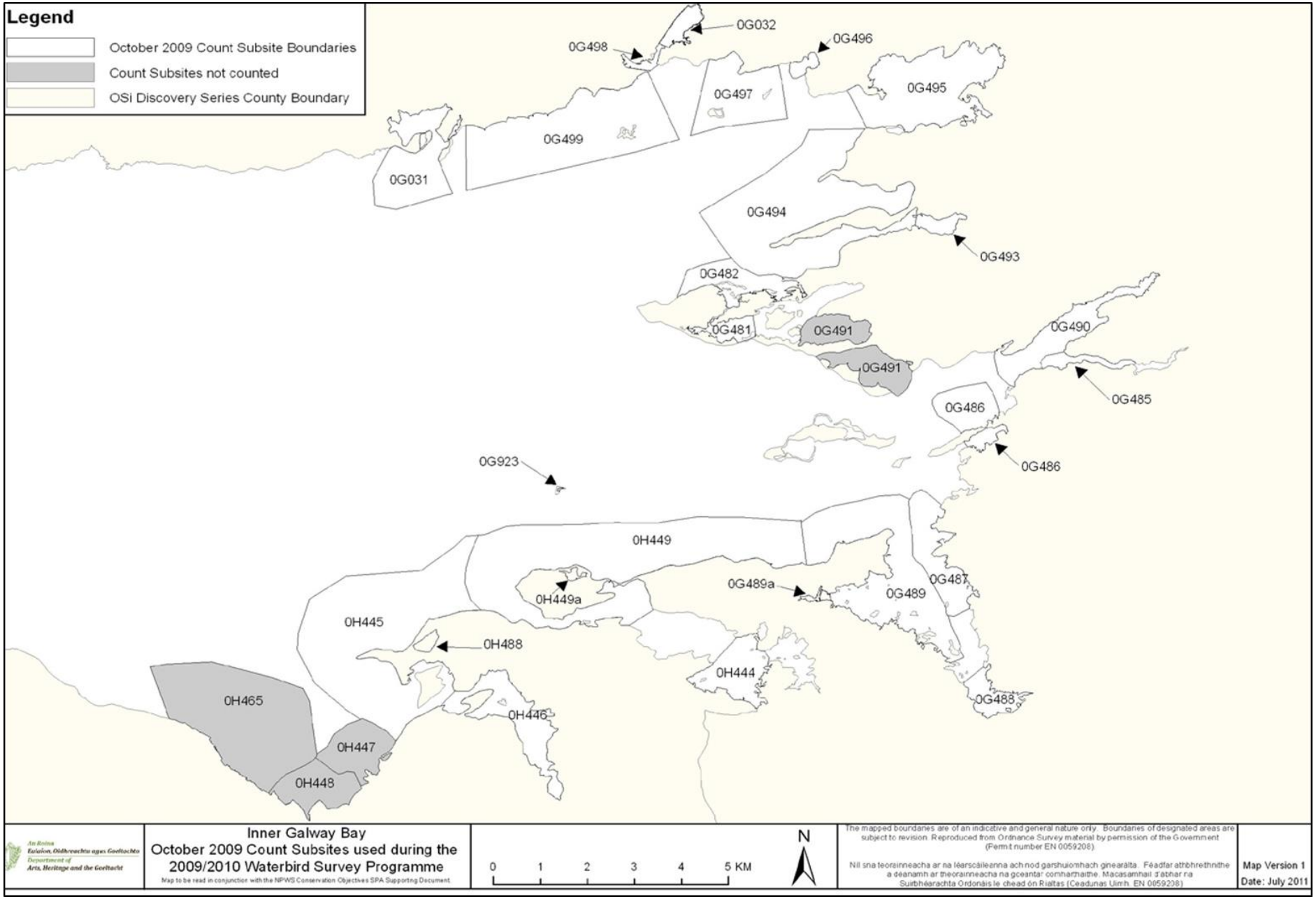


Figure 29. SPA Subsites.

Table 5 shows the Inner Galway Bay Subsite assessment – total numbers foraging intertidally,[I] subtidally[II] and intertidal/subtidal combined [III](LT surveys).Low, M Moderate; H High, V Very high;) for the following species

Table 5. *Ballyloughane Subsite assessment – total numbers foraging LT surveys*

PB	Light-bellied Brent Goose	*Branta bernicla hrotra*
ND	Great Northern Diver	*Gavia immer*
RM	Red-breasted Merganser	*Mergus serrator*
CA	Cormorant	*Phalacrocorax carbo*
H.	Grey Heron	*Ardea cinerea*
BA	Bar-tailed Godwit	*Limosa lapponica*
RP	Ringed Plover	*Charadrius hiaticula*
TT	Turnstone	*Arenaria interpres*
WN	Wigeon	*Anas penelope*
GP	Golden Plover	*Pluvialis apricaria*
T.	Teal	*Anas crecca*
SV	Shoveler	*Anas clypeata*
DN	Dunlin	*Calidris alpina*
L.	Lapwing	*Vanellus vanellus*
CU	Curlew	*Numenius arquata*
BH	Black-headed Gull	*Chroicocephalus ridibundus*
CM	Common Gull	*Larus canus*
RK	Redshank	*Tringa totanus*

Species ▶ Subsites ▼	PB[I]	PB[II]	RM[II]	ND[II]	CA[II]	H.[II]	RP[I]	BA[III]	TT[III]	WN[I]	WN[II]	T.[I]	T.[II]	SV[II]	GP[I]	L.[I]	DN[III]	CU[III]	RK[I]	BH[I]	CM[I]
n																					
0G497	4	L		H	L	H	L	M	H	M	L	M						M	L	M	H	M

Table 6 shows the Inner Galway Bay Subsite assessment – total numbers (roosting/other behaviour) within LT surveys (Intertidal[I], Subtidal[II], Intertidal/Supratidal[III] and Int/Supra/Sub combined[IV]. Low, M Moderate; H High, V Very high) Table 7 shows the ranked total numbers for HT surveys (all habitats) across the SPA. Ballyloughane in red.

Table 6. *Ballyloughane Subsite assessment – total numbers total numbers (roosting/other behaviour) within LT surveys*

Species ▶ Subsites ▼	PB[I]	PB[II]	RM[II]	ND[II]	CA[II]	H.[II]	RP[II]	BA[I] [V]	TT[II]	WN[II]	WN[II]	T.[I]	T.[II]	SV[II]	SV[I]	GP[I]	L.[I] [V]	DN[II]	CU[I] [V]	RK[I] [V]	BH[I]	BH[II]	CM[I]	CM[II]
n																								
0G497	4					H			V															

Table 7. Ranked total numbers for HT surveys (all habitats) across the SPA.

Species ▶ Subsites ▼	PB	RM	ND	CA	RP	H.	BA	TT	WN	T.	SV	GP	L.	DN	CU	RK	BH	CM
0G031	11	11	11	2	1	5	2		13			2	7	1	13	1	4	18
0G032								11	16	14			2			22	5	6
0G479	6	13	11			5		9	18	12			14		20	22	22	
0G480	8	7	6	6		1			24						23	17	18	22
0G481	4	1	3	8	9	4	5	1		17		1	4	4	15	2	11	3
0G482	3		2					13	15	12					16	22	22	
0G483	12	8	6		5			6	5	14				8	5	13	22	15
0G484	17	3				5	7	5	14				9	10	4	10	14	22
0G485		15	11						20	11							18	
0G486	7								9	1			13		16	15	16	19
0G487	20	11							10						23	11	20	21
0G488								13	12	9			5		12	21	20	17
0G489	1		3	8	6	5	8	1	4	6			1	9	1	17	13	5
0G490	15		11						7	10			10		9	14	14	22
0G491																		
0G493	19						6	13	17	4	2			3	6	3	9	1
0G494																		26
0G495	16	16	5	10				3	2	2			3	7	3	7	6	9
0G496						5	10		21	8				12	18	16	7	19
0G497	18	9	10		2		4	4	19						19	19	3	22
0G498				10		2										26	2	7
0G499	20			3			1	6	23					13	20	6	1	3
0G923				1														
0H444		6							1	3	1		8		10	4	10	8
0H445	5	5	11	6	8	5				17			12	5	8	12		9
0H446	10	2		4	4	2		10	8	5			6		2	5	8	2
0H447	12		6		7				21	7					22	19	11	13
0H448	9	4			3		3		6	16			11	6	10	22	17	12
0H449	2	9	1	5			9	8	11					2	13	8	22	16
0H465	14	14	6				10	11						11	7	8		11
0H488									3	19								13
n	21	16	15	11	9	10	11	15	24	19	2	2	14	13	24	26	25	26

Recreation and disturbance

As outlined in the conservation objectives supporting document "*Inner Galway Bay offers a great deal in terms of coastal and marine leisure and tourism for the region. Galway City's coastal area is an important tourist and recreational amenity. Although sandy beaches are relatively limited across the site, two areas (Salthill beach (subsite 0H499) and Silverstrand (subsite 0G031) have achieved EU Blue Flag status in recent years. The urban village of Salthill is a traditional seaside resort and major tourist attraction. Silverstrand and Ballyloughaun beaches (subsite 0G497) are also considered significant recreational assets for the city.*

Of the activities that were recorded as causing disturbance during field surveys, walking (intertidal areas and including dogs) was the most widespread (13 subsites) and responsible for the peak disturbance score for 11 subsites (Table 8). 64% of field observations resulted in a response from waterbirds, the most common response being 'moderate' in that the waterbirds were displaced for short periods of time, most often to another part of the subsite. Higher disturbance scores relate to records where dogs, and particularly loose dogs, were involved in the activity. The overall 'high' score attained at 0G497 (Ballyloughlan) relates to humans and loose dogs recorded walking within this subsite frequently, with waterbirds displaced whilst the activity was occurring."

Potential Impact of the Proposed works on Inner Galway Bay SPA

The status of the qualifying interests are seen in Table 8. As outlined in the SPA conservation objectives supporting document the proposed cable route is in an area of high disturbance at a time outside of overwintering bird season. Terns are not located in the vicinity of the landfall and would be used to vessel activity in the region of Mutton Island where they nest during the summer. The proposed cable laying in the intertidal is within the Mudflats and Sandflats not covered by Low tide habitat which would be an area where birds would forage when disturbance levels are low.

It is proposed that all works will be carried out outside of the overwintering bird season of Late September to March, so as to eliminate disturbance impacts on the overwintering features of interest of this SPA. Mitigation measures are proposed including having an ecologist present on site to ensure birds (roosting or foraging) are not disturbed by the proposed works. The cable route would see invertebrate mortalities along the machinery access areas and in the vicinity of the plough. This would be primarily due to compression by the plough/machinery in a maximum 4m wide track and the disturbance of sand during the plough action, during one tidal cycle. These impacts would be limited in nature (4m x 460m) and would be short term.

Table 8 Current Status of Qualifying interests.

Natura 2000 Site	Qualifying Interests	Current Status[3]
Special Protection Areas (SPA)		
Inner Galway Bay SPA [004031]	A003 Great Northern Diver *Gavia immer*	Amber
	A017 Cormorant *Phalacrocorax carbo*	Amber
	A028 Grey Heron *Ardea cinerea*	Green
	A046 Brent Goose *Branta bernicla hrota*	Amber
	A050 Wigeon *Anas penelope*	RED
	A052 Teal *Anas crecca*	Amber
	A056 Shoveler *Anas clypeata*	RED
	A069 Red-breasted Merganser *Mergus serrator*	Amber
	A137 Ringed Plover *Charadrius hiaticula*	Amber
	A140 Golden Plover *Pluvialis apricaria*	RED
	A142 Lapwing *Vanellus vanellus*	RED
	A149 Dunlin *Calidris alpina alpina*	RED
	A157 Bar-tailed Godwit *Limosa lapponica*	Amber
	A160 Curlew *Numenius arquata*	RED
	A162 Redshank *Tringa totanus*	RED
	A169 Turnstone *Arenaria interpres*	Green
	A179 Black-headed Gull *Chroicocephalus ridibundus*	RED
	A182 Common Gull *Larus canus*	Amber
	A191 Sandwich Tern *Sterna sandvicensis*	Amber

[3] Birds of Conservation Concern in Ireland 4: 2020–2026

	A193Common Tern *Sterna hirundo*	Amber

Table 9. *Recreation and disturbance activities in each SPA subsite*

Number of activities recorded to cause disturbance to waterbirds during field surveys (2009/10 wate survey programme) plus the calculated peak disturbance score (see text for explanation)
Scores 0 – 3 = Low Scores 4 – 6 = Moderate Scores 7 – 9 = High
Grey shading = no activity recorded to cause disturbance during field surveys

Subsite Code	Subsite Name	Number Activities causing disturbance	Peak Disturbance Score	Activity Responsible
0G031	Lough Rusheen	1	3	• Walking (incl. dogs)
0G032	Lough Atalia	1	3	• Walking (incl. dogs)
0G479	Rinville & Ardfry South	2	3	• Flight path (aircraft)
0G480	Rinville & Ardfry North	4	4	• Motorised watercraft
0G481/482	Tawin South & North	0		
0G483/484	Bayynacourty South & North	0		
0G485	Tyrone House & Morans	0		
0G486	Killeenaran	0		
0G487	Tarrea & adjacent areas	0		
0G488	Kinvarra	1	3	• Intertidal aquaculture (associated activities)
0G489	Traught & Doorus	0		
0G490	Cave – Clarinbridge	3	5	• Flight path
0G493	Kilcaimin	2	6	• Walking (incl. dogs)
0G495	Oranmore Bay	2	4	• Walking (incl. dogs)
0G496	Rosshill	0		
0G497	Ballyloughlan	1	7	• Walking (incl. dogs)
0G498	Nimmo's Pier & Docks	1	4	• Walking (incl. dogs)
0G499	Salthill & environs	2	4	• Walking (incl. dogs)
0H444	Coranroo	0		
0H445	Martello Tower, L. Muree & shore	1	6	• Motorised watercraft
0H446	Castle – bell Harbour – Finvarra	3	6	• Walking (incl. dogs)
0H447	Bishop's Quarter	2	5	• Walking (incl. dogs)
0H448	Ballyvaughanan Bay	1	5	• Motorised vehicles
0H449	Aughinish	3	6	• Walking (incl. dogs)
0H465	Rinn	2	6	• Walking (incl. dogs)
0H488	Rine Lough Murree Flaggy Shore	0		

5.3 Cetaceans

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 are designated as sites of Community importance.

The proposed cable lay would be expected to impact on cetaceans primarily through the emission of noise due to the vessel and acoustics from the USBL equipment. 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*."

Southall *et al*. (2019) outlined 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 10.

Table 10. *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	*Balaenidae (Balaena, Eubalaenidae spp.); Balaenopteridae (Balaenoptera physalus, B. musculus)*
		Balaenopteridae (Balaenoptera acutorostrata, B. bonaerensis, B. borealis, 1 B. edeni, B. omurai; Megaptera novaeangliae); Neobalenidae (Caperea);Eschrichtiidae (Eschrichtius)
High-frequency cetaceans	HF	*Physeteridae (Physeter); Ziphiidae (Berardius spp., Hyperoodon spp., Indopacetus, Mesoplodon spp., Tasmacetus, Ziphius); Delphinidae (Orcinus)*
		Delphinidae (Delphinus, Feresa, Globicephala spp., Grampus, 2 Lagenodelphis, Lagenorhynchus acutus, L. albirostris, L. obliquidens, L. obscurus, Lissodelphis spp., Orcaella spp., Peponocephala, Pseudorca, Sotalia spp., Sousa spp., Stenella spp., Steno, Tursiops spp.); Montodontidae (Delphinapterus, Monodon); Plantanistidae (Plantanista)
Very high frequency cetaceans	VHF	*Delphinidae (Cephalorhynchus spp.; Lagenorhynchus cruciger, L. australis); Phocoenidae (Neophocaena spp., Phocoena spp., Phocoenoides); Iniidae (Inia); Kogiidae (Kogia); Lipotidae (Lipotes); Pontoporiidae (Pontoporia)*
Phocid carnivores in water	PCW	*Phocidae (Cystophora, Erignathus, Halichoerus, Histriophoca, Hydrurga,Leptonychotes, Lobodon, Mirounga spp., Monachus, Neomonachus, Ommatophoca, Pagophilus, Phoca spp., Pusa 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 10). 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 on marine mammals was also outlined in NOAA 2018 (Table 11). The updated figures for PTS and TTS for are outlined in Table 12.

Table 10. 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 11. Onset of PTS in Marine mammals

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

[1]Impulsive: 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).

[2]Non-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 12. Southall *et al.* (2019) TTS- and PTS-onset thresholds for marine mammals exposed to impulsive noise: SEL thresholds in dB re 1 µPa^{2}s under water and dB re (20 µPa)^{2}s ; and peak SPL thresholds in dB re 1 µPa under water.

Hearing Group	**Impulsive Noise**		**Non-impulsive Noise**
	Unweighted SPLpeak(dB re 1 µPa)	Weighted SELcum (dB re 1 µPa^{2}s)	Weighted SELcum (dB re 1 µPa^{2}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

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. 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 USBL equipment and the noise frequency emissions are seen in Table 13. The low frequencies emitted from the equipment (18-36 kHz) are below the auditory range of the high and very frequency cetaceans but are within the hearing range of low frequency cetaceans that would be seen on the cable route (Table 11).

Table 13. Details of the proposed types of geophysical equipment which emit sound

Equipment Type	Typical Source Pressure Level (dB re 1 µPa @ 1 m)	Potential for auditory injury?	Typical Frequency Range (kHz)
USBL System (Transducers)	< 220	Potential risk	18-36
USBL Beacons (Transponders)	< 206	Potential risk	18-36

The noise emitted from a USBL is above the TTS- and PTS-onset threshold injury levels indicated by Southall *et al.* (2019), negative impacts may be foreseen if Low Frequency Cetaceans are close enough to the equipment to receive sound levels above this indicative threshold.
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.

5.4 Marine Annex IV Cetacean Species in the vicinity of Galway Bay.

In O'Brien (2013) "*a total of 28 dedicated land-based visual watches were carried out from Spiddal Pier (2700 minutes/45 hours) between March 2005 and February 2007. Cetaceans were recorded during 10 of the 27 watches (37%). A total of 16 sighting were recorded during watches comprising of three species; including, harbour porpoise (81%), bottlenose dolphin (13%) and Minke whale (7%). Only a single sighting of two harbour seals was recorded on one occasion. All sightings recorded were within a 5km radius of Spiddal pier. Most sightings (75%) were recorded between the months June to December with only 25% of sightings recorded in the period January to May, highlighting mid-summer through to December as the months when porpoises are most active at the site.*

The OE Test site was again the target of long-term Static Acoustic Monitoring (SAM) as part of the PReCAST project, when monitoring commenced in January 2009 and continued until September 2010. During this time a total of 572 days were monitored at the site. SAM monitoring from January 2009 to September 2010 at the test site show that, on average, harbour porpoises were recorded on 95% of days monitored, while dolphins were rarely recorded (4%days). These results reflect those of the SAM I. Over the 572 days monitored, a total of 27,902 porpoise Detection Positive Minutes (DPM) were recorded (4,515 Detection Positive Hours; DPH). As dolphin sightings were rare, only the porpoise data were analysed to identify factors influencing their presence at the site.

Results from visual and acoustic monitoring are very similar as all show that autumn and winter months are when porpoises are most active at the site. Visual data shows that in comparison with other sites in the bay subjected to land-based watches, Spiddal is not the most important, with a greater relative abundance recorded from Black Head on the south shore. This is most likely due to the tidal nature at Black Head as porpoises are known to use tidal races when feeding."

Figure 30 shows all cetacean species, and Figure 31 shows monthly activity trends, in the area as recorded by IWDG sightings scheme. Cetacean activity has been seen in the vicinity of the cable route corridor. Species seen in the area and along the cable route include bottle-nosed dolphin (*Tursiops truncates*) (especially in inner Galway Bay and inshore areas along the route), harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*), minke whale (*Balaenoptera acutorostrata*, and a single killer whale (*Orcinus orca*). During the months of proposed cable laying (July-August) bottle-nosed dolphin (*Tursiops truncatus)* harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*) have been recorded. Cetaceans observed in the offshore area are seen in Appendix II.

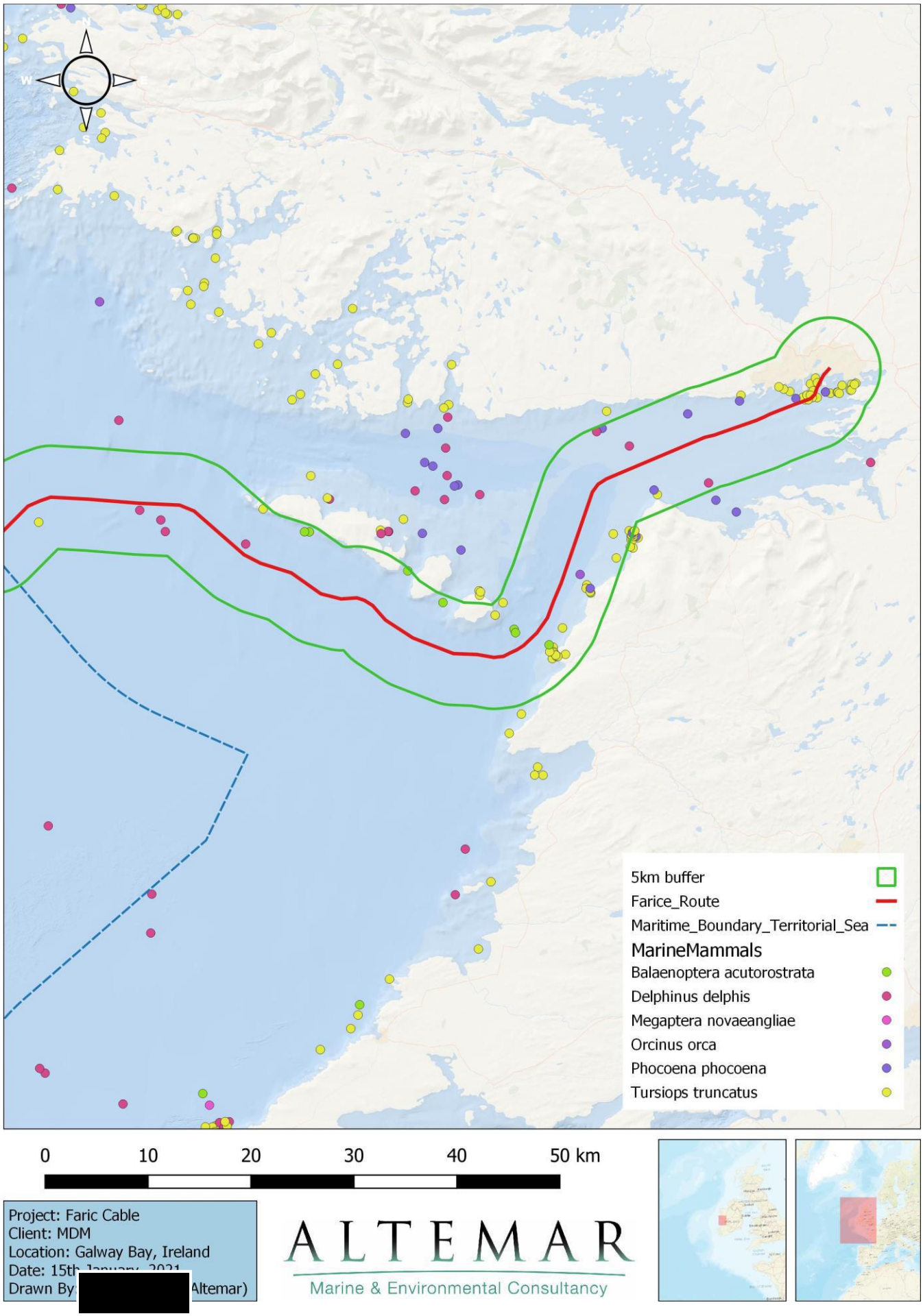


Figure 30. Observations of marine mammals in vicinity of the proposed cable route.

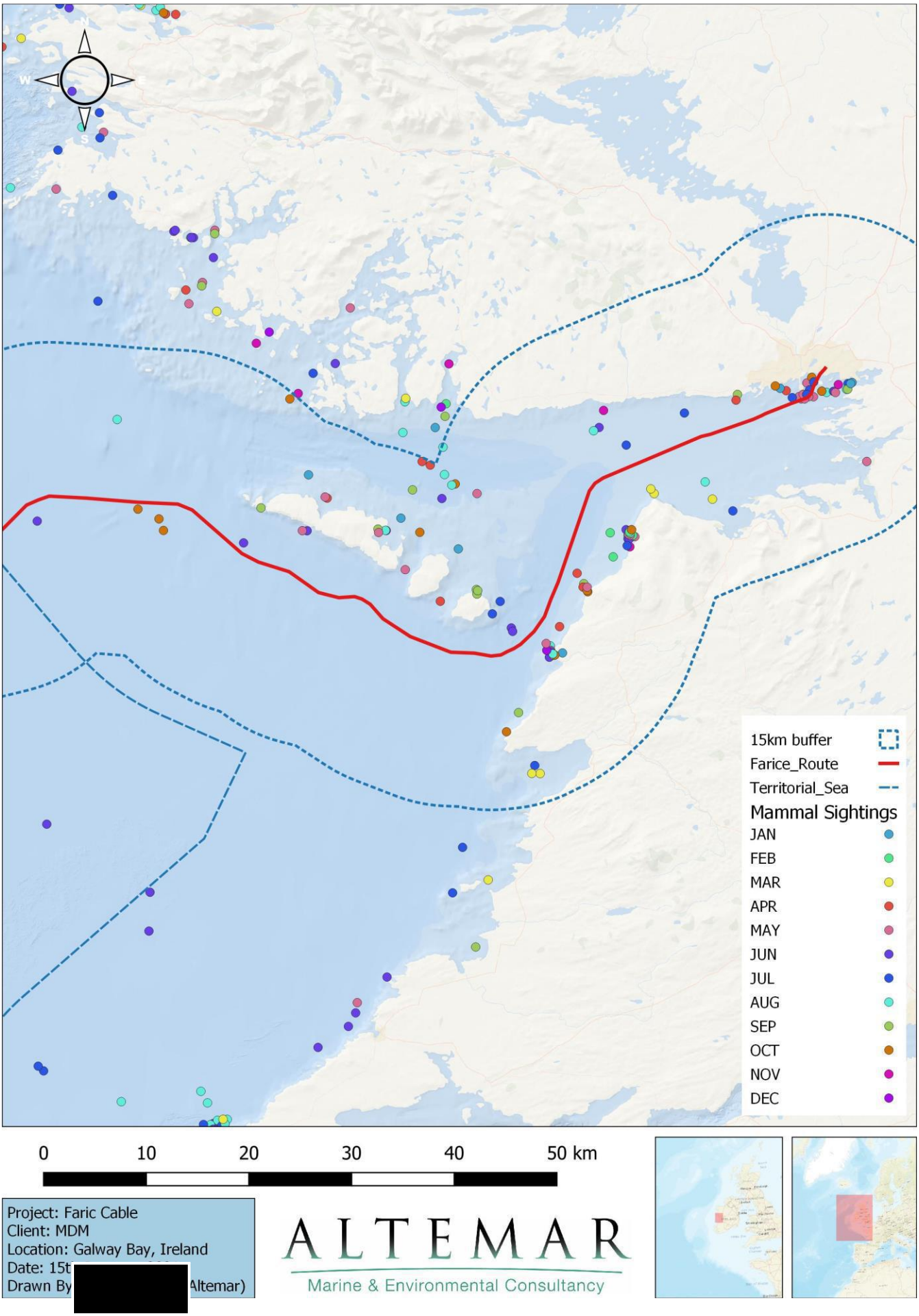


Figure 31. Monthly observations of marine mammals in vicinity of the proposed cable route.

6 Mitigation Measures

Minor short-term impacts may result as a consequence of the main lay phase of the project, but these are believed not to be at the scale to impact on the integrity of the Natura 2000 sites, species or the Site Specific Conservation Objectives. However, following the precautionary principle, substantial mitigation measures have been developed to minimise the ecological impacts of the project, not only in relation to Natura 2000 Annex habitats and species, but also additional species and habitats of conservation importance that have been recorded in the area.

Pre cable laying mitigation

Route Planning

A strict route selection process was carried out to assess the optimal route and landing site across the east coast of Galway Bay, taking into account the lowest environmental impact, highest resource efficiency and wave exposure on the basis of sound and comparable data. This included addressing engineering issues as well as environmental concerns and assessing existing subsea infrastructure. Altemar were involved in and an integral part of the route selection and planning process from the outset.

The proposed landfall location is within overlapping Natura 2000 sites of conservation significance (SAC & SPA). The conservation significance of the features of interest and qualifying interests of the Natura 2000 sites was assessed. The route through the conservation sites was deemed to be the optimal route of satisfying conservation significance (within the designated sites) based on the assessment of NPWS ratings data, the optimal from an engineering perspective and for the stability and longevity of the cable. Initial routing used NPWS data to avoid sensitive subtidal communities including maerl and *Zostera* communities. However, a video survey was carried out within the SAC in 2018 to fine tune these data and identify other sensitive subtidal communities in areas not covered by previous NPWS data.

However, following further optimisation of the route based on marine survey (acoustic) results, two further video surveys were carried out in 2021 to assist in finetuning the routing to minimise the impact on communities of the Slender sea pen (*Virgularia mirabilis*) within the SAC. However, it should be noted that this community is not a feature of interest of the SAC. Nonetheless it is a sensitive subtidal community and sea pen and burrowing megafauna communities are classified by OSPAR as a '*Threatened and/or Declining Habitat*' (OSPAR, 2004). As a result discussions have taken place with NPWS to assist in optimising the cable route to have minimal impact on this community within Galway Bay SAC.

Timing of Cable Lay

The assessment of environmental factors within the landfall area was critical to the timing of the project and mitigation of impacts on species of conservation importance. The primary conservation interest of the SPA at the landfall is over-wintering birds. The cable lay is to be carried out during summer, after all over-wintering birds have left and prior to the arrival of species for the overwintering season. Terns are also listed as a conservation interest and are not located in the vicinity of the proposed cable route.

- *Shore-end Installation: April 2022*
- *Main-Lay: May – August 2022*

Harbour Seals will be at breeding sites during summer months. The cable lay is at minimum 1.5km from the nearest breeding site. As discussed with Inland Fisheries Ireland the proposed cable laying timeline will coincide with the main salmon run returning through Galway Bay into the River Corrib catchment for the purposes of spawning. The salmon smolt run is from mid-April to the end of May (outside the timeline of the proposed cable laying works). There is no significant noise generation during ploughing operations. As the cable installation by plough is relatively slow (0.5kn) it produces only a minor plume of suspension of seabed sediments in the water column and this is transient and localised due to the nature of the ploughing and natural backfill activities. The cable laying operation from Ballyloughane Beach to the Aran Islands should only take approximately three days.

Laying Procedure

Subtidal burial of the cable will involve the use of a marine plough. Ploughing entails disturbing a wedge of seabed and the placing of the cable within the wedge in one pass. The seabed backfills passively over the laid cable.

As outlined by OSPAR (2012) "*As far as the burial technique is concerned, installation via jetting by means of sledge or ROV or use of a plough involves the lowest environmental impacts. Jetting fluidises the seabed using high power jets, and material may suspend to the water column for prolonged periods (a number of hours), and have the capacity to be transported over longer distances, increasing the number of potential receptors. Ploughing usually entails lifting a wedge of seabed and the seabed backfills over the laid cable. The level of sediment disturbance is, therefore, lower using ploughing compared to jetting techniques*."

Mitigation measures

Terrestrial

It is proposed to use a HDD to travel under the car park, beach wall, drift line, cobble upper shore and into the upper intertidal. The following will need to be provided or confirmed to the project ecologist prior to HDD commencement:

a) Supervision and Notification

An ecologist will be hired by the applicant. The ecologist will have previous experience with HDD operations in the intertidal/subtidal should observe all works from planning, initial site setup to reinstatement. NPWS and IFI should be notified of pending operations at least 1 week before operations commence and of any breaches of compliance. An Ecological Clerk of Works report will be submitted to IFI/NPWS. No invasive species were noted on site. However, a pre construction survey will be carried out by the ecologist in relation to invasive species.

b) Timing of drill

It is estimated that the HDD will take one day to drill the duct for the cable. The timing of the HDD in the intertidal will be that no seawater is over the drill head during drilling. This would mean that the drill will be done on a receding tide to that there would not be water in the vicinity of the bore. This would allow for observation of the drill progress by the ecologist and the rapid completion of the operation in a single tide.

c) Frac-out Contingency Plan

A Frac-out Contingency Plan will be discussed with the ecologist before works commence. The HDD operators will be need to be equipped with a tracked hydraulic excavator, straw or hay bales, stakes to secure bails, silt fence, sand bags, shovels, pumps, and any other materials or equipment necessary to contain and clean up inadvertent releases.

d) Corrective Actions for an Inadvertent Release

In the event of an inadvertent release to the surface, the following actions will be taken:

- If the release is large, mud circulation will cease immediately. If the spill is small to moderate, the contractor will continue circulation in order to maintain pressure in the hole.
- Maintaining circulation will also be necessary if the native material does not have the frictional characteristics necessary to maintain hole stability without the presence of mud provided under pressure.

In all cases, the contractor will also proceed as follows:

- Contain any drilling fluid that has surfaced.
- Notify all on-site representatives.

- Reduce circulation pressure and evaluate the circumstances leading to circulation loss to determine if the fracture can be sealed.
- Thicken the drilling fluid to attempt to seal off the location of the release as reasonably practical.

d) Containment of Drilling Fluid Release

Immediately following the detection of any inadvertent drilling fluid release, containment and clean-up operations shall commence. For releases on land, Contractor shall use straw bales, silt fences, sand bags and earth berms to prevent fluid from migrating or flowing from the immediate area of the discharge. If the volume released is too small for containment measures or, if the release occurs in an environmentally sensitive area where release of containments can cause additional damage, the receiving area will be allowed to dry naturally. If there is a threat to a sensitive resource, or a threat to public safety, HDD activities will cease immediately until a plan to proceed is discussed.

Other containment measures include the following:

- Additional berms may be constructed around the release area as directed by the Engineer In Charge to prevent release of materials.
- If the amount of fluid released is large enough to prevent practical collection, the affected area will be diluted with fresh water and allowed to dry. Measures will be implemented (berm, silt fence, and/or hay bale installation) to prevent silt laden water from flowing into the sea.
- If hand tools cannot contain a small on-land release, small collection sumps may be constructed to pump the released material into the mud processing system.

The decision to proceed with the drilling operation will be at the sole discretion of the Engineer In Charge after all practical methods to seal off the location of the discharge have been attempted. Underwater releases are not expected as HDD operations in the intertidal will be carried out in the dry. However, the ecologist will inform NPWS and IFI immediately should there be any perceived risk to water quality.

e) Clean-up of Releases

The clean-up shall commence after the release is contained. Clean-up shall include removal of all visible drilling fluid located in accessible areas. Removal methods will vary based on the volume of the release and the site specific conditions. Removal equipment may include vacuum trucks, loader and back hoe buckets, small pumps, shovels and buckets. After removal of the released drilling fluid, the release area will be reinstated as close to the original condition as possible.

f) Notification

In the event of a frack-out NPWS and IFI will be informed immediately.

Pollution

The presence of machinery on the intertidal could pose a threat of pollution. Toilet facilities will need to be provided on site. In order to minimise pollution the following will take place:

1) All machinery will only be fuelled on the hard stand area of a car park or road at least 10m from a drain or gulley.
2) All waste from the beach manhole operations will be removed from the site.
3) Any fluid leaks/spills will be cleaned up immediately.

Intertidal

As was seen during the fieldwork, the beach at which the intertidal ploughing is to be carried out on is moderately exposed. This can be seen by the evidence of 10m wide storm beach and the presence of a concrete wall at the top of the shore. Even though the works are outside over-wintering bird season and during the

summer when there is increased human visitor activity on the beach, disturbance of resident birds, summer visiting birds, otters and harbour seals may occur and the integrity of these conservation interests must be maintained. As a result mitigation of impacts in the intertidal will concentrate on minimising the following:

Disturbance

The proposed route is within a popular beach which will have increased activity during summer months. As a result the presence of additional personnel on the shore during summer would not be thought to cause a significant additional adverse effect. However, the presence of machinery and digging generated noise could cause a localised disturbance to bird populations. In order to minimise disturbance of the intertidal habitat and species the following mitigation measures would be carried out:

1. An ecologist would be onsite for the HDD, ploughing and back blading process in order to minimise disturbance and ensure site integrity is maintained. If roosting birds are present on the shore, the cable lay will be postponed until the birds depart, without provocation. If otters are present on the shore or in the subtidal within 200m of the works, the cable lay will be postponed until the otter depart, without provocation. The ecologist will be a suitably qualified ecologist, ideally familiar with the sensitivities of the site, the methodologies and will brief the contractor prior to the commencement of the works.

2. Drift lines in close proximity to the proposed route would contain the highest proportion of potential food source for bird species. If present, these will be avoided by machinery and personnel.

3. Noise generated from machinery could cause a disturbance. The bucket of the digger used in gaining access to the HDD will have teeth, so as to minimize scraping of metal against the cobble or boulders (if present).

4. The cable route on the shore will be plough buried on a receding tide, as soon as practical to go along the upper shore. 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 will result in the cable route being imperceptible following a single or several tidal cycles.

5. The HDD operations in the intertidal will take one day and will commence under the intertidal element, on a receding tide when the area above the HDD has no water and will be completed within one tidal cycle. HDD operations in the intertidal will not be carried out while the HDD is covered with water, so that any potential leak of bentonite can be easily seen on the sand surface, isolated and cleaned.

6. Any temporary access arrangements or structures that are put in place to allow machinery access to the beach area will be prepared in consultation with an ecologist and the site will be fully reinstated post works.

7. *Reinstatement*

Reinstatement of the terrestrial and intertidal habitat will be carried out to pre-construction conditions. Any concerns in relation to the trenching process or resulting reinstatement of the habitat to pre construction conditions will be raised with NPWS by the project ecologist prior to the removal of personnel from the site. A report on the trenching and reinstatement of the intertidal habitat, with imagery, will be submitted by the project ecologist to NPWS within 1 week of the completion of works.

Subtidal

Mitigation impacts are primarily concerned with the cable laying as minimal impacts are foreseen during the operation phase, with the exception of human intervention in relation to a break or fault in the cable. Impacts in a decommissioning stage are similar to those of the cable laying phase. Repairing the cable may involve several scenarios, from *insitu* repair with divers to the use of a grapnel to lift the cable on board so that repairs can be carried out at sea. As a result the following mitigation measures would be enforced during construction, repair and decommissioning.

1. A marine biologist will be present onboard the lay vessel during cable laying within the SAC to ensure minimal impact on the sensitive subtidal communities. In addition, an marine biologist will be directing the plough over the continental slope and determining the habitats where the cable will be surface laid.

2. Under no circumstance should seals hauled out in the area be disturbed such that they enter the water. This is unlikely, as this area is not recognised as a haul out area. Cable laying is to be carried out outside of breeding and haul out areas, but will be carried out during haul out period. A MMO will be onboard the vessel at all times in Irish waters to enforce mitigation measures. "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" will be applied to ensure noise introduced into the marine environment have minimum effect.

3. No hydroacoustics are to be used during the cable lay without consultation with the MMO so as to limit disturbance to cetaceans.

4. Additional permissions would be sought from NPWS in the case of repair/removal of the cable etc. prior to carrying out works.

5. In order to ensure the integrity of Annex habitats and additional habitats and species of conservation importance are retained in the vicinity of the planned project a marine ecologist will be onsite during all intertidal works including the final making good of site, including back filling, beach manhole completion and removal of machinery. The ecologist will also ensure that birds of conservation importance roosting on the shore will not be disturbed during works.

6. 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 populations, to ensure that the vessel stays within 250m of the cable route and that vessel-generated noise is restricted to engines and winches only.

7. On approaching the landfall area the cable ship will approach its closest point to shore at the lower end of an incoming tide. No discharges from the vessel will be made from the ship within 5km of landfall. The MMO/ecologist will ensure that mitigation measures are carried out. 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.

8. Laying of the cable will be carried out in calm weather to ensure that there is no risk of vessel grounding. The vessel will not carry out the landfall operations in strong westerly winds (>force 3) due to the presence of intertidal reef to the south.

9. The cable lay vessel will at all times be within 500m of the cable lay route in order to minimise disturbance of breeding birds in the surrounding SPA's.

10. Due to the presence of sensitive subtidal communities in the Galway Bay Complex SAC NPWS will be informed of the final proposed route prior to main lay.

Post-lay Monitoring

Given the location of the cable, buried in marine sediments or passively laid across reef areas (outside Galway Bay where no reef is present), monitoring of the cable would pose more of an impact on the marine environment than just leaving the cable *insitu* unmonitored. Underwater cables by their nature are passive on/within the seabed. It is would not be expected that the cable will move, deteriorate or impact on marine/intertidal habitats over time, unless impacted by anthropogenic /storm influence. Problems, if they arise would be expected to result in a loss of signal and subsequent location of the break/damage and repair.

Monitoring of the intertidal could take place to assess the levels of sediment cover over the cable across the intertidal. However, the plough method ensures effective burial and reinstatement within one or several tides depending on weather conditions.

Ecological supervision

In order to ensure the integrity of Annex habitats and additional habitats/species of importance are retained in the vicinity of the planned project, the following is recommended:

a) An ecologist will be onsite for the initial set up of HDD machinery and commencement of drill.
b) An aquatic ecologist will be onsite to observe the HDD drill operations to ensure that no bentonite escapes into the intertidal/marine environment.
c) An ecologist will be onsite to observe the making good of site, including back filling of drill pit and removal of machinery Images will be taken of the process and submitted to NPWS as part of an ecological report.
d) A MMO will be present during cable laying and ship cable laying to minimise any impact on marine mammals.
e) A marine biologist will be on the lay vessel/s within the Galway Bay SAC.

7 Adverse Effects on the conservation objectives of Natura 2000 sites likely to occur from the project (post mitigation)

The conservation objectives of Natura 2000 sites within 15km of the proposed main lay route were assessed. Given the minor and localised nature of the impacts no impacts were foreseen beyond 15km. The proposed works will be carried outside of the over-wintering bird season and will not be close to tern colonies in Galway Bay during summer months where there is existing disturbance in the area. The project may cause localised disturbance to the Mudflats and Sandflats within Ballyloughane Beach in addition to otter and harbour seals during the main lay periods. However, these impacts are deemed to be short term for the period of works (2-3 days for main lay) with the reinstatement of infaunal communities within the intertidal corridor taking longer. Sensitive subtidal communities that are conservation interests within the SAC will be avoided during the cable lay. A robust series of mitigation measures are proposed that will see ecological supervision of all aspects of the works on the beach and within Galway Bay SAC. A MMO will be in place during the cable lay. .

In conclusion, no significant adverse effects are likely on the features of interest or the site specific conservation objectives of Natura 2000 sites within 15km of the proposed cable laying operations associated with the proposed fibre optic cable routing within Irish waters and at the landfall at Ballyloughane Beach, individually or in combination with other plans or projects. However, mitigation measures are required and should be carried out in consultation with an ecologist.

No adverse effects on Natura 2000 sites are Likely.

Trans-boundary effects

The potential impact footprint of the proposed cable lay is very small with localised temporary non significant adverse effects only seen during construction. The cable will be buried along its route. No operational impacts are foreseen unless the cable is damaged and repair will involve localised disturbance of the cable and reburial of the cable with ROV. Removal of the cable if/when required will be subject to an additional licencing process. The cable is not expected to have any transboundary ecological or environmental impacts. As seen in Appendix I (APV-I) the proposed cable route is greater than 15km from the nearest UK offshore SAC.

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 were assessed. The proposed landfall cable laying is in a populated area and is a popular destination for the local community. It is a location with a regular stream of dog walkers and pedestrians on the shore. The cable laying would not be seen to have an impact on water quality of the area including impacting the water quality status. The intertidal section of this project will involve trenching (in SAC/SPA/pNHA & Ramsar site) and machinery that will enter the upper shore (within the conservation sites).

The terrestrial fibre optic cable routing from the beach manhole will comprise the use of existing cable infrastructure (ducting) supplemented by sections of infill or linking telecoms ducting of approximately 2km to connect to local and national fibre optic telecoms networks. The installation of the telecoms duct will be assessed and licenced by Galway City Council and installed in the public road or verge/footway in accordance with 'Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. (Dept. of Transport, Tourism and Sport, 2017). The terrestrial works will be carried out in advance of the marine works. There are no direct pathways from the terrestrial cable works to European Sites.

Galway City Council planning permissions, Foreshore Applications and EIA portal[4] were examined for potential cumulative impacts due to development in the area. Permission for the construction of a new playing pitch and public walkway/cycleway to the west of Ballyloughane Beach was granted on 30/05/2017. The development was to include a full-size GAA pitch with 6 no. floodlights and 2 no. ball stop nets; provision of a new public walkway and cycleway, incorporating a coastal path and circular route; extension to existing vehicle parking area; and all associated site and ground works. This application was accompanied by a Natura Impact Statement (NIS). This development was completed in the summer of 2021.

James & Breda O'Reilly have submitted a planning permission application (20221) for development to the east of the proposed landfall which "will consist of the construction of a new two storey dwelling and garage, with new access road plus wastewater treatment system and associated site works" at Ballyloughane, Renmore,, Galway. The application is currently at FI stage. No additional planning applications have been received in the past four years in the vicinity of the proposed cable laying route on Ballyloughane Beach.

DeepSea Fibre Networks Limited has applied for a Pre-installation cable laying, localised site investigations and installation of a subsea fibre optic cable also at Ballyloughane Strand, Renmore, Co Galway for the WINS cable. This project is at application stage and no works in relation to this project are planned at the same time as the Farice cable installation. An EcIA and NIS were submitted in relation to this application and no significant adverse effects were foreseen in relation to the proposed works, following the implementation of mitigation measures which includes ecological supervision.

DeepSea Fibre Networks Limited was granted a foreshore licence for Pre-installation marine survey and localised site investigations for a subsea fibre optic cable at Ballyloughane Strand, Renmore, Co Galway for this proposed Farice cable to Iceland. A NIS was submitted in relation to this application and no significant adverse effects were foreseen in relation to the proposed works, following the implementation of mitigation measures which includes ecological supervision.

On the 23/04/2021 the Health Service Executive submitted a Foreshore Application to deploy 6 swim buoys along Salthill promenade in support of Healthy Galway City programme which is the structure to implement Healthy Ireland at the local level (FS007100). The application is currently at Application Stage.

The potential impacts of the proposed cable laying are Temporary (i.e. Effects lasting less than a year) and primarily to occur during the brief construction period (with the presence of boats, machinery and personnel in the vicinity of the works) and over several tidal cycles as sediments redistribute over the cable. Impacts on infauna would be deemed to be temporary (i.e. Effects lasting less than a year). 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 in combination effects are foresee with the proposed project. This report pertains to the cable laying for a marine fibre optic cable in subtidal and intertidal habitats. As can be seen from using the Best Available Techniques and mitigation measures during cable laying 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.

[4] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

9 Conclusion

Mitigation measures are proposed. With the implementation of these mitigation measures no significant impacts on water quality, disturbance or underwater noise are foreseen from the construction or operation of the proposed project. No Natura 2000 sites, conservation objectives or qualifying interests will be compromised as a result of the proposed works based on the successful implementation of the mitigation measures outlined. No significant adverse impacts on the conservation objectives of Natura 2000 sites are likely following the implementation of the mitigation measures outlined above.

In conclusion, no significant impacts are likely on the features of interest or the site specific conservation objectives of Natura 2000 sites as a result of the installation or operation of the cable, individually or in combination with other plans or projects. However, mitigation measures are required and will be carried out in consultation with an ecologist and marine biologist. The proposed project will not adversely affect the integrity of Natura 2000 site.

This report presents a Natura Impact Statement for the proposed laying of a marine fibre optic cable. It outlines the information required for the competent authority to screen for appropriate assessment and to determine whether or not the proposed development, 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.

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

The proposed project will not adversely affect the integrity of the European site.

10 References

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5. Assessment of Plans and Projects Significantly Affecting NATURA 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; ec.europa.eu/environment/nature/Natura2000management/docs/art6/Natura_2000_assess_en.pdf
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17. NPWS (2014) Conservation Objectives: Inishmaan Island SAC 000212. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
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20. NPWS (2020) Conservation objectives for Moneen Mountain SAC [000054]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.

21. NPWS (2020) Conservation objectives for Ballyteige (Clare) SAC [000994]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.
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11 Appendix I Field Observations at Ballyloughane Beach, Co. Galway

During fieldwork, only those features relevant to the proposed cable route, the potential adverse cumulative effects and surrounding impacts, that may have an adverse effect on the integrity of NATURA 2000 sites, other conservation sites and species/habitats of conservation importance, have been considered.

A site visit was carried out on at low tide of 0.6m on the 2nd April 2018, the 11th October 2019, 6th February 2021 and on a 0.4m tide on 27th February 2021 by Bryan Deegan MCIEEM. The proposed route was walked and photographed (Plates 5 & 6). The proposed works will include the amenity grassland area on the north side of the road (Plate 7).

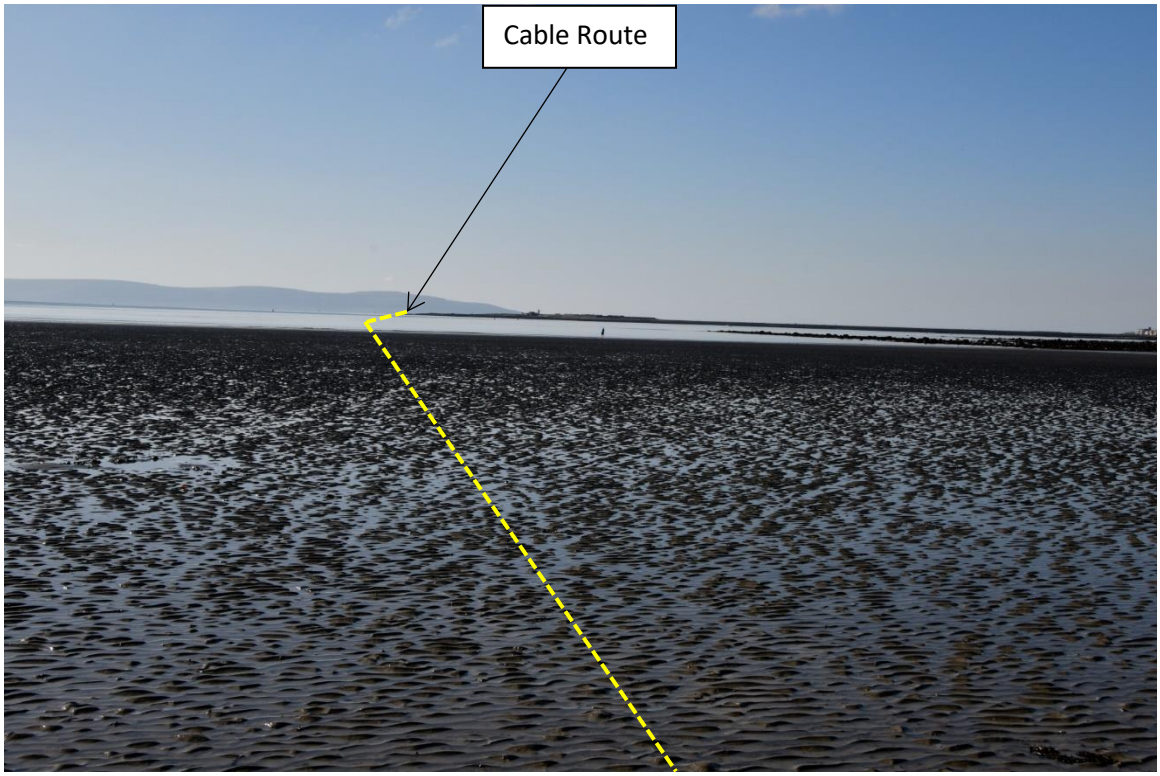


Plate 5: Uppershore on Ballyloughane Beach with the approximate location of the lay route

Plate 6: Mid-Lower shore on Ballyloughane Beach with the approximate location of the lay route

Plate 7: Terrestrial element and upper shore of Ballyloughane Strand.

The upper shore of the site is bounded by a concrete wall (1m high)(Plate 7 inset) followed directly on the landward side by amenity grassland, a car park, road and then another larger area of amenity grassland.

Along the proposed cable route the upper shore of the beach is dominated by a cobble storm beach (approximately 10m wide) and muddy sand to the low water mark. Algal drift lines were present on the cobble storm beach at the time of survey and were dominated by Fucoids and Laminaria species. Abundant casts of juvenile *Arenicola marina* were seen on lower shore of Ballyloughane Beach in additional to rare *Lanice conchilega* on the lower shore. Bird species noted on site included black-headed gull (*Larus ridibundus*), little egret (*Egretta garzetta*), grey heron (*Ardea cinerea*) and pied wagtail (*Motacilla alba yarrellii*)

The proposed cable route (Figure 32) was walked and it should be noted that the *Zostera* species were not noted along the proposed route and in the shallow subtidal, as noted by the video survey.

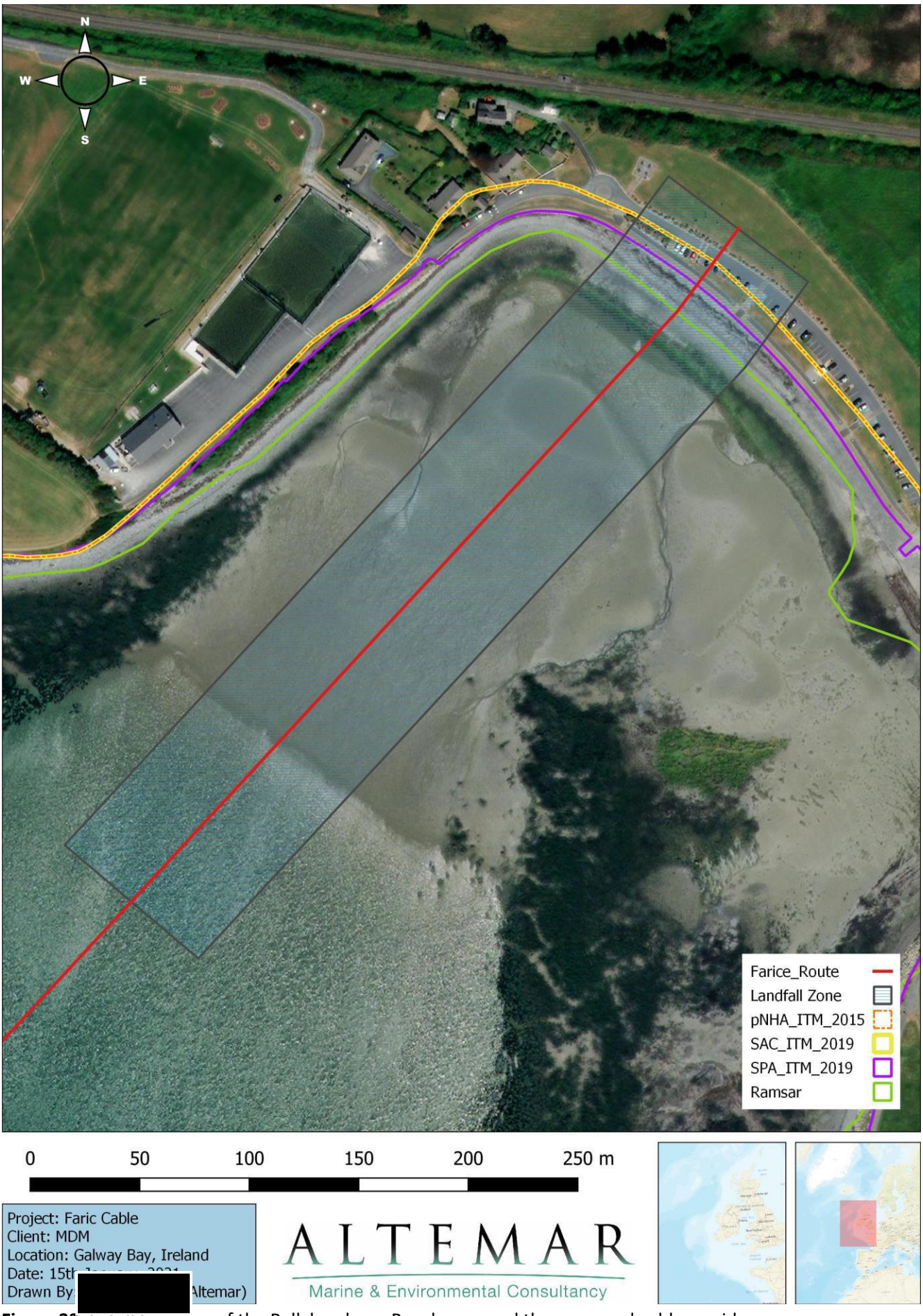


Figure 32: Satellite image of the Ballyloughane Beach area and the proposed cable corridor.

12 Appendix II Offshore Area (12nm-limits to limits of EEZ)

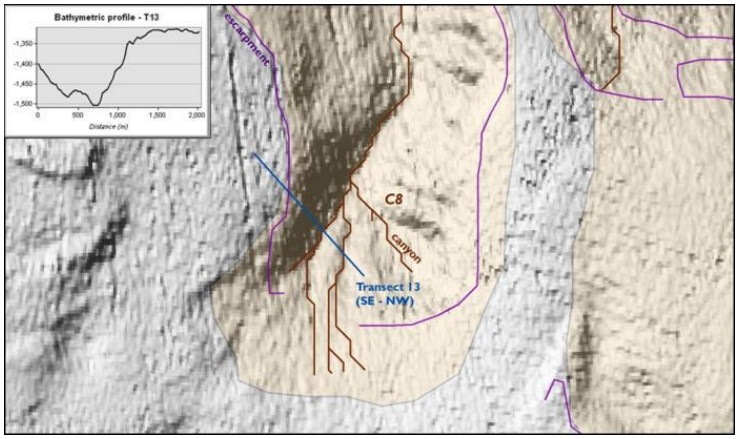
The proposed fibre optic cable corridor in relation to the Irish EEZ, UK EEZ, 12nm Limit and Offshore SAC's for Cold Water Corals are seen in Figure APII-1. The proposed route does not pass through or proximate to Offshore SACs in UK or Irish waters. The nearest off shore SAC in Irish waters is the South East Rockall Bank SAC at 106km. The nearest Offshore SAC in UK waters is the North West Rockall Bank SAC at 15km. In offshore areas the 38mm cable will be surface laid and will have minimal impact on seabed habitats. No impact is foreseen on offshore SACs which are at least 15km from the proposed route.

Information on and mounds which could potentially host biogenic reef (*Lophelia pertusa*) populations, not currently afforded protection, in addition to the positions of the newly protected offshore Geogenic Reefs are seen in Figure APII-2.

The entire route, within the Irish EEZ, was examined using shaded relief service of bathymetry data collected by INFOMAR. The closest the fibre optic route corridor comes to mounds, or obvious anomalies that could potentially host significant biogenic reef forming populations of *Lophelia pertusa*, is 15km. The closest designated area to the proposed cable route in the offshore area is 15km.

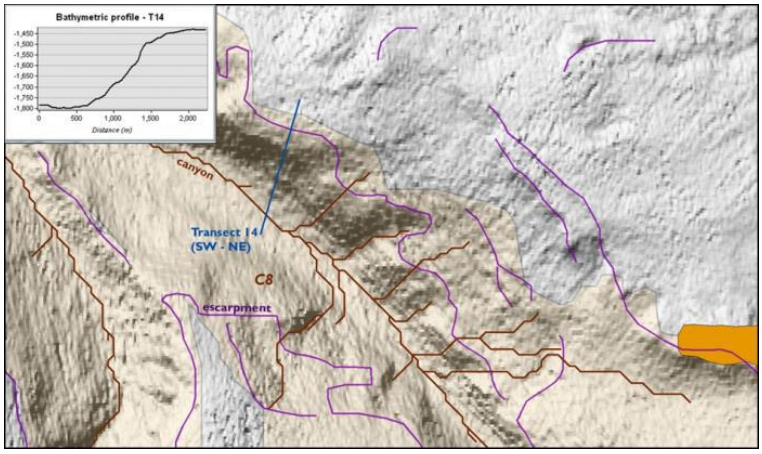
Predicted marine habitat data for the offshore section of the fibre optic cable route is shown in Figure APII-3 (Source Infomar). Figure APII-7 shows all cetacean activity Porcupine Bank area as recorded by IWDG sightings scheme, in addition to all sightings during August the month of the proposed routing of the fibre optic cable. Detailed bathymetry of the continental slope and records of *Lophelia pertusa* are seen in Figure APII-4. SeaRover survey data from the surveys for the Assessment of Fisheries / Habitat interaction on offshore reefs Sensitive Ecosystem Assessment and ROV Exploration of Reef (2017) were reviewed. However, at the upper portion of the slope a small escarpment is seen. SeaRover survey transects in the vicinity of the proposed cable route appeared to target features that including canyons and escarpments, where higher biodiversity would be expected due to hydrodynamics including increased current flow and where there is potentially less fishing activity due to potential entanglements risks. It should be noted that the 38mm cable will be buried in the sediment to 1500m and surface laid where burial is not possible and greater than 1500m. The dives seen in Figure APII-6 are described as follows:

Transect 13



Features of Interest: canyon, escarpments
Water Depth: 1506 – 1311 m
The canyon has a ridge along the bottom approximately 40 m in height. The substrate is primarily soft sediment with areas of rock outcrop. Hard ground is colonised by glass and encrusting sponges while the soft ground largely contained xenophyophores, Aphroditidae sp. and the occasional cerianthid anemone. Grenadiers are common along the canyon floor; invertebrate fauna is similar to that observed on the ridge. The canyon wall is steep and terraced; the bivalve Acesta excavata is present in the crevices as are small clumps of the stony coral species Solenosmilia variabilis. Mobile and stalked crinoids, glass sponges and the black coral Leiopathes sp. are commonly recorded on the hard ground with Benthoctopus sp. seen on one of the ledges. Grenadiers are common with the occasional orange roughy and oreo. Over the crest of the canyon soft sediment containing xenophyophores is prevalent and among these a single glass sponge Pheronema carpenteri is recorded.

Transect 14

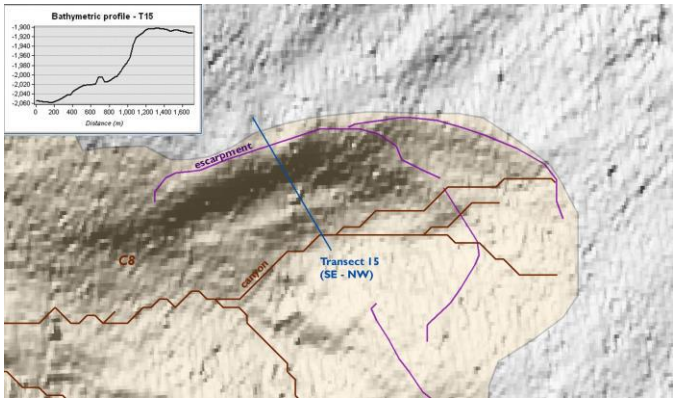


Features of Interest: canyon, escarpments

Water Depth: 1800 – 1427 m

The substrate of the canyon floor (1800 m) is soft sediment with pebbles. Xenophyophores are common here with the occasional sea pen. Towards the side of the canyon the sediment is rippled, sand waves occur at the foot of the canyon wall. A terraced wall begins at 1750 m and contains dense areas of Solenosmilia variabilis; midway up this terrace very large bamboo corals occur. Several species of sea pens are noted throughout the sediment, pebbles and rocks of the terraces. The black coral cf. Parantipathes sp. is frequent on the cliffs and terraces. Brisingids and anemones are present among the stone coral Madrepora oculata; brisingids also occur in clusters on rocks. On a 500 m hard incline, sponges are frequent as are the black coral Stichopathes sp., anemones and the occasional stalked crinoid. Common fish species included grenadier and oreos. Coral species, including the stony corals M. oculata and S. variabilis and black corals are abundant.

Transect 15



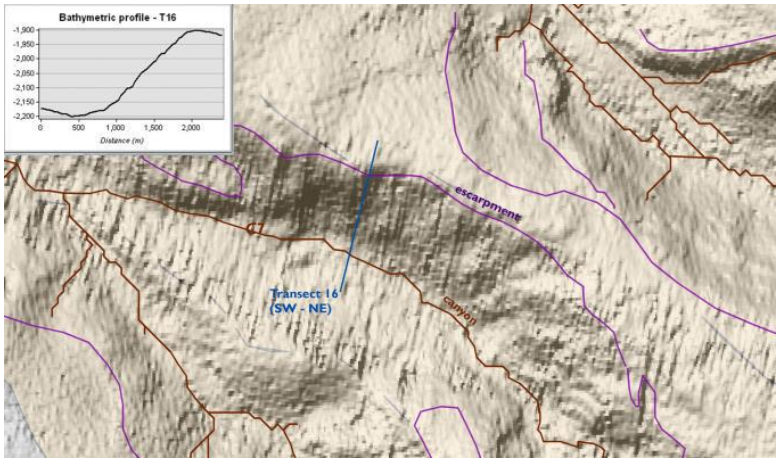
Features of Interest: canyon, escarpments

Water Depth: 1800 – 1427 m

The substrate at the bottom of this canyon is that of sand, this is occasionally rippled with coarser sediment in these ripples. Conspicuous fauna is sparse and includes cerianthids, sea pens, echinoids and holothurians. The occasional rock is colonised by brisingids, bamboo coral and encrusting and glass sponges. Moving up slope sea pens become more frequent in species and number. Continuing further up slope the ground becomes steeper and coarser; the sea pens are less frequent. Hard ground in the form of small rocks and stones is more apparent and is colonised by brisingids, bamboo corals, crinoids and a variety of sponges.

Carbonate substrate which on occasion is steep and forms cliffs is colonised by a wide variety of sponges and corals including Parantipathes sp., Leiopathes sp., Bathypathes sp., Lepidisis sp., as well as Stichastrella sp., stalked crinoids and brisingids. Towards the top of the feature the layer of fine sediment appears thicker; the fauna consists of a variety of sea pens, some echinoid species and a few xenophyophores.

Transect 16



Features of Interest: canyon, escarpments

Water Depth: 2204 – 1901 m

"*At the foot of the slope at approximately 2170 m the substrate is that of mixed sediment. There is a lot of marine snow which continued throughout this site. The fauna is dominated by ophiuroids and small white echinoids with occasional holothurians and stalked crinoids. There is evidence of bioturbation. The slope consists of areas carbonate sediment interspersed with areas of mixed sand. The carbonate substrate forms terraces, cliffs and pavements; it is on occasion overlaid with a fine layer of sediment. On all substrates small to medium rocks occur, sometimes forming the predominant substrate type.*

On carbonate substrate stalked crinoids are common throughout, brisingids are occasionally very common where there are rocks or boulders. Ophiuroids and a variety of holothurians are present throughout the site. Midway along the slope corals species occur, these included Leiopathes sp., Parantipathes sp. A variety of sea pens also occur throughout the slope. Moving over the top of the slope in mixed sediment the fauna is dominated by xenophyophores and sea pens, holothurians and corals such as Bathypathes sp., Leiopathes sp. and Antipathes sp. are present. Stalked crinoids and brisingids also occur here."

As seen in APII-6a-c the vast majority of the continental slope consists of fine and coarse sediment. However, where the slope is particularly steep rock outcrops are seen. In addition, there are small rock outcrops within the sediment areas (blue stars). No ploughing will take place where the bedrock is at the surface either in large bedrock areas or ,where small bedrock outcrops penetrate through the sediment. In these areas the cable will be surface laid. In other words, in all areas of potential reef habitat, the cable will be surface laid over the surface. Localised disturbance would be expected on the slope area in the immediate vicinity of the cable route as the cable is laid at 0.5kn. It should be noted that the plough has a camera feeding back images of the seabed live to the vessel. This assists in avoiding obstacles. The proposed methodology to surface lay over bedrock areas is simply to lift the plough off the seabed and continue laying the cable on the surface. Therefore, an ecologist will be directing the plough over the continental slope and determining the habitats where the cable will be surface laid.

Figure APV-5 shows the distribution of individual Cetacean species in the Irish EEZ (Source NPWS). All cetaceans listed in Figure APII-5 are listed under Annex IV of the Habitats Directive; in addition harbour porpoises and bottle-nosed dolphins are also listed under Annex II. Harbour and Grey seal distributions in the offshore area are seen in Figure 14 (NPWS, 2007). Both species are protected under Annex II of the Habitats Directive.

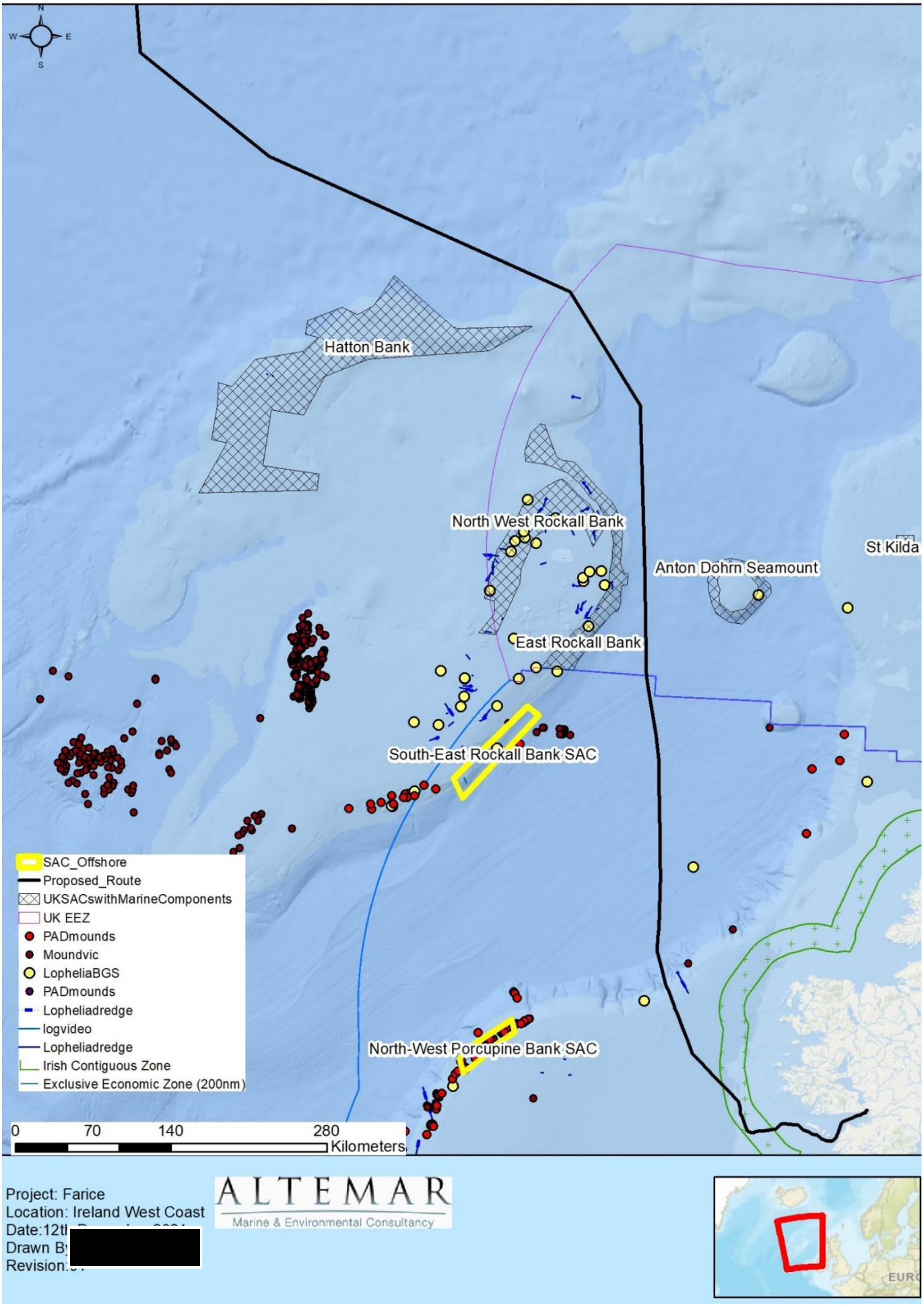


Figure APII-1: Position of offshore fibre optic route in relation to the Irish EEZ, Designated Irish Continental shelf and Offshore SAC's.

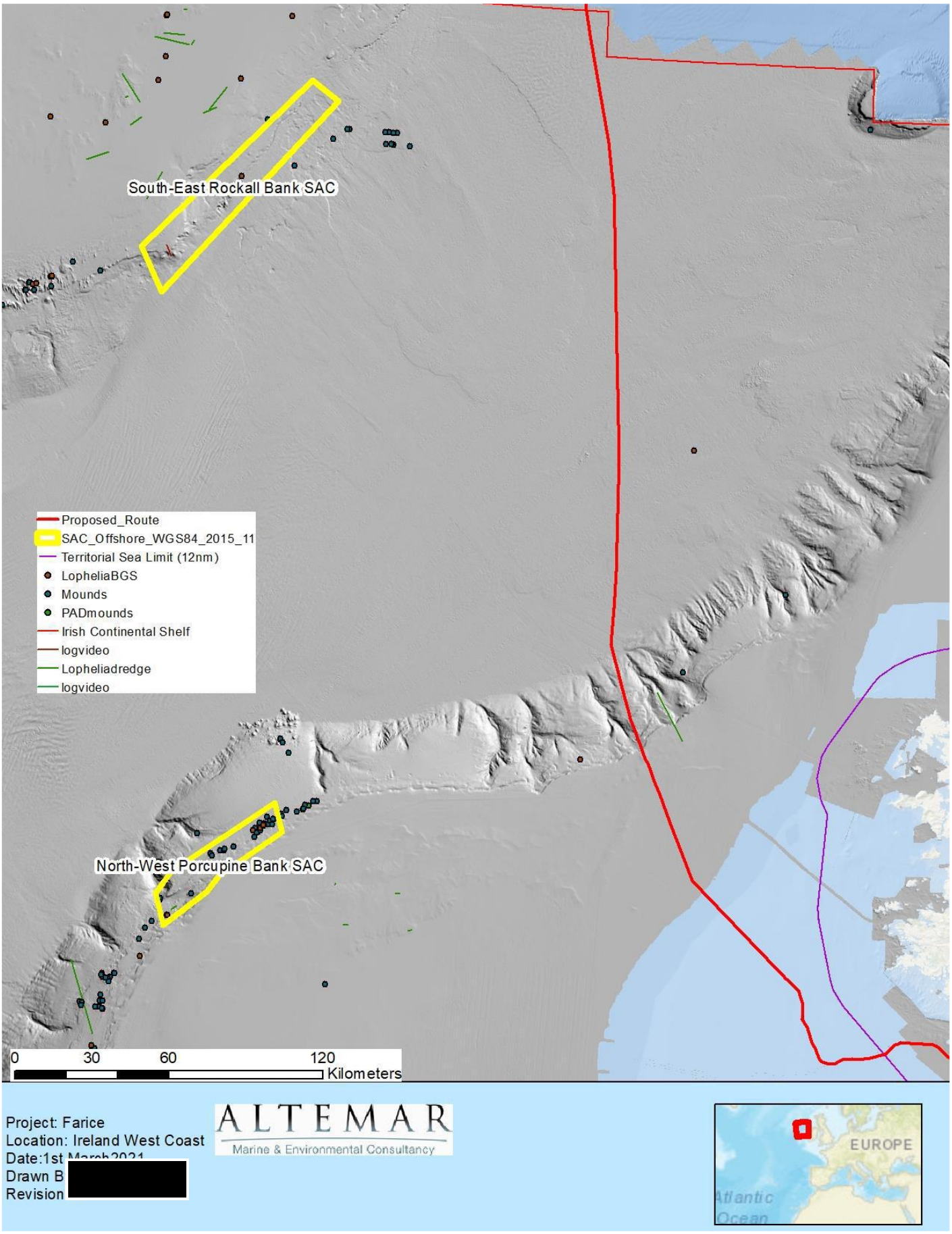


Figure APII-2. Proposed location of the fibre optic cable route in relation to SAC's, carbonate mounds or potential biogenic reefs in the offshore area (Infomar Backscatter).

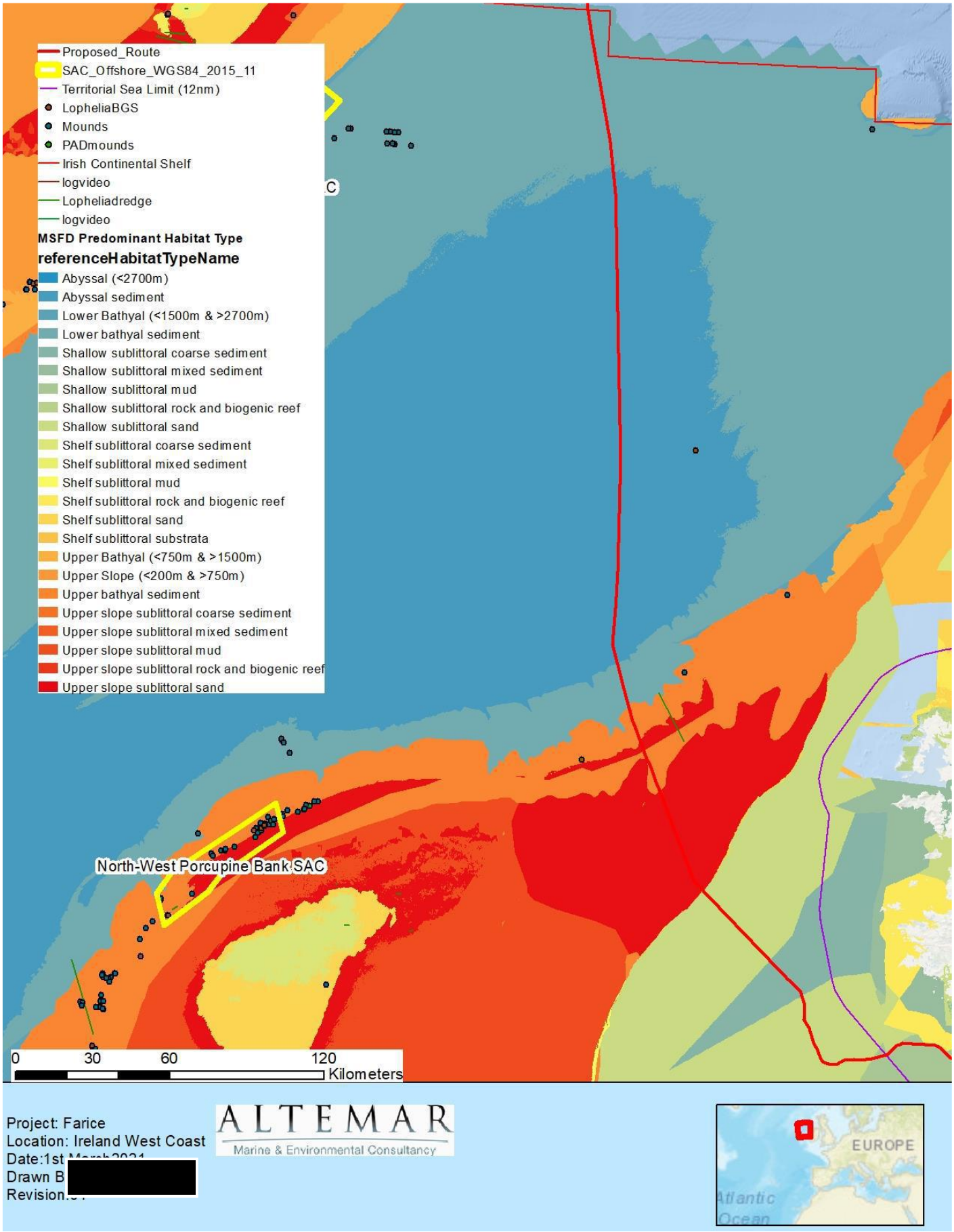


Figure APII-3: Predicted marine habitat data for the offshore section of the fibre optic cable route (Source MI MSFD Habitat mapping).

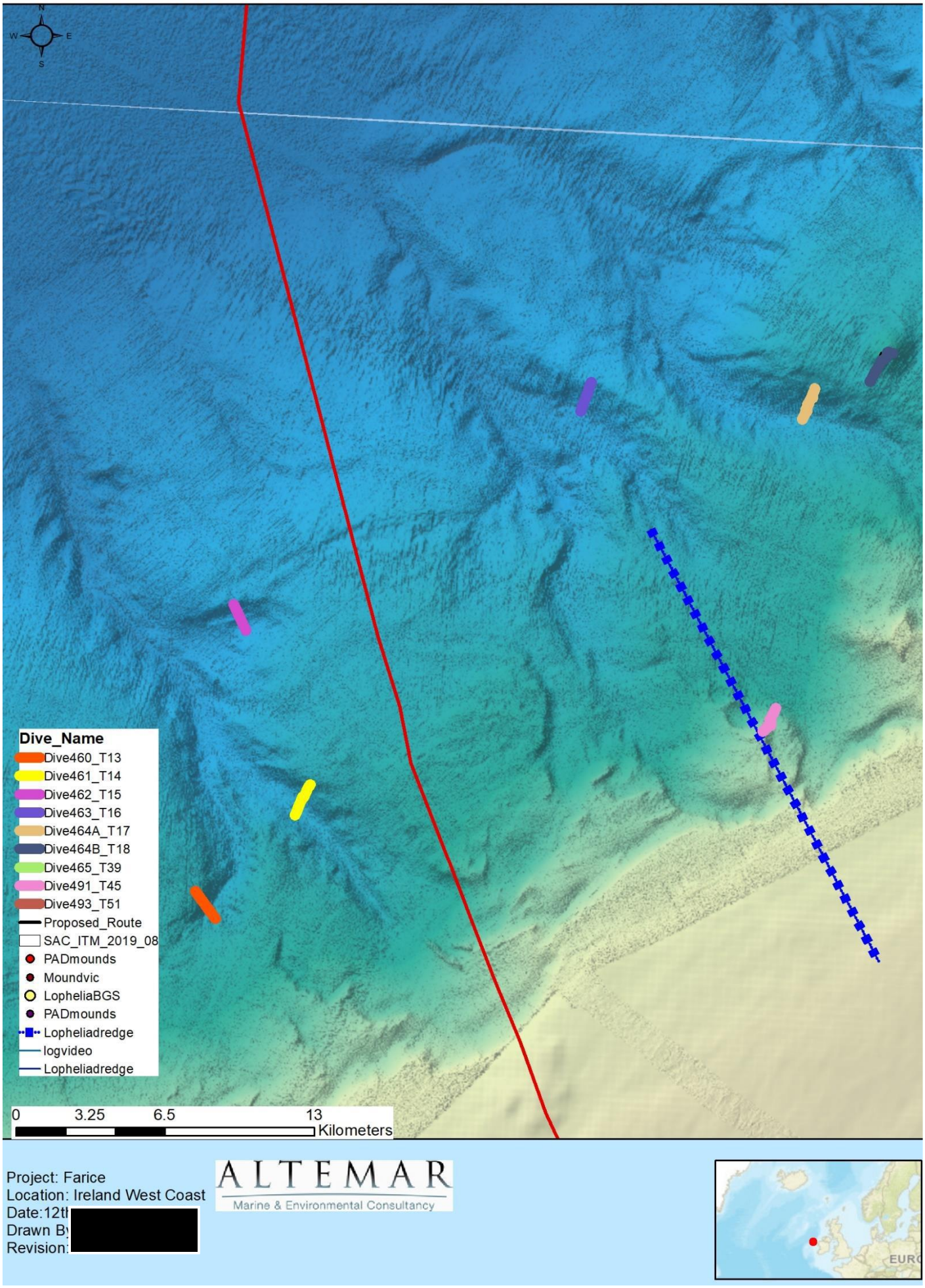


Figure APII-4: Biodiversity data proximate to the proposed cable route.

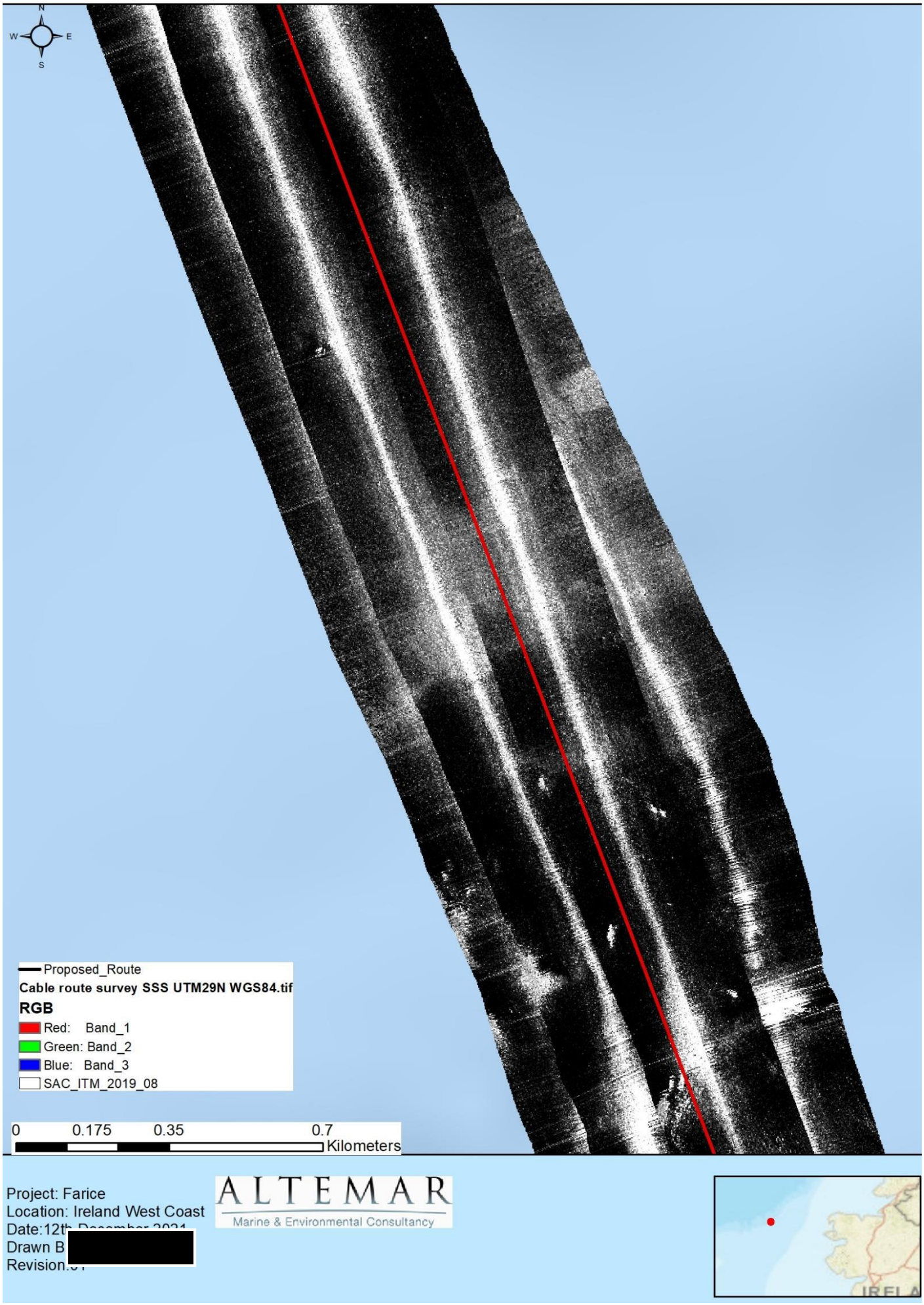


Figure APII-5: Sidescan data proximate to the proposed cable route showing rock outcrops near route on continental slope.

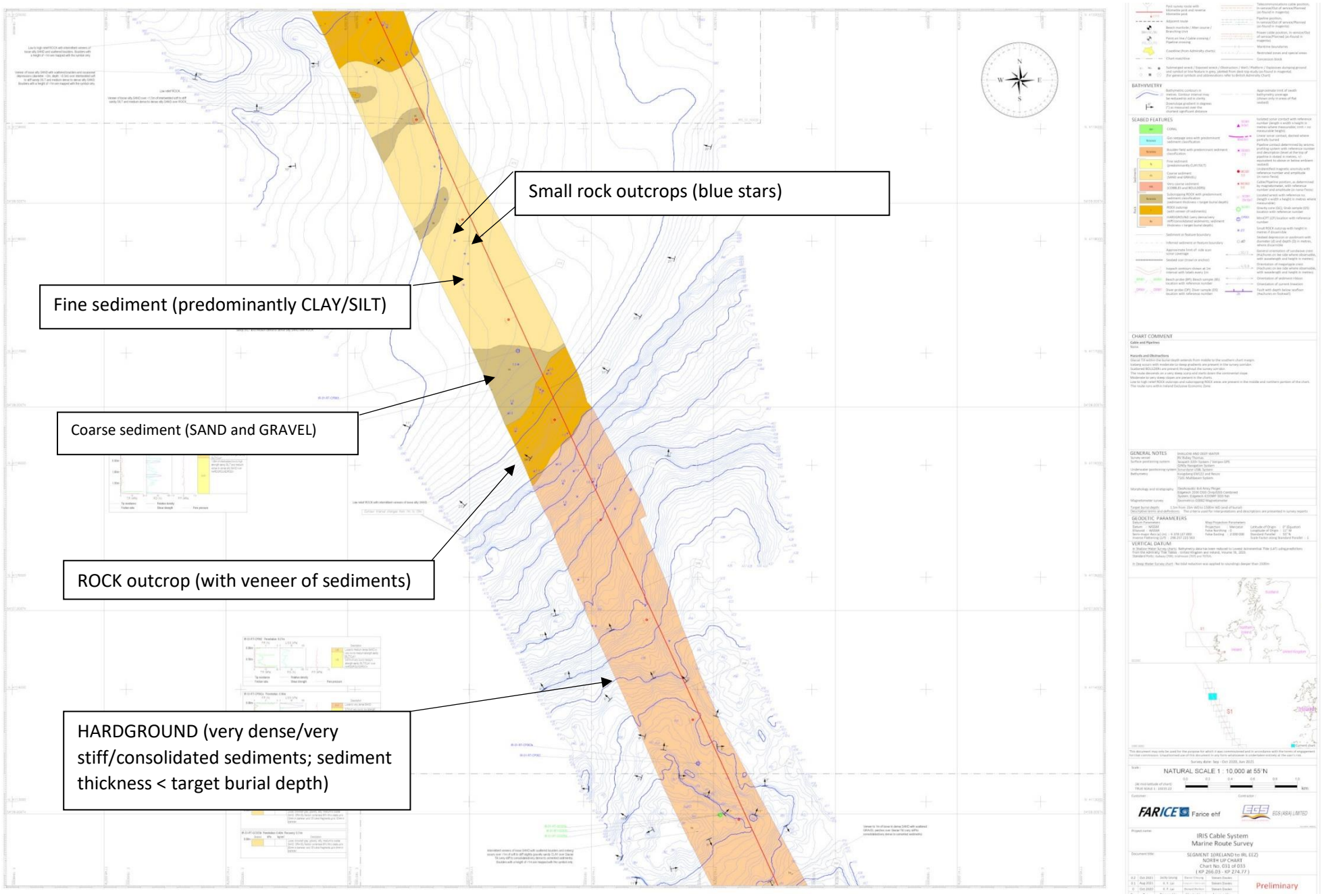


Figure APII-6a: Survey data proximate to the proposed cable route showing rock outcrops near route on continental slope (Shallow slope depth).

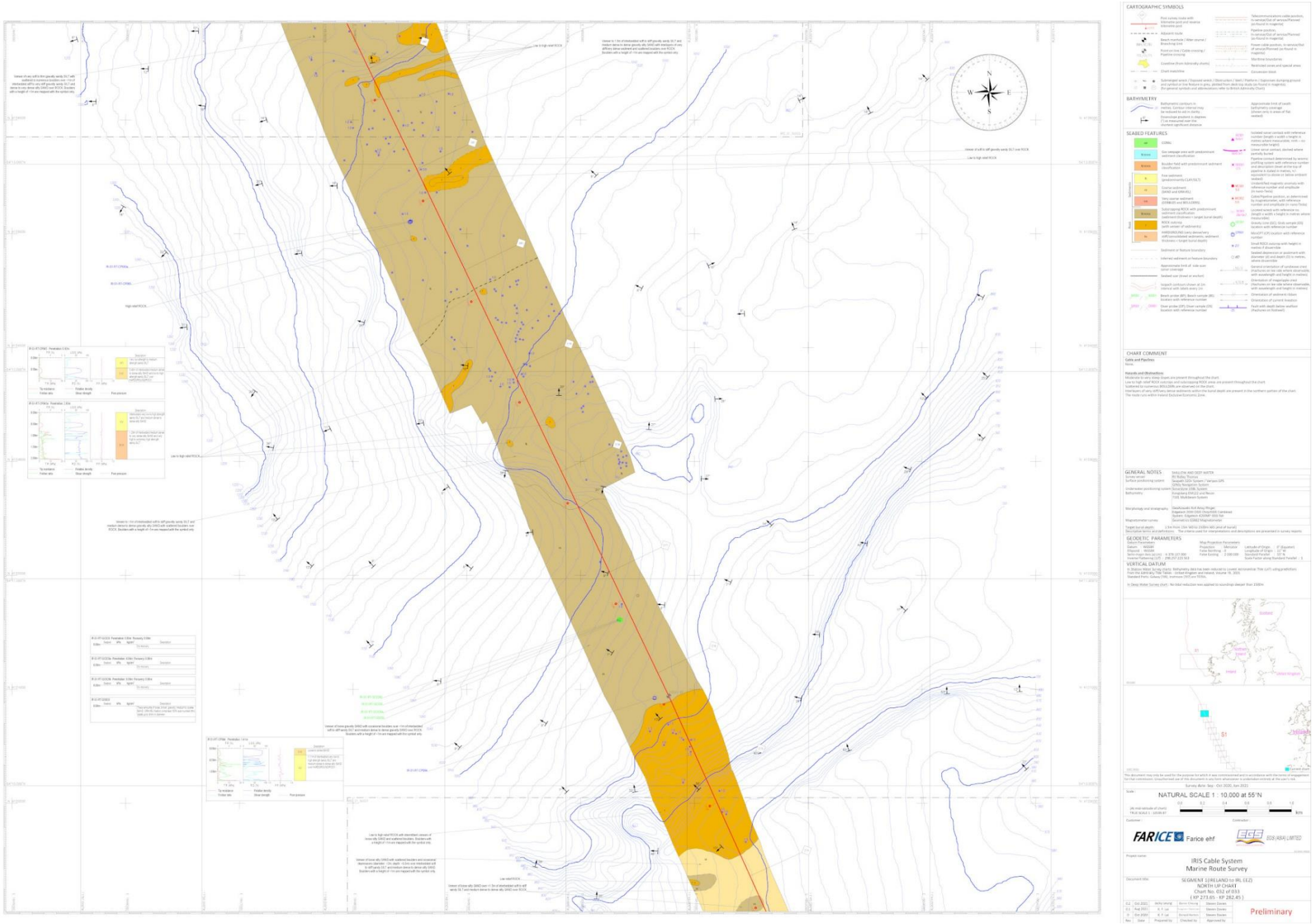


Figure APII-6b: Survey data proximate to the proposed cable route showing rock outcrops near route on continental slope (mid slope depth).

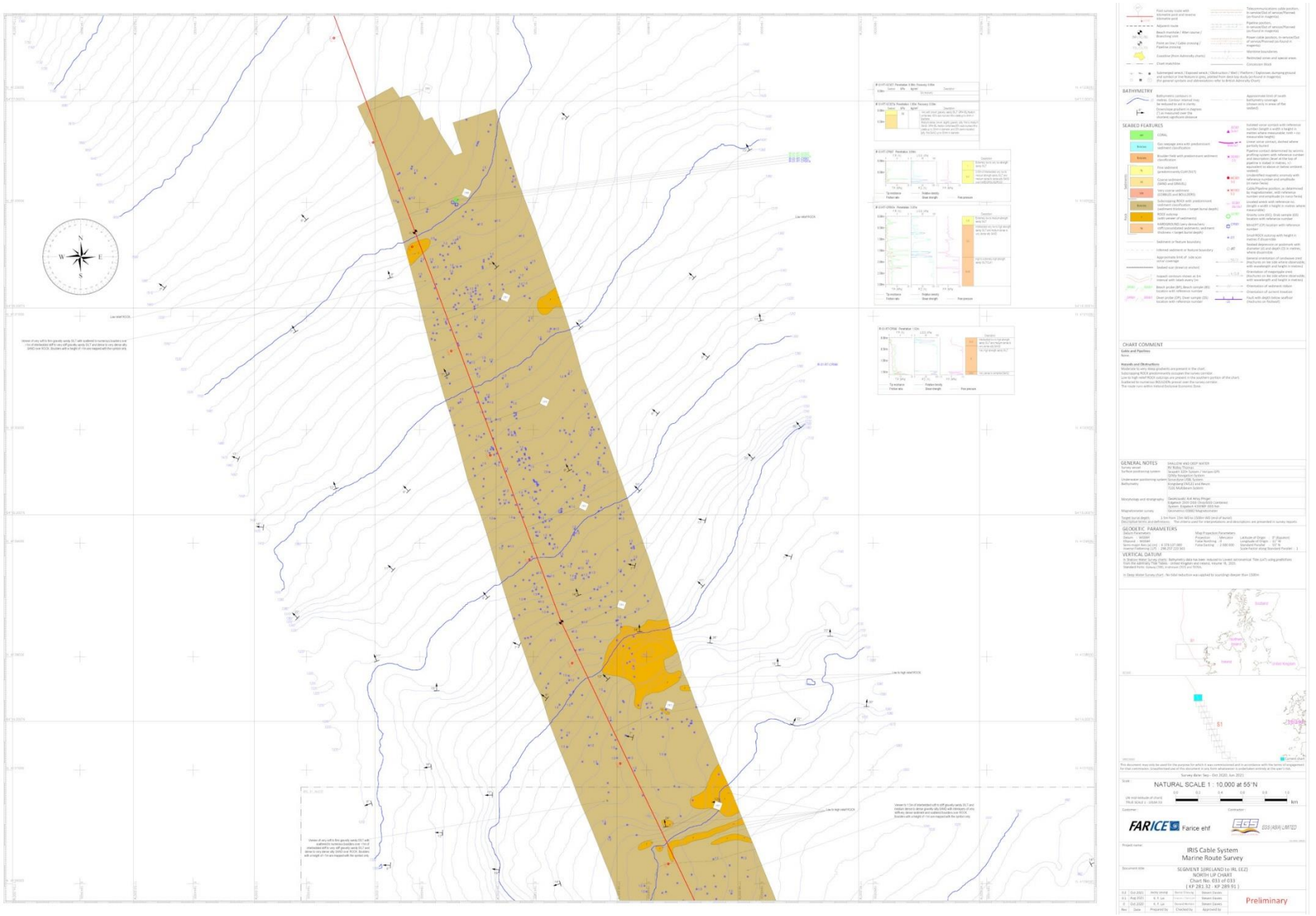


Figure APII-6c: Survey data proximate to the proposed cable route showing rock outcrops near route on continental slope (deepest slope depth).

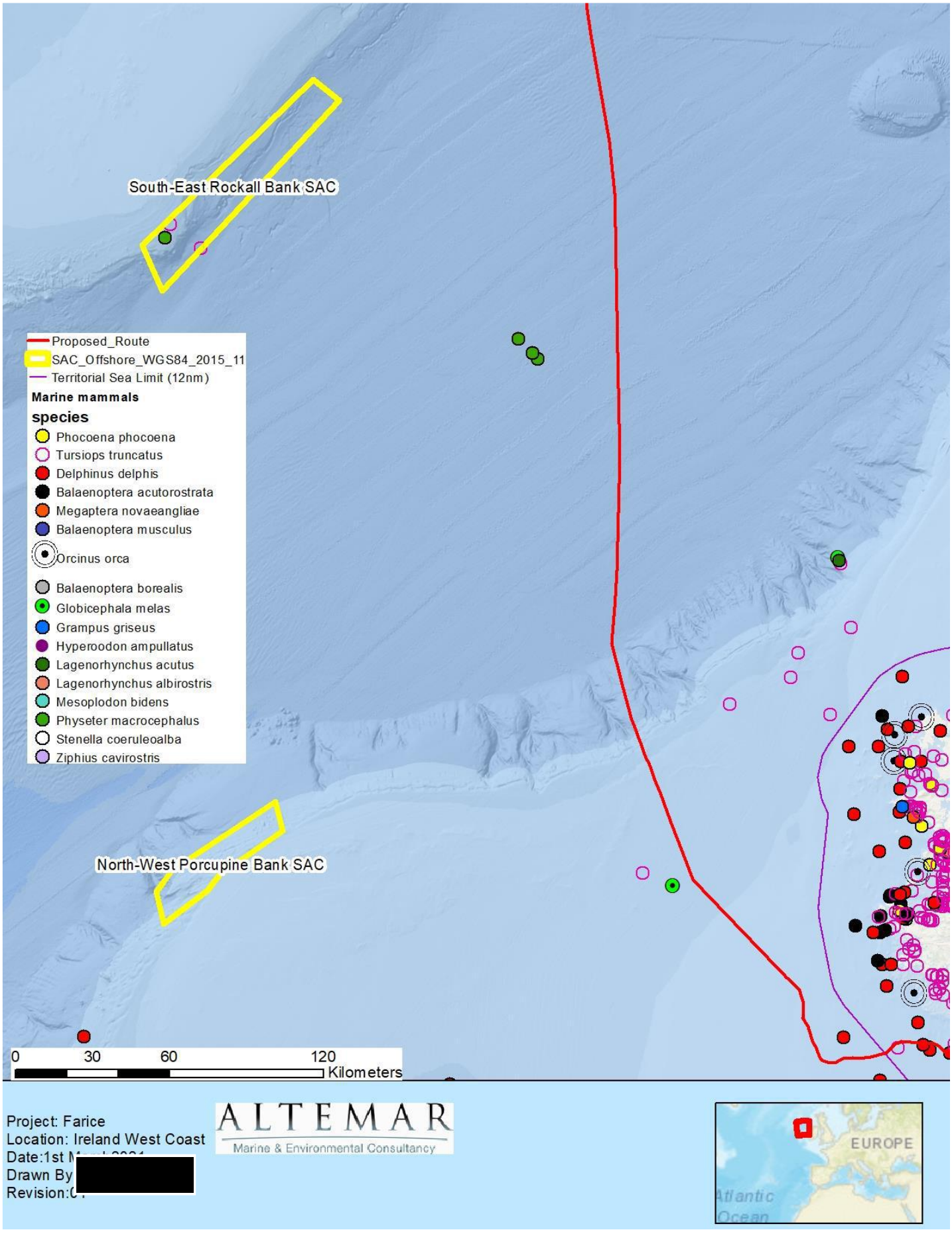
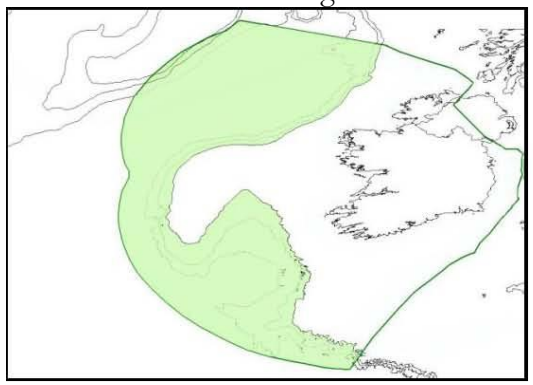
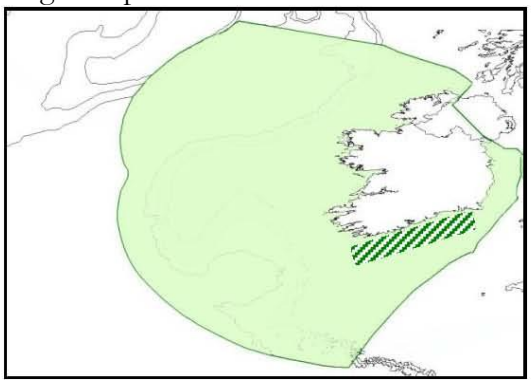


Figure APII-7. Recorded Cetacean sightings.

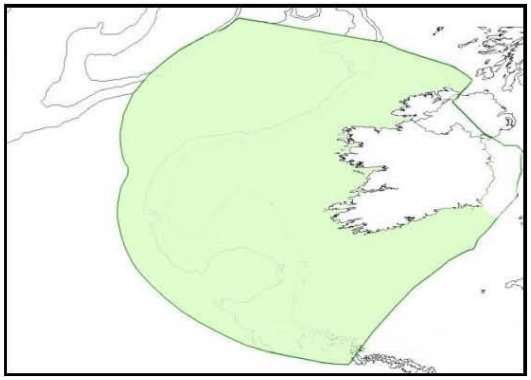
= Cetacean habitat = High number of records v) = Vagrant species



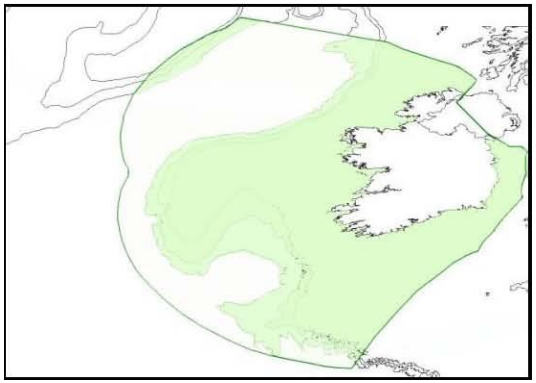
Blue whale



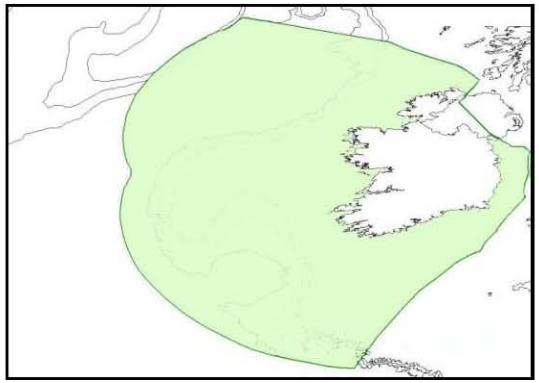
Fin whale



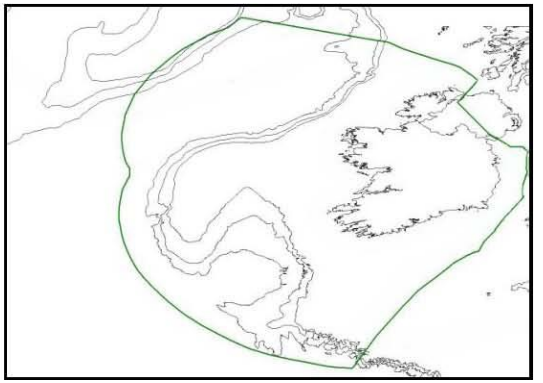
Sei whale



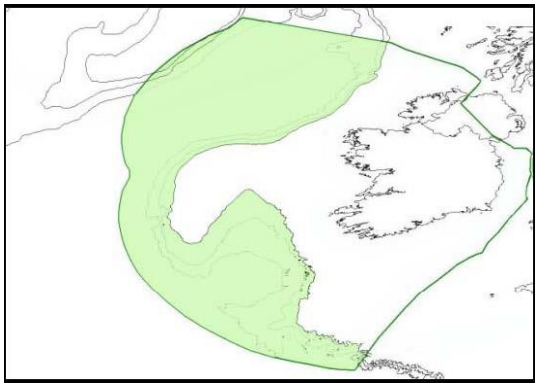
Minke whale



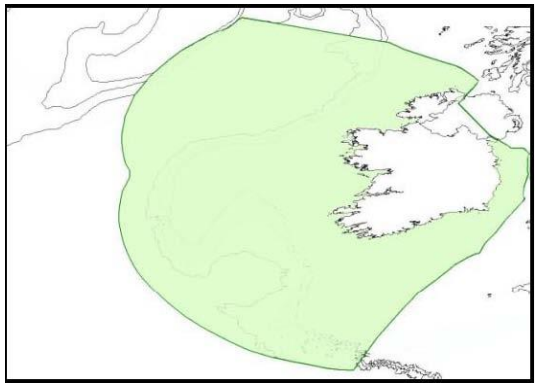
Humpback whale



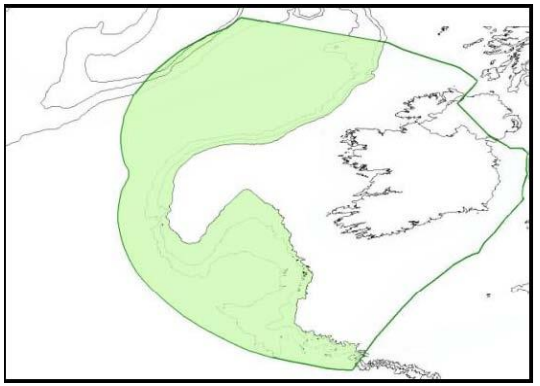
Northern right whale (v)



Sperm whale

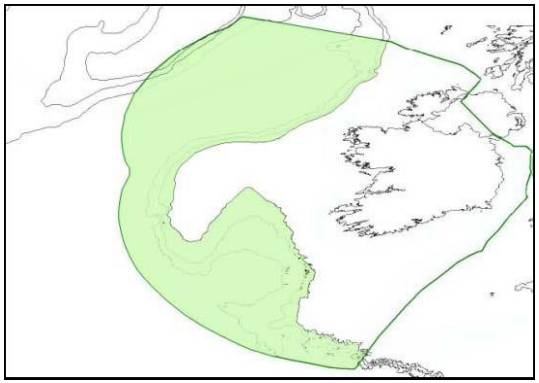


Northern bottlenose whale

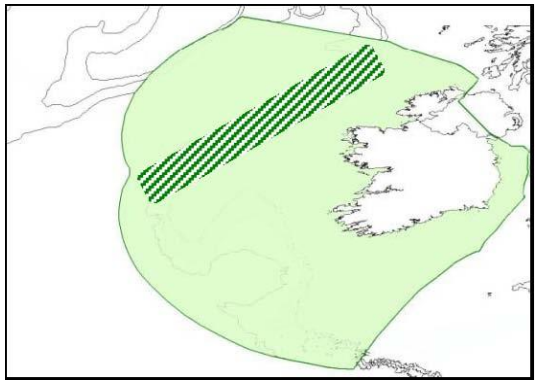


Sowerby's beaked whale

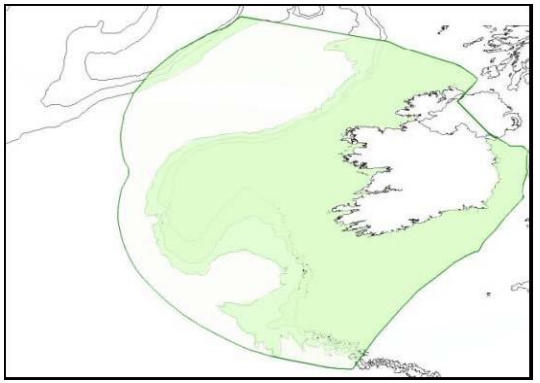
Figure APII-8. Distribution of Cetacean species in the Irish EEZ (Source NPWS).



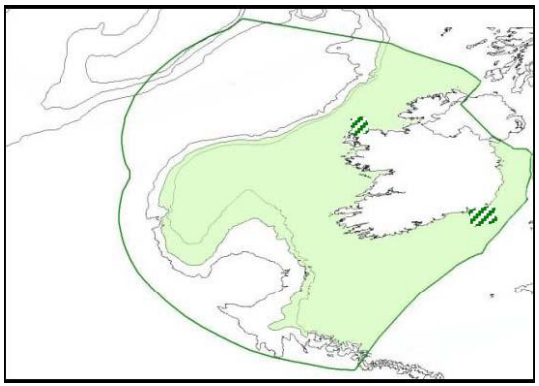
Cuvier's beaked whale



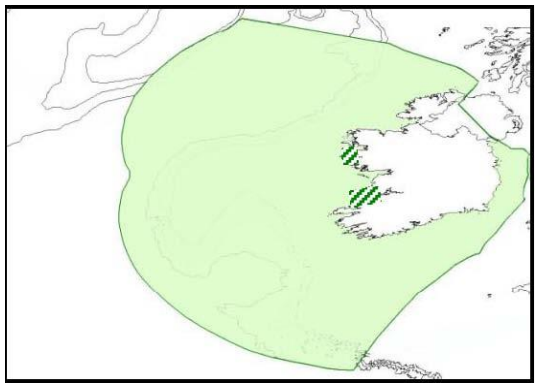
Long-finned pilot whale



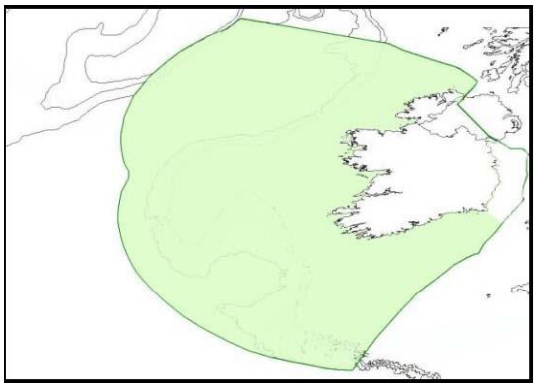
Killer whale



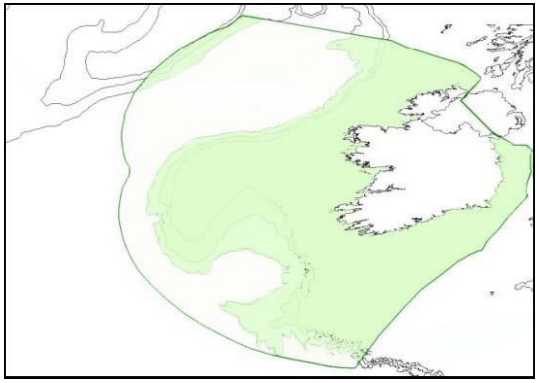
Risso's dolphin



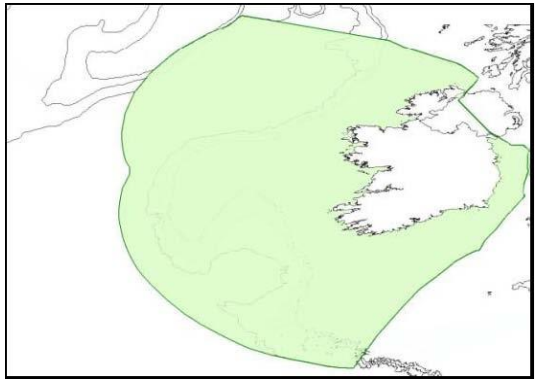
Bottlenose dolphin



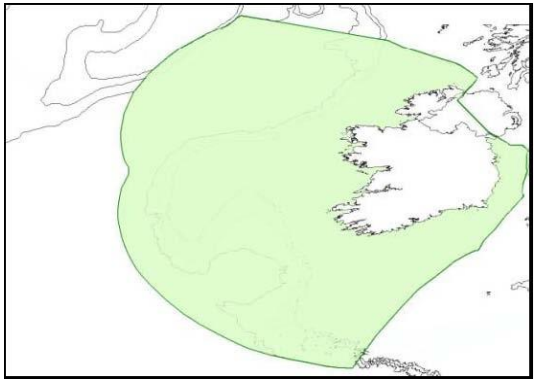
Atlantic white-sided dolphin



White-beaked dolphin

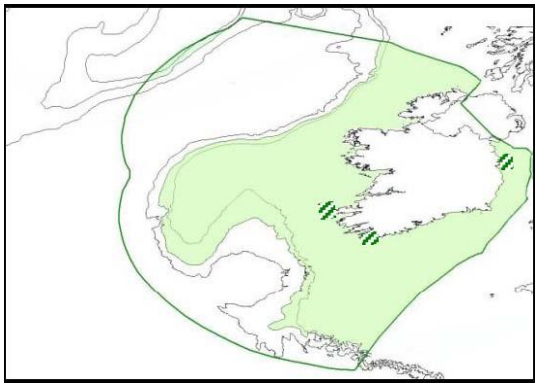


Striped dolphin

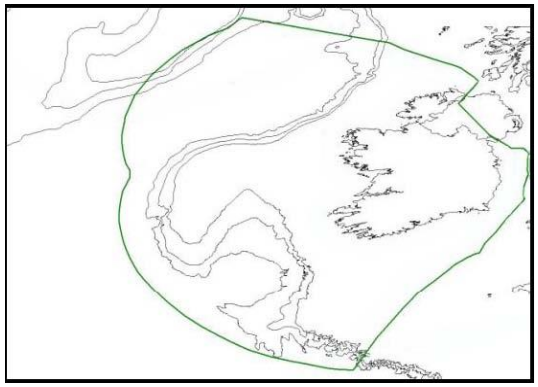


Short-beaked common dolphin

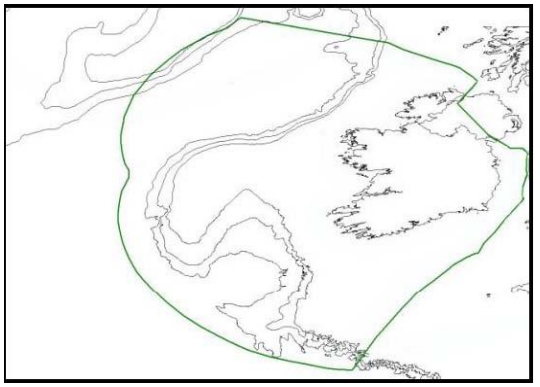
Figure APII-8. Distribution of Cetacean species in the Irish EEZ (Source NPWS) (contd.).



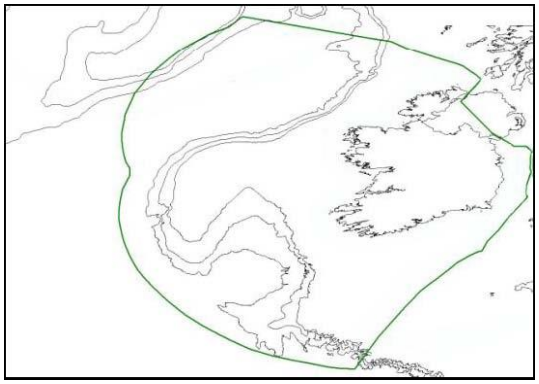
Harbour porpoise



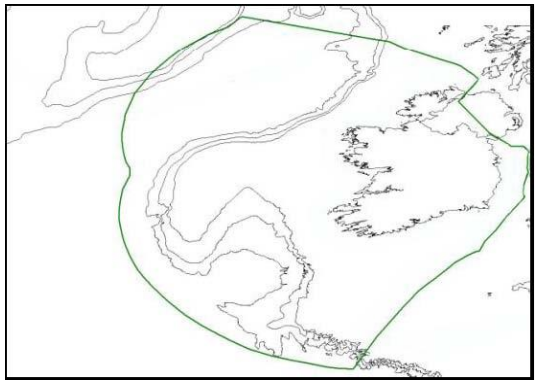
False killer whale (v)



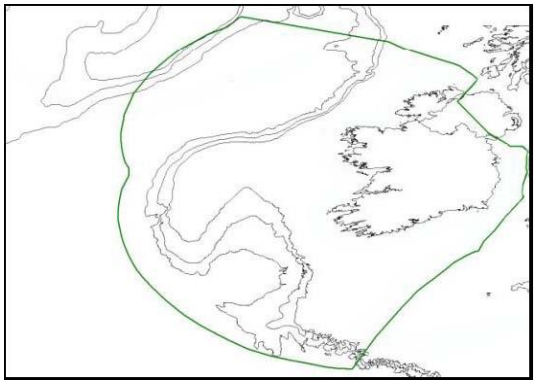
Gervais' beaked whale (v)



True's beaked whale (v)



White whale (v)



Pygmy sperm whale (v)

Figure APII-8. Distribution of Cetacean species in the Irish EEZ (Source NPWS) (contd.).