Tuskar Subsea Fibre Optic Cable

APPLICATION FOR BAND 1 MARINE LICENCE

FOR MARINE SURVEY & SITE INVESTIGATION WORKS AT NEWGALE,

WORKS METHOD STATEMENT & SUPPORTING INFORMATION

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1.0 SUMMARY

1.1 The applicant plans to investigate the feasibility of constructing a new subsea fibre optic cable system, TUSKAR, linking Ireland to the United Kingdom, from a landfall on Kilmore Quay, Wexford to a landfall at Newgale, Pembrokeshire on the South west coast of Wales as shown in Figure 1 below. This Works Method Statement is produced in support of an application for a marine licence for marine surveys and site investigations under the Marine and Coastal Access Act 2009 and should not be used for any other purpose apart from that expressly stated in this document. The applicant intends to undertake the survey campaign at the Marine Licence Application Area within the UK Territorial waters (12nm) in order to inform the location and design and assessments of the proposed fibre optic cable route, landfall and installation.

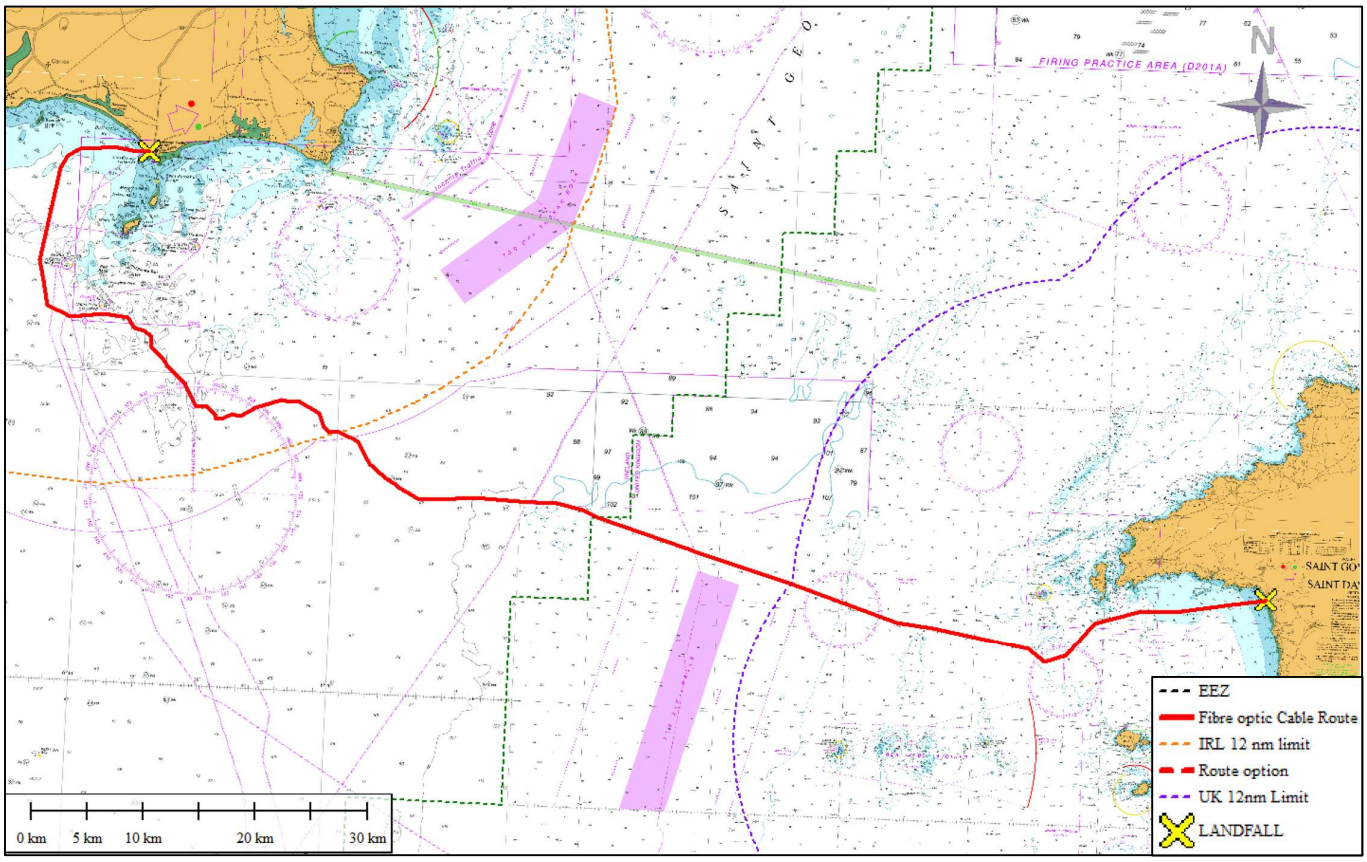

Figure 1. Proposed TUSKAR Telecoms Cable System

1.2 This Works Methodology has been prepared by McMahon Design and Management Ltd on behalf of the applicant and forms part of an application for a Marine Licence for Marine

Survey and Site Investigations for a fibre optic cable route and landfall traversing St. Brides Bay, North of The Smalls and across the southern extents of St Georges Channel. The works will be carried out predominantly by remote sensing seabed mapping techniques (non marine-licensable geophysical survey: Multibeam Echo Sounder, Side Scan Sonar, Marine Magnetometer, Sub Bottom Profiler) with some selective sampling of the upper layers of the seabed (geotechnical & sampling survey):

- 6 to 9 Seabed CPT's to 3m.
- 12 to 16 Grab samples (2 per location).
- 6 to 8 Vibrocore/gravity core (120mm diameter) to 3m.

1.3 The total combined volume of sediment samples recovered under this Marine Licence application will not exceed 4m^3 and the density of samples will not exceed 50 samples within any one hectare.

Sample Type	No. of Samples	Volume per Sample (m^3)	Total Volume (m^3)
Grab samples	up to 16	0.010	0.160
Vibrocore / Gravity Core	up to 8	0.040	0.320
Slit Trench	up to 4	0.030	0.120
		TOTAL	**0.600**

Table 1. Estimated Sample Volume

1.4 Once the results of the survey are obtained and analysed a preferred route corridor will be determined, design and method statements will be developed and a final Route Position List (RPL) will be defined as part of a further submission for a Marine Licence for installation works.

2.0 PROPOSED SURVEY ROUTE AND SURVEY LICENCE APPLICATION AREA IN UK TERRITORIAL WATERS

Marine Licence Application Area

2.1 The Marine License Application Area is situated off the coast of Pembrokeshire (Figure 2). The cable route survey corridor has length of 44.3 km and a total area of 2522 hectares within UK 12nm limits.

2.2 The cable route survey corridor covers the proposed landfall at Newgale, with a survey corridor through St Brides Bay and traversing St Georges Channel to the West. The general

line of the inshore section of the proposed survey route is shown on an Admiralty Chart base in Figure 4. The route heads westwards from the landfall, dipping south west after Ramsey Island and continuing generally westwards to Ireland.

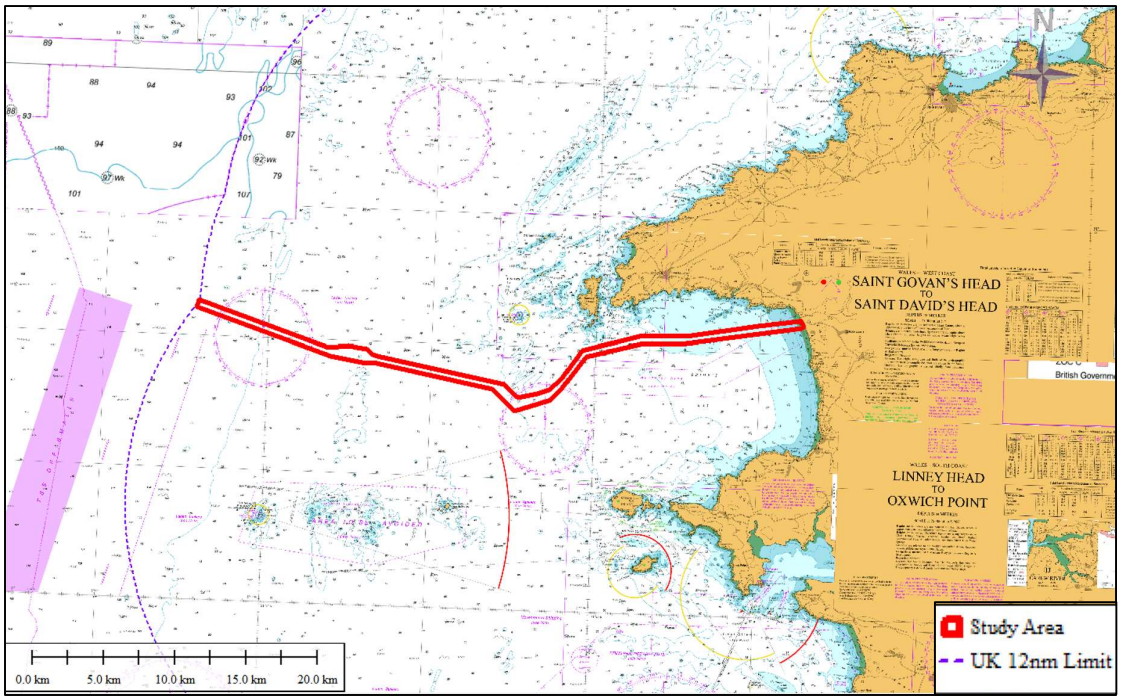

Figure 2. Proposed Marine Licence Application Area.

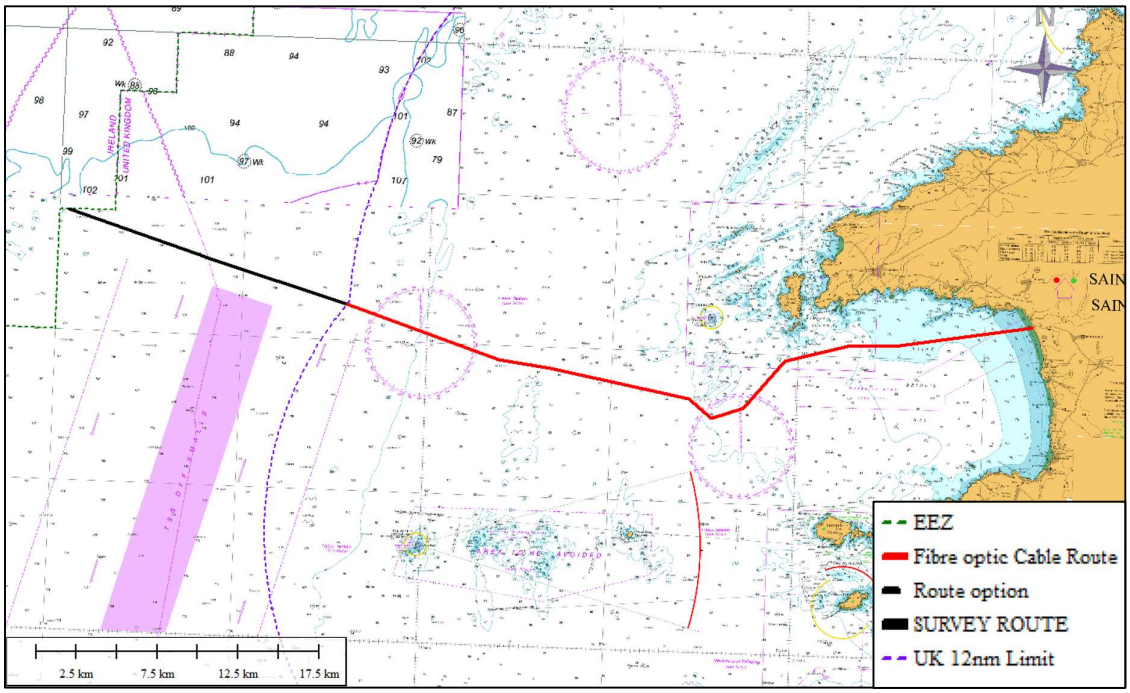

Figure 3. Offshore Survey Route.

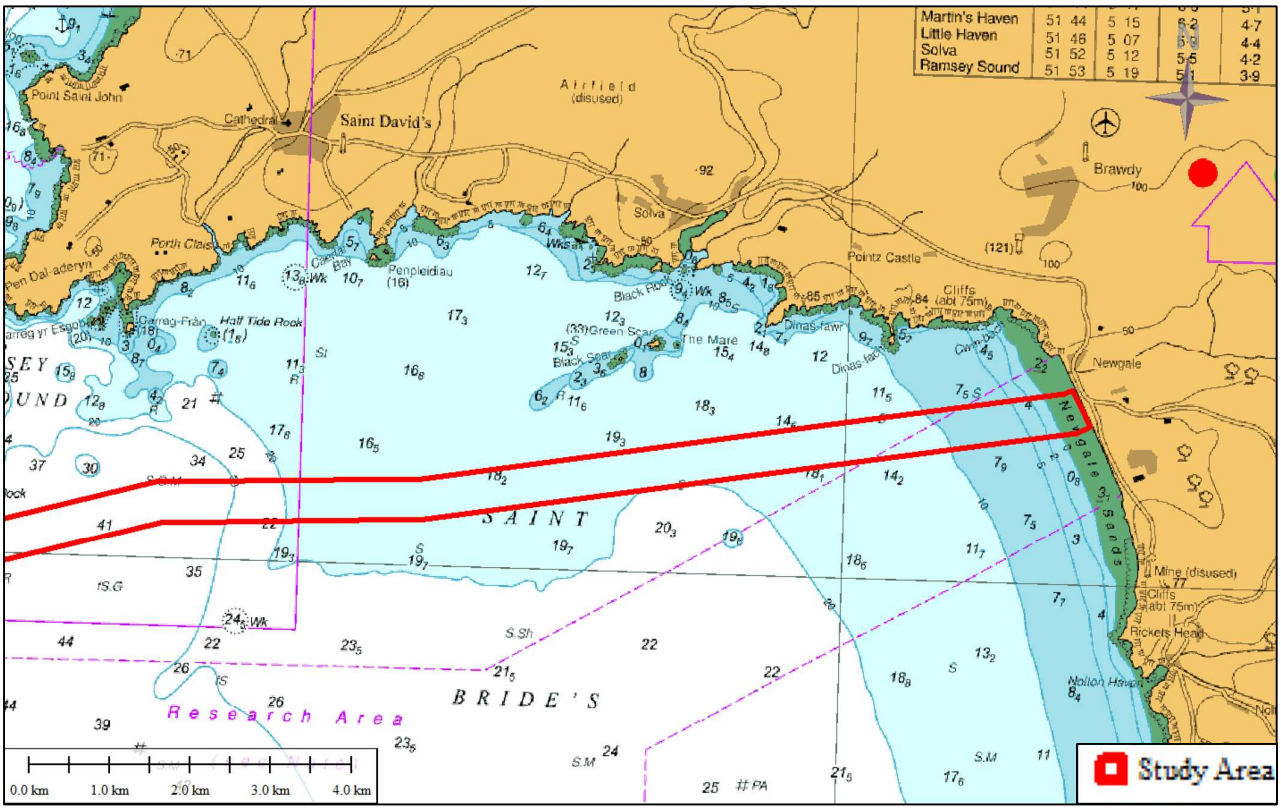

Figure 4. Landfall Location Newgale.

Figure 5. Beach Access at Newgale.

2.3 The co-ordinates for the Marine Licence Area is presented in Table 2 below.

Idx	Latitude	Longitude	Idx	Latitude	Longitude
1	53° 17' 56.8245" N	3° 34' 54.2825" W	33	53° 34' 37.4701" N	4° 48' 51.2516" W
2	53° 18' 06.6246" N	3° 35' 12.4954" W	34	53° 35' 04.2518" N	4° 47' 16.9131" W
3	53° 18' 11.6225" N	3° 35' 36.7899" W	35	53° 34' 46.3523" N	4° 41' 50.3540" W
4	53° 18' 22.2315" N	3° 36' 26.3067" W	36	53° 34' 50.6673" N	4° 33' 02.8933" W
5	53° 19' 20.6120" N	3° 37' 43.0745" W	37	53° 34' 40.0982" N	4° 26' 13.8467" W
6	53° 21' 01.1237" N	3° 39' 26.0576" W	38	53° 34' 29.8650" N	4° 23' 36.0346" W
7	53° 22' 06.1974" N	3° 41' 40.2268" W	39	53° 34' 00.0518" N	4° 20' 21.5012" W
8	53° 22' 54.7995" N	3° 41' 58.5084" W	40	53° 33' 15.3760" N	4° 17' 57.7427" W
9	53° 23' 37.3983" N	3° 42' 14.5685" W	41	53° 33' 13.1802" N	4° 17' 24.3758" W
10	53° 24' 02.1225" N	3° 42' 47.8698" W	42	53° 32' 20.7085" N	4° 14' 52.7770" W
11	53° 24' 27.4112" N	3° 43' 19.4481" W	43	53° 30' 27.0567" N	4° 09' 12.0973" W
12	53° 24' 38.7991" N	3° 43' 55.5262" W	44	53° 28' 38.4509" N	4° 03' 23.0831" W
13	53° 24' 41.8875" N	3° 44' 10.7978" W	45	53° 27' 43.5368" N	3° 59' 45.3839" W
14	53° 25' 21.7270" N	3° 47' 23.7174" W	46	53° 26' 30.6419" N	3° 54' 37.3494" W
15	53° 26' 45.8474" N	3° 54' 28.0857" W	47	53° 25' 06.4097" N	3° 47' 32.4105" W
16	53° 27' 58.5049" N	3° 59' 35.1134" W	48	53° 24' 26.5854" N	3° 44' 19.5625" W
17	53° 28' 53.0918" N	4° 03' 11.5104" W	49	53° 24' 23.8940" N	3° 44' 06.2536" W
18	53° 30' 41.2851" N	4° 08' 59.1918" W	50	53° 24' 14.8145" N	3° 43' 37.4874" W
19	53° 32' 34.7581" N	4° 14' 39.3263" W	51	53° 23' 46.2650" N	3° 43' 01.8360" W
20	53° 33' 36.6273" N	4° 17' 38.0708" W	52	53° 23' 46.2569" N	3° 43' 01.4924" W
21	53° 34' 22.7922" N	4° 20' 06.6180" W	53	53° 23' 30.1397" N	3° 42' 39.5668" W
22	53° 34' 58.3544" N	4° 23' 49.6529" W	54	53° 22' 51.2460" N	3° 42' 24.8971" W
23	53° 34' 58.6885" N	4° 23' 51.7486" W	55	53° 21' 57.1674" N	3° 42' 04.5471" W
24	53° 35' 22.5473" N	4° 28' 03.0637" W	56	53° 20' 50.3061" N	3° 39' 46.6766" W
25	53° 35' 27.5912" N	4° 33' 06.9583" W	57	53° 19' 11.3489" N	3° 38' 05.2740" W
26	53° 35' 27.6086" N	4° 33' 08.0075" W	58	53° 18' 28.8048" N	3° 37' 09.3117" W
27	53° 35' 26.4017" N	4° 42' 29.0428" W	59	53° 18' 13.7000" N	3° 36' 45.8400" W
28	53° 35' 39.5865" N	4° 44' 52.0695" W	60	53° 17' 54.8810" N	3° 35' 18.4251" W
29	53° 35' 41.2547" N	4° 46' 48.0908" W	61	53° 17' 51.4886" N	3° 35' 09.0956" W
30	53° 35' 20.6060" N	4° 47' 41.2123" W	62	53° 17' 42.7011" N	3° 35' 02.8701" W
31	53° 34' 59.5671" N	4° 48' 31.0910" W	63	53° 17' 46.0635" N	3° 34' 46.1717" W
32	53° 34' 36.9878" N	4° 49' 19.1821" W	64	53° 17' 56.8245" N	3° 34' 54.2825" W

Table 2. Cable Route Survey Corridor.

Access to the landfall at Newgale

2.4 At Newgale, there is vehicular access to the beach from the public road (Figure 5) and pedestrian access from the car parking area. A mini-digger / JCB will be used to excavate the slit trenches on the beach and will access and exit the beach via the track.

3.0 PROPOSED SCOPE OF WORKS

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

Sequence of Works

3.2 Geophysical survey data (non-marine licensable) will be acquired prior to the geotechnical & sampling survey. The geophysical survey data acquired will include Multi-Beam Echo Sounder, Side Scan Sonar, Sub bottom profiler and Marine Magnetometer. The geophysical surveys will comply with the JNCC guidelines for minimising risk of injury to marine mammals from geophysical surveys (JNCC, 2017) and recorded on the JNCC Marine Noise Registry.

3.3 The objectives of the marine geophysical survey shall be:

- To collect up to date high-resolution bathymetry along a 500 – 950m wide cable corridor within the Marine License Application Area;
- To obtain information on the seabed surface (type, texture, variability, etc.) and in particular, to identify any seabed features that may be of interest.
- Identify any shallow geohazards and man-made hazards (including but not limited to outcropping, boulders, shallow gas, wrecks, debris etc.);
- Determine the stratigraphy of the upper layers of the seabed along the cable route and quantify the variability in the lateral and vertical extents to depths of 2-5m
- Identify any magnetic anomalies;
- Identify sensitive marine habitats which will need to be avoided during site investigations and sampling.

3.4 The geotechnical and sampling survey will also provide “ground-truthing” of the geophysical data along the route.

3.5 A topographic survey along the line of the proposed cable route at the landfall is required to the low water mark.

3.6 The topographical survey would typically be carried out by GPS Rover, Total Station or UAV Aerial Drone using photogrammetry or LiDAR techniques.

3.7 An intertidal and beach survey (walkover survey) will be carried out on the beach by the project ecologist. The intertidal surveys will be undertaken at low or Spring tides in line with guidance in the JNCC Marine Monitoring Handbook (Davies et al., 2001).

3.8 An intertidal and beach survey (walkover survey) will be carried out on the beach by the project archaeologist. The intertidal surveys will be undertaken at low or Spring tides. A camera, GPS and marine metal detector will be deployed, scanning a series of survey lines in a grid pattern on the beach and intertidal zones. All archaeological survey will be carried out to determine the location of all known archaeological or cultural heritage features in advance of the landfall site investigations.

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

- Bar probes on the intertidal at 10m spacing (approx. 8 to 10).
- Bar probes from the Low Water Line to the 3m water depth contour at 10m spacing. (approx. 8 to 10)
- Slit trenches on the beach to 2.5m (approx. 3 - 4 No.)

3.10 The bar probes on the intertidal are manually driven to a depth of up to 2.5 metres simply to probe the depth of upper layers of sand, gravel or soft material. They may be undertaken as part of a diver swim survey or from a small RIB.

3.11 The Slit trenches on the beach are excavated using a mini digger or JCB to a depth of up to 2.5m and backfilled using the excavated material.

Marine Site Investigations and Seabed Sampling

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

3.13 The scheduled site investigations and seabed sampling within 12nm limits will comprise of the following techniques:

- 6 to 9 Seabed CPT's to 3m.
- 12 to 16 Grab samples (2 per location).
- 6 to 8 Vibrocore/gravity core (120mm diameter) to 3m.
- 4 No. Slit Trenches, 0.8m to 1m in width, up to 2.5m in depth.

3.14 Typically, individual sampling positions will be determined following initial interpretation of the geophysical survey data. Care will be taken in choosing the final geotechnical and sampling locations after the geophysical survey data has been reviewed and screened for potential hazards or seabed obstructions. The positioning of individual site investigation locations will also take into consideration environmental constraints such as the position of sensitive habitats or archaeological features.

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

3.16 An acceptable sample / push is defined as;

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

- CPT – Penetration to the 3m target depth or refusal. Any push resulting in less than 2m penetration will warrant a second attempt. No samples are recovered as part of CPT.

3.17 The Slit trenches will be positioned at approximately 30m centres starting seaward of the High Water Mark. The Slit trenches will be excavated, logged, photographed and backfilled in a single tidal cycle. The slit trenches will be backfilled with the original excavated materials in the sequence in which they are excavated.

3.18 The area in the vicinity of the slit trenches will be appropriately marked to warn members of the public and operations will only be carried out when safe to do so. All equipment and materials will be removed from the beach immediately on completion of the slit trenches. A summary Method Statement for excavation of any Slit trench is as follows;

- Excavate sand by mini digger or JCB and place to one side.
- Excavate substrate and place separate from sand.
- Measure, log and photograph each Slit trench.
- Backfill in sequence compacting with bucket of excavator as the backfilling proceeds.

3.19 The total overall scope of the Site Investigations is as follows;

• Bar Probes	8 to 10 No. on the intertidal
• Bar Probes	8 to 10 No. from Low Water - 3m contour.
• Grab Samples	12 - 16 No. along the route corridor.
• Gravity Cores / Vibrocores	6 - 8 No. along the route corridor.
• Cone Penetration Tests	6 – 9 No. along the route corridor.
• Slit Trenches	4 No on the beach, 0.8m to 1m in width, up to 2.5m in depth.

3.20 Of the site investigation activities listed above, the following will take place within the West Wales Marine / Gorllewin Cymru ForolSAC;

• Grab Samples	10 to 12 No. along the route corridor.
• Gravity Cores / Vibrocores	5 - 6 No. along the route corridor.
• Cone Penetration Tests	5 - 7 No. along the route corridor.

Timeline and Duration of Survey Activities

3.21 The intention is to commence the survey as soon as feasible following license award, taking into account survey vessel availability, the overall cable route survey programme, seasonality and suitable weather windows. The exact mobilisation dates will not be known until the process of procuring a contractor and issue of the marine licence is complete.

3.22 It is anticipated that the marine geophysical survey and site investigations activities within the marine licence area will take less than 6 weeks in total and should be completed over a 6 month period. We request a licence duration of 12 months to allow sufficient contingency should the works be delayed. Working hours inshore will be 12-hour periods and offshore will be continuous 24-hour periods for up to 14 days between port calls.

Survey Vessels and Equipment

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

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

3.25 All survey vessels will be fit for purpose, will possess all relevant classification certificates and capable of safely undertaking the survey work required. Health, safety, environment and welfare considerations will be a priority and will be actively managed during the course of the survey scopes of work. Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work.

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

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

Cone Penetration Test (CPT)

3.27 The survey vessel will position itself over the target position to carry out the seabed CPT. The seabed CPT rig (such as a Geomil Manta 100DW, Figure 6) is deployed to the seabed from the vessel crane, A-frame or dedicated Launch and Recovery System (LARS). Once on the seabed, in a stable position, a steel rod with a conical tip (typically an apex angle of 60° and a diameter of 35.7 mm) is pushed at a steady rate into the seabed until it reaches target penetration depth of 3m or refusal. The penetration resistance at the tip and along a section of the shaft (friction sleeve) is measured and recorded for later analysis

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

Figure 6. Geomil Manta 100DW CPT rig.

Gravity Core

3.29 Gravity corers (Figure 7) provide a rapid means of obtaining a continuous core sample in water depths from a few metres down to several thousand metres. A gravity corer consists of a steel tube in which is inserted a plastic liner to hold the core sample. Gravity corers are commonly used for cable route investigations.

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

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

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

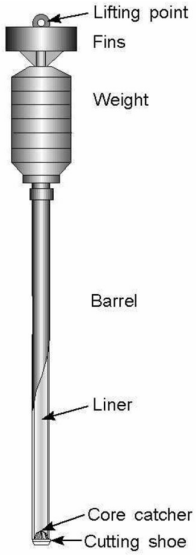

Figure 7. Gravity Corer schematic.

Vibrocorer

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

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

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

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

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

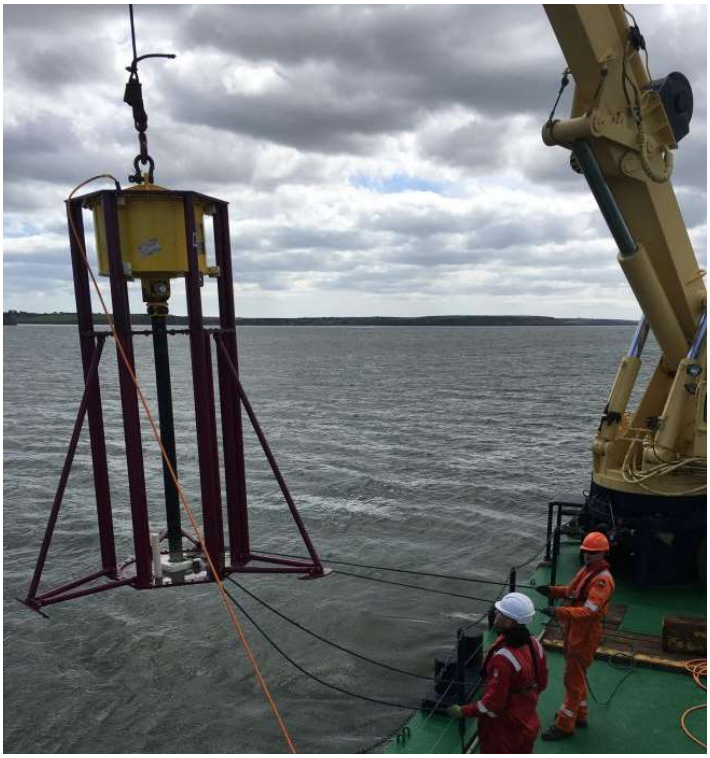

Figure 8. Deployment of Vibrocorer from Survey Vessel.

Grab samplers

3.38 Grab samplers are one of the most common methods of retrieving soil samples from the seabed surface. The grab sampler is a device that simply grabs a sample of the topmost layers of the seabed by bringing two steel clamshells together and cutting a bite from the seabed surface to a depth of 0.1 to 0.5m. The information they provide can be applied in a number of applications such as seabed classification, environmental sampling, chemical and

biological analysis and ground truthing for morphological mapping and geophysical survey. Grab samplers can be used to recover samples of most seabed soils, although care is needed in selecting the right size unit for the task.

3.39 There are various grab sampler types to include but not limited to Van Veen (single or double, Figure 9), Hamon, Shipek and Day Grab samplers. Generally, some variants may come both as single or double, and in a variety of different sizes. The grab sampler comprises two steel clamshells acting on a single or double pivot. The shells are brought together either by a powerful spring (Shipek type) or powered hydraulic rams operated from the survey vessel.

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

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

Figure 9. Single and Double Van Veen Grab.

Underwater Video Survey

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

Geophysical Survey Equipment

3.43 The geophysical surveys will include:

- Multi-Beam Echo Sounders
- Side Scan Sonar
- Sub-bottom profiler (Pinger, Chirper or Parametric)
- Marine Magnetometer
- Ultra-Short Base Line (USBL) for subsea positioning.

3.44 The operating frequencies of the geophysical survey equipment are outlined in Table 3 below. The geophysical surveys will comply with the JNCC guidelines for minimising risk of injury to marine mammals from geophysical surveys (JNCC, 2017) and recorded on the JNCC Marine Noise Registry.

Equipment Type	Purpose	Typical Frequency Range
Teledyne T50-R Multibeam Echo Sounder (MBES)	Measure detailed bathymetry by transmitting sound pulses (active sonar).	190 kHz to 420 kHz
Edgetech 4205 Side Scan Sonar (SSS)	Determine surficial nature of the seabed and detect objects by transmitting sound pulse.	230 kHz to 850 kHz
Innomar Medium-100 Sub-bottom Profiler (SBP) - Parametric	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 to 22 kHz, 85 to 100 kHz
Kongsberg µPAP 201-H Ultra-Short Base Line (USBL)	Subsea positioning.	20 kHz to 30 kHz
Magnetometer	Identify ferrous anomalies for metal obstructions, shipwrecks, etc. on and under the seabed.	Passive

Table 3. Geophysical survey equipment

4.0 NAVIGATION AND OTHER SEA USERS

4.1 The Maritime and Coastguard Agency (MCA) and Trinity House have been consulted regarding the proposed geotechnical surveys and the MCA have provided best practice advice. The MCA have provided the following mitigation to be followed:

- All maritime safety legislation is adhered to, in particular the COLREGs (Rule 10) at all times;
- Local mariners and fishermen's organisations (including Kingfisher) must be made fully aware of the activity through a local notification. This must be issued at least 5 days before the commencement of the works.
- Zone28@hmcg.gov.uk must be notified prior to commencement of activities.
- All dropped objects which are a danger or hazard to navigation must be reported to NRW, UKHO and HMCG, as soon as reasonably practicable and in any event within 24 hours of the undertaker becoming aware of an incident. NRW may require relevant surveys to be carried out by the undertaker (such as side scan sonar) if reasonable to do so and NRW may require obstructions to be removed from the seabed at the undertaker's expense if reasonable to do so.
- A risk assessment for operating in the TSS should be undertaken before the works commence, with a process in place for identifying high levels of traffic to avoid;
- Carry out the surveys in parallel to and in the general direction of traffic flow in the lane.
- Notify the UKHO (Navwarnings@ukho.gov.uk) for consideration any required navigational warnings;
- Consider the width of the lanes and whether there is sufficient available sea room for vessels to pass when your vessel is stationary to collect samples etc.
- Survey vessel to inform any relevant VTS/MRS/MRCC if waiting for any reason.
- Consider a minimum working limit of horizontal visibility within the traffic lane i.e not less than one (1) nautical mile.
- If using machinery land side in the intertidal area at low tide, ensure suitable bunding and/or storage facilities are installed to contain and prevent the release of fuel, oils, and chemicals associated with plant, refuelling and equipment, into the marine environment.

4.2 The survey operations will adhere to the following:

- Comply with all maritime safety related legislation and guidance, including COLREGs;

- Issue local notification to marine users - including fisherman's organisations, neighbouring port authorities and other local stakeholders - to ensure that they are made fully aware of the activity; and
- Notify HM Coastguard of the works prior to commencement.
- While undertaking survey operations, the survey vessel shall display the appropriate lighting and navigational warnings to other vessels to indicate that the survey vessel is restricted in its ability to manoeuvre.
- Whilst surveying, the vessel crew and survey team will be mindful of fishing interests and in particular, fixed gear in the vicinity of the route, and where appropriate, shall put in place measures to minimise and / or avoid interaction. The project FLO shall liaise with local stakeholders from the fishing industry.
- While on station, suitably trained personnel shall maintain a watch from the bridge to monitor vessel traffic.
- Vessel marine crew shall have assigned emergency duties and muster points stipulated on the vessel's muster list. Safety inductions of all onboarding crew shall be undertaken not more than 24-hours after arrival onboard.

5.0 ARCHAEOLOGY

5.1 The relevant archaeological bodies (Royal Commission for Ancient Historic Monuments Wales and Gwynedd Archaeological Trust) have been consulted regarding the proposed geophysical and geotechnical surveys. The proposed survey specification takes into account archaeological data acquisition to enable professional archaeological interpretation and analysis of data. The survey equipment deployed and data acquisition and processing shall comply with the requirements of the Royal Commission for Ancient Historic Monuments Wales.

5.2 Best practice archaeological guidance will be adhered to minimise the risk to sites of archaeological interest. These include:

- Archaeological desk-based assessment to inform a Written Scheme of Investigation (WSI);
- English Heritage (2013) Marine Geophysics Data Acquisition, Processing and Interpretation: Guidance Note;

• Standard Guidance for Archaeological Geophysical Survey (CifA, 2020);

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

5.4 Although unlikely given the nature of the survey works, should any artefacts be recovered during the survey activities, these will be retained and a notification reported through the Portable Antiquities Scheme, including the location of the find. This will be detailed within the WSI.

6.0 BEST PRACTICE AND PROPOSED MITIGATION MEASURES

6.1 The following mitigation measures and environmental best practice will be adhered to throughout the survey work to minimise risk to the marine environment and designated sites:

- Relevant Guidance for Pollution Prevention (GPP) including PPG 6: Works and maintenance in or near water;
- All equipment associated with the works will be removed on completion of the works;
- Bunding, storage facilities and spill kits will be employed to contain and prevent the release of fuel, oils and chemicals associated with the equipment into the marine environment;
- Plant, vehicles and machinery will not be refuelled on the foreshore;
- Coatings and treatments will be suitable for use in the marine environment and are used in accordance with best environmental practice;
- All equipment, materials, machinery and PPE used will be in a clean condition prior to their arrival on site, and upon removal from site, to minimise risk of introducing non-native species into the marine environment;
- The locations of the grab samples, CPT's and gravity cores/vibrocores will be informed by the geophysical survey data. Therefore, geotechnical locations will be sited to avoid sensitive habitats (such as potential Annex I habitat), potential archaeological features and other seabed obstructions;

- Dropped objects procedure shall include reporting and notification procedures to comply with statutory requirements;
- The surveys will be undertaken in accordance with the JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017);
- Vessels shall have appropriate fully certified safety equipment to comply with SOLAS codes or equivalent, including adequate marine lifesaving equipment and personal protective equipment, and shall have trained personnel onboard who are familiar with its use;
- Working areas on board shall be kept clean and clear of trip hazards and flammable materials;
- No waste shall be discharged from the vessels offshore with all waste disposed shore side in accordance with Client and statutory requirements;
- The Contractor shall propose a suitable operational port nearby to the work area that allows for safe and efficient survey operations, 24-hour vessel port access and suitable facilities for safe loading/unloading of personnel, equipment and supplies;
- A dedicated person for watching and monitoring vessel traffic will be present on the bridge at all times.

7.0 ADDITIONAL INFORMATION

7.1 An application has been submitted to The Crown Estate for a Seabed Survey Licence (SSL) for the TUSKAR project. This is pending.

7.2 See attached chart showing location of project and shapefile of the survey area.

7.3 See attached email correspondence from the MCA, Trinity House and the Royal Commission on the Ancient and Historical Monuments of Wales.

Louise Bridges

From: navigation safety [redacted]
Sent: 14 June 2023 12:20
To: Louise Bridges; navigation safety
Cc: Nick O'Brien; Rachel Antill
Subject: RE: P11917 - Tusker Site Investigation Works

Hello Louise,

Thank you for the opportunity to comment on the proposed site investigations works in preparation for the installation of a new subsea fibre optic cable system Tusker. The UK Technical Services Navigation team of the Maritime and Coastguard Agency (MCA) has reviewed the information provided and would like to comment as follows:

We note the works include Cone Penetration Tests, grab samples, vibrocores and slit trenches. We have assumed that the works in the intertidal area will be undertaken at low tide using machinery rather than a vessel. Please let me know if this is not the case, and I will remove the point 11 below. I believe that no jack up barges will be used, and the works will take approx. 4 weeks to complete over a six-month period. Some of the sites are located in the Traffic Separation Scheme off The Smalls and in high density shipping areas, therefore additional risk mitigation measures are required.

On the understanding that the following takes place, the MCA would have no significant concerns to raise with regards to the safety of navigation and would be satisfied that the risk should be relatively low on this occasion:

1. All maritime safety legislation is adhered to, in particular the COLREGs (Rule 10) at all times;
2. Local mariners and fishermen's organisations (including Kingfisher) must be made fully aware of the activity through a local notification. This must be issued at least 5 days before the commencement of the works.
3. Zone28@hmcg.gov.uk must be notified prior to commencement of activities.
4. All dropped objects which are a danger or hazard to navigation must be reported to NRW, UKHO and HMCG, as soon as reasonably practicable and in any event within 24 hours of the undertaker becoming aware of an incident. NRW may require relevant surveys to be carried out by the undertaker (such as side scan sonar) if reasonable to do so and NRW may require obstructions to be removed from the seabed at the undertaker's expense if reasonable to do so.
5. A risk assessment for operating in the TSS should be undertaken before the works commence, with a process in place for identifying high levels of traffic to avoid;
6. Carry out the surveys in parallel to and in the general direction of traffic flow in the lane.
7. Notify the UKHO (Navwarnings@ukho.gov.uk) for consideration any required navigational warnings;
8. Consider the width of the lanes and whether there is sufficient available sea room for vessels to pass when your vessel is stationary to collect samples etc.
9. Survey vessel to inform any relevant VTS/MRS/MRCC if waiting for any reason.
10. Consider a minimum working limit of horizontal visibility within the traffic lane i.e not less than one (1) nautical mile.
11. If using machinery land side in the intertidal area at low tide, ensure suitable bunding and/or storage facilities are installed to contain and prevent the release of fuel, oils, and chemicals associated with plant, refuelling and equipment, into the marine environment.

You may also wish to liaise with any local fishermen that may be impacted by the works.

Please can you confirm acceptance of the above risk mitigation measures.

Kind regards

Helen

Helen Croxson
UK Technical Services Navigation

From: Louise Bridges [redacted]
Sent: Wednesday, June 7, 2023 2:04 PM
To: navigation safety [redacted]
Cc: Nick O'Brien [redacted] Rachel Antil [redacted]
Subject: P11917 - Tusker Site Investigation Works

Good afternoon,

We are in the process of applying for a Band 1 marine licence application with National Resources Wales (NRW), and we are required to consult with you prior to submission of our application to ensure no impact on the safety of others at sea.

The marine licence application is to enable pre-construction survey works to support the proposed installation of a new subsea fibre optic cable system, Tusker, which will link Ireland to the United Kingdom, from North Dublin to a landfall near Newgale in Pembrokeshire, West Wales. Only works carried out in Welsh waters are being considered in the marine license application to NRW (works carried out in Irish waters will be covered under the Irish regulatory system).

The Band 1 licence activities include:

- Seabed CPT's to 3m (offshore);
- Grab samples (2 per location) (offshore);
- Vibrocore/gravity core (120mm diameter) to 3m (offshore); and
- Slit Trenches, 0.8m to 1m in width, up to 2.5m in depth (intertidal area).

The exact locations of the works are not yet known (they will be informed by a preceding geophysical survey), however the survey route is shown in the attached figure.

The duration of the proposed works is expected to take less than 4 weeks in total and should be completed over a 6-month period, with all works due to be completed during daylight hours.

Please would you verify whether you have enough information to consider any impact to the safety of others at sea?

Many thanks,
Louise

Louise Bridges BSc (Hons), MSc, Mem.MBA (She/They)
Marine Technical Specialist

[redacted]

[redacted]

www.apemltd.com

Louise Bridges

From: Catherine Bransby <[redacted]
Sent: 16 June 2023 16:10
To: Louise Bridges
Cc: Nick O'Brien; Rachel Antill
Subject: FW: P11917 - Tusker Site Investigation Works
Attachments: P11917 Tusker SI Study Area.png

> **Caution:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe

Good afternoon Louise,

Thank you for providing the details of your application.

I can confirm that Trinity House has no objections to these works.

Kind regards,

Catherine Bransby
Navigation Requirements Advisor | Navigation | Trinity House
e:[redacted]
www.trinityhouse.co.uk

TRINITY HOUSE

From: Enquiries <enquiries@trinityhouse.co.uk>
Sent: 07 June 2023 15:11
To: Navigation <navigation@trinityhouse.co.uk>
Subject: FW: P11917 - Tusker Site Investigation Works

From: Louise Bridges <[redacted]
Sent: 07 June 2023 14:04
To: Enquiries [redacted]
Cc: Nick O'Brien <[redacted]; Rachel Anti[redacted]
Subject: P11917 - Tusker Site Investigation Works

Good afternoon,

We are in the process of applying for a Band 1 marine licence application with National Resources Wales (NRW), and we are required to consult with you prior to submission of our application to ensure no impact on the safety of others at sea.

The marine licence application is to enable pre-construction survey works to support the proposed installation of a new subsea fibre optic cable system, Tusker, which will link Ireland to the United Kingdom, from North Dublin to a landfall near Newgale in Pembrokeshire, West Wales. Only works carried out in Welsh waters are being considered in the marine license application to NRW (works carried out in Irish waters will be covered under the Irish regulatory system).

The Band 1 licence activities include:

- Seabed CPT's to 3m (offshore);
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- Slit Trenches, 0.8m to 1m in width, up to 2.5m in depth (intertidal area).

The exact locations of the works are not yet known (they will be informed by a preceding geophysical survey), however the survey route is shown in the attached figure.

The duration of the proposed works is expected to take less than 4 weeks in total and should be completed over a 6-month period, with all works due to be completed during daylight hours.

Please would you verify whether you have enough information to consider any impact to the safety of others at sea?

Many thanks,
Louise

Louise Bridges BSc (Hons), MSc, Mem.MBA (She/They)
Marine Technical Specialist

[redacted]

www.apemltd.com

RE: Archaeological assessments for initial telecoms cables - Welsh waters

Dr Julian Whitewright <[redacted]>
Mon 15/05/2023 15:56
To: Darren Glazier <[redacted]>
Cc: Michael Walsh <[redacted]>;Kevin Whyte <[redacted]>;Tom McMahon <[redacted]>;Jim McMahon <[redacted]>;Rory Ryan <[redacted]>

Dear Darren,

Many thanks for your email outlining the proposed work. From our perspective, thinking about any potential impact on marine archaeology, we have no objections to any of the geophysical survey, and actively look forward to the results being shared as a means to enhance collective knowledge of an historic assets within the cable corridors.

In terms of the geotechnical investigations. Nearer the time, it would be helpful if possible, for any finalised borehole/sample locations to be shared, to ensure that they are not in conflict with a known historic asset – or if you are going to do this as part of the process following the geophysical survey, then to briefly discuss that with ourselves. We of course realise that in some instances the geotechnical sample locations are not known in detail in advance.

Yours

Julian

Comisiwn Brenhinol
Henebion Cymru
Royal Commission on the Ancient
and Historical Monuments of Wales

Dr Julian Whitewright
Dysgwr
Uwch Ymchwilydd (Arforol) | Senior Investigator (Maritime)
Ffordd Penglais, Aberystwyth, SY23 3BU
[redacted]
www.cbhc.gov.uk | www.rcahmw.gov.uk
Noddir gan Lywodraeth Cymru | Sponsored by Welsh Government

From: Darren Glazier [redacted]
Sent: Monday, May 15, 2023 1:17 PM
To: Dr Julian Whitewright [redacted]
Cc: Michael Walsh [redacted]>; Kevin Whyte [redacted]; Tom McMahon [redacted]; Jim McMahon [redacted]; Rory Ryan [redacted]
Subject: Archaeological assessments for initial telecoms cables - Welsh waters

Dear Julian

I hope this email finds you well? Coracle Archaeology has recently been commissioned to provide archaeological services in support of licence applications to undertake marine surveys and site investigations for four subsea fibre optic cables, each with landfall in Wales. It is anticipated that site investigations will begin in UK waters in Q3 of 2023, with data assessments and route design completed by Q2 of 2024, and full marine licence applications submitted in Q3 2024. The four cables include:

- **SOBR 1** cable, with landfall at Trearddur Bay, Anglesey;
- **SOBR 2** cable, with landfall at Colwyn Bay;
- **TUSKAR** cable, with landfall at Newgale; and
- **Newport connect**, with landfalls at Newport and Weston-super-Mare on the English coast.

The proposed cable systems will aim to provide high speed strategic international telecommunications connectivity between the UK (specifically Wales) and Ireland, or between Wales and England in the case of Newport Connect. The installation of these cables will underpin existing, planned and future developments in Wales. Indicative cable routes in Welsh waters are attached.

Initial surveys will include the collection of marine geophysical survey data (multibeam echosounder, sidescan sonar, sub-bottom profiler and magnetometer) within a potential route corridor, followed by benthic and geotechnical investigations. The latter will include vibrocores, CPT's and grab samples. Best practice measures will be adhered to throughout the survey works to ensure safe working and no significant risk to archaeological interests. Slit trenching or sampling will also be undertaken at the landfall locations, to investigate sediment layers for trenching and / or potential HDD.

At present, Coracle has been commissioned to provide the following marine archaeological assessments in support of initial licence applications to be submitted to NRW:

- a full marine archaeological desk-based assessment, from mean-high springs at the landfall locations to the UK-Ireland median line, or from Newport to Weston-super-Mare in the case of Newport Connect. This will focus on both the route corridor, and an additional wider study area to facilitate the assessment of marine archaeological potential;
- a marine archaeological written scheme of investigation, including a method statement outlining mitigation for works that disturb the seabed (including geotechnical works and sampling / slit trenches at the landfall locations); and
- a marine archaeological Protocol for Archaeological Discoveries.

Additional archaeological assessments will be undertaken as part of the marine environmental assessment process in support of marine licence applications for cable installation, to be submitted in in 2024.

We hope that this meets with your approval, but we would very much welcome your comments on the proposed assessments. We have sent data requests to both the NMR and the HER's for the relevant archaeological trusts, and are also consulting with your colleagues at the Marine Planning Unit, Historic England, with reference to Newport Connect.

As part of the licence applications to the NRW, our client requires written confirmation from the archaeological curators that the planned works will not pose a significant risk to cultural heritage assets. We would be grateful if you would be able to provide us with a response, to be included with the initial licence applications in early summer. An email has also been sent to the various trusts for the landfall locations.

As ever, please don't hesitate to get in touch with any questions or queries,

All the very best

Darren

Darren Glazier MA PhD MCIfA
Principal Archaeologist
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