Scottish Hydro Electric Power Distribution plc

EPS and Protected Sites and Species Risk Assessment

Argyll EPS Risk Assessment

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CONTENTS

ABBREVIATIONS

3D	3-Dimensional
AA	Appropriate Assessment
ADCP	Acoustic Doppler Current Profiler
AUV	Autonomous Underwater Vessel
AWAC	Acoustic Wave and Current
cm	Centimetre
CPT	Cone Penetration Testing
dB	Decibels
dB re 1 µPA	Decibels relative to 1 Micro Pascal
DD	Decimal Degrees
DDM	Degrees and Decimal Minutes
DECC	Department of Energy and Climate Change
DLV	Doppler Velocity Logger
DMS	Degrees Minutes Seconds
DSV	Dive Support Vessel
EC	European Community
EEC	European Economic Community
EPS	European Protected Species
EU	European Union
FCS	Favourable Conservation Status
HF	High Frequency
HRA	Habitats Regulations Appraisal
HWDT	Hebridean Whale and Dolphin Trust
IAMMWG	International-Agency Marine Mammal Working Group
IRM	Inspection Repair and Maintenance
IROPI	Imperative Reason of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
kHz	Kilohertz
km	Kilometres
km^2	Kilometres Squared
LARS	Launch and Recovery System
LF	Low Frequency
LSE	Likely Significant Effect
m	Metres
m^2	Metres Squared
MAG	Magnetometer
MBES	Multi-Beam Echo Sounder
ms	Millisecond
MHWS	Mean High Water Spring

MMO	Marine Mammal Observer
MMPP	Marine Mammal Protection Plan
MPA	Marine Protected Area
MS-LOT	Marine Scotland Licensing Operations Team
MU	Management Unit
NC MPA	Nature Conservation Marine Protected Area
NM	Nautical Miles
NMFS	National Marine Fisheries Service
NMPi	National Marine Plan interactive
NOAA	National Oceanic and Atmospheric Administration
OSPAR	Oslo and Paris Convention
PAM	Passive Acoustic Monitoring
PCPT	Piezocone Penetration Testing
PMF	Priority Marine Features
PSA	Particle Size Analysis
PW	Phocid Carnivores in Water
ROV	Remotely Operated Vehicle
ROTV	Remotely Operated Towed Vehicle
SAC	Special Areas of Conservation
SBES	Single Beam Echosounder
SBP	Sub-Bottom Profiler
SCANS	Small Cetaceans Abundance in the North Sea
SCOS	Special Committee on Seals
SEL	Sound Exposure Level
SHEPD	Scottish Hydro Electric Power Distribution plc
SMWWC	Scottish Marine Wildlife Watching Code
SSS	Side Scan Sonar
SNH	Scottish Natural Heritage (now NatureScot)
SPA	Special Protection Area
SPL	Sound Pressure Level
SPL_{rms}	Sound Pressure Level Root Mean Squared
SVP	Sound Velocity Profiler
UAV	Uncrewed Aerial Vehicles
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
USBL	Ultra-Short Baseline
USV	Uncrewed Surface Vehicle
UXO	Unexploded Ordnance
VHF	Very High Frequency
WCA	Wildlife and Countryside Act

1 INTRODUCTION

1.1 Overview

Scottish Hydro Electric Power Distribution plc (SHEPD) holds a licence under the Electricity Act 1989 for the distribution of electricity in the north and west of Scotland, including the islands. It has a statutory duty to provide an economic and efficient system for the distribution of electricity and to ensure that its assets are maintained to ensure a safe, secure and reliable supply to customers. Electricity is now considered to be an essential service for communities, with the cable routes detailed below in Section 1.2 distributing electricity to domestic and business customers, providing a long term economic and social benefit to the communities in the Argyll region. The monitoring of existing assets and survey of new routes relating to submarine power cables therefore constitutes work of overriding public need.

SHEPD has a number of interconnector cables across the Scottish Marine Regions, of which, the Marine Region of Argyll is discussed in this application. In order to ensure a safe, secure and reliable supply of electricity to the Argyll region, SHEPD is planning to undertake geophysical, geotechnical and environmental surveys of their existing assets and over routes for potential new subsea cables.

As such, the proposed survey activities will enable SHEPD to:

- Identify cable location and condition: SHEPD undertake programmed inspections and surveys to understand the condition of the fleet and identify which ones should be taken forward for planned replacement;
- Identify fault locations and carry out repairs;
- Identify any new routes that may be required; and
- Inform cable routing, protection and decommissioning decisions; as well as ensure accurate installation of new cables and their protection during installation.

The survey activities across the Argyll geographical area are scheduled to be undertaken between 1st August 2023 – 31st July 2028.

1.2 Cable Routes

SHEPD is planning to undertake geophysical and environmental surveys, as well as testing and calibration of survey equipment, that may be required for the following cable routes in the Argyll marine region:

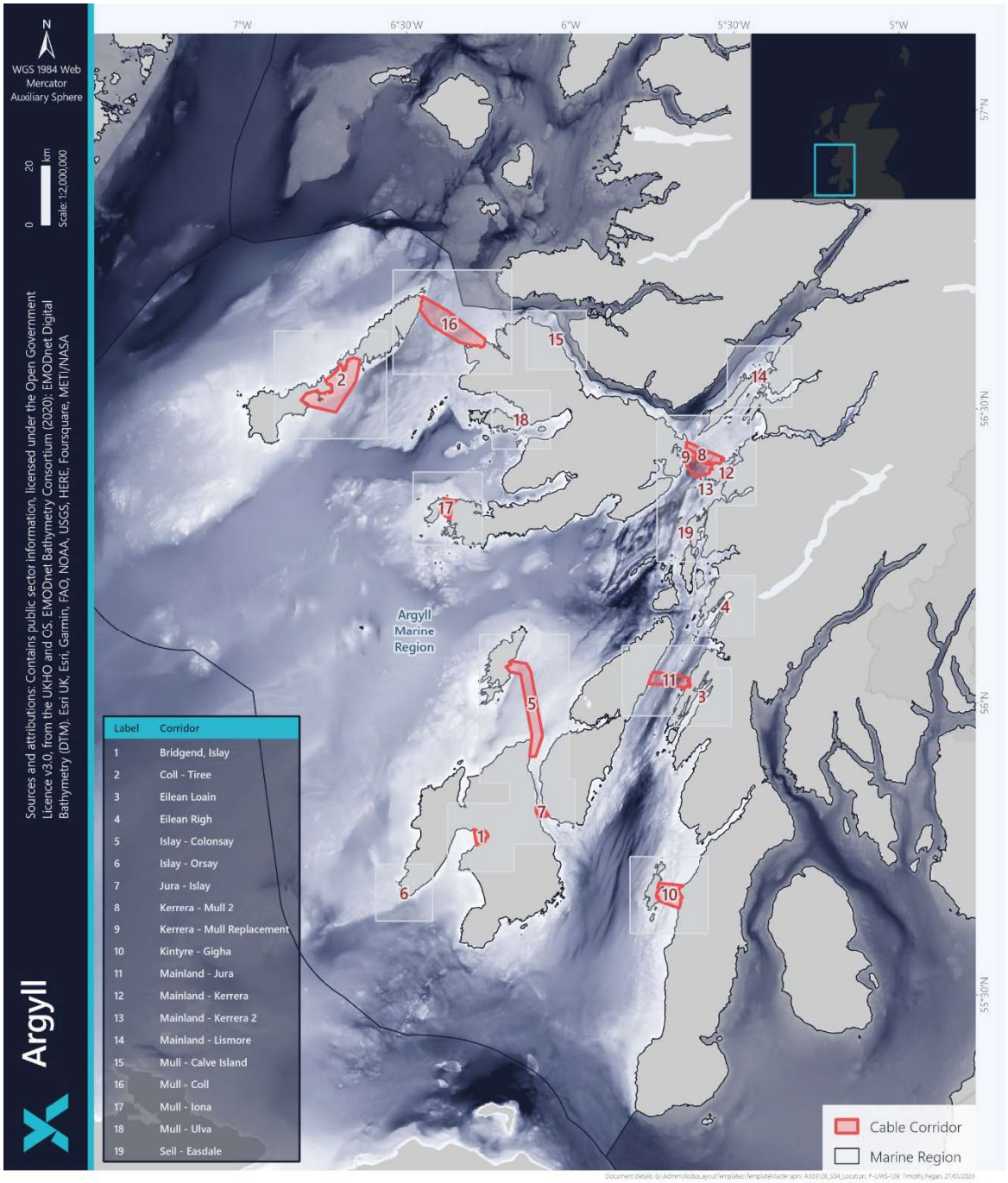
- Mainland – Kerrera (1)
- Mainland – Kererra (2)
- Mainland – Lismore
- Eilean Loain
- Lochaline – Mull
- Mainland – Jura
- Seil – Easdale
- Eilean Righ
- Kerrera – Mull (2)
- Kerrera – Mull (Replacement)
- Kintyre – Gigha
- Kintyre – Gigha (Replacement)
- Coll – Tiree
- Coll – Tiree (Replacement)
- Islay – Colonsay
- Islay – Orsay
- Jura – Islay
- Mull – Calve Island
- Mull – Coll (1)
- Mull – Coll (2)
- Mull – Ulva
- Mull – Iona
- Mull – Iona (Replacement)
- Bridgend Islay

For the Argyll Marine Region, there are 24 cable routes to be surveyed, contained within 19 cable corridors. For these corridors, the maximum survey area is 211 km^2, as shown in Figure 1-1.

All of the cables are within the Argyll Scottish Marine Regions and are included in this EPS and Protected Sites and Species Risk Assessment.

The co-ordinates for the cable corridors have been provided in Appendix A – Cable Corridor Coordinates, additionally individual maps of the cable corridors and cable routes are provided in Appendix B.

Figure 1-1 Location of Cable Corridors within the Argyll Marine Region



1.3 Consents and Licences

Ahead of any cable surveys, all relevant consents and licences need to be in place. This document provides the necessary information to support the following:

1. An application for a European Protected Species (EPS) Licence. An EPS Licence is required under the Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland) (the Habitats Regulations)

where there is potential for the presence of vessels or underwater sound from the proposed survey activities to injure or cause disturbance to an EPS;

2. An assessment of potential impact on basking sharks as per the Wildlife and Countryside Act 1981 (as amended) (the WCA);
3. The Habitats Regulations Appraisal (HRA) process, which is conducted by the Competent Authority as prescribed by the Habitats Regulations, to assess if the cable inspections or any subsequent surveys have the potential to result in likely significant effects on a European site (either alone or in combination with other plans or projects). The Habitats Regulations state that 'the effects of a project on the integrity of a European site need to be assessed and evaluated as part of the HRA process'. This includes any European sites with a marine component as well as any terrestrial or coastal European sites with qualifying features that could potentially be impacted;
4. An assessment of impacts on Nature Conservation Marine Protected Areas (NC MPAs) as per section 82 of the Marine (Scotland) Act 2010 which also includes those which are Historic or Demonstration and Research sites;
5. An assessment of potential impacts on designated seal haul-out sites as per Section 117 of the Marine (Scotland) Act 2010;
6. Notice of intention to carry out a Marine Licence exempted activity for geotechnical sampling of less than 1 m^3 volume per sample; and
7. Notice of intention to carry out a Marine Licence exempted activity for the sediment sampling component of benthic surveys, which will be undertaken according to NatureScot Guidance Notice No. 45 – Subsea Cable and Oil and Gas Pipeline Proposals – Benthic Habitat and Species Survey Requirements.

For end-to-end cable installation, a separate Marine Licence will be submitted and supported by separate environmental supporting documents which will be informed by, and incorporate the findings of, the above listed marine surveys and geotechnical investigations.

1.4 Protected Species Overview

1.4.1 EPS – Cetaceans and Otters

All species of cetacean (whale, dolphin and porpoise), and the Eurasian otter *Lutra lutra*, occurring in United Kingdom (UK) waters are listed in Annex IV of the Habitats Directive as EPS, meaning that they are species of community interest in need of strict protection, as per Article 12 of the Directive. Harbour porpoise *Phocoena phocoena* and bottlenose dolphin *Tursiops truncatus* are listed under Annex II of the Habitats Directive, which enables the designation of Special Areas of Conservation (SACs) for those species. They are also regarded as EPS.

The Eurasian otter is the only native UK otter species and is fully protected as an EPS and under section 9 and 11 of the WCA 1981 (as amended). When considering a certain activity, the presence of an otter as an EPS is a material consideration if the proposals are likely to result in the disturbance or harm to the species.

In Scotland, the Habitats Directive is transposed into law by The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) within Scottish Territorial Waters (from the Mean High Water Spring (MHWS) sea level seawards to 12 NM limit), and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in UK Offshore Waters (between 12 and up to 200 NM). An EPS licence is required where an activity may result in an offence under the Habitats Regulations, which in the context of marine surveys, pertains to cetaceans and otters.

As such, an EPS licence is required under the protection afforded in Scottish territorial waters (out to 12 nautical miles (NM)) under the Habitats Regulations. Regulation 39(1) of the Habitat Regulations make it an offence to:

a) Deliberately or recklessly capture, injure or kill a wild animal of an EPS;

b) Deliberately or recklessly:

   i. Harass a wild animal or group of wild animals of an EPS;

   ii. Disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;

   iii. Disturb such an animal while it is rearing or otherwise caring for its young;

   iv. Obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place;

   v. Disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;

   vi. Disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; or

   vii. Disturb such an animal while it is migrating or hibernating.

Further protection is afforded through an additional disturbance offence provided under Regulation 39(2) which states that "it is an offence to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean)". An EPS Licence is therefore required within Scottish Territorial Waters for any activity that might result in disturbance or injury to cetaceans or otters.

1.4.2 Basking Sharks

Basking sharks *Cetorhinus maximus* are protected under Schedule 5 of the WCA which prohibits the killing, injuring or taking by any method of those wild animals listed on Schedule 5 of the Act. The Nature Conservation (Scotland) Act 2004, Part 3 and Schedule 6 make amendments to the WCA, strengthening the legal protection for threatened species to include 'reckless' acts, and specifically makes it an offence to intentionally or recklessly disturb or harass basking sharks. A derogation licence under the WCA will therefore be required for any activity which may result in disturbance or injury to basking sharks.

1.4.3 Pinnipeds

The Marine (Scotland) Act 2010 protects both harbour seal and grey seal around Scotland's coast. This Act provides the Scottish Ministers with the power to designate Seal Conservation Areas. The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) prohibits certain methods of catching or killing seals. The Protection of Seals (Designated of Haul-Out Sites) (Scotland) Order 2014 introduces additional protection for seals from harassment (intentional or reckless) at 194 designated haul-out sites, where harbour seal and grey seal come ashore to rest, moult or breed.

1.4.4 Seabirds

The primary legislation for the protection of birds in the UK is the WCA in combination with the Nature Conservation (Scotland) Act 2004. Under these acts, it is an offence to harm wild bird species, their eggs and nests. Additional protection is provided for certain bird species listed on Schedule 1 of the WCA, and it is an offence to disturb those species at their nest while it is in use.

The proposed development activities are unlikely to result in the intentional or reckless killing of wild birds or the destruction of their nests, but if carried out during the breeding season, such works could result in an offence by disturbing nesting Schedule 1 bird species. Licensing for wild birds does not cover development purposes, so any activity that could result in disturbance of a nesting Schedule 1 species should not proceed unless outwith the breeding season.

1.5 Protected Sites

1.5.1 European Sites

The term 'European Site' is being used to refer to what were previously known as 'Natura 2000' sites. This recognises that Special Protection Areas (SPAs) and SACs protect species and habitats across Europe and were originally designated under European legislation.

European sites (SACs and SPAs) form a unique network of protected areas that stretches across the European Union (EU), known as the Natura 2000 site network. Prior to leaving the EU, Scotland's sites contributed to this network. These sites also form part of the Emerald Network, spanning Europe and into Africa, and European sites in the Scottish Marine Region comprise part of the OSPAR Network of Marine Protected Areas.

Natura sites (now European Sites) were originally designated under the European Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC). European Sites continue to be designated under Scottish domestic law and are now referred to as the UK's European Site Network:

In the terrestrial environment and within Scottish Territorial Waters (from MHWS seaward to 12 NM limit) by:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland); and
- Habitats Directive and Birds Directive (EU legislation).

Outwith Scottish Territorial Waters (>12 NM) by:

- The Offshore Habitats Regulations.

SACs were designated under the Habitats Directive for habitats and non-avian species. The Habitats Directive sets out how such European sites should be protected and has a number of wider implications such as those relating to EPS. The Birds Directive protects all wild birds and their nests, eggs and habitats within the European Union. SPAs are classified under the Birds Directive to protect birds that are rare or vulnerable in Europe as well as all migratory birds that are regular visitors.

The above aims to promote the maintenance of biodiversity, by requiring EU Member States to maintain or restore representative natural habitats and wild species at a Favourable Conservation Status (FCS), through the introduction of robust protection for those habitats and species of European importance.

As part of these protection measures, Member States are required to undertake assessments to determine whether a plan or project is likely to have an adverse effect on the integrity of a European site. This is implemented in Scotland through the HRA process. The HRA process requires that any proposal which has the potential to result in a negative Likely Significant Effect (LSE) to a European site or its designated features, to be subject to an HRA by the Competent Authority. If LSE are predicted, an Appropriate Assessment (AA) should be completed. The HRA/AA processes

ensure that no activity can be consented if it may cause adverse effects on the integrity of a European site, unless there are no satisfactory alternatives, and there is an Imperative Reason of Overriding Public Interest (IROPI) for the development to be constructed.

Following the UK's exit from the EU, the requirements of the Habitats and Birds Directives and conservation measures associated with designated sites and protected species (including all cetaceans) persist through the interpretation of those directives in UK (and Scots) law.

1.5.2 Nature Conservation Marine Protected Areas (NCMPAs)

Under Section 82 of the Marine (Scotland) Act 2010, Marine Scotland Licensing Operations Team (MS-LOT) is required to consider whether a licensable activity is capable of affecting (other than insignificantly) a protected feature in a NC MPA, or any ecological or geomorphological process on which the conservation of any protected feature in an NC MPA is dependent. If MS-LOT determine that there will be, or may be, a significant risk of a project hindering the achievement of the conservation objectives, then they must notify the relevant conservation bodies (NatureScot in this case).

It is an offence to intentionally or recklessly kill, remove, damage, or destroy any protected feature of an NCMPA. Marine Scotland must be sure that consenting/licensing decisions do not cause a significant risk to the conservation objectives of any NC MPA.

1.5.3 Designated Seal Haul-Outs

Seal haul-outs are coastal locations that seals use to breed, moult and rest. Almost 200 seal haul-out sites have been designated through the Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014 which was amended with additional sites in 2017. These haul-out sites are protected under Section 117 of the Marine (Scotland) Act 2010. The Act is designed to assist in protecting the seals when they are at their most vulnerable and, as such, provides additional protection from intentional or reckless harassment whilst seals occupy these important coastal sites.

1.6 Determining the need for an EPS Licence

The purpose of the assessments presented in this report is to determine whether, when considering appropriate mitigation as presented in Section 5, there is potential for the cable inspection or marine survey activities to injure or disturb cetaceans, otters or other protected species. Where there is still potential for harm or disturbance to occur, an EPS Licence (or Basking Shark Licence) may be required. The need for an EPS Licence (or Basking Shark Licence) will be determined based on findings from the EPS Risk Assessment. MS-LOT's consideration of whether an EPS Licence will be required will comprise three tests:

1. To ascertain whether the licence is to be granted for one of the purposes specified in the Regulations;
2. To ascertain whether there are no satisfactory alternatives to the activity proposed (that would avoid the risk of offence); and
3. That the licensing of the activity will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status.

1.6.1 What Constitutes Disturbance

Whether or not a specific activity could cause 'disturbance' (for the purpose of Article 12(1) (b) of the Habitats Directive) depends on the nature of the particular activity and the impact on the particular species. Whilst

'disturbance' is not defined in the Habitats Regulations, Marine Scotland (2020a) advise that the following matters should be taken into account when considering what constitutes disturbance:

- Changes in (direction or speed of) swimming or diving behaviour;
- Bunching together or females shielding calves;
- Changes in breathing patterns;
- Changes in vocalisation;
- Aggression, agitation or panic behaviour;
- Certain surface behaviours such as tail slashes and trumpet blows; and
- Moving out of an area previously occupied

What disturbance to a cetacean may mean:

- Displacement from important feeding areas;
- Disruption of feeding;
- Disruption of communication, migration, breeding, nursing, feeding, resting and other social behaviours;
- Abandonment of preferred breeding or calving sites;
- Changes to regular migratory pathways to avoid areas of human interaction;
- Increased vulnerability of an individual or population to predators or physical stress;
- Increased risk of injury or mortality; and
- Excessive use of energy leading to loss of condition (caused by continual or repeated avoidance or flight).

Where there is the possibility for injury or disturbance to occur, an EPS Risk Assessment must be carried out and the need for an EPS Licence determined. The injury and disturbance criteria for EPS are described in Section 3.4.1.

1.7 Document Structure

This document provides the information to support the EPS licencing, protected species and protected sites assessment process as per the following:

Section 2 provides a description of the proposed survey activities and their proposed location;

Section 3 provides an assessment of the risk to EPS and other protected species;

Section 4 provides an assessment of potential impacts on protected sites and designated seal haul-outs;

Section 5 outlines the proposed species protection measures to be implemented;

Section 6 presents the overall conclusions of the assessment;

Appendix A – table of Cable Corridor Co-ordinates; and

Appendix B – individual Corridor/Cable Maps.

2 DESCRIPTION OF PROJECT ACTIVITIES

2.1 Location of Activities

A list of the cable routes for the Argyll Marine Region is given in Section 1.2. Corridors approximately 2 km wide have been used for the assessment - these corridors have multiple cables which have been combined into one corridor. The indicative corridor area is provided in Table 2-1. The total area covered by the cable route survey corridors is approximately 211 km^2. Corridors are approximate and it can be confirmed that all licences cover up to MHWS.

The co-ordinates for each cable route have also been provided in Appendix A – Cable Route Coordinates.

Table 2-1 Cable Routes and Indicative Cable Corridors

Cable Corridor Name	Cables within Corridor	Indicative Corridor Area (km^2)
Bridgend, Islay	Bridgend, Islay	5.0476
Coll - Tiree	Coll - Tiree	47.5127
Eilean Loain	Eilean Loain	0.4967
Eilean Righ	Eilean Righ	0.7694
Islay - Colonsay	Islay - Colonsay	38.0450
Islay - Orsay	Islay - Orsay	0.3206
Jura - Islay	Jura – Islay Islay - Jura	3.5166
Kerrera - Mull 2	Kerrera - Mull 2	15.5488
Kerrera - Mull Replacement	Kerrera - Mull Replacement	18.0218
Kintyre - Gigha	Kintyre - Gigha	16.8605
Mainland - Jura	Mainland - Jura	15.3589
Mainland - Kerrera	Mainland - Kerrera	0.6785
Mainland - Kerrera 2	Mainland - Kerrera 2	1.0411
Mainland - Lismore	Mainland - Lismore	1.7710
Mull - Calve Island	Mull - Calve Island	0.4510
Mull - Coll	Mull - Coll Coll - Mull	43.8988
Mull - Iona	Mull - Iona	5.7534
Mull - Ulva	Mull - Ulva	0.3346
Seil - Easdale	Seil - Easdale	0.7655

2.2 Summary of Project Activities

2.2.1 Overview

The proposed cable surveys will be undertaken to confirm cable position, assess cable condition and provide information to help determine whether any future maintenance or replacement or new cable routes are required (or if there has been any third-party damage). The results of the geophysical survey will be used to inform future routeing of replacement cables and/or the requirement for additional cable protection. If the results of the surveys identify cable routes that require maintenance or replacement, these maintenance or replacement activities will be covered by a separate Marine Licence application. As such no repair, maintenance or installation activities have been included within this assessment.

Testing and Calibration of Survey Equipment

Prior to survey activities commencing, the survey equipment and sensors will need to be tested and calibrated. Testing and calibration may be required for all survey equipment that will be utilised during the survey activity, as detailed in Table 2-2. It is anticipated that the testing and calibration will take approximately 24 hours per vessel per survey mobilisation. There will be approximately six vessel mobilisations per year for each survey cable corridor.

The exact location of the testing and calibration sites is unknown at this stage, where possible this would be undertaken with the survey corridor. It is however noted that specific bathymetric conditions and features are required to facilitate testing and calibration; where these are not available within the survey corridor, an alternative location will be utilised.

Since the vessels, equipment, and activities required for testing and calibration will be the same as those used during geophysical survey works, the potential impacts on protected species and sites resulting from testing and calibration will be analogous to those resulting from the main survey phase.

Geophysical and Geotechnical Surveys

The geophysical surveys will typically be carried out by two vessels. A typical scenario for their use is considered to be:

- A large survey vessel (> 50 m) will be utilised in the offshore areas; and
- A smaller nearshore survey vessel / Uncrewed Surface Vehicle (USV) deployed in shallower waters.

It is however noted that an additional nearshore vessel may be mobilised to meet timing and logistical constraints, hence, up to three survey vessels (one large offshore, and two small nearshore) could be operating simultaneously in the region. Offshore survey operations will be executed on a 24-hour basis by the larger vessel whilst inshore survey operations will be executed only during daylight hours by the smaller vessels.

Survey vessel selection and their selection of deployment will be made both prior to survey operations and will be informed by a number of factors. These include environmental considerations, weather and sea state, survey requirements and water depth. In addition to the survey vessels there may also be small supporting vessels in attendance, depending on the activity.

Table 2-2 presents the types of activity that are associated with the geophysical, geotechnical and environmental surveys.

It should be noted that examples of the potential vessels utilised during both inshore and offshore survey activities are provided in Table 2-3 in Section 2.2.2 below.

Table 2-2 Summary of the Activities Associated with the Different Survey Types

Activities	
Vessels and Vehicles	Survey Vessel
	Uncrewed Surface Vehicle
	Rigid Inflatable Boat (RIB) / Multicat
	Dive Support Vessel (DSV)
	Autonomous Underwater Vessel (AUV)
	Uncrewed Aerial Vehicle (UAV)
	Remotely Operated Vehicle (ROV)
	Remotely Operated Towed Vehicle (ROTV)
Geophysical Survey	Ultra-short Baseline (USBL) positioning system
	Side Scan Sonar (SSS)
	Multi Beam Echosounder (MBES)
	Single Beam Echosounder (SBES)
	Sub-Bottom Profiler (SBP)
	Magnetometer (MAG)
	Cable tracker system
	Subsea altitude metre
	Sound Velocity Profiler (SVP)
	Acoustic Doppler Current Profiler (ADCP)
	Obstacle Avoidance Sonar
Benthic Habitat Analysis	ROV survey / inspection
	Drop-down camera video / photo
	Benthic sediment grab sampling
Geotechnical survey	Vibrocoring / Cone Penetration Testing (CPT)
Landfall area investigations	Landfall topographical survey (note; this is not part of this application as above MHWS)

2.2.2 Vessels and Vehicles

Vessels will be mobilised as required from an agreed mobilisation port depending on which cable or set of cables are being surveyed. The type and number of vessels required to complete the geophysical surveys will vary depending on physical parameters of the cable and the survey area (such as the cable length and water depth).

The contractors that will be employed to undertake the surveys have not been selected yet, and therefore exact details of the vessels to be used are not available. The vessels detailed in Table 2-3 below are of a similar type and size that could be deployed and have been used as proxy vessels for the purpose of the EPS and Protected Sites Risk

Assessment. The vessels detailed go up to the maximum size that could be provided by the contractors, thereby providing a worst-case scenario and offering maximum flexibility in the survey procurement process.

Table 2-3 Example Vessels and Vehicles that Could be Used During Inspections and Surveys

Example Vessel / Vehicle	Description
Survey	
Vessel for ROV surveys – DP2 vessel	Purpose-designed vessel for ROV surveys, Inspection Repair and Maintenance (IRM) and construction support. Generally, diesel-electric, DP2 vessel that has advanced DGPS, USBL acoustic system and a Seapath 200. Typically, these vessels utilise Launch and Recovery System (LARS). The typical lengths of vessel can be 85 m, breadth 20 m, deck area 630 m^2 and draught 6m.
Multi-purpose vessel – both geophysical and geotechnical survey	Multi-purpose vessel which will typically have diesel-electric propulsion and a specially designed hull. Vessel will be suitable for geophysical and geotechnical survey operations up to 1,000 m water depth. Typical length is expected to be 54 m, beam 12.5 m, deck area is 250 m^2 and the draught 3 m.
Multi-purpose DP1 vessel – shallow and medium depth water	Multi-purpose DP1 vessel designed for survey operations in shallow and medium water depths. The vessel will be suitable for geophysical surveys, ROV support operations for up to light Work-Class vehicles, geotechnical CPT and vibrocoring, and environmental surveys. Typical length is expected to be 54 m, beam 12.5 m, deck area is 250 m^2 and the draught 3 m.
Vessel for inshore shallow water hydrographic and geophysical surveys	Purpose built vessel for hydrographic and geophysical surveys which is typically equipped for 12 hour operations up to 60 NM from save haven. Typical length is expected to be 12 m, beam 5 m and the draught 2 m.
Vessel for offshore deep water hydrographic and geophysical surveys	Geophysical survey vessel equipped with permanently mobilised geophysical and hydrographic survey spreads. Often, this type of vessel has diesel-electric propulsion and specially designed hulls. The equipment of this vessel will include MBES, single beam echosounders, sub bottom profilers and side scan sonar. Typical length of vessel is expected to be 65 m, beam 14 m, deck area is 250 m^2 and the draught 5 m.
Vessel for deep water	Purpose built IMR and ROV vessel, designed for deep water remote intervention, renewables, construction and survey works. Typical length of this type of vessel is expected to be 130 m, beam 24 m, and draught of 7.5 m.
USV	A 2-3 m long untethered ROV which floats on the waters surface as a platform of deployment for geophysical survey equipment used in seabed or water column mapping. They are operated using battery power.
AUV	An uncrewed, untethered subsea vehicle which is remotely piloted from a surface operator and are often battery powered.
ROV	An uncrewed vehicle which is tethered to a vessel/mothership which is powered via electrical cables and hydraulic pumps. ROVs carry various instruments, image and sampling equipment used in benthic surveys and, on occasion, some geophysical survey equipment.
ROTV	An uncrewed towed vehicle used to deploy survey sensors including MBES, MAG, SSS, and SBP.
UAV	Also known as 'drones,' UAVs are uncrewed aircraft deployed for a variety of purposes, including aerial imagery used in surveys.

2.2.3 Survey Techniques

A range of different equipment would be employed during the surveys of the cable routes (see Table 2-2). The survey techniques are described in detail in Table 2-4Table 2-4. They have also been assessed for their potential to introduce sound into the marine environment and/or interact with protected species or seabed habitat. The most significant acoustic aspects potentially generated by this project are detailed within Table 3-1, along with a determination as to whether each requires further assessment.

Table 2-4 Details of the Equipment to be Employed for the Surveys of the Cable Routes

System / Survey Equipment	Description
Geophysical Survey	
Ultra-Short Baseline (USBL)	USBL systems are used to determine the position of subsea survey equipment, including ROVs, towed sensors, etc. This involves the emission of sound from a vessel-mounted transducer to a subsea transponder, thereby introducing sound into the marine environment. A USBL system consists of a transducer, which is commonly mounted on the vessel, and a transponder attached to the survey equipment (i.e., ROV). The transducer transmits sound through the water and the transponder sends a response which is detected by the transducer. The USBL calculates the bearing and time taken for the transmissions to be completed and thus can estimate the position of the subsea unit / sampling equipment. These systems can either be used continuously or intermittently through the operation they are supporting. In the shallowest regions of the nearshore environment, alternative positioning methods (e.g., layback and position calculations) may need to be considered.
Multi-beam echo-sounder (MBES)	MBES are used to obtain detailed Three-Dimensional (3D) maps of the seafloor which show water depths. They measure water depth by recording the two-way travel time of a high frequency pulse emitted by a transducer. The beams produce a fanned arc composed of individual beams (also known as a swathe). Multi-beam echo-sounders can, typically, carry out 200 or more simultaneous measurements. With respect to this project, the MBES specifications are to be high resolution, e.g., max ping space of 25 cm or 9 pings per square metre with a towed array. Sound sources with a frequency below 200 kHz may be used (for the Kongsberg EM710) and have therefore been discussed further with applicable mitigation outlined in Section 5. Nonetheless, the Kongsberg EM710 has been identified as a specific MBES equipment which may be required in the completion of these works. This equipment operates within a frequency range of 70-100 kHz with sound pressure levels in the range of 225- 231 dB re1µPa at 1 metre range. Given that that these frequencies fall within the hearing range of High Frequency (HF) and Very High Frequency (VHF) cetaceans, this specific equipment has been scoped in for further assessment. However, it should be noted that the equipment supports a "Marine Mammal Protection Mode" which effectively reduces the power outage. The intensity level may be lowered by 10 or 20 dB by the operator. The EM710 may also be set in a mode to begin pinging with a flexible soft-start as a possible means of inducing marine mammals to leave the area of high intensity sound. As

System / Survey Equipment	Description
	such this mitigation will be used with regard to this equipment as discussed in Section 5.
Side-scan Sonar (SSS)	SSS is used to generate an accurate image of the seabed, which may include 3D imagery. An acoustic beam is used to obtain an accurate image of a narrow area of seabed to either side of the instrument by measuring the amplitude of back-scattered return signals. The instrument can either be towed behind a ship at a specified depth or mounted on to a ROV. The frequencies used by side-scan sonar are generally very high and outside of the main hearing range of all marine species (NOAA, 2018). Higher frequency systems provide higher resolution but shorter-range measurements. Frequency levels below 200 kHz will not be used during survey activities and have therefore been scoped out of further assessment on the basis that they are outwith the generalised hearing range for EPS and other protected species likely to be affected by underwater sound.
Single Beam Echosounder (SBES)	SBES operate in a similar manner to MBES; rather than measuring multiple points per acoustic echo wave (echo) emitted, SBES can only measure one point at a time. The preferred equipment is a Kongsberg EA600.
Sub-Bottom Profilers (SBP)	SBP systems are used to identify and characterise layers of sediment or rock under the seafloor. A transducer emits a sound pulse vertically downwards towards the seafloor, and a receiver records the return of the pulse once it has been reflected off the seafloor. SBP systems which may be employed for these surveys include pingers and boomers. Pingers operate at a higher frequency but smaller bandwidth than boomers, which operate on a lower broadband frequency spectrum. The higher frequencies of operation provide the highest resolution but are limited in amount of penetration below the sea floor. The high frequency profilers are particularly useful for delineating shallow features such as faults, gas accumulations and relict channels. The lower frequencies yield more penetration but provide lower resolution. Lower frequency systems are more general-purpose tools that provide a good compromise between penetration capacity and resolution. Parts of the sound pulse from both systems will penetrate the seafloor and be reflected off the different sub-bottom layers, providing data on the sub-floor sediment layers. Unlike the pinger system which has a combined transducer/transceiver deployed in-water from the vessel, the boomer system requires the deployment of a boomer plate and a receiver array that is a separate floating unit from the emission source.
Magnetometer survey (MAG)	Magnetometer surveys are used to detect any ferrous metal objects on the seabed, such as wrecks, unexploded ordinance (UXO), or any other obstructions. Marine magnetometers come in two types: Surface towed and near-bottom. Both are towed a sufficient distance (about two ship lengths) away from the ship to allow them to collect data without it being polluted by the ship's magnetic properties. Surface towed magnetometers allow for a wider range of detection at the price of precision accuracy that is obtained by near-bottom

System / Survey Equipment	Description
	magnetometers. These surveys use equipment to record spatial variation in the Earth's magnetic field and do not emit sound.
Cable tracker system (magnetic)	Various geophysical methods may be used to locate and survey the depth of burial of cables. Passive magnetic and active electromagnetic sensors can be used to detect and track buried cables underwater. With these types of equipment, the depth of burial can be determined through modelling. To assess the coverage of underwater cables electromagnetic systems will be used. Cable tracker systems do not emit sound.
Subsea altitude metre	Subsea altitude metres (altimeters) utilise ultra-high frequency sonar technology to make precision underwater distance measurements by measuring the time it takes for sound pulses to travel from the altimeter to the seafloor and back to the altimeter. The altimeter will be attached to the magnetometer. These devices emit high frequency pulses to measure distance. These sound pulses are outwith the generalised hearing range for EPS and other protected species likely to be affected by underwater sound.
Sound velocity profiler (SVP)	The SVP continuously emits high frequency pulses as it is lowered towards the seafloor in order to measure the speed of sound within the water column. This technology also makes use of sonar to determine how quickly sound attenuates in the marine environment, which can aid in calibrating geophysical survey equipment. These devices emit high frequency pulses to measure sound velocity. These sound pulses are outwith the generalised hearing range for EPS and other protected species likely to be affected by underwater sound.
Acoustic Doppler Current Profiler (ADCP)	An ADCP is a hydro-acoustic current meter similar to a sonar, used to measure water current velocities over a depth range using the Doppler effect of sound waves scattered back from particles within the water column. Transducers on the ADCP transmit and receive sound signals in the form of high frequency pulses, and the data is then processed to calculate the Doppler shift, and thus the water velocity along the acoustic beams. ADCPs are generally deployed from a small vessel, using a davit arm, and placed on the seabed where it remains for one lunar cycle, transmitting and recording continuously. To aid location at the end of the lunar cycle, an acoustic beacon (which lies passively during the survey period) is activated when the vessel returns. An ROV or diver attaches a line and it is then recovered onto the vessel. These devices emit high frequency pulses to measure current velocity. These sound pulses are outwith the generalised hearing range for EPS and other protected species likely to be affected by underwater sound. Acoustic Wave and Current (AWAC) is a type of ADCP which measures wave and currents. Doppler Velocity Logger (DVL) is a type of ADCP which measures the speed and direction of ROVs etc. These ADCPs may be required for the survey and will operate in deep waters >1000 m. Most types of ADCPs operate at high frequency between 300kHz and 1200kHz and as such are outwith the generalised hearing range for EPS and other protected species likely affected by underwater noise.

System / Survey Equipment	Description
Obstacle avoidance sonar	High frequency pulses created by obstacle avoidance sonar systems produce sound waves which are used to identify small objects and hazards on the seabed. Higher frequency pulses provide higher resolution imaging. These devices emit high frequency pulses and have been scoped out of further assessment on the basis that the sound pulses they produce are outwith the generalised hearing range for EPS and other protected species likely to be affected by underwater sound.
Geotechnical Sampling	
Vibrocoring (with PCPT)	Geotechnical sampling will also be undertaken as part of the marine survey. This may include both vibrocoring operations and Piezocone Penetration Testing[1] (PCPT). Vibrocoring operations will be undertaken using a high power vibrocorer which will be deployed from both the offshore and nearshore vessels. The PCPT will be carried out from both the offshore and nearshore vessels using piezocones that will be pushed into the seabed to collect samples in order to allow determination of the geotechnical engineering properties of the sediment and delineation of the seabed stratigraphy. The vibrocoring equipment, including PCPT, does not have the potential to generate significant levels of sound. Therefore, this technology does not require any further consideration with respect to possible injury or disturbance to protected species and sites. The USBL system may be used to determine the sampling locations when undertaking vibrocoring and PCPT operations.
Benthic Habitat Analysis	
ROV survey / observations	An ROV is a tethered underwater mobile device. ROVs are commonly used for visual surveys of the seafloor. For underwater positioning a USBL system is used. The ROV is manoeuvrable by the use of thrusters. The ROV survey does not have the potential to generate significant levels of sound.
Drop-down video/ photography	Ground-truthing of acoustic data will be undertaken using drop-down video/photography (drop frame and/or ROV) and grab sampling techniques (see below). This survey technique does not interact with the seabed. It is required to provide detail on epifaunal species (animals living on the surface of the substrate), habitats and geological features. The survey methodology will follow the NatureScot Guidance Notice No. 45 – Subsea Cable and Oil and Gas Pipeline Proposals – Benthic Habitat and Species Survey Requirements and consultation will be undertaken with NatureScot and Marine Scotland to ensure sufficient sampling frequency.

[1] An *in situ* testing method used to determine the geotechnical engineering properties of soils and assessing subsurface stratigraphy, relative density, strength and equilibrium groundwater pressures.

System / Survey Equipment	Description
	Drop-down video/photography does not have the potential to generate significant levels of sound.
Benthic Sediment Sampling	Grab samples will be taken of the seabed to provide detail on the sediment itself and infauna (animals living within the substrate) which cannot be provided by the use of video and photography. Grab samples will not be collected on hard substrates and will be minimised at locations with sensitive habitats. As such, grab sampling will be preceded with video/camera drops. The survey methodology will follow the NatureScot Guidance Notice No. 45 – Subsea Cable and Oil and Gas Pipeline Proposals – Benthic Habitat and Species Survey Requirements and consultation will be undertaken with NatureScot and Marine Scotland to ensure sufficient sampling frequency. The benthic sediment sampling equipment does not generate potentially significant levels of sound. Therefore, this technology does not require any further consideration with respect to potential injury or disturbance of protected species. Any benthic sampling will be subject to a future Marine Licence Exemption application.
Landfall Area Investigations	
Landfall topographical survey	The intertidal part of the cable route will be inspected by an onshore survey team, using standard topographic survey equipment. This survey activity will include two surveyors carrying the equipment along the beach. The landfall topographic survey technique does not generate potentially significant levels of sound, nor does it interact with the seabed. Therefore, this technology does not require any further consideration with respect to potential sound-generated injury or disturbance of EPS or impacts to protected sites. While the landfall topographical survey will not generate significant levels of sound to generate injury or disturbance to EPS, there is potential for disturbance to semi-aquatic EPS (i.e., otters) from human presence at the landfall sites.
Hand augers and hand dug trial pits	Hand augers and hand dug trial pits may be required in the intertidal zone. This will not occur in areas of sensitive habitats. These techniques do not create significant levels of noise and therefore this activity does not require any further consideration with respect to potential noise generated injury or disturbance of EPS, or impacts to protected sites.

It is recognised that UXO could, as in many areas, be identified during survey operations. Should UXO be identified, SHEPD will consult with all relevant agencies prior to determining a course of action. No removal or remediation

activities would be progressed in advance of such consultation. SHEPD recognise the potential need for further assessment and licensing should UXO remediation be required.

2.2.4 Activity Schedule

The cable route survey activities in the Argyll marine region are scheduled to be undertaken sometime between 1st August 2023 and 31st July 2028; whilst this is a period of 1,827 days in total, survey activities will be for much shorter durations as detailed below.

In total, survey activities on all cable routes within the Argyll Marine Region are expected to take approximately 280 days which includes 187 days allowance for weather downtime, transit between sites and waiting on tides, with an additional 24 hours allowed for equipment calibrations for each survey mobilisation.

The duration in days for each survey along a specific cable corridor directly relates to the length of the cable. For instance, duration ranges between approximately 3.5 days for the Mull-Ulva and Seil-Easdale cable routes (each 0.2 km in length) to 47.2 for the Coll-Tiree cable route (15.5 km in length).

Please note, the duration of activities represents a worst-case scenario for each standalone cable route survey. Overall, for the purposes of this assessment it has been assumed that all cable routes within the Argyll Marine Region require surveys twice prior to 31st July 2028.

For all survey activities, no allowance for time has been included for the following categories as estimation of these is considered to be beyond the reasonable limits of the assessment. Nonetheless each category has the potential to impact on delivery of the survey scope and increase the overall timescale of the surveys:

- Third party activities (e.g., fishing, other users);
- Technical equipment issues;
- Environmental mitigation standby; and
- Force majeure.

3 EPS AND OTHER PROTECTED SPECIES RISK ASSESSMENT

3.1 Overview

The primary function of this EPS and Protected Sites and Species Risk Assessment is to identify the potential for injury and disturbance to EPS and other protected species from testing and calibration of geophysical survey equipment and from geophysical surveys across the cable routes within the Argyll marine region. This section of the risk assessment addresses potential impacts to protected species, including EPS, regardless of their inclusion as qualifying features of protected sites. An assessment of potential impacts to protected sites and their qualifying features is provided in Section 4 – Protected Sites Assessment.

A number of different survey activities will be employed as part of the survey works, each with varying risk to protected species. They include:

- Vessel activity;
- Survey equipment calibration testing; and
- Geophysical surveys of seabed.

An overview of survey activities and their potential impacts to protected species is provided in Table 3-1. As detailed in Section 2.2.4, the duration of activities represents a worst-case scenario for each standalone cable route survey. Overall, for the purposes of this assessment it has been assumed that all cable routes within the Argyll Marine Region require surveys twice prior to 31st July 2028.

Underwater sound emitted by survey vessels and the physical presence of the vessels during the survey period have the potential to cause injury or disturbance to EPS and other protected species.

While some survey techniques may introduce sound to the marine environment, other activities do not generate sufficient levels of sound to be considered as potential sources of sound-related injury or disturbance to protected species and have been screened out of the detailed assessment, as indicated in Table 3-1.

Table 3-1 Overview of Potential Impacts of Marine Survey Activities on EPS and Other Protected Species within the Argyll Marine Region

Activity / Equipment	Potential Impacts	Further information Required as Part of the EPS Risk Assessment?
Vessels and Vehicles		
Survey and post survey vessels Guard vessels RIB / Multicat / DSV	Propellers, engines, and propulsion activities form the primary sound sources of survey vessels. Vessel sound is generally continuous and comes in both narrowband and broadband emissions. Potential impacts on EPS and other protected species depend on the duration of the survey activities, location of the survey routes and species of cetacean potentially present in the area. Increased vessel activity additionally has the potential to cause injury from collisions. The risk of collision with an animal is influenced by the dimensions of the vessel and its speed.	No –The source levels associated with vessels are likely to be too low to result in injury, and the presence of three survey vessels in the Argyll region does not constitute a change from baseline conditions. It is acknowledged that vessels pose a collision risk to EPS and other protected species. While this does not constitute a change from baseline, all vessels will adhere to The Scottish Marine Wildlife Watching Code (SMWWC) (SNH, 2017) during operations, as detailed in Section 5.2.
USV	USVs are controlled and maneuvered using batteries which power propellers and thrusters. Sound generated by USVs is similar to other vessels (i.e., continuous and broadband) but reduced in power due to their smaller size.	No – the predominant sound source during USV deployment is the SBP, with the MBES forming a secondary sound source. Both of these survey technologies will mask the sounds generated by the USV and have thus been considered separately (see below).
AUV ROV ROTV	Potential impacts to EPS and other marine mammals include disturbance from sound emissions associated with movements underwater. However, these are anticipated to be limited in scale, given the small size of the submerged vehicles. Collision risk is considered an unlikely impact, given the high level of manoeuvrability and slow movement associated with AUVs, ROVs and ROTVs.	No – the predominant sound source during such activities is the USBL, and other geophysical survey sensors deployed on the vehicle, which is expected to mask any sound generated by the vehicle itself. Sound generated by geophysical survey devices has been considered separately (see below).

Activity / Equipment	Potential Impacts	Further information Required as Part of the EPS Risk Assessment?
UAV	Disturbance from UAVs may result from sound emissions or visual cues associated with UAV presence, such as its movement or shadow. Flight altitude appears to be the most important factor in determining the behavioural response of marine mammals, including EPS, to UAVs. However, environmental factors, including ambient sound levels and weather (i.e., sunniness), also play an important role in the likelihood of a disturbance event transpiring. UAVs may also cause disturbance to nesting or foraging seabirds and as such care should be taken when utilising this equipment to avoid sensitive locations and periods such as important winter foraging grounds, and bird nesting sites.	No –The sound source levels associated with the UAV are too low to result in injury (Christiansen *et al.*, 2016), and there remains the potential for a disturbance offence to EPS (Fettermann *et al.*, 2019; Ramos *et al.*, 2018). Dolphins have been observed exhibiting low overall responsiveness to UAVs, which tended to be when they were directly approached or followed by the UAV (Ramos *et al.*, 2018). Dolphin's responses involved investigational behaviour including side-roll and spin-and-orient. The duration of the response was short, and the animals seemed minimally impacted (Ramos *et al.*, 2018). Disturbance responses were observed when UAV's were flown at 10 m altitudes, whereas no significant disturbance was recorded at 25 m or higher (Fettermann *et al.*, 2019). However, UAV surveys will only be conducted at landfall and very nearshore locations, where marine mammals are unlikely to be present. Birds may be present at the landfall, however, and as such mitigations will be followed as set out in Section 5, to ensure nesting or foraging birds are not disturbed whilst utilising this equipment.
Geophysical Survey		
USBL positioning system	USBL systems involve the emission of impulsive sound from a hull-mounted transducer to a subsea transponder, thereby introducing sound into the marine environment. The potential impacts of this sound on cetaceans depends upon the abundance, distribution and sensitivity of the species, and the duration of the operations.	Yes – The pressure levels and frequencies at which the USBL emit are not of a level where there is a realistic injury risk but do have the potential to cause disturbance to marine mammals and other protected species.

Activity / Equipment	Potential Impacts	Further information Required as Part of the EPS Risk Assessment?
SSS	SSS equipment produces impulsive sound emissions through high frequency pulses used to image the seabed habitat. Potential impacts to EPS and other marine mammals depend upon the frequency, location, and duration of the pulses.	No – The SSS used for the proposed survey operations will operate at frequencies above 200 kHz. This is above the hearing range of all marine mammals and other protected species which may be present in the area (as detailed in Table 3-3. Hence no potential for injury or disturbance exists (NOAA, 2018).
MBES	High frequency sound pulses created by multi-beam echo sounder equipment generate sound waves which produce impulsive underwater sound. Depending on the frequency of the pulses, location and duration of the operations, and the species present, there could be potential impacts on cetaceans.	Yes – Although the MBES used for the majority of proposed survey operations will operate at frequencies between 200 400 kHz, which is above the hearing range of all marine mammals and other protected species which may be present in the area, there is the potential that the Kongsberg EM710 which operates between 70 – 100 kHz may be required for certain surveys. As this is within the hearing range of HF and VHF cetaceans (as detailed in Table 3-3) and could potentially cause disturbance or injury, this specific equipment has been screened in for the assessment. It should be noted that it is unlikely that this equipment will be used but cannot be ruled out. It will possess mammal protect feature, reduced power output, and the intensity level may be lowered by 10 or 20 dB as discussed in the mitigation section (Section 5).

Activity / Equipment	Potential Impacts	Further information Required as Part of the EPS Risk Assessment?
SBP	Sub-bottom profiling involves the vertical emission of sound pulses (impulsive sound) to characterise the layers of sediment comprising the seabed. Such activities introduce sound emissions into the marine environment. The potential impacts of this sound depend upon the type of profiler technology used, as well as the abundance, distribution and sensitivity of the species, and the duration of the operations. There are numerous SBP technologies that may be deployed during the survey operations including: pingers, chirpers, and boomers. Another SBP technology which may be employed during survey activities is a sparker. A sparker uses a spark across a pair of electrodes to create a gas bubble whose oscillations generate the sound.	**Yes** – Although source pressure levels emitted by this equipment are unlikely to pose a realistic injury risk to any marine mammal species, this equipment may be a source of disturbance to marine mammals or other protected species.
Subsea Altitude Meter	Subsea Altitude Meters, SVPs and ADCPs all rely on high frequency pulsed sounds to gather data on the marine environment. Subsea altimeters use sonar to identify the distance to the seafloor, while SVPs are used to measure the speed of sound within the water column to calibrate geophysical survey equipment with. Alternatively, ADCPs emit very high frequency doppler waves and use the backscatter of those sound waves to measure current speeds and directions within the water column.	**No** - the sound source frequencies fall outwith the hearing range of marine mammals. There is no potential for injury or disturbance to any marine mammal or other protected species from sound emitted by this equipment.
SVP		**No** - the sound source frequencies fall outwith the hearing range of marine mammals. There is no potential for injury or disturbance to any marine mammal or other protected species from sound emitted by this equipment.
ADCP		**No** - the sound source frequencies fall outwith the hearing range of marine mammals. There is no potential for injury or disturbance to any marine mammal or other protected species from sound emitted by this equipment.

Activity / Equipment	Potential Impacts	Further information Required as Part of the EPS Risk Assessment?
Obstacle Avoidance Sonar	High frequency pulses created by obstacle avoidance sonars produce high frequency sound waves which can be used to generate high-resolution images of the seabed. As such, there is potential for auditory damage to occur. Nevertheless, the high frequency emissions used by this technology causes sounds to attenuate very quickly and become rapidly lost to the marine environment.	No - the sound source frequencies fall outwith the hearing range of marine mammals. There is no potential for injury or disturbance to any marine mammal or other protected species from sound emitted by this equipment.

3.2 European Protected Species

3.2.1 Cetaceans

All cetacean species within UK waters are deemed 'species of community interest' under Annex IV of the Habitats directive and thus require strict protection as EPS. As EPS, cetaceans are fully protected throughout their range in Scottish waters under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended), while bottlenose dolphins and harbour porpoise are afforded additional protection under Annex II of the Habitats Directive, through which Special Areas of Conservation (SACs) are designated for those species.

Around 20 species of cetacean have been recorded off the west coast of Scotland, with eight being commonly observed (HWDT, 2018); harbour porpoise, minke whale *Balaenoptera acutorostrata*, common dolphin *Delphinus delphis*, bottlenose dolphin, Risso's dolphin *Grampus griseus*, white-beaked dolphin *Lagenorhynchus albirostris*, white-sided dolphin *Lagenorhynchus acutus* and killer whale *Orcinus orca* (HWDT, 2018). The following summarises those species regularly sighted within the vicinity of Argyll:

- Harbour porpoise are the most abundant cetacean species in UK waters and are generally observed in small groups of one to three individuals (Reid *et al.*, 2003). Harbour porpoise are commonly sighted on the west coast of Scotland, including within the Argyll marine region, year-round (Pollock *et al.*, 2000; HWDT, 2018). The distribution model prepared by Heinänen and Skov (2015) predicted persistent high summer densities of harbour porpoise during the summer months across the northwest of Scotland. There are also several expected 'hot spots' for this species on the northwest coast of Scotland, including the west coast of Mull and a preference for water depths between 50 and 150 m is expected (Booth *et al.*, 2013). The density of harbour porpoise within Block G of the of the SCANS III survey, within which the Argyll area resides, was approximately 0.336 animals/km^2, which is average in the context of the wider United Kingdom Continental Shelf (UKCS) region (Hammond *et al.*, 2021). It is predicted that harbour porpoise densities within the area can range between low to high, with highest densities in The Inner Hebrides and Minches SAC which was designated on the basis that it protects a high density (and habitat area) of this species (Carter *et al.*,, 2022, Lacey *et al.*, 2022; Hague *et al.*, 2020; Hammond *et al.*, 2021). Specifically, there are a number of areas in the Argyll marine region which are notable for having a high density of harbour porpoise, including the Sound of Jura, Sound of Mull, and the waters surrounding the Treshnish Isles (Booth *et al.*, 2013; HWDT, 2018). These areas are in close proximity to the cable routes landfalling in Mull, Coll, and Tiree.

- Minke whale are present on the west coast of Scotland between May and October and are most commonly sighted in the summer months (June – August) (Weir *et al.*, 2001). They feed mainly in shallower waters over the continental shelf and regularly appear around shelf banks and mounds, or near fronts where zooplankton and fish are concentrated at the surface (Reid *et al.*, 2003). They are also commonly seen in the strong currents around headlands and small islands, where they can come close to land, even entering estuaries, bays and inlets. The highest encounter rates for minke whale on the west coast of Scotland are east of the Outer Hebrides in the Minch and in the Sea of Hebrides, and high densities are observed between Mull and Coll (HWDT, 2018). Minke whale have been sighted across the entire extent of the Argyll marine region (Weir *et al.*, 2001). In particular, areas with higher density of minke whales occur in the north of the Argyll marine region, close to the cable routes connecting Mull, Tiree, and Coll (HWDT, 2018; Macleod *et al.*, 2004). The Sound of Jura is also known as an area where minke whale can commonly be sighted, with sighting densities then decreasing towards the south of the Argyll marine region (HWDT, 2018). Minke whale density in Block G of the SCANS-III survey is considered to be moderate to high in comparison to the rest of the UKCS, with an estimate of 0.027 animals / km^2 (Carter *et al.*,, 2022; Lacey *et al.*, 2022; Hammond *et al.*, 2021). This species shows a large seasonal variation with fewer sightings in the winter months, likely driven by variations in sea surface temperature and chlorophyll concentrations (Hague *et al.*, 2020).
- Bottlenose dolphin are present in Scottish waters year-round, with the highest encounter rates observed in coastal waters (Hague *et al.*, 2020), with sightings being less common in the southern areas of the west coast of Scotland (HWDT, 2018; Cheney *et al.*, 2013). Two distinct bottlenose dolphin populations reside on the west coast of Scotland, one found mostly around Skye, and one around Barra (Cheney *et al.*, 2013). Those bottlenose dolphins which form the Skye population are known to travel south towards the Argyll marine region (Cheney *et al.*, 2013). The waters surrounding Mull, Tiree, Coll, and Islay (where some of the cable routes are located) have the highest bottlenose dolphin encounter rates in the Argyll marine region (HWDT, 2018; Hammond *et al.*, 2021). Bottlenose dolphin density in Block G of the SCANS-III survey was estimated at 0.121 animals / km^2, which is considered to be high in comparison to the rest of the UKCS (Carter *et al.*,, 2022; Lacey *et al.*, 2022; Hammond *et al.*, 2021). Notably, Hammond *et al.*, (2021) estimate that the abundance of bottlenose dolphins in Block G, which corresponds to the Argyll area, is 1,824 individuals, several orders of magnitude higher than the biogeographic population estimate of 45 individuals for the Coastal west Scotland and Hebrides Management Unit (MU) (IAMMWG, 2022).
- Common dolphin are generally sighted in groups of up to 30 with the exception of summer months when 'super pods' of up to hundreds of individuals are observed (HWDT, 2018). They are seasonal visitors to Scotland with this species being most commonly sighted on the west coast of Scotland, predominantly between April and October, although some winter sightings do occur (Hague *et al.*, 2020; HWDT, 2018). Sightings along the west coast of Scotland have also increased in the last twenty years (HWDT, 2018). In the Argyll marine region, densities are fairly low compared to more northern areas of the west coast of Scotland (HWDT, 2018; Reid *et al.*, 2003). However, sightings are more frequent around Coll, Tiree, and Mull, and are highest between April and October (HWDT, 2018).
- Risso's dolphin are present in Scottish waters year-round but are in fairly low densities across the west of Scotland, including the Argyll marine region (HWDT, 2018; Reid *et al.*, 2003; Hague *et al.*, 2020). Sightings of Risso's dolphin are very regular around north-east Lewis and the North Minch, and this area has been designated as a NCMPA for the species. Although Risso's dolphin are present throughout the entire range of the region, the highest densities occur around the Mull, Coll, and Tiree (HWDT, 2018).
- Other species, such as killer whale, white-beaked dolphin and Atlantic white-sided dolphin are seen infrequently in varying numbers across the Argyll marine region (Hammond *et al.*, 2021; Reid *et al.*, 2003).

The distribution, density, and abundance of the eight most commonly occurring cetacean species around the Argyll marine region off the west coast of Scotland are described in Table 3-2.

It should be noted that the assessment detailed in Table 3-2 takes into consideration the overall cable corridors (approximately 2 km wide). In reality, only the cables within these specific corridors will be surveyed and therefore the overall area effected is likely to be smaller.

*Table 3-2 Population Parameters of Cetacean Species Potentially Present in the Argyll Marine Region**

Species Name	Estimated Density Across the Area (individuals/km^2) (Hammond et al., 2021)	Estimated Abundance within the Area (80 km^2)	MU / Biogeographical Population Estimate (IAMMWG, 2022)	Proportion of the MU Potentially Affected by Activities
Atlantic white-sided dolphin	*Insufficient data*	*Insufficient data*	12,293	*Insufficient data*
Bottlenose dolphin	0.1206	25.4466	1,299	0.1106
Common dolphin	*Insufficient data*	*Insufficient data*	57,417	*Insufficient data*
Harbour porpoise	0.336	70.896	24,305	0.2917
Minke whale	0.0271	5.718	10,288	0.0556
Risso's dolphin	*Insufficient data*	*Insufficient data*	8,687	*Insufficient data*
White-beaked dolphin	*Insufficient data*	*Insufficient data*	34,025	*Insufficient data*
Killer whale	*Insufficient data*	*Insufficient data*	*Insufficient data*	*Insufficient data*
** Density estimates are taken from SCANS-III survey Block G*				

Potential Impacts

Sound emissions constitute the greatest potential risk to cetaceans within the Argyll area. Sound has the potential to impact cetaceans and other marine species (see Section 1.4.3) in two ways:

- Injury – physiological damage to auditory or other internal organs; and
- Disturbance (temporary or continuous) – disruptions to behavioural patterns, including, but not limited to: migration, breathing, nursing, breeding, foraging, socialising and / or sheltering.

If a sound emission is composed of frequencies which lie outside the estimated auditory bandwidth for a given species, then the potential for auditory impact is considered to be very unlikely (NOAA, 2018). To understand the potential for acoustic-related impacts, the likely hearing sensitivities of different marine mammal hearing groups has been summarised in below in Table 3-3.

To determine the potential for sound impacts to cetaceans and pinnipeds, predicted emission levels are compared to available empirically estimated thresholds for injury and disturbance. Several threshold criteria and methods for determining how sound levels are perceived by marine mammals are available (e.g., the decibel hearing threshold (dBht) method and other hearing weighted and linear measures) and each has its own advantages and disadvantages. Marine Scotland (2020) guidance recommends using the injury and disturbance criteria proposed by Southall *et al.*, (2007), which is based on a combination of linear (un-weighted) peak Sound Pressure Levels (SPL) and weighted Sound Exposure Levels (SEL). Since the publication of this paper (Southall *et al.*, 2007), there has been mounting evidence of marine mammal auditory abilities in novel species and well-researched species alike (e.g., harbour porpoise) which has led to amendments to the auditory thresholds for injury (NMFS, 2018; Southall *et al.*, 2019). In accordance with recent regulator feedback, these amended hearing groups and thresholds for acoustic injury have been adopted herein; they are detailed in Table 3-3.

If a sound emission is composed of frequencies which lie outside the estimated auditory bandwidth for a given species, then disturbance is unlikely. However, sound sources which are sufficiently high can still cause physical damage to hearing and other organs, even when the frequencies lie outside an animal's auditory range. To understand the potential for acoustic-related impacts, the likely hearing sensitivities of different cetacean hearing groups has been summarised below in Table 3-3. Section 3.4 assesses the potential for injury to be incurred for each hearing group, given their estimated auditory bandwidth and the source frequencies of the technology to be deployed.

Table 3-3 Auditory Bandwidths Estimated for Cetaceans (Southall et al., 2019; NMFS, 2018)

Hearing Group	Estimated Auditory Bandwidth
Low-frequency cetaceans (LF): (e.g. baleen whales, such as humpback whales, minke whales, sei whales, etc.)	7 Hz to 35 kHz
High-frequency cetaceans (HF): (e.g. dolphins, toothed whales, beaked whales and bottlenose whales)	150 Hz to 160 kHz
Very high-frequency cetaceans (VHF): (e.g. marine mammal species such as harbour porpoises and other 'true' porpoises)	275 Hz to 160 kHz
Phocid carnivores in water (PW): (e.g. earless or 'true' seals, such as grey and harbour seals)	75 Hz to 100 kHz

3.2.2 Pinnipeds

Two pinniped (seal) species regularly occur in the Scottish offshore and coastal environment: grey seals *Halichoerus grypus* and harbour seals *Phoca vitulina*. Both grey and harbour seals are listed under Annex II of the EU Habitats Directive and are PMFs. Approximately 36% of the world's grey seals breed in the UK (of these, 81% breed at colonies in Scotland with the main concentrations in the Outer Hebrides and in Orkney). Approximately 32% of the world's harbour seals are found in the UK, however, this proportion has declined from approximately 40% in 2002. Harbour seals are widespread around the west coast of Scotland and throughout the Hebrides and Northern Isles (Special Committee on Seals (SCOS), 2021). Seal haul-outs are terrestrial sites designated for the protection of seals during vulnerable haul-out periods, such as breeding and pupping. The extent of this protection is limited to those seals on shore at the haul-out. The conservation regulations covering the protection of grey and harbour seals in UK waters include the Marine (Scotland) Act 2010 and the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

The pupping season of harbour seals is mid-June to July with moulting occurring in August. Grey seals also breed from October through to December and then moult until early April (SCOS, 2021). Similar to seabirds, seals are central-place foragers, utilising a terrestrial 'base' for important life history events (i.e., breeding, pupping, moulting, etc.) and to rest, and then head offshore on foraging trips before returning to land (Pollock, 2000). While both species are associated with shallower shelf waters, grey seals often make longer foraging trips to deeper waters than harbour seals.

According to the National Marine Plan interactive (NMPi) (2023), the estimated at-sea usage of harbour seals within the Argyll area is 0 – 1 per 25 km^2 (Figure 3-1) and the estimated at-sea usage of grey seals within the Argyll area is

50 – 100 per 25 km^2 (Figure 3-2). This shows that the mean at-sea usage of grey seals across the Argyll marine region is relatively low when compared to the wider Scottish waters (Russell *et al.*, 2017). However, there are hot spots located north of Islay, and around Coll and Tiree where mean at-sea usage ranges from 50-100 animals per 25 km^2 (Carter, 2022). The mean at-sea usage of harbour seals in the Argyll marine region is characteristic of the rest of West of Scotland and is relatively high compared to the wider Scottish waters. Some hotspots for harbour seals are located south of Islay and Jura, where mean at-sea usage ranges from 50-100 animals per 25 km^2 (Carter, 2022).

Figure 3-1 Estimated Number of Harbour Seal for "at-sea" Density (Carter et al., 2022)

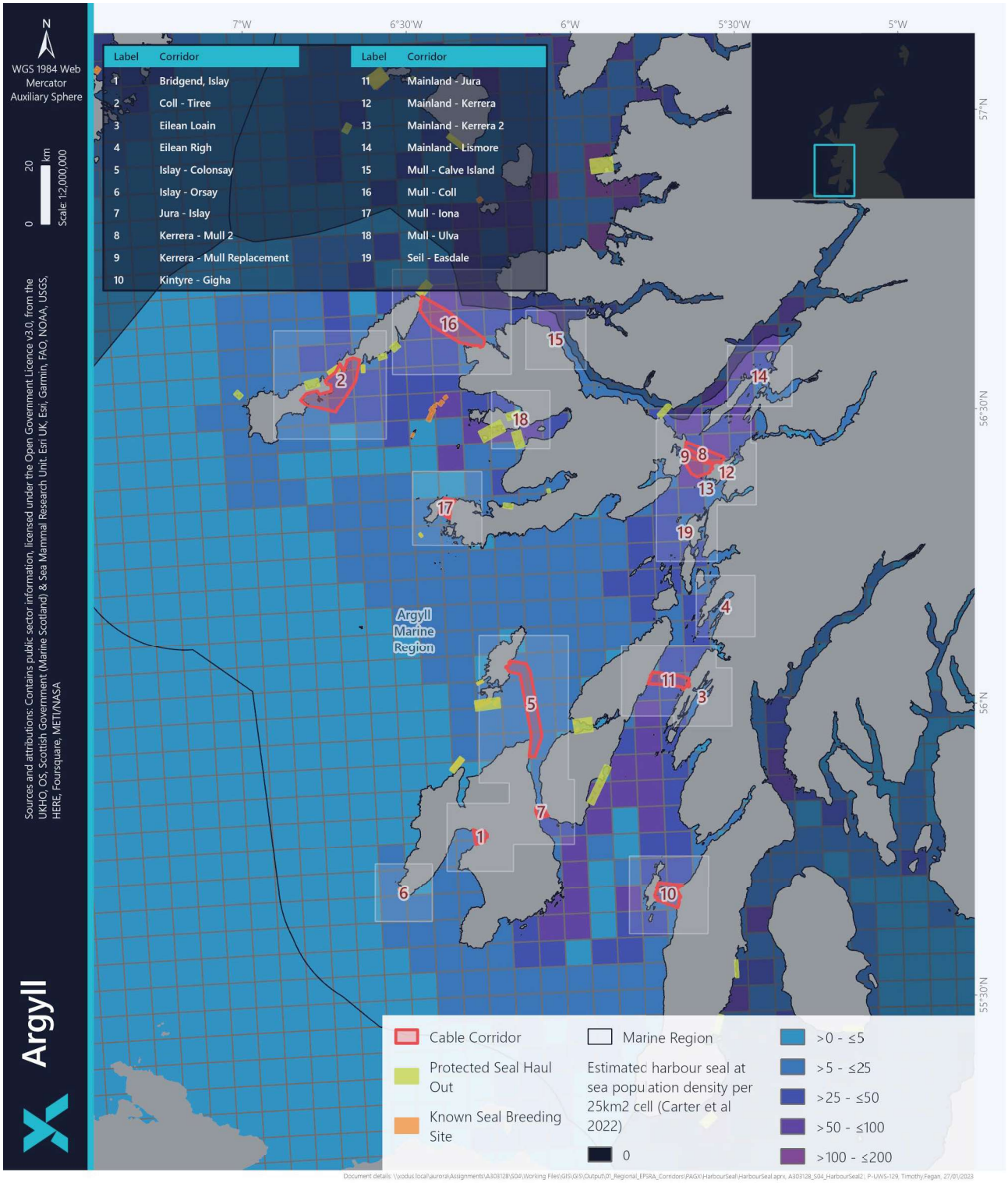
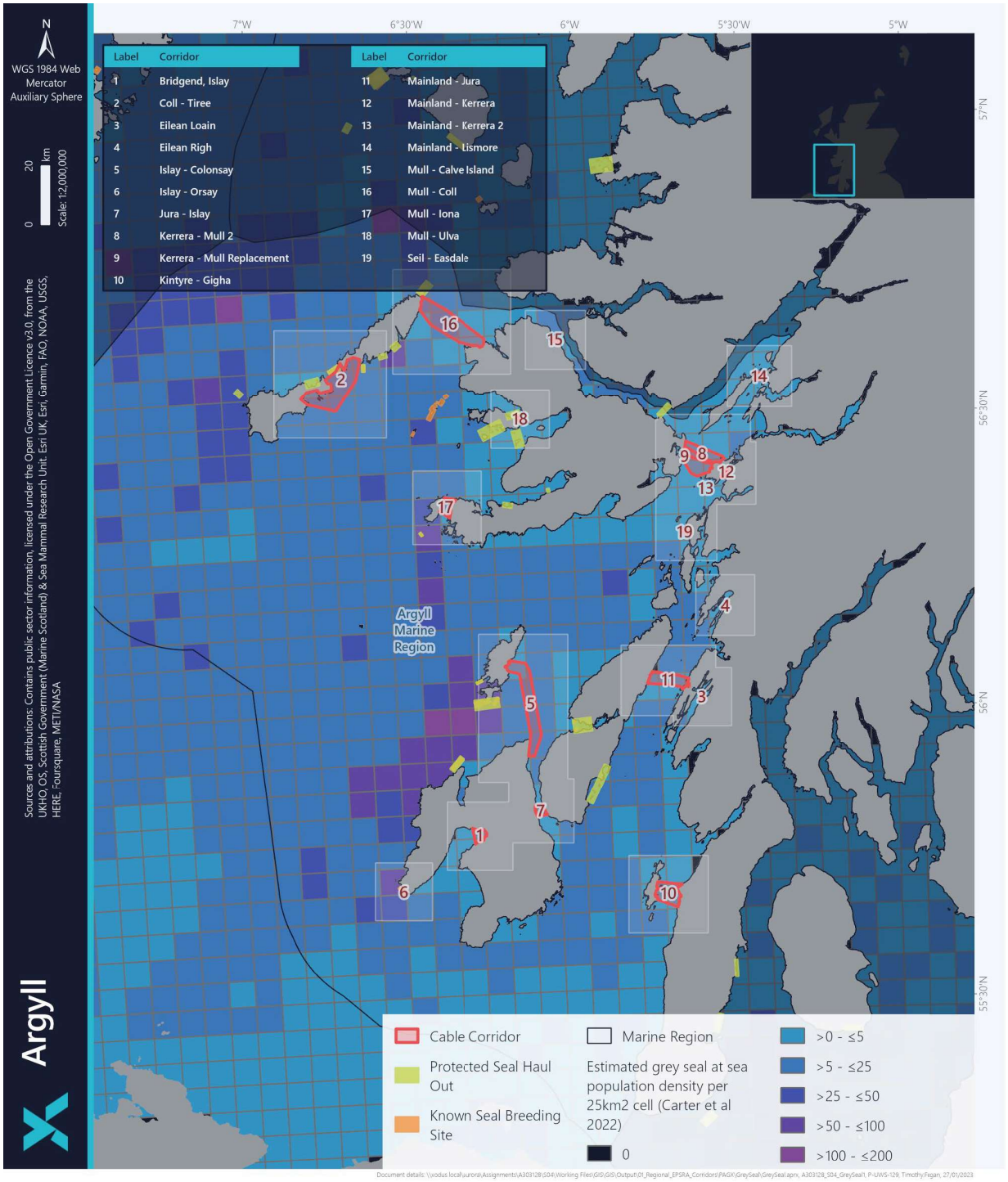


Figure 3-2 Estimated Number of Grey Seals for "at-sea" Density (Carter et al., 2022)



Potential Impacts

Potential impacts from the testing and calibration of equipment and geophysical surveys may arise from underwater sound generated during the survey activities and physical disturbance at haul-outs (i.e., from vessel or human presence), as outlined in Table 3-1. Seals are particularly susceptible to project-related impacts during their respective pupping and moulting seasons, when the residency of seals at haul-outs and in surrounding waters elevates the relative density of each species.

Underwater sound emissions have the potential to cause physical injury or disturbance to seals, particularly if they fall within their generalised hearing range of 50 Hz to 86 kHz (NMFS, 2018). However, contemporary data suggests that even with very intense sound emissions, such as those from pile driving activity, harbour seals are likely to return to the region of the sound source once the emissions have ceased (Russell *et al.*, 2016). Where this leads to an animal avoiding their main feeding and breeding grounds this can have longer term effects on the health and breeding ability of that animal.

The underwater sound emissions resulting from the survey activities will not result in the killing of seals, for which the two species are protected (see Section 1.5.3) and no further assessment of underwater sound in this respect is conducted. Furthermore, the only other protection for seals is against disturbance at haul-outs, which will not occur from underwater sound (since the emissions are, by definition, not airborne). On this basis and considering also the mitigation measures to be adopted for the project (Section 5), no further assessment of underwater sound is made for seals. As seals are specifically protected from disturbance at designated haul-outs, this has been considered in Section 4.

3.2.3 Otters

The Eurasian otter *Lutra lutra* are listed in Annex IV of the Habitats Directive as EPS. They are small, semi-aquatic mammals which inhabit riverine, brackish and coastal environments throughout the UK. Although land mammals, otters depend on both freshwater and marine environments for food. Their marine habitat comprises low, peat-covered coastlines with shallow, seaweed rich waters and a consistent freshwater supply (DECC, 2016).

The coastal areas in the Argyll marine area have a number of designated sites with good quality habitat for otters. These occur on the mainland coast, east of the Sound of Jura, and along the coasts which surround the Sound of Mull (NMPi, 2023).

Potential Impacts

Otters may be present at some of the landfalls of the cable routes during geophysical surveys. The otters may be disturbed by the presence of vessels but are not particularly sensitive to sound. Each cable route survey will only take place over a short period of time in the nearshore area adjacent to the landfalls (i.e., for a period much shorter than the overall survey period), and therefore any disturbance will be temporary. Therefore, no adverse impacts to otter are expected.

That said, as part of some activities (relating on onshore works) there may be a requirement to commission otter surveys in consultation with NatureScot and any further licensing requirements will be informed by the outcome of these surveys and subject to separate licencing at the relevant time. Fundamentally, as some level of temporary disturbance is possible, SHEPD will implement appropriate mitigation as outlined in Section 5.

3.3 Other Protected Species

3.3.1 Basking Sharks

Basking sharks are one of the only three species of shark which filter feed and are the second largest fish in the world (Sims, 2008). This species can be found throughout the offshore waters in the UK continental shelf (Sims, 2008) and are considered frequent visitors to the west coast of Scotland (HWDT, 2018; Witt *et al.*, 2012). They are widely distributed in cold and temperate waters and feed predominantly on plankton and zooplankton e.g., barnacles, copepods, fish eggs and deep-water oceanic shrimps by filtering large volumes of water through their wide-open mouth. They typically move very slowly (around 4 miles per hour). In the winter, they dive to great depths to get plankton while in the summer they are mostly near the surface, where the water is warmer.

Basking sharks were hunted in Scotland up to 1995. However, they are now protected in the UK waters principally under Schedule 5 of the Wildlife and Countryside Act 1981 and under the Nature Conservation (Scotland) Act 2004 and are classed as a Scottish PMF, as well as a species on the Oslo and Paris Convention (OSPAR) list of Threatened and Declining species. Due to their size, slow swimming speeds and preference for swimming in coastal waters during the summer months, basking sharks are considered to be at potential risk of collision with vessels associated with the cable route survey activities. Given that basking sharks are slow to mature and have a long gestation period, the species can be slow to recover if populations are rapidly depleted.

Basking sharks seasonally arrive in Scottish waters during spring and leave in autumn. They appear to aggregate in summer to breed, with peak sighting densities in the west coast of Scotland occurring in August (Witt *et al.*, 2012). Some of the high-density areas (> 3 sightings an hour) in the west coast of Scotland occur close to the cable routes in the Argyll marine region, around Mull, Tiree, and Coll (Witt *et al.*, 2012; Speedie *et al.*, 2009). In particular, the waters surrounding Mull and Coll were designated as 'hot spots' for basking shark sightings by Bloomfield and Solandt (2006) and Speedie *et al.*, (2009), respectively. Marine Scotland (2019) reports basking sharks to be present in the Argyll marine region at predicted densities of 0.00-0.10 animals/km^2.

Potential Impacts

The basking shark is an elasmobranch (sharks and rays) which is a group with generally low sensitivity to sound vibrations due to the fact they do not have a swim bladder. The hearing range of basking sharks is not known; however, five other elasmobranchs have been found to have a hearing range between 20 Hz to 1 kHz. However, this may or may not be transferable to basking sharks (Macleod *et al.*, 2004). As 20 Hz – 1 kHz only encompass a small proportion of the sound emitted during the proposed geophysical surveys, and considering the temporary nature of activities, sound disturbance is not expected to impact basking sharks. On this basis, the potential for sound emissions to impact upon basking sharks is screened out of further assessment.

Vessel collision also poses a threat to this slow-moving species. Collision risk increases with increasing vessel speed. As the survey vessels will be slow-moving, collision risk is generally low. Risk will be reduced further on the basis of mitigation measures that SHEPD introduce (Section 5).

3.3.2 Birds

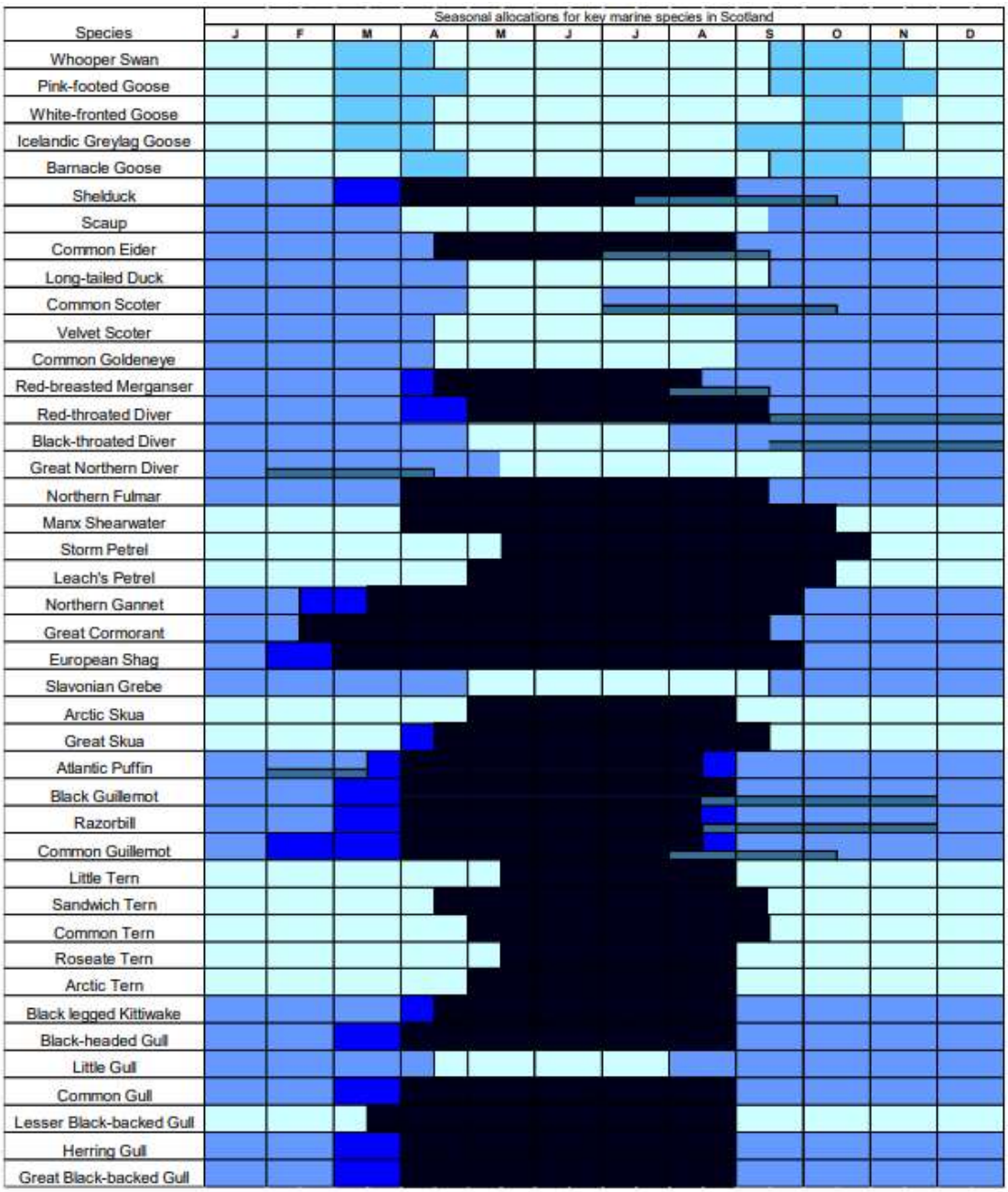
The primary legislation for the protection of birds is the WCA in combination with the Nature Conservation (Scotland) Act 2004. Under these acts, it is an offence to harm wild bird species, their eggs and nests. Additional protection is provided for certain bird species listed on Schedule 1 of the WCA, and it is an offence to disturb those species at their nest while it is in use.

The Scottish coastal and marine environment forms vital habitat to a variety of seabird species. The west coast of Scotland hosts some particularly important cliff and island habitat for nesting seabirds. While the marine environment

forms important habitat to seabirds year-round, birds are most vulnerable to human disturbance at sea during the moulting season when they become flightless and spend greater time on the water's surface (Pollock *et al.*, 2000). After the breeding season ends, moulting birds disperse from their coastal colonies to head to offshore waters. This at-sea period increases the likelihood of interactions with survey vessels and the potential collision risk. The important life-history periods for seabird species found in Scotland's waters are shown in Table 3-4.

In addition, there are several species of seabird, shorebird and waterfowl (e.g., ducks) for which Special Protection Areas (SPA) are designated under the requirements of the EU Birds Directive. These SPAs protect key areas for certain species at specific times of the year, e.g., breeding colonies or important foraging areas.

Table 3-4 Breeding Season and Nest Occupancy of Seabirds in Scottish Waters (NatureScot, 2020)



Breeding period (strongly associated with nest site)	
Breeding site attendance (not closely associated with nest site)	
Migration Period (birds in marine environment only on active passage)	
Flightless moult period	
Winter period (non-breeding)	
Not present in significant numbers (in Scottish marine areas)	

Potential Impacts

During the proposed activities, the physical presence of vessels may cause disturbance to birds in the Argyll area. Disturbance from increased vessel light also has the potential to disorientate fledgling birds, leading to collisions with vessels which may be fatal (Rodriguez *et al.*, 2015). The proposed project activities have the potential to take place at any point between the 1st August 2023 to the 31st July 2028, and therefore have the potential to coincide with the sensitive breeding and moulting periods for birds.

Despite the potential overlap between the proposed activities and sensitive periods for birds which utilise the marine environment, the short-term and temporary nature of the activities, and their limited spatial extent, preclude them from introducing significant impacts to birds in the area. Finally, survey vessels will be travelling slowly and in a predetermined pattern over the course of the surveys. Considering that the seabirds are protected by legislation from harm to individuals, eggs, and nests, no further assessment is conducted herein since these impacts will not occur from the proposed project activities.

Impacts on conservation sites with seabird features are considered below in Section 4, and mitigation to control impact on sites protected for seabirds is detailed in Section 5.

3.4 Underwater Sound Impact Assessment on Protected Species

3.4.1 Protected Species Assessment Criteria

Injury

The acoustic injury criteria as set out by NOAA (2018) are devised for two different types of sound:

- Impulsive: sounds which are short in duration (i.e., less than 1 second long) and temporary, occupy a broadband bandwidth, and have rapid rise and decay times with a high peak pressure level; and
- Non-impulsive: sounds which may occupy a broadband, narrowband or tonal bandwidth, can be brief, prolonged, continuous or intermittent in nature, and are not characterised by rapid rise and decay times or a high peak pressure level.

The geophysical surveys comprise acoustic equipment which emits multiple pulsed sound. The Scottish Government (2014) guidance recommends assessment of acoustic impacts based on thresholds for acoustic-related injury to marine mammals uses the thresholds identified by Southall *et al.* (2007). These injury thresholds have since been amended with contemporary acoustics data on marine mammal auditory abilities, as described in NOAA, 2018 and Southall *et al.* (2019). For this reason, the underwater sound impact assessment presented here considers contemporary sound impact thresholds as best practice (as advised by NatureScot).

The sound emitted from the equipment listed above will disperse through the water column, with sound pressure reducing as distance from the sound source increases, therefore marine mammals will be exposed to a lower source pressure further from the sound source. Therefore, for the survey equipment with potential to cause injury to marine mammals, the dispersion of sound through the water column has been to assess the appropriate mitigation zone in which the source pressure levels received by marine mammals are reduced below potentially injurious levels.

A dual-metric approach has been adopted which identifies the range of potential injury to marine mammals from both the sound pressure level (SPL_{rms}) and cumulative SEL for each equipment type identified to require consideration

for acoustic-related injury (see Table 3-1). The thresholds above which each marine mammal hearing group may experience sound-related injury are presented in Table 3-5. These thresholds are derived from measurements of marine mammal hearing using weighting functions which account for peak hearing abilities for each hearing group (NOAA, 2018).

Table 3-5 Criteria Considered in this Assessment for the Onset of Injury in Marine Mammals from Impulsive Sound (NOAA, 2018; Southall et al., 2019)

Marine Mammal Hearing Group	Impulsive Sound		Non-Impulsive Sound
	Peak pressure (dB re 1 µPa)	Cumulate SEL (dB re 1 µPa^{2}s)	Cumulate SEL (dB re 1 µPa^{2}s)
Low-frequency (LF) cetaceans	219	183	199
High-frequency (HF) cetaceans	230	185	198
Very high-frequency (VHF) cetaceans	202	155	173
Phocid pinnipeds (underwater)	218	185	201

Disturbance

Disturbance Regulations

There are two regulations which govern disturbance to EPS: Regulation 39(1) and Regulation 39(2). Regulation 39(1) from the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) defines disturbance for all EPS in UK waters and individuals which are vulnerable to disturbance due to biological or environmental circumstances. Regulation 39(2) (for which comparable offence is not found in offshore waters, or in English or Welsh inshore waters) goes beyond the disturbance guidelines provided in Regulation 39(1) by making it an offence to deliberately or recklessly disturb any cetacean in Scottish Territorial Waters (i.e., up to 12 NM) (Marine Scotland, 2020a). The definitions of disturbance are provided in Box 1 below.

Box 1 Disturbance Regulations in Scottish Territorial Waters

The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)

Regulation 39 (1) makes it an offence —

(a) deliberately or recklessly to capture, injure, or kill a wild animal of a European protected species;

(b) deliberately or recklessly –

(i) to harass a wild animal or group of wild animals of a European protected species;

(ii) to disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;

(iii) to disturb such an animal while it is rearing or otherwise caring for its young;

(iv) to obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place;

(v) to disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;

(vi) to disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; or

(vii) to disturb such an animal while it is migrating or hibernating.

Regulation 39(2) provides that it is an offence —

to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean).

To consider the possibility of a disturbance offence resulting from the proposed survey, it is necessary to consider the likelihood that survey activities would generate a non-trivial disturbance based on the sensitivity of the species present. Where there is a possibility of disturbing an individual animal, it is necessary to apply for a Marine EPS Licence to ensure that an offence is not committed. However, in issuing a Marine EPS Licence, Marine Scotland must consider whether the FCS of any species will be affected, is it a licensable activity and are there any satisfactory alternatives. Consequently, the impacts of proposed activities on the FCS of all protected species must be considered to satisfy both Regulation 39(1) and 39(2). This impact assessment below addresses the impacts of survey activities on the current conservation status of protected species within the area.

Acoustic Disturbance Criteria

Auditory thresholds for disturbance, as defined by NMFS (2014), coupled with behavioural response criteria detailed in Southall *et al*. (2019) have been used in this assessment of potential marine mammal disturbance from both non-impulsive and impulsive sound sources. These thresholds, which utilise the behavioural response severity scale detailed in Southall *et al.* (2019) for grading the strength of behavioural responses, are provided in Table 3-6.

Table 3-6 Disturbance Threshold Criteria for Impulsive Sounds Only (Southall et al., 2019)

Behavioural Effect	Threshold Criteria SPLrms
Potential strong behavioural reaction (6 or more on the severity scale)	160

3.4.2 Acoustic Impact Assessment

Sound Propagation Modelling Approach

Underwater sound propagation modelling has been undertaken to identify the potential range (i.e., the straight-line distance from the source) in which acoustic impacts to marine mammals could occur. The duel-metric modelling approach recommended by NOAA (2018) has been used to identify impacts from: (1) the SPL reported as root-mean-square (rms) pressure level (SPL_{rms}); and (2) the cumulative SEL. The SEL represents the total energy produced by a sound-generating activity standardised to a one-second interval. This enables comparison of the total energy attributed to different activities with different inter-pulse intervals. As described above, empirically-based weighting functions (NOAA, 2018; Southall *et al.*,2019) have been applied to the modelling outputs to account for peak hearing sensitivity for the respective marine mammal hearing groups.

The following assumptions have been applied to the models:

- Maximum SPL_{rms} has been used for all calculations;
- Maximum pulse length and minimum turn around has been used where provided;

- Where source frequencies occur across a range of frequencies, a flat one-third octave spectrum has been used;
- Where data is unavailable, the time between pulses has been calculated as 1.5 times the ping length;
- Mammals swim at seabed depths (this represents the worst-case);
- Vessels are moving at slow speeds; and
- Survey equipment used in the nearshore shallow water environment (i.e., <10 m) will likely operate at a very high frequency to provide better resolution and will have a lower SPL, and so does not constitute a worst case scenario.

It is important to note that the rms value associated with the SPL_{rms} depends upon the length of the integration window used. Using a longer duration integration window results in a lower rms than produced by a shorter integration window.

An acoustic phenomenon results from the elongation of the waveform with distance from the source due to a combination of dispersion and multiple reflections. Measurements presented by Breitzke *et al.* (2008) indicate elongation of the T90 window up to approximately 800 m at 1 km. This temporal "smearing" reduces the rms amplitude with distance by elongating the rms window, which has been included within the disturbance modelling scenarios. Since the auditory organs of most marine mammals integrate low frequency sounds over an acoustic window of around 200 ms (Madsen *et al.*, 2006 and references therein), this duration was used as a maximum integration window for the received SPL_{rms}.

The directivity characteristics of the sound sources are also an important factor affecting the received sound pressure levels from sound-generating activities. In geophysical surveys, source arrays are designed so that the majority of acoustic energy is directed downwards towards the ocean floor for data collection purposes. As such, the amount of energy emitted across the horizontal plane is significantly less (> 20 dB) than that emitted directly downwards. The physics of sound propagation dictates that the loss of pressure on the horizontal plane is more pronounced at higher frequencies than at lower frequencies. Directivity corrections can be applied to the model outputs, which provide broadband normalised amplitudes at varying angles of azimuth[1] and dip angle[2]. Directivity corrections have been applied to the modelling outputs under the assumption that the animal is directly in-line with the vessel (i.e., at the 0º azimuth).

Injury Impacts

For the proposed surveys, the expected frequency range for USBL, SSS and SBP operations overlaps with the hearing range of all cetacean hearing groups (Table 3-3). Potential injury to cetaceans (i.e., injury which results from a permanent threshold shift in hearing abilities) is limited to impulsive sound sources which exceed the injury thresholds defined in Table 3-5.

Modelling of ranges at which injury impacts are likely to result from deployment of survey equipment has been undertaken. Examples of survey equipment have been selected to exemplify the worst-case scenario for each survey technique, including the greatest SPLs across source frequencies meant to encapsulate the hearing abilities of all representative hearing groups. Impacts from sound sources which are strictly behavioural in nature (i.e., disturbance impacts) are covered in Section in the subsection below.

[1] The azimuth is taken as the angle of circumference around the boat which lies parallel to the surface of the water, progressing around the boat from port to starboard.

[2] The dip angle is taken as the angle under the boat, progressing from prow to stern.

Table 3-7 Sound Modelling Results for Injury Impacts from Impulsive Acoustic Sources (N/E = no exceedance of thresholds)

Activity	Example Equipment Modelled	Depth (m)[3]	Frequency (kHz)	SPLrms (dB re 1µPa)	Injury range (m)											
					Cumulative SEL (Static Mammals)				Cumulative SEL (Moving Mammals)				Peak SPL			
					VHF	HF	LF	PW	VHF	HF	LF	PW	VHF	HF	LF	PW
USBL	1000 Series Mini Beacon, Applied Acoustics Underwater Technology	100	24 - 33.5	200	104	98	73	86	104	56	36	44	24	6	11	11
		10	24 - 33.5	200	12	11	11	11	12	11	11	11	36	10	16	17
SBP/ SSS	EdgeTech 2000 series, combined side scan and sonar and sub-bottom profiling system[4]	100	0.5 – 12	230	40	38	38	38	38	38	38	38	61	3	8	9
		10	0.5 - 12	230	5	4	4	4	5	4	4	4	73	4	13	15
SBP	Innomar SES 2000 sub-bottom profiler, 4 kHz	100	4	235	9	5	9	9	9	5	6	5	255	28	68	73
		10	4	235	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	445	98	178	188
	Innomar SES 2000 sub-bottom profiler, 100 kHz	100	100	235	28	17	17	17	19	17	16	17	30	12	17	18
		10	100	235	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	29	11	16	17

[3] Depth refers to depth below the survey activity, which has been assumed to be hull-mounted or towed at the surface. These depths have been identified as representative of the nearshore and offshore depths in which surveys are likely to occur across the project area, based on available bathymetry data.

[4] For modelling purposes, the specifications of the 2000-CSS have been used.

All survey technologies emitting impulsive sound that have been modelled have the potential to cause injury to EPS and other marine mammals (Table 3-5; Table 3-7). As such, survey activities associated with the project may be potentially injurious to EPS species without appropriate mitigations.

Across modelling scenarios and metrics, the injury ranges were generally highest for the VHF hearing group (Table 3-7), which is represented by harbour porpoise in UK waters. Conversely, HF cetaceans seemed to constitute the hearing group with the lowest potential impact ranges for the SPL metric, while LF cetaceans had the lowest impact ranges for the cumulative SEL metric, when comparing between activity types (Table 3-7).

High frequency sounds attenuate more quickly than lower frequency sounds such that an animal would need to be much closer to the sound source for acoustic injury to occur. For this reason, injury ranges were of the order of metres to tens of metres for the SBP operating at 100 kHz. The deployment of a hull-mounted USBL in 100 m depths elevated the potential range of impact to a maximum of 104 m (cumulative SEL) for VHFs. The source is deployed from a moving vessel travelling at more than 2ms^{-1} (i.e., 4 knots) and, in some cases is being towed at depth (e.g., a USBL may be mounted on a towed device within a few metres of the seabed).

The majority of injury ranges were slightly reduced when considering animal movement during cumulative SEL estimation. Swim speeds of the species most likely to be observed in the area have been shown to be several ms^{-1} (e.g., cruising minke whale swim speed is 3.25 ms^{-1} and harbour porpoise may swim up to 4.3 ms^{-1}) (Blix and Folkow, 1995; Otani *et al.*, 2000). Further, SNH (2016a) has provided standard values for mean swimming speeds of various marine mammal species likely to occur in the project area, including harbour porpoise (1.4 ms^{-1}; Westgate *et al.*, 1995); harbour seal / grey seal (1.8 ms^{-1}; Thompson, 2015); and minke whale (2.1 ms^{-1}; Williams, 2009). To offer a representative model of the predicted sound exposure ranges of marine mammals moving away from the sound source, a conservative mean swim speed of 1.5 ms^{-1} has been used in the calculations. Considering that the surveys themselves will take place while the vessel is moving, the cumulative SELs of all equipment types are expected to be even lower than predicted, on the premise that animals are likely to move away from the mobile sound source, opposite to the direction of vessel travel.

It should also be noted that the modelling scenarios are meant to define the worst-case injury ranges associated with the deployment of the project's survey equipment. The *in situ* deployment of the sound-generating survey equipment will most frequently occur in waters of intermediate depths (i.e., somewhere between 10-100 m). Moreover, the frequency ranges depicted constitute the lowest and highest reasonably practicable settings for the survey activities modelled, meaning that the spread of sound in the marine environment is also likely to fall somewhere between the modelled extremes. The injury ranges anticipated to result from equipment use are thus likely to be less than those defined by the model outputs, thereby reducing the impact ranges associated with the low frequency survey equipment presented in this assessment are likely to be conservative estimates.

Available mitigation measures specifically designed for geophysical surveys (JNCC, 2017) have been incorporated into mitigation measures described in Section 5.2 below. These measures include deployment of a Marine Mammal Observer (MMO) to monitor for the presence of cetaceans within a 500 m mitigation zone prior to the commencement of, and during, any SBP surveys (JNCC, 2017).

In consideration of the relevant mitigation measures, none of the modelled scenarios indicate any injury events are likely to exceed the 500 m mitigation zone. As EPS and other marine mammal species would need to occur and remain within 500 m of the moving vessel or vehicular platforms from which the survey equipment will be deployed, injury to EPS from survey activities is highly unlikely once these mitigations are applied. For these reasons, the survey activities are not anticipated to impair the ability of an animal to survive or reproduce or result in any significant impacts on the FCS of any EPS.

Disturbance Impacts

In addition to physical injury, sound emissions have the potential to affect the behaviour of cetaceans in the vicinity of the sound source. Significant or strong disturbance (see Table 3-6; Southall *et al.*, 2007) may occur when an animal

is at risk of a sustained or chronic disruption of behaviour or habitat use which could result in population-level effects. An assessment of potential disturbance impacts from impulsive and non-impulsive sound is provided in the Sections below. The outputs of the sound modelling assessment against the disturbance thresholds are provided in Table 3-8.

Table 3-8 Sound Modelling Results for Disturbance Impacts from Impulsive Acoustic Sources

Activity	Example Equipment Modelled	Depth (m)	Frequency (kHz)	SPLrms (dB re 1µPa)	Range of Behavioural Change (m)
USBL	1000 Series Mini Beacon, Applied Acoustics Underwater Technology	100	24 - 33.5	200	182
		10	24 - 33.5	200	207
Combined SBP/SSS	EdgeTech 2000 series, combined side scan and sonar and sub-bottom profiling system[5]	100	0.5 - 12	230	3,250
		10	0.5 - 12	230	2,750
SBP	Innomar SES 2000 sub-bottom profiler, 4 kHz	100	4	235	4,220
		10	4	235	3,120
	Innomar SES 2000 sub-bottom profiler, 100 kHz	100	100	235	125
		10	100	235	120

Three types of survey activities have the potential to result in behavioural disturbance in EPS (i.e., a disturbance offence) as described above. These activities are: USBL, combined SBP/SSS and SBP (Table 3-8). The potential for a disturbance offence to result from these types of technology varies between activity type, though, the predicted disturbance range is much greater for the low frequency sound sources which travel farther within the marine environment. The sounds emitted by the combined SBP/SSS and the SBP survey have the potential to generate disturbance impacts on the order of several km, whilst those emitted by the USBL are of the order of hundreds of metres (Table 3-8).

The number of individuals which may experience disturbance from the worst-case scenario for each activity type has been calculated and are presented in Table 3-9 below, based on the population parameters supplied in Table 3-2.

[5] *For modelling purposes, the specifications of the 2000-CSS have been used.*

In these calculations, the impact range serves as a radius with which to calculate the total area of coverage for a potential disturbance event associated with each survey activity.

Table 3-9 Number of Cetacean Individuals and Proportion of the Management Unit (MU) which may Experience a Disturbance Offence from Impulsive Survey Activities, Based on Known Population parameters of the Most Frequently Occurring Species

Species	Number of Individuals which may Incur a Strong Disturbance			Maximum Proportion of the MU Potentially Affected by Project Activities
	USBL (0.13 km² area)	Combined SBP/SSS (33 km² area)	SBP – 4 kHz[6] (56 km² area)	
Harbour porpoise	< 0.1	11.1	18.8	< 0.1%
Minke whale	< 0.1	0.9	1.5	< 0.1%
Bottlenose dolphin	< 0.1	4.0	6.8	15.1%

The source levels associated with the example survey equipment have the potential to elicit a strong behavioural response in EPS which could be classed as a disturbance offence as defined under Regulations 39(1) or 39(2) of the Habitats Regulations. However, for the relevant biogeographical Management Units (MU) for harbour porpoise and minke whale, which both regularly occur in the area, this will not incur significant impacts. For these species, less than 0.1% of the biogeographic population will be impacted by sound-related disturbance (Table 3-2). According to the density estimates provided by Hammond *et al.*, (2021), and the biogeographical population estimates for the Coastal west Scotland and Hebrides MU provided by IAMMWG (2022), 15.1% of the biogeographic population of bottlenose dolphins could be impacted by sound related disturbance. However, this percentage is likely to be artificially high, caused by the large discrepancy between the abundance estimates in Hammond *et al.*, (2021) and IAMMWG (2022). The estimated abundance of bottlenose dolphins in Block G, which corresponds to the project area, is 1,299 individuals (see Table 3-2), and this is several orders of magnitude higher than the biogeographic population estimate of 45 individuals for the Coastal west Scotland and Hebrides MU (IAMMWG, 2022). Therefore, the density estimate provided by Hammond *et al.*, (2021) for the region most likely over-estimates the percentage of the biogeographical population impacted by sound disturbance. In reality, it is likely to be much lower than this estimate, and the sound related disturbance is not thought to incur any adverse impacts on the biogeographic population of bottlenose dolphins.

As the survey vessel will not be stationary during these activities, animals within a particular area will not be exposed to extended periods of underwater sound. Rather, individuals would have to follow the moving equipment to be subjected to lasting or prolonged periods of sound which may have detrimental impacts to either the individual or the population (i.e., a significant disturbance).

The programme of geophysical surveys will take place *ad hoc*, with the use of survey technologies and vessels being intermittent therein. There will be periods of inactivity during weather downtime and during geotechnical data collection. Given the transient and short-term nature of the survey and vessel activities, it is highly unlikely that any disturbance offences from use of combined SSS/SBP or SBP would negatively impact upon the FCS of any of the cetacean species which may be present in the survey area. This is on the basis that the modelled level of disturbance is unlikely to affect the ability of any individual animal to survive or reproduce and will not have significant population-

[6] The Innomar SES 2000 sub-bottom profiler at an operational frequency of 4 kHz has been taken as a worst case.

level impacts to any EPS (Table 3-9). Regardless, it is possible that a small number of animals may experience some level of disturbance for the short period that they encounter the proposed survey activities. As such, an EPS Licence is expected to be required for the SBP-related survey activities within 12 nautical miles (as per Regulation 39(2)).

Qualitative Assessment: Kongsberg EM710 MBES

No modelling of the Kongsberg EM710 MBES equipment has been carried out. This equipment operates within a frequency range of 70-100 kHz with sound pressure levels in the range of 225- 231 dB re 1 µPa at 1 metre. Given that that these frequencies fall within the hearing range of HF and VHF cetaceans, this specific equipment has the potential to cause injury and disturbance to these cetaceans. The maximum intensity is encountered in a thin wedge extending below the ship with an angular coverage of about 140°. Due to the Marine Mammal Protection Mode feature of the equipment, the intensity level may be lowered by 10 or 20 dB by the operator. The EM710 may also be set in a mode to begin pinging with a flexible soft-start as a possible means of inducing marine mammals to leave the area of high intensity sound.

Injury Impacts

When comparing the specifications of this equipment to those modelled, as a worst case, without the implementation of the protection mode, the equipment would most likely result in injury ranges similar to those modelled for the SBP at 100 kHz, given the equipment characteristics. As higher frequency sounds attenuate more quickly than lower frequency sounds such that an animal would need to be much closer to the sound source for it to cause injury. For this reason, injury ranges were of the order of metres to tens of metres for the SBP operating at 100 kHz and it is considered that injury ranges would be similar with the use of the unmitigated use of the EM710 MBES equipment.

For the mitigated system, whereby, the intensity is lowered by up to 20 dB and soft start is implemented and given the higher frequencies of the equipment and the swath angled nature of the device, it is highly unlikely that injury would occur. This is particularly relevant when considering that the downward angle of the device which effectively would require a cetacean to be directly beneath the equipment in order to induce injury, given the soft-start mitigation this is highly unlikely to occur.

Additional mitigation specifically designed for geophysical surveys (JNCC, 2017) have been incorporated into mitigation measures described in Section 5.2 below. These measures include deployment of an MMO to monitor for the presence of cetaceans within a 500 m mitigation zone prior to the commencement of, and during, any SBP surveys (JNCC, 2017).

In consideration of the relevant mitigation measures, none of the modelled scenarios indicate any injury events are likely to exceed the 500 m mitigation zone. For this reason, the MBES survey activities using the Kongsberg EM710 are not anticipated to impair the ability of an animal to survive or reproduce or result in any significant impacts on the FCS of any individual EPS or EPS population.

Disturbance Impacts

As discussed above, the unmitigated system most similarly compares to the SBP modelled at 100 kHz frequency. The potential for a disturbance offence is much greater for the low frequency noise sources which travel farther within the marine environment. As such, the range of sounds emitted by the USBL and higher frequency (i.e. 100 kHz) SBP are on the order of a couple hundred metres, which is less than equipment operating at lower frequencies (Table 3-8). Therefore, the unmitigated system would likely result in similar disturbance ranges to that of the SBP (100 kHz) equipment, which shows disturbance in the range of 125 m in offshore locations, resulting in potential disturbance to a maximum of 13.1 individual animals (harbour porpoise) and resulting in all cases to <0.1 % of the biogeographical MUs exhibiting disturbance, resulting in negligible impacts from disturbance.

The mitigated system, as described above, would further reduce disturbance to cetaceans, ensuring no significant impacts on the FCS of any individual EPS or EPS population would occur. The mitigation for this equipment is further discussed in Section 5.

Nearshore Activities

The taxa which are most likely to be impacted by nearshore activities and at landing points are seals and otters. The potential impact to these species is disturbance from vessel presence and survey activities. Geophysical survey activities within the intertidal zone have the potential to disturb protected species with varying consequences.

- *Seals* - although they occupy the marine environment for the majority of the year, grey and harbour seals utilise the coastal environment during their most sensitive life-history periods; breeding, pupping and moulting. They form breeding colonies and haul-outs for these purposes along rocky, often remote coastlines around the UK, though sometimes colonies may extend onto sandbanks and up cliffs (Nordstrom, 2006). Disturbance at these important terrestrial habitats through vessel presence has the potential to cause acute distress, which may lead to individuals vacating the site and returning to water. This intentional or reckless disturbance at a haul-out site constitutes an offence under the Marine (Scotland) Act 2010. At pupping sites, this behavioural response to stressors has the potential to impact pup survival, as it can disrupt nursing and lead to energetic deficits in pre-weaned pups (NMFS, 2018).

  As detailed in Section 4.1, the landfall sites of some cable routes are located within, or immediately adjacent to known seal (harbour and grey seal) pupping sites and haul-outs. Activities within the intertidal area will be constrained to the immediate area of landfall. As detailed in Section 4.2.1, nearshore and intertidal survey works of cable landfalls within or in the immediate vicinity of designated seal haul outs and breeding sites will be scheduled (except in case of emergency) to avoid the breeding and moulting seasons of the relevant seal species. This, together with, the adoption of best practice mitigation measures designed to minimise impacts to marine mammals including seals, are set out in Section 5. On the basis of this mitigation, there will be no significant disturbance of seals at their haul-outs.

- *Otters* – these species are particularly sensitive to anthropogenic changes to their habitats, as their coastal habitat use is highly dependent on the inclusion of freshwater features (Roos *et al.*, 2015). As such, the location of their holts (or dens) is restricted, and anthropogenic changes to their habitat may have severe repercussions, including localised extinctions. As detailed in Section 4.1, there are some cable routes which have landfalls within or in the immediate vicinity of habitat designated for its importance to otters. As detailed in Section 5, SHEPD will implement pre-works otter surveys in these areas or provide an otter ecologist to advise survey personnel during shore based intertidal surveys of cable landfalls within or immediately adjacent to designated otter habitat. This will enable sensitive otter features to be identified and avoided, hence ensuring the proposed activities do not result in the destruction of, damage to, or obstruction of access to an otter holt, or other structure or place it uses for shelter or protection. Additionally, the temporary and short-term nature of any potential activities in the intertidal zone preclude significant impacts to the population from which any otters found within the project areas will belong. As such, impacts on otters are expected to be extremely limited, will not impair an otter's ability to survive, breed or reproduce, or rear, or otherwise care for its young, and there will be no impact on the FCS of otters in the region.

  Additional mitigation measures for avoiding potential impacts to otters during vessel based works, which will be implemented as a matter of best practice, are presented in Section 5. Considering the extremely limited nature of the potential effects on otters anticipated to result from the proposed survey activities, it is concluded that an EPS licence will not be required for otters.

3.5 Protected Species Conclusion

3.5.1 Impact to EPS

There will be no injurious impacts to cetaceans or otters as a result of project activities and no requirement to apply for an EPS Licence in that respect, once the proposed mitigation measures are applied (Section 5). However, there is potential for disturbance to cetaceans, and SHEPD will therefore apply for an EPS Licence with respect to disturbance to these. However, this disturbance is expected to be limited to one or a few individuals of the local population and will therefore not result in any adverse impact to the FCS of any cetacean species.

It is recognised that the risk of disturbance to otters cannot be ruled out. However, the extremely limited nature of this effect will not constitute an offence under the Habitats Regulations, and hence an EPS licence for otters will not be required. The mitigations listed in Section 5 will further minimise any potential disturbance impacts to EPS.

3.5.2 Impact to Basking Sharks

The potential to impact basking sharks is considered very low and will be reduced further through the implementation of the mitigation measures outlined in Section 5.3. However, as disturbance to basking sharks remains a possibility, an application for a Basking Shark Licence under the Wildlife and Countryside Act 1981 (as amended) will be submitted.

3.5.3 Impact to Seabirds

Several seabird species have the potential to be disturbed by the physical presence of vessels during the geophysical survey activities and UAVs used in the intertidal and nearshore areas. However, given the temporary and relatively short-term nature of proposed activities, the potential impacts on protected seabirds will not result in killing of individuals or disturbance of eggs and nests, particularly with the implementation of the mitigation measures outlined in Section 5.5, and are therefore not considered to be significant with respect to the Wildlife and Countryside Act (as amended).

3.5.4 Impact to Seals

Project activities will not result in the catching or killing of seals, and thus the protection provided to the two species by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) will not be breached. Furthermore, the short-term and localised nature of the proposed activities, the fact that the majority activities will occur outside of the important breeding and moulting areas, and that a number of mitigation strategies will also be followed to further reduce any potential impact to seals, all mean that harbour and grey seals making use of protected haul-outs will not be significantly disturbed. As such, the protection given by Section 117 or the Marine (Scotland) Act 2010, and the Protection of Seals (Designation of Haul-Out Sites) (Scotland) 2014 will also not be breached.

3.5.5 Final Conclusion

Overall, the proposed geophysical survey operations constitute work of overriding public need while presenting a trivial and temporary disturbance to a few individual animals in a limited area once the risk of injury has been mitigated.

4 PROTECTED SITES ASSESSMENT

4.1 Selection Criteria for Assessment of Protected Sites

Over and above potential impacts on protected species, the potential for the proposed cable surveys to impact protected sites (including designated seal haul-outs) needs to be considered. For each of the cable routes the following criteria has been used to select those designated sites where potential impacts need to be assessed:

- SACs and NC MPAs (including proposed and candidate sites) with cetaceans as qualifying features within 50 km of the proposed geophysical surveys;
- SACs (including proposed and candidate sites) with harbour seal interests within 50 km of the proposed survey area and breeding grey seal within 20 km of the proposed survey area;
- Designated seal haul-outs or grey seal breeding sites that overlap with or located within 500 m of the proposed survey area;
- SACs and NC MPAs (including proposed and candidate sites) with otter interests that overlap with or located within 500 m of the proposed survey area;
- SPAs and NC MPAs (including proposed and candidate sites) with birds as qualifying features that overlap with or are located within 2 km of the proposed survey area; or
- SACs and NC MPAs (including proposed and candidate sites) with seabed / benthic protected features that overlap with the proposed survey area.

The designated sites located in the vicinity of the cable routes which have the potential to be impacted by cable survey activities subject to the selection criteria above are outlined in Table 4-1 and shown in Figure 4-1.

For each designated site that has the potential to be impacted by the surveys, mitigation measures have been considered based upon site-specific protected features and these are also included within Table 4-1. Details of the mitigation measures are provided in Section 5.

It should be noted that some of the mitigation measures included in Section 5 may not be listed in Table 4-1 if they are not related to protecting designated features of identified sites. However, all mitigation measures in Section 5 will be applied to all activities, regardless of proximity to a protected site.

Table 4-1 Protected Sites in the Vicinity of the Proposed Cable Survey Corridors

Cable Name	Designated Site Potentially Affected	Survey Corridor Overlaps with Protected site or is within Site Selection Criteria Distance to Protected Site	Distance from Nearest Part of Survey Corridor to Protected Site (km)	Features of Designated Site Most Likely to be Affected	Activity	Duration of Activities within Site Selection Criteria Distance to Protected Site (days)	Proposed Mitigation Measures	Potential for Likely Significant Effect
Mainland – Kerrera (1)	Loch Sunart to the Sound of Jura NC MPA	The designated site overlaps with the cable corridor.	0	Common skate (*Dipturus batis*) Quaternary of Scotland	Geotechnical survey and benthic grab sampling.	1.4	N/A	No
	Sea of the Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	33.9	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	8.3	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Mainland – Kerrera (2)	Loch Sunart to the Sound of Jura NC MPA	The designated site overlaps with the cable corridor.	0	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.	1.8	N/A	No
	Sea of the Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	33.1	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agua Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	8.6	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Mainland – Lismore	Sea of the Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	40.8	Basking shark Minke whale	Vessel presence, geophysical and video surveys	1.8	M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agua Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	0.5	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	2.2	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Eilean Loain	Loch Sween NC MPA	The designated site overlaps with the cable corridor.	0	Burrowed Mud Maerl beds Native oysters Sublittoral mud and mixed sediment communities	Geotechnical survey and benthic grab sampling.	1.2	N/A	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	40.8	Basking shark Minke whale Burrowed mud Maerl beds	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	2.8	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No

Cable Name	Designated Site Potentially Affected	Survey Corridor Overlaps with Protected site or is within Site Selection Criteria Distance to Protected Site	Distance from Nearest Part of Survey Corridor to Protected Site (km)	Features of Designated Site Most Likely to be Affected	Activity	Duration of Activities within Site Selection Criteria Distance to Protected Site (days)	Proposed Mitigation Measures	Potential for Likely Significant Effect
	South-East Islay Skerries SAC	The designated site is within 50 km of the cable corridor.	44.4	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Taynish and Knapdale Woods SAC	This designated site overlaps with the cable corridor.	0	[R Marsh fritillary butterfly (*Eurodryas aurinia*)	Vessel presence, geophysical and video surveys. Shore based landfall surveys.		M10, M11, M12	No
Lochaline - Mull	Loch Sunart to the Sound of Jura NC MPA	This designated site overlaps with the cable corridor.	0	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.	1.6	N/A	No
	Loch Creran NC MPA	The designated site is within 50 km of the cable corridor.	22.0	Reefs	Geotechnical survey and benthic grab sampling.		N/A	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	22.8	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
Mainland – Jura	Loch Sunart to the Sound of Jura NC MPA	This designated site overlaps with the cable corridor.	0	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.	5.3	N/A	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	31.5	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	South-East Islay Skerries SAC	The designated site is within 50 km of the cable corridor.	42.1	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Tayvallich Juniper and Coast SAC	The designated site is within 500 m of the cable corridor.	0.1	[R *Juniperus communis* formations on heaths or calcareous grasslands Marsh fritillary butterfly	Vessel presence, geophysical and video surveys. Shore based landfall surveys.		M10, M11, M12	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	48.1	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Seil - Easdale	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	21.0	Harbour seal	Vessel presence, geophysical and video surveys	1.2	M1, M2, M3, M4, M6, M7	No
	Loch Sunart to the Sound of Jura MPA	This designated site overlaps with the cable corridor.	0	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.		N/A	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No

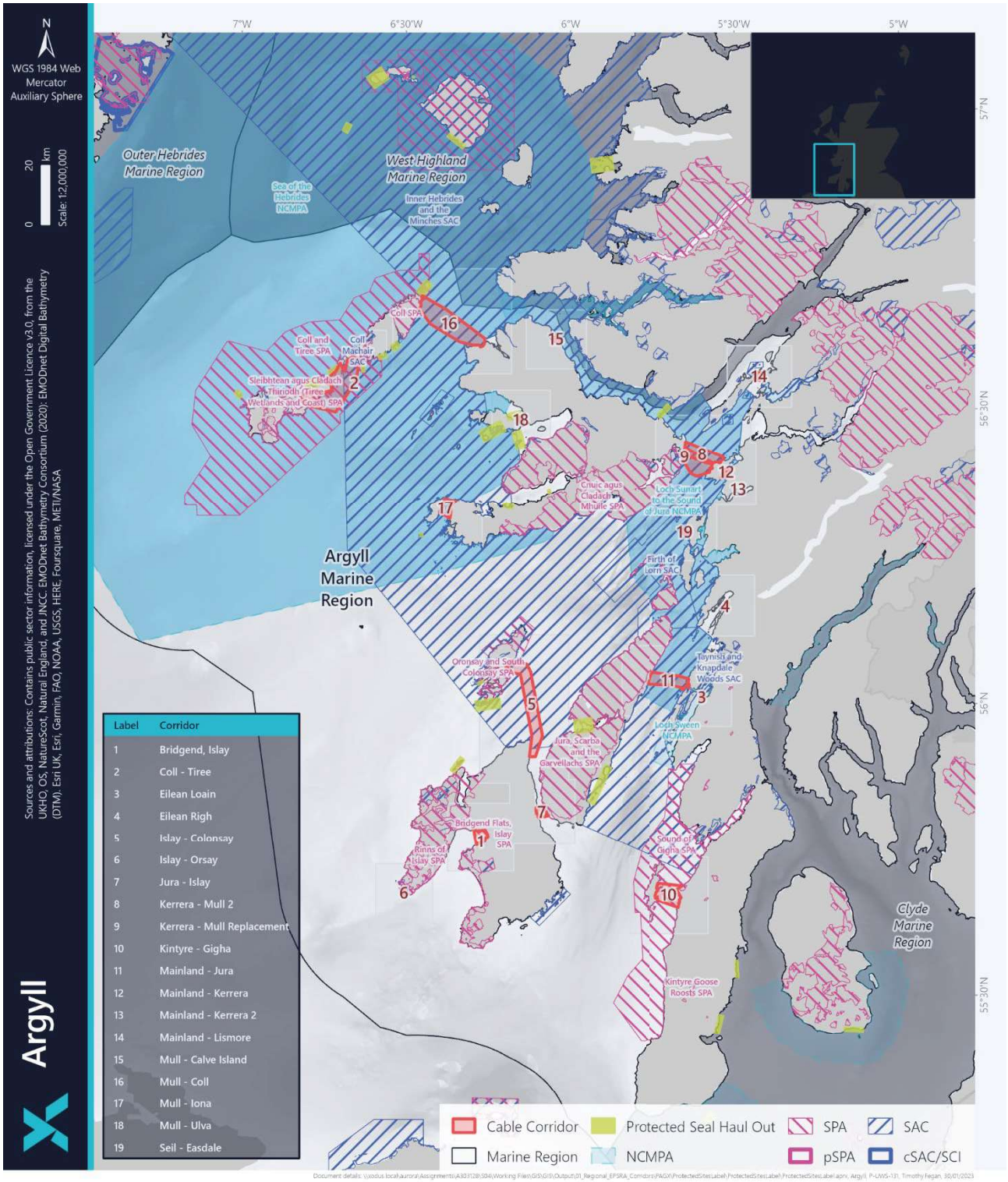
Cable Name	Designated Site Potentially Affected	Survey Corridor Overlaps with Protected site or is within Site Selection Criteria Distance to Protected Site	Distance from Nearest Part of Survey Corridor to Protected Site (km)	Features of Designated Site Most Likely to be Affected	Activity	Duration of Activities within Site Selection Criteria Distance to Protected Site (days)	Proposed Mitigation Measures	Potential for Likely Significant Effect
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable route.	24.4	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Firth of Lorn SAC	The designated site overlaps with the cable route.	0	Reefs	Geotechnical survey and benthic grab sampling.		N/A	No
Eilean Righ	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	33.3	Harbour seal	Vessel presence, geophysical and video surveys	1.6	M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	3.2	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	34.5	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
Kerrera – Mull (2)	Loch Sunart to the Sound of Jura MPA	This designated site overlaps with the cable corridor.	0	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.	4.1	N/A	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	5.3	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	33.1	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
Kerrera – Mull (replacement)	Loch Sunart to the Sound of Jura MPA	This designated site overlaps with the cable corridor.	0	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.	5.4	N/A	No
	Inner Hebrides and the Minches SAC.	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	27.8	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	6.4	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Kintyre – Gigha	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	2.6	Harbour porpoise	Vessel presence, geophysical and video surveys	3.5	M1, M2, M3, M4, M6, M7	No
	Sound of Gigha SPA	The designated site overlaps with the cable corridor.	0	Common eider *Somateria mollissima* Great northern diver *Gavia immer* Red-breasted merganser *Mergus serrator*	Vessel presence, geophysical and video surveys		M13, M14, M16	No

Cable Name	Designated Site Potentially Affected	Survey Corridor Overlaps with Protected site or is within Site Selection Criteria Distance to Protected Site	Distance from Nearest Part of Survey Corridor to Protected Site (km)	Features of Designated Site Most Likely to be Affected	Activity	Duration of Activities within Site Selection Criteria Distance to Protected Site (days)	Proposed Mitigation Measures	Potential for Likely Significant Effect
	South-East Islay Skerries SAC	The designated site is within 50 km of the cable corridor.	16.3	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Coll – Tiree	Gunna Haul Out	The designated site overlaps with the cable corridor.	0	Harbour seal Grey seal	Vessel presence, geophysical and video surveys Shore based landfall surveys,	15.7	M1, M2, M4, M5, M7	No
	Soa (Coll) Haul Out	The designated site is within 500 m of the cable corridor.	0.4	Harbour seal Grey seal	Vessel presence, geophysical and video surveys Shore based landfall surveys,		M1, M2, M4, M5, M7	No
	Sea of Hebrides NC MPA	The designated site overlaps the cable corridor.	0	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Treshnish Isles SAC	The designated site is within 20 km of the cable corridor.	13.7	Reefs Grey seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Coll and Tiree SPA	The designated site overlaps with the cable corridor.	0	Common eider Great Northern diver	Vessel presence, geophysical and video surveys		M13, M14, M16	No
	Sleibhtean agus Cladach Thiriodh (Tiree Wetlands and Coast) SPA	The designated site overlaps with the cable corridor.	0	Greenland Barnacle goose *Branta leucopsis* Greenland White-fronted Goose *Anser albifrons flavirostris* Dunlin *Calidris alpine schinzii* Oystercatcher *Haematopus ostralegus* Redshank *Tringa tetanus* Ringed plover *Charadrius hiaticula* Turnstone *Arenaria interpres*	Vessel presence, geophysical and video surveys		M13, M14, M15, M16	No
Islay – Colonsay	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys	13.3	M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	19.8	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	South-East Islay Skerries SAC	The designated site is within 50 km of the cable corridor.	25.7	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	North Colonsay and Western Cliffs SPA	The designated site is within 2 km of the cable corridor.	0.6	Chough *Pyrrhocorax pyrrhocorax* Guillemot *Uria aalge* Kittiwake *Rissa tridactyla*	Vessel presence, geophysical and video surveys		M13, M14, M15, M16	No

Cable Name	Designated Site Potentially Affected	Survey Corridor Overlaps with Protected site or is within Site Selection Criteria Distance to Protected Site	Distance from Nearest Part of Survey Corridor to Protected Site (km)	Features of Designated Site Most Likely to be Affected	Activity	Duration of Activities within Site Selection Criteria Distance to Protected Site (days)	Proposed Mitigation Measures	Potential for Likely Significant Effect
Islay – Orsay	Skerries and Causeway SAC	The designated site is within 50 km of the cable corridor.	43.1	Sandbanks which are slightly covered by sea water all the time Reefs Submerged or partially submerged sea caves Harbour porpoise	Vessel presence, geophysical and video surveys	1.2	M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	33.6	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	South-East Islay Skerries SAC	The designated site is within 50 km of the cable corridor.	24.1	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Eilean Mhic Coinnich Haul Out	The designated site overlaps with the cable corridor.	0	Harbour seal Grey seal	Vessel presence, geophysical and video surveys Shore based landfall surveys,		M1, M2, M4, M5, M7	No
Jura – Islay	South-East Islay Skerries SAC	The designated site is within 50 km of the cable corridor.	14.2	Harbour seal	Vessel presence, geophysical and video surveys	3.0	M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	6.6	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	47.3	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
Mull – Calve Island	Inner Hebrides and the Minches SAC	The designated site is within 50km of the cable corridor.	0.16	Harbour porpoise	Vessel presence, geophysical and video surveys	11.3	M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	6.1	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	29.6	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Loch Sunart to the Sound of Jura MPA	This designated site is within 500 m of the cable corridor.	0.1	Common skate Quaternary of Scotland	Geotechnical survey and benthic grab sampling.		N/A	No
Mull – Coll	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	42.5	Harbour seal	Vessel presence, geophysical and video surveys	15.4	M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Sea of Hebrides NC MPA	The designated site overlaps with the cable route.	0	Basking shark Minke whale	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7, M8, M9	No

Cable Name	Designated Site Potentially Affected	Survey Corridor Overlaps with Protected site or is within Site Selection Criteria Distance to Protected Site	Distance from Nearest Part of Survey Corridor to Protected Site (km)	Features of Designated Site Most Likely to be Affected	Activity	Duration of Activities within Site Selection Criteria Distance to Protected Site (days)	Proposed Mitigation Measures	Potential for Likely Significant Effect
	Treshnish Isles SAC	This designated site is within 20km of the cable corridor.	9.4	Reefs Grey seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Coll and Tiree SPA	The designated site is within 2 km of the cable corridor.	0.1	Common eider Great Northern diver	Vessel presence, geophysical and video surveys		M13, M14, M15, M16	No
	Cairns of Coll Haul Out	The designated site overlaps with the cable corridor.	0	Harbour seal Grey seal	Vessel presence, geophysical and video surveys. Shore based landfall surveys.		M1, M2, M4, M5, M7	No
Mull – Ulva	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	2.2	Basking shark Minke whale	Vessel presence, geophysical and video surveys	1.2	M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	33.1	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	1.7	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Treshnish Isles SAC	This designated site is within 20 km of the cable corridor.	12.6	Reefs Grey seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Laggan Bay (Mull) Haul Out	This designated site overlaps with the cable corridor.	0	Harbour seal Grey seal	Vessel presence, geophysical and video surveys Shore based landfall surveys.		M1, M2, M4, M5, M7	No
Mull – Iona	Sea of Hebrides NC MPA	The designated site overlaps with the cable corridor.	0	Basking shark Minke whale	Vessel presence, geophysical and video surveys	2.6	M1, M2, M3, M4, M6, M7, M8, M9	No
	Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable corridor.	48.6	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Inner Hebrides and the Minches SAC	The designated site overlaps with the cable corridor.	0	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	Treshnish Isles SAC	The designated site is within 20 km of the cable corridor.	13.6	Reefs Grey seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
Bridgend Islay	Sea of Hebrides NC MPA	The designated site is within 50 km of the cable corridor.	48.9	Basking shark Minke whale	Vessel presence, geophysical and video surveys	2.5	M1, M2, M3, M4, M6, M7, M8, M9	No
	Inner Hebrides and the Minches SAC	The designated site is within 50 km of the cable corridor.	16.52	Harbour porpoise	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No
	South-East Islay Skerries SAC	The designated site is located within 50 km of the cable corridor.	16.3	Harbour seal	Vessel presence, geophysical and video surveys		M1, M2, M3, M4, M6, M7	No

Figure 4-1 Argyll Protected Sites



4.2 Conclusion of Protected Site Assessment

A summary is presented in the following subsections of the potential impacts to designated sites which will be further reduced though implementation of the specific species protection measures outlined in Section 5.

4.2.1 Potential Impact on SACs with Seals as a Feature and Seal Haul-Out Sites

There are 12 cable routes which are located within 50 km of the Eileanan agus Sgeiran Lios mor SAC (JNCC, 2023a), and 7 cable routes located within 50 km of the South – East Islay Skerries SAC (JNCC, 2023b). Both sites are designated for harbour seal. There are also 4 cable routes located within 20 km of the Treshnish Isles SAC (JNCC, 2023c) which is designated for grey seal.

Five of the cable corridors in the Argyll marine region are located within 500 m of known seal haul-out sites. These five cable corridors are within the criteria for seal haul-out sites for Gunna, Sao (Coll), Eilean Mhic Coinnich, Cairns of Coll and Laggan Bay (Mull) seal haul-out sites.

As discussed in Section 3.2.2, harbour seals and grey seals are most sensitive to impact during the pupping and moulting season. The pupping season for grey seal in the west coast of Scotland is generally September through to October, and moulting occurs thereafter during November and December. For harbour seal, the pupping season is June to July and moulting season occurs thereafter in August. The proposed activities, which include calibration tests and geophysical surveys will be carried out between 1st August 2023 – 31st July 2028 and could coincide with the sensitive periods for harbour seal and grey seal.

Due to the short duration of the proposed activities close or within the sites, it is considered that offshore vessel presence and survey operations will have no adverse impacts on either seal species while at sea, with a maximum duration of 15.7 days for the Coll-Tiree cable corridor (excluding standby allowances). It is considered that no adverse impact is expected on harbour seals during these activities, particularly with adherence to the mitigation strategies which will also be followed to further reduce any potential impact on seals, as provided in Section 5.

However, as detailed above, seals are inherently more susceptible to disturbance while ashore, particularly during the breeding and moult periods. The presence of vessels very close to shore, or shore-based survey works in the intertidal zone may result in seals flushing (rapidly returning to sea) if such activities are conducted in close proximity to a haul-out site. During the breeding season, this may lead to pup abandonment or crushing by adults. If disturbance of a haul-out occurs during the moult, seals returning to the sea will be subjected to thermoregulatory stress as their fur is not in suitable condition. As such it is recognised that disturbance of seal haul-outs by nearshore or intertidal survey works may result in a reduction of fitness of seals at an individual or local population level, particularly if the disturbance occurs regularly and over multiple seasons.

Therefore, where cable landfalls are located within a designated seal haul-out, breeding site, or SAC designated for seals; SHEPD will apply mitigation measure M5 as discussed further in Section 5.2.5. This will reduce the risk of the proposed works resulting in disturbance and flushing of seals during their most sensitive periods, thus ensuring that the proposed cable surveys do not adversely affect the conservation objectives of the SACs or result in an offence under Section 117 of the Marine (Scotland) Act 2010.

These measures are detailed in Section 5, together with a number of best practice mitigation strategies will also be followed to further reduce any potential impact on seals.

4.2.2 Potential Impact on SACs and MPAs with Highly Mobile Megafauna (i.e., Cetaceans and Basking shark) as a Feature

All of the Argyll marine region cable routes are located within 50 km of the Inner Hebrides and the Minches SAC, which is designated for harbour porpoise (JNCC, 2023d). This includes ten cable routes which overlap with this site. In addition, all of the Argyll marine region cable routes, with the exception of the Kintyre – Gigha cable route, are located within 50 km of the Sea of Hebrides NC MPA (SNH, 2019), a site designated for basking sharks and minke whale. There is a maximum duration of 15.7 days for surveys along the Coll-Tiree cable corridor (excluding standby allowances) which transects the Sea of Hebrides NC MPA designated for minke whale and basking shark.

As stated in Section 3.5, there will be no injurious impacts to cetaceans from the activities, and the potential to impact basking sharks is considered to be very low. Although the Argyll marine region cable routes are within 50 km of, and overlap with, several SACs with highly mobile megafauna species as designated features, due to the relatively short, temporal aspect of each cable survey, as well as the mitigation measures outlined in Section 5, no adverse impact upon the conservation status of the designated sites is expected.

A full assessment of the potential impacts on cetaceans and basking sharks from the cable inspection and survey activity is provided in Section 3.

4.2.3 Potential Impact on SACs and MPAs with Benthic Features

There are 7 cable routes that overlap with the Loch Sunart to the Sound of Jura NC MPA, a site designated for common skate, and quaternary geology of Scotland. There is also one cable route which overlaps with Loch Sween NC MPA, a designated site for burrowed mud, maerl beds, native oysters, and sublittoral mud and mixed sediment communities, and one cable route which overlaps with the Firth of Lorn SAC, a designated site for reefs.

The project activities that have the potential to interact with the seabed, and benthic features include benthic sediment sampling and vibrocoring (with PCPT). Given the relatively small volume of sediment which will be extracted during the sampling activity, and the video inspection preceding sediment sampling, any impacts on sensitive habitats or geological features will be avoided. Moreover, only a relatively small area will be impacted during benthic grab sampling, vibrocoring and PCPT activities. Consequently, the survey activities are not likely to have a significant effect on the integrity of any of the designated sites with benthic features that are located in the vicinity of the cable routes.

4.2.4 Potential Impact on SACs with Otters as a Feature

There are 2 cable routes which overlap with, or are within 500 m of, a SAC which is designated for otters. This includes the Eilean Loain cable route which overlaps with the Taynish and Knapdale Woods SAC (JNCC, 2023e) and the Mainland – Jura cable route which is within 500 m of the Tayvallich Juniper and Coast SAC (JNCC, 2023f). It is noted that otters are not the primary reason for the designation of any of these sites.

Otters may be disturbed by the presence of vessels but are not as sensitive to sound as cetaceans for example. Due to the short period of time in the nearshore area adjacent to landfalls, compared to the overall survey period, disturbance will be temporary; therefore, no adverse impacts to otters are expected as a result of the vessel-based operations. Furthermore, as detailed in Section 3.4.2, the proposed mitigation measures will ensure that the shore based intertidal survey works will not result in the disturbance of or damage to otter holts or other sensitive otter features. As a result, no adverse significant effects are expected on the integrity of the SACs designated for otters that are located within 500 m of the cable survey corridors.

4.2.5 Potential Impact on SPAs

Sound of Gigha SPA

The Sound of Gigha SPA is located in the southern edge of the Argyll marine region, extending west from the mainland of Scotland to surround Gigha. Due to the diversity of environmental conditions in the region, the area of the Sound of Gigha SPA consists of a diverse range of habitats. As a result, this SPA has a rich marine life which forms a high-quality feeding habitat for diving birds (Scottish Government, 2020a;b).

The Sound of Gigha SPA qualifies as a SPA because it has a population of great northern diver (an Annex I species of Directive (79/409/EEC)) that is 20.2% of the GB population. As a result, it is the second most important site for great northern divers in Scotland. The Sound of Gigha SPA is also a nationally important site for common eider and red-breasted merganser (Scottish Government, 2020a).

Great northern diver and red-breasted merganser winter at the Sound of Gigha SPA and common eider are present year-round. These three species forage at sea (Scottish Government, 2020a).

The Kintyre – Gigha cable route overlaps with the Sound of Gigha SPA. As for all cable routes in the Argyll marine region, the proposed activities in the vicinity of these SPAs could involve testing and calibration of equipment, and geophysical and video surveys.

One survey cable corridor overlaps the Sound of Gigha SPA which is the Kintyre – Gigha. Survey activities on this cable corridor are likely to take up to a maximum of 3.5 days (excluding standby allowances), however, the duration spent at the landfall will be much shorter.

Although the survey activities could disturb birds whilst foraging, the possibility of collisions will be minimised by the slow movement of vessels. Moreover, the temporary and localised nature of the survey activities, and the mitigation measures outlined in Section 5, will minimise any potential disturbances to the bird species for which this SPA is designated. Therefore, no significant effect to the populations of these bird species is expected and therefore no adverse impact is expected on the conservation status of the Sound of Gigha SPA.

Coll and Tiree SPA

The Coll and Tiree SPA is located in the north of the Argyll marine region and extends over an area of 794.8 km^2 around Coll and Tiree. The shallow waters close to the coast of these two islands form a high-quality feeding habitat for diving birds (Marine Scotland, 2020b).

This SPA qualifies as a SPA under the Directive (79/409/EEC), because it has a population of great northern diver that is 18% of the GB population (Marine Scotland, 2020b). This is the fourth largest population of great northern diver in Scotland. Additionally, this designated site has the sixth largest population of common eider in Scotland. Great northern diver winter in this SPA and common eider are present year-round (Marine Scotland, 2020b).

Two cable routes are located within 2 km of the Coll and Tiree SPA. This includes the Coll – Tiree cable route which overlaps with it and the Mull – Coll cable route which is located within 2 km. The proposed survey activities could take up to 15.7 days and 15.4 days (excluding standby allowances), respectively, per cable corridor. Nonetheless, the duration spent at the landfall where the cable corridors are at closest proximity to this SPA will be much shorter.

Although there is the potential for survey activities to disturb the bird species that this SPA is designated for, the slow movement of the vessels limits any potential for collisions, and the presence of survey vessels will not impede foraging. Furthermore, significant effects on the bird species populations, or the habitats that they depend on are considered unlikely given the short duration, temporary nature, and localised spatial extent of the survey activities. The mitigation measures outlined in Section 5 will also minimise any disturbances to these bird species, and as a result, no adverse impact is expected on the conservation status of the Coll and Tiree SPA or its qualifying interests.

Sleibhtean agus cladach Thiriodh (Tiree Wetlands and Coast) SPA

The Sleibhtean agus Cladach Thiriodh (Tiree Wetlands and Coast) SPA is located on Tiree. It consists of a rich array of coastal habitat types including heathlands and machair (Scottish Government, 2018).

This SPA qualifies as a SPA because it has populations of three Annex I species of Directive (79/409/EEC) which are > 1% of the GB population. This includes populations of Greenland white fronted goose, Greenland barnacle goose, and dunlin which are 10, 5 and 1% of the GB population, respectively. It also has populations of ringed plover, turnstone, redshank, redshank and oystercatcher (non-annex I migratory species) which are of European importance (Scottish Government, 2018).

The Coll – Tiree cable route overlaps with the Sleibhtean agus cladach Thiriodh SPA. These activities could potentially disturb the qualifying bird species of the Sleibhtean agus cladach Thiriodh SPA. The proposed survey activities could take up to 15.7 days (excluding standby allowances). Nonetheless, the duration spent at the landfall where the cable corridor is at closest proximity to this SPA will be much shorter.

However, only a small area of the SPA would be impacted, and consequently, any disturbances at important habitats for wintering or breeding birds in this SPA should be minimal. Moreover, the slow movement of the vessels will limit any possibilities of collision during feeding activities, and the temporary and localised nature of the survey activities mean that no significant impact on the populations of the qualifying bird species, or the habitats that they depend on, is expected. Therefore, no adverse impact is predicted for the conservation status of the Sleibhtean agus cladach Thiriodh (Tiree Wetlands and Coast) SPA.

North Colonsay and Western Cliffs SPA

The North Colonsay and Western Cliffs SPA is located on Colonsay. It consists of a range of coastal habitat types including sand dunes, rocky cliffs, and wet health lands (JNCC, 2022).

This SPA qualifies as a SPA because it has a population of chough (an Annex I species of Directive (79/409/EEC) that is 2.6% of the GB population (JNCC, 2022). It also is home to a large population of seabirds (20,000 individuals) and is an important site for kittiwake and common guillemot (JNCC, 2022).

Guillemot and kittiwake are only present in this SPA during their breeding season however chough is present year-round. All three species breed within this SPA but predominantly forage outside of its boundary (JNCC, 2022).

The Islay – Colonsay cable route is located within 2 km of the North Colonsay and Western Cliffs SPA. The proposed survey activities could take up to 13.3 days (excluding standby allowances). Nonetheless, the duration spent at the landfall where the cable corridor is at closest proximity to this SPA will be much shorter.

Although the survey activities could disturb kittiwake and guillemot whilst foraging, collisions with survey vessels are considered unlikely. Moreover, any disturbance at the breeding and non-breeding habitats at North Colonsay and Western Cliffs SPA will be limited by the temporary and localised nature of the survey activities. Therefore, it is not expected that the survey activities will have a significant effect on the populations bird species for which the Northern Colonsay and Western Cliffs SPA is designated, and therefore, no adverse impact is predicted for the conservation status of this site.

4.2.6 Conclusion

The duration of the survey activities will allow for periods of stand-by due to a range of factors, and as such, are likely to be conservative in nature, hence the actual survey duration may be shorter. It is unlikely that cable routes within the same region will require geophysical surveys to occur concurrently, although more than one survey vessel may be present on any one route at the same time.

No adverse impacts on the populations of cetaceans and basking sharks at designated sites is expected from equipment calibration testing and geophysical survey work, and the explanation for this conclusion is provided in Section 3.

The proposed Argyll region works will occur sometime between 1st August 2023 – 31st July 2028. As such, the activities have the potential to coincide with the breeding and moulting seasons of harbour seal, grey seal and numerous seabird species (both breeding and migratory). However, given the relatively short duration of the surveys across the majority of cable routes over a long period of time, as well as the transient nature of the project activities, no significant impacts upon breeding birds and seals are expected. Furthermore, no adverse impact on the conservation status of qualifying species is not anticipated, and hence the conservation objectives of relevant designated sites should not be affected.

Although there are two designated sites with otters as qualifying interests overlapping with, or in close proximity to, the proposed survey activities in the Argyll marine region, adverse impacts on otters at an individual or population level are considered unlikely given the limited duration and extent of the nearshore survey activities. Impacts on otters will be further reduced through mitigation identified in Section 5. As such no adverse impacts are anticipated on conservation objectives of the three SACs with otter as qualifying features.

Due to the temporary and localised nature of the proposed activities within the overall survey window and the mitigation measures outlined in Section 5, no significant impact is anticipated on the conservation objectives of any protected site. Overall, the monitoring of submarine power cables constitutes work of an overriding public need whilst presenting a trivial and temporary disturbance in a limited area.

4.3 Cumulative and In-Combination Impacts

Several other concurrent, preceding or subsequent activities are taking place within the Argyll area which could have an accumulative risk of disturbance to EPS. These have been identified through the Marine Scotland EPS Licence Register which are detailed in Table 4-2 (Marine Scotland, 2023).

Table 4-2 List of Licensed Activities within the Argyll Region Which Could Impact on EPS In-Combination with the SHEPD Cable Surveys

EPS Licence Number or Reference	Project Name (Licence to Injure/Disturb)	Period Licence Valid From/To	Number of EPS Predicted to be Injured/Disturbed
00009937	North Moine, Shuna Castle, Kames Bay East, Kames Bay West, Ardifuir and Pooltiel West (Disturb)	1st June 2022 – 1st June 2023	Minimal due to transient nature of the animals and the brief nature of the works
00010002	Geophysical Survey - West Loch Tarbert	18th January 2023 – 31st March 2023	Minimal due to transient nature of the animals and the brief nature of the works

SHEPD have considered this list of projects with regard to the relevant MU for each EPS species (see Table 3-2). Each of these activities is licensed for a limited time period, and the duration of most activities within that time period is typically shorter. In addition to the short duration of each of these activities, the predicted levels of disturbance associated with each activity is very small (where this information is available on the MS EPS Licence portal).

Cumulative/in-combination impacts have the potential to reach levels that could impact negatively on cetacean species, with consequences for maintaining those species at Favourable Conservation Status (FCS). The conservation status is considered 'favourable' when:

- Population dynamics data on the species concerned indicates that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Based on available data, it is considered that the population of each cetacean MU is being maintained on a long-term basis as a viable component of its natural habitat (IAMMWG, 2022; Hammond *et al.*, 2021). No activities within the in-combination list (i.e., activities with EPS licences) are predicted to have the potential to reduce the natural range of the species for the foreseeable future. Each relevant cetacean MU comprises sufficiently large area of habitat for populations to be maintained at FCS on a long-term basis.

SHEPD have considered the information included in this EPS Risk Assessment in relation to the SHEPD Argyll cable surveys, in combination with information available on other activities capable of impacting on EPS, together with the latest information on cetacean MU (IAMMWG, 2022). SHEPD conclude that there is no cumulative or in-combination risk to the MU populations of Atlantic white-sided dolphin, bottlenose dolphin, common dolphin, harbour porpoise, minke whale, Risso's dolphin, white-beaked dolphin and killer whale.

5 SPECIES PROTECTION MEASURES

5.1 Overview

This section summarises the proposed mitigation measures to be implemented for avoiding and reducing potential impacts on species that may be present in the vicinity of the cable inspections and any required survey works. The M1 to M11 mitigations detailed below for marine mammals, basking sharks and otter are applicable only for use of SBP.

Although species and task specific mitigation is provided below, the following measures will be implemented during all survey works:

- All vessels will adhere to the provisions of the Scottish Marine Wildlife Watching Code (SNH, 2017), and the Basking Shark Code of Conduct (SMWWC, 2023); and
- Survey personnel will be made aware of all protected species within the marine environment, and their responsibility to implement the mitigation in this document.

5.2 Marine Mammals

The Marine Mammal Protection Plan (MMPP) is implemented through the adherence to the mitigations set out below. Compliance with these mitigations will reduce risk of injury and disturbance to marine mammals resulting from SBP survey operations, these mitigations are aligned with the JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017). It is noted that most SBP are not capable of performing a soft-start, and hence this procedure is not included. The key components of the MMPP for SBP include:

- Deployment of a MMO to monitor for the presence of cetaceans and seals within the mitigation zone (see below), prior to the commencement of SBP operations;
- For SBP operations during hours of darkness and/or in periods of poor visibility and/or during periods when the sea state is greater than Beaufort 3, deployment of Passive Acoustic Monitoring (PAM) system to detect for the presence of vocalising cetaceans that cannot be observed by the MMO;
- 500 m mitigation zone for cetaceans;
- 500 m mitigation zone for seals, reducing to 100 m in the event of a need to avoid critical delay to the project; and
- Reporting procedure.

5.2.1 M1 – Marine Mammal Monitoring

There will be MMO coverage for the duration of the SBP activities, with adequately trained and experienced MMO(s) working standard 12-hour shifts. They will have experience of working at sea and will have successfully deployed and used PAM equipment previously. They will be equipped with binoculars offering at least 8x magnification. The MMO will be located at a high point on the vessel, providing good all-round visibility.

Reduced power output (Mammal protect) could be used for the Kongsberg EM710. Maximum intensity is encountered in a thin wedge extending below the ship with an angular coverage of about 140°. The intensity level may be lowered by 10 or 20 dB by the operator. The Kongsberg EM710 may be set in a mode to begin pinging with a flexible soft-start as a possible means of inducing marine mammals to leave the area of high intensity sound.

5.2.2 M2 – Marine Mammal Observer (MMO)

During daylight hours the MMO(s) will carry out visual observations to monitor for the presence of cetaceans, seals and basking sharks before the SBP is activated and will advise of the need for delays in the commencement of the operation should any marine mammals be detected within the 500 m mitigation zone for cetaceans. This distance will be 500 m for seals and basking sharks, except in the event of a need to avoid critical delay to the project in which case the mitigation zone for both species' groups will be 100 m. The criteria as to what constitutes a critical delay leading to reduction in mitigation zone distance from 500 m to 100 m would be agreed on a case by case basis in consultation with MS-LOT.

5.2.3 M3 – Passive Acoustic Monitoring (PAM)

When visibility is poor (i.e., due to fog or during hours of darkness) and/or during periods when the sea state is greater than Beaufort 3, the PAM system will be operated by a single MMO/PAM operator. The PAM system shall comprise of at least 3 hydrophone elements, allowing for directional localisation of detections, together with software allowing real time detection of marine mammal vocalisations (e.g., PAM Guard or equivalent).

5.2.4 M4 – Pre-Start Search

Visual (MMO) (and acoustic (PAM) monitoring if required) will be conducted for a pre-start search of 30 minutes i.e., prior to the commencement of SBP operations. This will involve a visual (during daylight hours) or PAM watch (during poor visibility or at night) to determine if any cetaceans, seals or basking sharks are within 500 m of the activities (or 100 m in the event of the critical delay described in mitigation measure M2). It is recognised that PAM cannot detect seals or Basking Shark and as such during poor visibility or at night PAM alone will be the sole means of pre-watch monitoring.

5.2.5 M5 – Designated Seal Haul-Outs

During hours of darkness and in poor visibility when the MMO cannot monitor for the visibility of seals and otters, the equipment must not be started within 100 m of any SAC designated for seals or designated seal haul-out site. The SBP must be started outwith this distance, and the vessel then moved into position once the SBP is sounding.

Where cable landfalls are located in or within 500 m of a designated seal haul-out, breeding site, or SAC designated for seals; SHEPD will ensure that, unless required for works relating to a cable fault, shore-based intertidal survey works, and nearshore vessel-based surveys within 200 m of land are scheduled to take place outwith the breeding or moulting seasons for the relevant seal species. Specifically, the periods that will be avoided are:

- Grey seal sites: September – December (inclusive) for the breeding season and moult.
- Harbour seal sites: 15th June – August (inclusive) for the breeding season and moult.

If the MMO confirms that no seals are hauled out onshore inside a designated haul out, breeding site, or SAC such that they would be within 200 m of the vessel; personnel onshore or other operations; the above seasonal restrictions shall not apply to intertidal and nearshore survey operations, and the surveys will be permitted to continue.

5.2.6 M6 – Cetacean, Seal and Basking Shark Mitigation Zone

The mitigation zone is defined as the area within 500 m of the SBP; noting that if the SBP is deployed on a ROV/ROTV, this will be the centre of the mitigation zone, and not the vessel. Should any cetaceans, seals or basking sharks be detected within the mitigation zone prior to the commencement of SBP operations (or after breaks in SBP survey activity of more than 10 minutes), operations will be delayed until their passage, or the transit of the vessel, results in the cetaceans, seals or basking sharks being outwith the mitigation zone. In all three cases, there will be a 20 minute

delay from the time of the last sighting within the mitigation zone to the commencement/recommencement of the SBP operations.

As outlined in mitigation measure M2, the mitigation zone for seals and basking sharks may be reduced from 500 m to 100 m in the event of a need to avoid critical delay to the project, subject to agreement with MS-LOT.

5.2.7 M7 – Reporting

All recordings of cetaceans, seals and basking sharks will be made using JNCC Standard Forms. At the end of the operations, a monitoring report detailing the cetaceans recorded, methods used to detect them, and details of any problems encountered will be submitted to Marine Scotland and SNH. The report will also include feedback on how successful the mitigation measures were. This requirement will be communicated to the MMOs at project start up meetings and at crew change.

5.3 Basking Shark

The following mitigation measures will be implemented during SBP operations in order to reduce disturbance to basking sharks.

5.3.1 M8 – Basking Shark Monitoring

There will be MMO coverage for the duration of the marine activities, with adequately trained and experienced MMO(s) working standard 12 hour shifts. The MMO will also monitor for the presence of basking shark following the mitigation measures described above for Marine Mammal Monitoring (see 5.2.1). Should any basking sharks be detected within 500 m of the vessel prior to the commencement of SBP surveys (or after breaks in geophysical survey activity of more than 10 minutes), operations will be delayed until their passage, or the transit of the vessel, results in the animals being outwith the mitigation zone. In all cases, there will be a 20 minute delay from the time of the last sighting within the mitigation zone to the commencement/recommencement of the operations.

5.3.2 M9 – Basking Shark Mitigation Zone

During survey works, the MMO will monitor for the presence of basking sharks, in addition to marine mammals and otters, and will delay start of the survey if any are seen within 500 m of the survey vessel. The mitigation zone for basking sharks may be reduced from 500 m to 100 m in the event of a need to avoid critical delay to the project subject to agreement with MS-LOT.

5.4 Otters

The following mitigation measures will be implemented in order to reduce disturbance to otters.

5.4.1 M10 – Otter Monitoring

There will be MMO coverage for the duration of the vessel based SBP survey operations, with adequately trained and experienced MMO(s) working standard 12 hour shifts. The MMO will also monitor for the presence of otters (see also Section 5.2.1 Mitigation Measure M1).

5.4.2 M11 – Otter Mitigation Zone

When conducting vessel based SBP surveys within 500 m of any SAC designated for otters, the MMO monitors for the presence of otters in the water in addition to marine mammals and basking sharks and delays the start of the

survey if any are seen within 200 m of the survey vessel. If working during the hours of darkness or in poor visibility when the MMO is not able to monitor otters, the SBP will not be started within 200 m of a SAC designated for otters. Instead, the SBP will be started outwith this distance, and the vessel then moved into position once the SBP is sounding.

5.4.3 M12 – Otter Mitigation for Shore Based Survey Operations

For shore based intertidal surveys of cable landfall sites where the survey corridor is located inside or within 500 m of SACs designated for otters, either of the following measures shall be adopted:

- Otter surveys will be conducted by an appropriately qualified ecologist prior to the commencement of the cable survey operation, and will include the cable landfall survey area and a 200 m mitigation zone; or
- An appropriately qualified ecologist will be appointed to work with the survey personnel and ensure sensitive otter sites are not disturbed.

The pre-works otter survey or ecologist working with the cable survey personnel will ensure the following:

- Any otter holts, layups and couches will be identified and avoided by a 40 m buffer during shore based cable landfall survey operations.

5.5 Seabirds

The following mitigation measures will be implemented in order to reduce disturbance to seabirds.

5.5.1 M13 – Rafting Seabirds

The survey vessels will be moving at a maximum speed of 4-8 knots during survey operations, to allow any rafting seabirds time to disperse before the vessel arrives. When not on survey effort, vessels will avoid bird rafts where operationally possible, and it is safe to do so.

5.5.2 M14 – Wintering Birds

When within a SPA which has been designated for wintering birds that may roost or feed in close proximity to the cable survey corridor or the landfall, further consultation will be undertaken with NatureScot on the requirement for any seasonal restriction to be implemented for cable inspections or survey activities, including UAV operations, in order to avoid disturbance to qualifying species during the most sensitive time of the year.

5.5.3 M15 – Breeding Birds

When within a SPA which has been designated for breeding birds that may nest or feed in close proximity to the cable survey corridor or the landfall, further consultation will be undertaken with NatureScot on the requirement for any seasonal restriction to be implemented for equipment calibration and testing, as well as geophysical survey activities, and UAV operations, in order to avoid disturbance to qualifying species during the most sensitive time of the year.

5.5.4 M16 – Light Disturbance

When within an SPA and where there is potential for 24-hour working, the following measures will be implemented to minimise the potential impacts to birds:

- Lighting on-board the cable survey vessel(s) will be kept to the minimum level required to ensure safe operations; and
- Lights will be directed or shielded to prevent upward illumination and minimise disturbance; and
- Blackout blinds and/or curtains will be used where possible when working in marine SPAs.

6 CONCLUSION

This risk assessment has assessed the risk posed by the geophysical survey (including equipment calibration) activities associated with the cable routes within the Argyll marine region to EPS and protected sites. This has included assessing the risk caused by sound emitted from the vessel and the geophysical survey, collision impact and disturbance to the following protected species and sites:

- Cetaceans;
- Seals;
- Otters;
- Basking sharks;
- Birds;
- SACs;
- NCMPAs; and
- SPAs.

The Argyll cable routes are all located within 50 km of the Inner Hebrides and the Minches cSAC, and the majority are located within 50 km of the Sea of Hebrides NC MPA. However, due to the localised and temporary nature of each geophysical survey, in combination with the proposed mitigation, no adverse impact through injury to cetaceans is anticipated. The use of geophysical survey equipment may cause disturbance to cetaceans in the vicinity and as such, an application for an EPS Licence will be submitted.

The Sea of Hebrides NC MPA is also designated for basking shark. However, the assessment found the proposed survey works have a very low potential to result in adverse impacts on this species, due to the localised and temporary nature of the proposed works. Impacts have been further reduced through implementation of mitigation. However, disturbance to basking sharks remains a possibility, and as such, an application for a Basking Shark Licence will be submitted.

The majority of cable routes are located within 50 km of the Eileanan agus Sgeiran Lios mor SAC, designated for harbour seals. There is a high density of harbour and grey seals within most of the proposed survey areas, and several cable routes are within designated seal haul-outs and breeding colony haul-outs. Due to the localised nature of each individual cable route survey activity, long-term impacts to harbour and grey seal populations will not be significant. A number of mitigation strategies will also be followed to further reduce any potential impact on seals resulting from the proposed survey operations.

Otter populations may be disturbed by vessel presence and near-shore landfall activities, including those populations present at Taynish and Knapdale Woods SAC and Tayvallich Juniper and Coast SAC. The proposed survey activities may result in disturbance of otters, however due to short survey periods in the nearshore area adjacent to landfalls compared with the overall survey period, disturbance will be temporary and localised; therefore, no adverse impacts to otters are expected. Furthermore, the proposed mitigation measures will ensure that the shore based intertidal survey works will not result in the disturbance of or damage to otter holts or other sensitive otter features. As such, no likely significant effects on the otter features of the three SACs are anticipated, and an otter EPS licence will not be required.

Breeding and moulting seabird species may be impacted by the physical presence of vessels within the survey corridors or through UAV utilisation in the intertidal and nearshore areas, however, given the temporary and short-term nature of the proposed activities, the potential impacts on seabirds are not considered to be significant, and were not further assessed. It was identified that the survey corridors are within the vicinity of four SPAs: Sound of

Gigha SPA, Coll and Tiree SPA, Sleibhtean agus Cladach Thiriodh (Tiree Wetlands and Coast) SPA and North Colonsay and Western Cliffs SPA. Due to the temporary and localised nature of the surveys, no significant or adverse impact is anticipated on any of the sites. Further to this, a number of mitigation strategies will also be followed to further reduce any potential impact on seabirds.

The survey corridor overlaps with the Loch Sunart to the Sound of Jura NC MPA and the Loch Sween NC MPA. Benthic sampling may be required in support of the survey activities; however, it is anticipated that only relatively small benthic samples will be extracted of < 1 m^3. As such, any benthic sampling activities will be subject to a future Marine Licence Exemption application.

Overall, the proposed survey operations constitute work of an overriding public need while presenting a trivial and temporary disturbance in a limited area.

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8 APPENDIX A - TABLE OF CABLE ROUTE COORDINATES

For the avoidance of doubt, the landward boundaries of the installation corridor covered by this EPS Risk Assessment shall be MHWS. The landfall boundaries defined by the coordinates within this document should be considered approximations, due to the requirement to limit the number of vertices.

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
Bridgend, Islay	6° 17' 43.605175" W	55° 47' 5.789256" N	6° 17.727' W	55° 47.096' N	-6.295445882	55.78494146
	6° 16' 45.70401" W	55° 46' 51.854261" N	6° 16.762' W	55° 46.864' N	-6.279362225	55.78107063
	6° 16' 20.47714" W	55° 46' 59.459243" N	6° 16.341' W	55° 46.991' N	-6.272354761	55.78318312
	6° 15' 56.137558" W	55° 46' 59.693549" N	6° 15.936' W	55° 46.995' N	-6.265593766	55.78324821
	6° 15' 36.886867" W	55° 46' 54.056816" N	6° 15.615' W	55° 46.901' N	-6.260246352	55.78168245
	6° 15' 8.876347" W	55° 46' 34.546001" N	6° 15.148' W	55° 46.576' N	-6.252465652	55.77626278
	6° 15' 9.887641" W	55° 46' 17.084298" N	6° 15.165' W	55° 46.285' N	-6.252746567	55.77141231
	6° 15' 31.933883" W	55° 46' 14.050409" N	6° 15.532' W	55° 46.234' N	-6.258870523	55.77056956
	6° 15' 42.774973" W	55° 45' 49.85213" N	6° 15.713' W	55° 45.831' N	-6.261881937	55.76384781
	6° 16' 17.783004" W	55° 45' 42.43806" N	6° 16.296' W	55° 45.707' N	-6.27160639	55.76178835
	6° 16' 51.633556" W	55° 45' 36.722174" N	6° 16.861' W	55° 45.612' N	-6.281009321	55.7602006
	6° 17' 10.489704" W	55° 45' 27.269752" N	6° 17.175' W	55° 45.455' N	-6.28624714	55.75757493
Coll - Tiree	6° 44' 51.028732" W	56° 32' 49.873272" N	6° 44.850' W	56° 32.831' N	-6.747507981	56.54718702
	6° 42' 55.012612" W	56° 33' 42.282792" N	6° 42.917' W	56° 33.705' N	-6.715281281	56.56174522
	6° 42' 6.748261" W	56° 34' 33.638952" N	6° 42.112' W	56° 34.561' N	-6.701874517	56.57601082
	6° 41' 21.324422" W	56° 33' 50.118048" N	6° 41.355' W	56° 33.835' N	-6.689256784	56.56392168
	6° 40' 45.962339" W	56° 34' 55.501752" N	6° 40.766' W	56° 34.925' N	-6.679433983	56.58208382
	6° 39' 41.183672" W	56° 35' 8.43576" N	6° 39.686' W	56° 35.141' N	-6.661439909	56.5856766

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	6° 38' 30.982888" W	56° 34' 56.286732" N	6° 38.516' W	56° 34.938' N	-6.641939691	56.58230187
	6° 38' 39.18786" W	56° 34' 25.134276" N	6° 38.653 W	56° 34.419' N	-6.64421885	56.57364841
	6° 39' 14.733608" W	56° 32' 46.124412" N	6° 39.246' W	56° 32.77' N	-6.654092669	56.54614567
	6° 42' 54.490154" W	56° 29' 38.306904" N	6° 42.908' W	56° 29.638' N	-6.715136154	56.49397414
	6° 48' 4.169412" W	56° 30' 18.363636" N	6° 48.069' W	56° 30.306' N	-6.80115817	56.50510101
	6° 49' 18.777781" W	56° 30' 52.572636" N	6° 49.313' W	56° 30.876' N	-6.821882717	56.51460351
	6° 48' 15.998008" W	56° 31' 32.988288" N	6° 48.267' W	56° 31.550' N	-6.804443891	56.52583008
	6° 46' 16.48758" W	56° 31' 49.82592" N	6° 46.275' W	56° 31.830' N	-6.77124655	56.5305072
	6° 45' 50.281265" W	56° 31' 29.88066" N	6° 45.838' W	56° 31.498 N	-6.763967018	56.52496685
	6° 43' 39.964638" W	56° 31' 48.837072" N	6° 43.666' W	56° 31.814' N	-6.727767955	56.53023252
	6° 43' 46.149092" W	56° 32' 25.704564" N	6° 43.769' W	56° 32.428' N	-6.729485859	56.54047349
	6° 44' 25.093964" W	56° 32' 28.586688" N	6° 44.418' W	56° 32.476' N	-6.740303879	56.54127408
Eilean Loain	5° 36' 11.807741" W	56° 0' 42.34046" N	5° 36.197' W	56° 0.706' N	-5.603279928	56.01176124
	5° 36' 1.898017" W	56° 0' 54.732596" N	5° 36.032 W	56° 0.912' N	-5.600527227	56.0152035
	5° 35' 37.064566" W	56° 0' 50.906945" N	5° 35.618' W	56° 0.848' N	-5.593629046	56.01414082
	5° 35' 22.047313" W	56° 0' 45.635238" N	5° 35.367' W	56° 0.761' N	-5.589457587	56.01267646
	5° 35' 14.577958" W	56° 0' 36.804838" N	5° 35.243' W	56° 0.613' N	-5.587382766	56.01022357
	5° 35' 29.227502" W	56° 0' 34.680791" N	5° 35.487' W	56° 0.578' N	-5.591452084	56.00963355
	5° 35' 37.956818" W	56° 0' 37.388182" N	5° 35.633' W	56° 0.623' N	-5.593876894	56.01038561
	5° 36' 1.652213" W	56° 0' 21.505003" N	5° 36.028' W	56° 0.358 N	-5.600458948	56.00597361
	5° 36' 14.47511" W	56° 0' 23.804921" N	5° 36.241' W	56° 0.397' N	-5.604020864	56.00661248
	5° 35' 59.545046" W	56° 0' 33.698902" N	5° 35.992' W	56° 0.562' N	-5.599873624	56.00936081
	5° 36' 0.686725" W	56° 0' 40.254772" N	5° 36.011' W	56° 0.671' N	-5.600190757	56.01118188

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
Eilean Righ	5° 31' 42.454758" W	56° 10' 0.743675" N	5° 31.708' W	56° 10.012' N	-5.528459655	56.16687324
	5° 31' 35.587463" W	56° 10' 7.222692" N	5° 31.593' W	56° 10.120' N	-5.526552073	56.16867297
	5° 31' 35.215666" W	56° 10' 15.55361" N	5° 31.587' W	56° 10.259' N	-5.526448796	56.17098711
	5° 31' 10.679578" W	56° 10' 24.451547" N	5° 31.178' W	56° 10.408' N	-5.519633216	56.17345876
	5° 31' 1.855931" W	56° 10' 13.41538" N	5° 31.031' W	56° 10.224' N	-5.517182203	56.17039316
	5° 31' 1.737275" W	56° 10' 8.504962" N	5° 31.029' W	56° 10.142' N	-5.517149243	56.16902916
	5° 31' 25.54396" W	56° 9' 40.675136" N	5° 31.426' W	56° 9.678' N	-5.523762211	56.16129865
	5° 31' 46.835112" W	56° 9' 34.937654" N	5° 31.781' W	56° 9.582' N	-5.52967642	56.1597049
	5° 32' 7.10853" W	56° 9' 37.966097" N	5° 32.118' W	56° 9.633' N	-5.535307925	56.16054614
	5° 31' 38.106376" W	56° 9' 59.449622" N	5° 31.635' W	56° 9.991' N	-5.527251771	56.16651378
Islay - Colonsay	6° 7' 31.490879" W	55° 54' 33.223622" N	6° 7.525' W	55° 54.554' N	-6.125414133	55.90922878
	6° 7' 5.234164" W	55° 56' 40.220686" N	6° 7.087' W	55° 56.670' N	-6.118120601	55.94450575
	6° 9' 10.417626" W	56° 2' 58.004192" N	6° 9.174' W	56° 2.967' N	-6.152893785	56.04944561
	6° 10' 59.759252" W	56° 3' 10.96992" N	6° 10.996' W	56° 3.183' N	-6.183266459	56.0530472
	6° 11' 22.334356" W	56° 3' 19.981984" N	6° 11.372' W	56° 3.333' N	-6.189537321	56.05555055
	6° 11' 27.718001" W	56° 3' 32.758978" N	6° 11.462' W	56° 3.546' N	-6.191032778	56.05909972
	6° 11' 49.46743" W	56° 3' 38.494508" N	6° 11.824' W	56° 3.642' N	-6.197074286	56.06069292
	6° 11' 46.545767" W	56° 3' 43.535624" N	6° 11.776' W	56° 3.726' N	-6.196262713	56.06209323
	6° 10' 53.187067" W	56° 3' 59.056531" N	6° 10.886' W	56° 3.984' N	-6.181440852	56.06640459
	6° 10' 55.325518" W	56° 4' 2.934836" N	6° 10.922' W	56° 4.049' N	-6.182034866	56.0674819
	6° 11' 11.87291" W	56° 4' 5.251098" N	6° 11.198' W	56° 4.088' N	-6.186631364	56.06812531
	6° 11' 12.060308" W	56° 4' 11.572817" N	6° 11.201' W	56° 4.193' N	-6.186683419	56.06988134
	6° 10' 58.028477" W	56° 4' 18.564866" N	6° 10.967' W	56° 4.309' N	-6.182785688	56.07182357

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	6° 8' 3.79662" W	56° 4' 1.762633" N	6° 8.063' W	56° 4.029' N	-6.13438795	56.06715629
	6° 7' 18.743405" W	56° 3' 15.445584" N	6° 7.312' W	56° 3.257' N	-6.121873168	56.05429044
	6° 5' 8.649402" W	55° 56' 41.618476" N	6° 5.144' W	55° 56.694' N	-6.085735945	55.94489402
	6° 6' 25.357446" W	55° 54' 33.956716" N	6° 6.423' W	55° 54.566' N	-6.107043735	55.90943242
Islay - Orsay	6° 30' 52.69099" W	55° 40' 40.075118" N	6° 30.878' W	55° 40.668' N	-6.514636386	55.67779864
	6° 30' 44.701114" W	55° 40' 48.298703" N	6° 30.745' W	55° 40.805' N	-6.512416976	55.68008297
	6° 30' 41.743562" W	55° 40' 49.637482" N	6° 30.696' W	55° 40.827' N	-6.511595434	55.68045486
	6° 30' 35.248392" W	55° 40' 46.462152" N	6° 30.587' W	55° 40.774' N	-6.50979122	55.67957282
	6° 30' 26.553074" W	55° 40' 49.163693" N	6° 30.443' W	55° 40.819' N	-6.507375854	55.68032325
	6° 30' 25.145834" W	55° 40' 48.558893" N	6° 30.419' W	55° 40.809' N	-6.506984954	55.68015525
	6° 30' 36.210546" W	55° 40' 38.290624" N	6° 30.604' W	55° 40.638' N	-6.510058485	55.67730295
	6° 30' 26.148791" W	55° 40' 36.295342" N	6° 30.436' W	55° 40.605' N	-6.507263553	55.67674871
	6° 30' 18.315562" W	55° 40' 28.09178" N	6° 30.305' W	55° 40.468' N	-6.505087656	55.67446994
	6° 30' 8.399808" W	55° 40' 30.786524" N	6° 30.140' W	55° 40.513' N	-6.50233328	55.67521848
	6° 29' 58.963204" W	55° 40' 29.653241" N	6° 29.982' W	55° 40.494' N	-6.499712001	55.67490368
	6° 30' 21.602297" W	55° 40' 15.862696" N	6° 30.360' W	55° 40.264' N	-6.506000638	55.67107297
	6° 30' 23.531011" W	55° 40' 21.492761" N	6° 30.392' W	55° 40.358' N	-6.506536392	55.67263688
	6° 30' 34.591504" W	55° 40' 25.490453" N	6° 30.577' W	55° 40.425' N	-6.509608751	55.67374735
	6° 30' 37.788653" W	55° 40' 32.00763" N	6° 30.630' W	55° 40.533' N	-6.510496848	55.67555768
	6° 30' 48.97472" W	55° 40' 36.089411" N	6° 30.816' W	55° 40.601' N	-6.513604089	55.6766915
Jura - Islay	6° 4' 26.467529" W	55° 48' 53.270262" N	6° 4.441' W	55° 48.888' N	-6.074018758	55.8147973
	6° 4' 20.02224" W	55° 48' 43.027279" N	6° 4.334' W	55° 48.717' N	-6.0722284	55.81195202
	6° 4' 0.363166" W	55° 48' 30.2562" N	6° 4.006' W	55° 48.504' N	-6.066767546	55.8084045

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	6° 5' 52.55313" W	55° 48' 16.566203" N	6° 5.876' W	55° 48.276' N	-6.097931425	55.80460172
	6° 5' 58.262726" W	55° 48' 26.32244" N	6° 5.971' W	55° 48.439' N	-6.099517424	55.80731179
	6° 5' 55.830206" W	55° 48' 31.15287" N	6° 5.931' W	55° 48.519' N	-6.098841724	55.80865358
	6° 6' 13.182005" W	55° 48' 43.915932" N	6° 6.220' W	55° 48.732' N	-6.103661668	55.81219887
	6° 6' 14.425128" W	55° 48' 47.188476" N	6° 6.240' W	55° 48.786' N	-6.10400698	55.81310791
	6° 6' 12.290616" W	55° 48' 50.447779" N	6° 6.205' W	55° 48.841' N	-6.10341406	55.81401327
	6° 6' 17.056076" W	55° 48' 53.19032" N	6° 6.284' W	55° 48.887 N	-6.104737799	55.81477509
	6° 6' 18.981929" W	55° 49' 1.17296" N	6° 6.316' W	55° 49.020' N	-6.105272758	55.81699249
	6° 6' 14.59305" W	55° 49' 4.583834" N	6° 6.243' W	55° 49.076' N	-6.104053625	55.81793995
	6° 6' 21.251048" W	55° 49' 9.114974" N	6° 6.354' W	55° 49.152' N	-6.105903069	55.8191986
	6° 6' 16.855718" W	55° 49' 21.254768" N	6° 6.281' W	55° 49.354' N	-6.104682144	55.82257077
	6° 4' 53.896202" W	55° 49' 31.586477" N	6° 4.898' W	55° 49.526' N	-6.081637834	55.82544069
	6° 4' 50.205972" W	55° 49' 24.322562" N	6° 4.837' W	55° 49.405' N	-6.08061277	55.82342293
	6° 4' 52.883335" W	55° 49' 19.729812" N	6° 4.881' W	55° 49.329' N	-6.081356482	55.82214717
	6° 4' 42.012973" W	55° 49' 4.77287" N	6° 4.700' W	55° 49.080' N	-6.078336937	55.81799246
Kerrera - Mull 2	5° 39' 5.525305" W	56° 25' 25.306223" N	5° 39.092' W	56° 25.422' N	-5.651534807	56.42369617
	5° 38' 49.163071" W	56° 26' 38.344171" N	5° 38.819' W	56° 26.639' N	-5.646989742	56.44398449
	5° 31' 57.32949" W	56° 25' 4.12329" N	5° 31.955' W	56° 25.069' N	-5.532591525	56.41781203
	5° 31' 48.948769" W	56° 24' 51.342923" N	5° 31.816' W	56° 24.856' N	-5.530263547	56.41426192
	5° 32' 19.003085" W	56° 24' 41.209801" N	5° 32.317' W	56° 24.687' N	-5.538611968	56.41144717
	5° 32' 25.420067" W	56° 24' 29.870021" N	5° 32.424' W	56° 24.498' N	-5.540394463	56.40829723
	5° 32' 34.031288" W	56° 24' 27.444233" N	5° 32.567' W	56° 24.457' N	-5.542786469	56.4076234
	5° 32' 57.90354" W	56° 24' 31.551952" N	5° 32.965' W	56° 24.526' N	-5.54941765	56.40876443

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	5° 33' 8.72518" W	56° 24' 33.414041" N	5° 33.145' W	56° 24.557' N	-5.552423661	56.40928168
	5° 33' 34.551112" W	56° 24' 29.924813" N	5° 33.576' W	56° 24.499' N	-5.559597531	56.40831245
	5° 33' 49.80474" W	56° 24' 24.686132" N	5° 33.830' W	56° 24.411' N	-5.56383465	56.40685726
	5° 33' 57.277966" W	56° 24' 19.404778" N	5° 33.955' W	56° 24.323' N	-5.565910546	56.40539022
	5° 34' 57.198706" W	56° 24' 26.621726" N	5° 34.953' W	56° 24.444' N	-5.582555196	56.40739492
	5° 38' 12.588828" W	56° 25' 7.674766" N	5° 38.210' W	56° 25.128' N	-5.63683023	56.41879855
Kerrera - Mull Replacement	5° 39' 25.127568" W	56° 25' 10.257312" N	5° 39.419' W	56° 25.171' N	-5.65697988	56.41951592
	5° 38' 53.620555" W	56° 26' 3.841818" N	5° 38.894' W	56° 26.064' N	-5.648227932	56.43440051
	5° 33' 48.146634" W	56° 24' 25.931225" N	5° 33.802' W	56° 24.432' N	-5.563374065	56.40720312
	5° 34' 2.468165" W	56° 24' 13.532112" N	5° 34.041 W	56° 24.226' N	-5.567352268	56.40375892
	5° 34' 3.284692" W	56° 24' 5.405537" N	5° 34.055' W	56° 24.090' N	-5.567579081	56.40150154
	5° 33' 55.702739" W	56° 23' 52.290352" N	5° 33.928' W	56° 23.872 N	-5.565472983	56.39785843
	5° 34' 8.303358" W	56° 23' 50.419097" N	5° 34.138' W	56° 23.840' N	-5.568973155	56.39733864
	5° 34' 23.990286" W	56° 23' 54.873244" N	5° 34.400' W	56° 23.915' N	-5.573330635	56.3985759
	5° 34' 24.768955" W	56° 23' 44.41448" N	5° 34.413' W	56° 23.740' N	-5.573546932	56.39567069
	5° 34' 25.759168" W	56° 23' 31.11436" N	5° 34.429' W	56° 23.519' N	-5.573821991	56.39197621
	5° 36' 45.347857" W	56° 23' 4.95191" N	5° 36.756' W	56° 23.083' N	-5.612596627	56.38470886
	5° 37' 49.507892" W	56° 23' 22.189549" N	5° 37.825' W	56° 23.369' N	-5.630418859	56.3894971
	5° 39' 17.484041" W	56° 24' 41.886065" N	5° 39.291' W	56° 24.698' N	-5.654856678	56.41163502
	5° 39' 11.98822" W	56° 24' 58.447663" N	5° 39.200' W	56° 24.974' N	-5.653330061	56.41623546
Kintyre - Gigha	5° 39' 27.452959" W	55° 41' 19.334832" N	5° 39.458' W	55° 41.322' N	-5.657625822	55.68870412
	5° 40' 26.784386" W	55° 40' 55.698132" N	5° 40.446' W	55° 40.928' N	-5.674106774	55.68213837
	5° 39' 37.209449" W	55° 40' 5.421396" N	5° 39.620' W	55° 40.090' N	-5.660335958	55.66817261

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	5° 39' 58.367066" W	55° 39' 51.223608" N	5° 39.973' W	55° 39.854' N	-5.666213074	55.66422878
	5° 39' 55.74141" W	55° 39' 33.126948" N	5° 39.929' W	55° 39.552' N	-5.665483725	55.65920193
	5° 40' 11.251142" W	55° 38' 59.736732" N	5° 40.188 W	55° 38.996' N	-5.669791984	55.64992687
	5° 43' 58.287929" W	55° 39' 45.56268" N	5° 43.971' W	55° 39.759' N	-5.732857758	55.6626563
	5° 43' 54.912436" W	55° 39' 56.59722" N	5° 43.915' W	55° 39.943' N	-5.731920121	55.66572145
	5° 43' 57.892303" W	55° 40' 5.857716" N	5° 43.965' W	55° 40.098' N	-5.732747862	55.66829381
	5° 44' 18.968114" W	55° 40' 2.054424" N	5° 44.316' W	55° 40.03' N	-5.738602254	55.66723734
	5° 44' 24.190919" W	55° 40' 17.70006" N	5° 44.403' W	55° 40.295' N	-5.740053033	55.67158335
	5° 44' 13.737059" W	55° 40' 35.140908" N	5° 44.229' W	55° 40.586' N	-5.737149183	55.67642803
	5° 44' 10.450529" W	55° 40' 42.221604" N	5° 44.174' W	55° 40.704' N	-5.736236258	55.67839489
	5° 43' 37.787848" W	55° 40' 54.14754" N	5° 43.630' W	55° 40.902' N	-5.727163291	55.68170765
	5° 43' 58.542924" W	55° 40' 56.677044" N	5° 43.976' W	55° 40.945' N	-5.73292859	55.68241029
	5° 44' 7.738091" W	55° 41' 5.089668" N	5° 44.129' W	55° 41.085' N	-5.735482803	55.68474713
	5° 43' 52.486781" W	55° 41' 35.846772" N	5° 43.875 W	55° 41.597' N	-5.731246328	55.69329077
Mainland - Jura	5° 45' 19.654506" W	56° 2' 51.862985" N	5° 45.328' W	56° 2.864' N	-5.755459585	56.04773972
	5° 45' 12.879954" W	56° 2' 51.561881" N	5° 45.215' W	56° 2.859' N	-5.753577765	56.04765608
	5° 44' 53.759645" W	56° 3' 12.096277" N	5° 44.896' W	56° 3.202' N	-5.748266568	56.05336008
	5° 39' 52.931801" W	56° 2' 47.675227" N	5° 39.882' W	56° 2.795' N	-5.664703278	56.04657645
	5° 38' 18.166754" W	56° 2' 32.004604" N	5° 38.303' W	56° 2.533' N	-5.638379654	56.0422235
	5° 38' 13.064896" W	56° 2' 26.046438" N	5° 38.218' W	56° 2.434' N	-5.636962471	56.04056846
	5° 38' 30.412766" W	56° 2' 0.467984" N	5° 38.507' W	56° 2.008' N	-5.641781324	56.03346333
	5° 38' 12.384118" W	56° 2' 2.792861" N	5° 38.206' W	56° 2.047' N	-5.636773366	56.03410913
	5° 38' 8.526692" W	56° 1' 45.316909" N	5° 38.142' W	56° 1.755' N	-5.635701859	56.0292547

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	5° 38' 16.202911" W	56° 1' 39.401436" N	5° 38.270' W	56° 1.657' N	-5.637834142	56.02761151
	5° 38' 44.197408" W	56° 1' 46.367828" N	5° 38.737' W	56° 1.773' N	-5.645610391	56.02954662
	5° 39' 22.216234" W	56° 1' 24.067412" N	5° 39.370' W	56° 1.401' N	-5.656171176	56.02335206
	5° 39' 35.07035" W	56° 1' 38.775972" N	5° 39.5854 W	56° 1.646 N	-5.659741764	56.02743777
	5° 41' 43.661296" W	56° 1' 52.091584" N	5° 41.728' W	56° 1.868' N	-5.695461471	56.03113655
	5° 45' 47.9336" W	56° 1' 59.28947" N	5° 45.799' W	56° 1.988' N	-5.763314889	56.03313596
	5° 45' 17.585755" W	56° 2' 45.894376" N	5° 45.293' W	56° 2.765' N	-5.754884932	56.04608177
Mainland - Kerrera	5° 30' 53.748587" W	56° 23' 34.819202" N	5° 30.896' W	56° 23.580' N	-5.514930163	56.39300533
	5° 30' 49.892461" W	56° 23' 31.668389" N	5° 30.832' W	56° 23.528' N	-5.513859017	56.39213011
	5° 31' 20.34683" W	56° 23' 14.017927" N	5° 31.339' W	56° 23.234' N	-5.522318564	56.3872272
	5° 31' 48.717732" W	56° 23' 21.944508" N	5° 31.812' W	56° 23.365' N	-5.53019937	56.38942903
	5° 31' 33.311028" W	56° 23' 34.404623" N	5° 31.555' W	56° 23.573' N	-5.52591973	56.39289017
	5° 31' 36.887203" W	56° 23' 45.04033" N	5° 31.615' W	56° 23.751' N	-5.526913112	56.39584454
	5° 31' 25.987177" W	56° 23' 51.836852" N	5° 31.43' W	56° 23.864 N	-5.523885327	56.39773246
	5° 30' 51.520745" W	56° 23' 43.249826" N	5° 30.859' W	56° 23.721' N	-5.514311318	56.39534717
	5° 30' 56.679682" W	56° 23' 37.48033" N	5° 30.945' W	56° 23.625' N	-5.515744356	56.39374454
Mainland - Kerrera 2	5° 30' 56.661743" W	56° 23' 37.229028" N	5° 30.944' W	56° 23.620' N	-5.515739373	56.39367473
	5° 30' 49.892461" W	56° 23' 31.668389" N	5° 30.832' W	56° 23.528' N	-5.513859017	56.39213011
	5° 31' 25.244569" W	56° 23' 10.680227" N	5° 31.421' W	56° 23.178' N	-5.523679047	56.38630006
	5° 31' 22.708607" W	56° 23' 8.183641" N	5° 31.378' W	56° 23.136' N	-5.522974613	56.38560657
	5° 32' 0.680543" W	56° 22' 56.145907" N	5° 32.011' W	56° 22.936' N	-5.533522373	56.38226275
	5° 32' 24.655898" W	56° 22' 57.095713" N	5° 32.411' W	56° 22.952' N	-5.540182194	56.38252659
	5° 32' 3.974006" W	56° 23' 11.430348" N	5° 32.066' W	56° 23.191' N	-5.534437224	56.38650843

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	5° 32' 12.293938" W	56° 23' 13.112761" N	5° 32.205' W	56° 23.219' N	-5.536748316	56.38697577
	5° 32' 12.082024" W	56° 23' 19.234792" N	5° 32.201' W	56° 23.321' N	-5.536689451	56.38867633
	5° 31' 58.475125" W	56° 23' 19.092091" N	5° 31.975' W	56° 23.318' N	-5.532909757	56.38863669
	5° 31' 53.493809" W	56° 23' 22.743355" N	5° 31.892' W	56° 23.379' N	-5.531526058	56.38965093
	5° 31' 47.851" W	56° 23' 22.280546" N	5° 31.798' W	56° 23.371' N	-5.529958611	56.38952237
	5° 31' 33.311028" W	56° 23' 34.404623" N	5° 31.555' W	56° 23.573' N	-5.52591973	56.39289017
	5° 31' 36.898723" W	56° 23' 40.599384" N	5° 31.615' W	56° 23.677 N	-5.526916312	56.39461094
	5° 30' 59.712541" W	56° 23' 42.842785" N	5° 30.995' W	56° 23.714' N	-5.516586817	56.39523411
	5° 30' 51.831994" W	56° 23' 42.711212" N	5° 30.864' W	56° 23.712' N	-5.514397776	56.39519756
Mainland - Lismore	5° 24' 30.779604" W	56° 33' 32.749204" N	5° 24.513' W	56° 33.546' N	-5.40854989	56.559097
	5° 24' 20.712352" W	56° 33' 29.366698" N	5° 24.345' W	56° 33.489' N	-5.405753431	56.55815742
	5° 24' 21.413268" W	56° 33' 22.815702" N	5° 24.357' W	56° 33.380' N	-5.40594813	56.5563377
	5° 24' 28.139861" W	56° 33' 18.530939" N	5° 24.469' W	56° 33.309' N	-5.407816628	56.55514748
	5° 24' 34.613035" W	56° 33' 20.443932" N	5° 24.577' W	56° 33.341' N	-5.409614732	56.55567887
	5° 24' 44.62884" W	56° 33' 16.170516" N	5° 24.744' W	56° 33.270' N	-5.4123969	56.55449181
	5° 25' 16.405684" W	56° 32' 50.101195" N	5° 25.273' W	56° 32.835' N	-5.421223801	56.54725033
	5° 26' 21.385122" W	56° 32' 54.092252" N	5° 26.356' W	56° 32.902' N	-5.439273645	56.54835896
	5° 26' 2.933995" W	56° 33' 9.060642" N	5° 26.049' W	56° 33.151' N	-5.434148332	56.55251685
	5° 26' 0.602542" W	56° 33' 17.88417" N	5° 26.010' W	56° 33.298' N	-5.433500706	56.55496783
	5° 25' 37.502962" W	56° 33' 36.180644" N	5° 25.625' W	56° 33.603' N	-5.427084156	56.56005018
	5° 25' 38.580722" W	56° 33' 39.45519" N	5° 25.643' W	56° 33.658' N	-5.427383534	56.56095978
Mull - Calve Island	6° 2' 39.672582" W	56° 37' 10.238254" N	6° 2.661' W	56° 37.171' N	-6.044353495	56.61951063
	6° 2' 41.681069" W	56° 37' 6.886351" N	6° 2.695' W	56° 37.115' N	-6.044911408	56.61857954

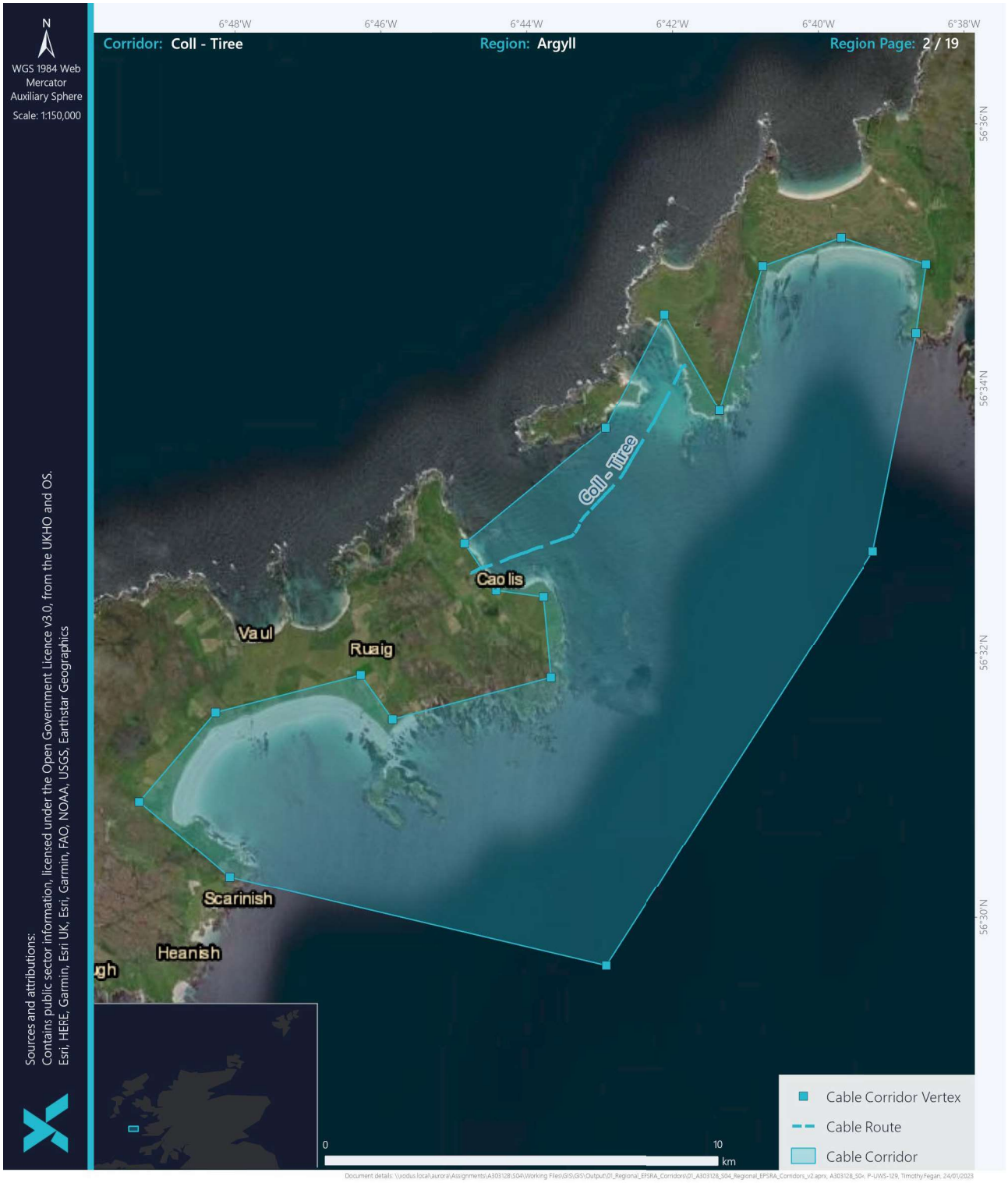
Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	6° 2' 41.022881" W	56° 37' 5.34643" N	6° 2.684' W	56° 37.089' N	-6.044728578	56.61815179
	6° 2' 41.923788" W	56° 37' 2.777434" N	6° 2.699' W	56° 37.046' N	-6.04497883	56.61743818
	6° 2' 23.354131" W	56° 36' 51.415999" N	6° 2.389' W	56° 36.857' N	-6.039820592	56.61428222
	6° 1' 59.789053" W	56° 36' 45.73849" N	6° 1.996' W	56° 36.762' N	-6.033274737	56.61270514
	6° 1' 59.714522" W	56° 36' 40.596019" N	6° 1.995' W	56° 36.677' N	-6.033254034	56.61127667
	6° 2' 11.340982" W	56° 36' 38.881861" N	6° 2.189 W	56° 36.648' N	-6.036483606	56.61080052
	6° 2' 37.261565" W	56° 36' 48.141544" N	6° 2.621' W	56° 36.802' N	-6.043683768	56.61337265
	6° 2' 45.425533" W	56° 36' 54.934657" N	6° 2.757' W	56° 36.916' N	-6.045951537	56.61525963
	6° 2' 53.033906" W	56° 36' 55.655392" N	6° 2.884' W	56° 36.928' N	-6.048064974	56.61545983
	6° 3' 1.912183" W	56° 36' 51.672535" N	6° 3.03' W	56° 36.861' N	-6.050531162	56.61435348
	6° 2' 58.906507" W	56° 36' 46.343178" N	6° 2.982' W	56° 36.772' N	-6.049696252	56.61287311
	6° 3' 2.668349" W	56° 36' 42.427033" N	6° 3.044' W	56° 36.707' N	-6.050741208	56.61178529
	6° 3' 8.508287" W	56° 36' 43.182331" N	6° 3.142' W	56° 36.720' N	-6.052363413	56.61199509
	6° 3' 12.797842" W	56° 36' 51.598606" N	6° 3.213' W	56° 36.860' N	-6.053554956	56.61433295
	6° 3' 8.545946" W	56° 36' 59.984734" N	6° 3.142' W	56° 37.000 N	-6.052373874	56.61666243
	6° 2' 53.228515" W	56° 37' 9.108635" N	6° 2.887' W	56° 37.1518' N	-6.048119032	56.61919684
	6° 2' 41.871469" W	56° 37' 11.368423" N	6° 2.698' W	56° 37.189' N	-6.044964297	56.61982456
Mull - Coll	6° 27' 4.883792" W	56° 41' 17.091139" N	6° 27.081' W	56° 41.285' N	-6.451356609	56.68808087
	6° 22' 44.211486" W	56° 39' 56.1798" N	6° 22.737' W	56° 39.936' N	-6.378947635	56.6656055
	6° 15' 39.989768" W	56° 37' 0.824596" N	6° 15.666' W	56° 37.014' N	-6.261108269	56.61689572
	6° 15' 44.175636" W	56° 36' 30.224254" N	6° 15.736' W	56° 36.504' N	-6.26227101	56.60839563
	6° 16' 1.476516" W	56° 36' 15.212423" N	6° 16.025' W	56° 36.254' N	-6.26707681	56.60422567
	6° 16' 28.285421" W	56° 36' 9.918594" N	6° 16.471' W	56° 36.165' N	-6.274523728	56.60275517

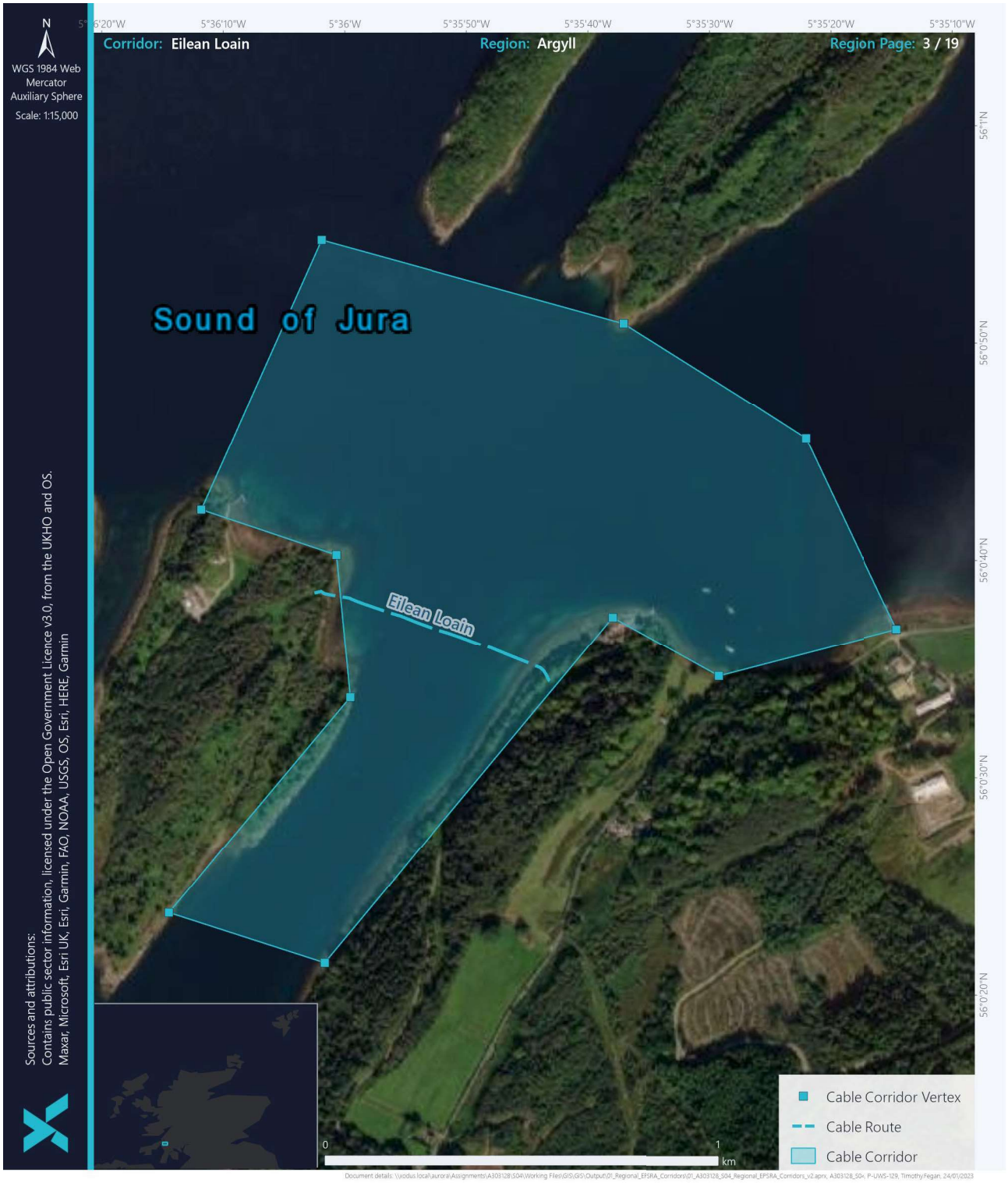
Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	6° 16' 46.988746" W	56° 36' 22.253738" N	6° 16.783' W	56° 36.371' N	-6.279719096	56.60618159
	6° 17' 43.085288" W	56° 36' 20.682331" N	6° 17.718' W	56° 36.345 N	-6.295301469	56.60574509
	6° 20' 16.569053" W	56° 36' 40.697244" N	6° 20.276' W	56° 36.679' N	-6.337935848	56.61130479
	6° 25' 35.229652" W	56° 38' 26.96483" N	6° 25.587' W	56° 38.449' N	-6.426452681	56.64082356
	6° 27' 36.179384" W	56° 39' 58.262044" N	6° 27.603' W	56° 39.971' N	-6.460049829	56.6661839
	6° 27' 18.903107" W	56° 40' 18.367795" N	6° 27.315' W	56° 40.31' N	-6.455250863	56.67176883
	6° 27' 22.536104" W	56° 40' 43.827442" N	6° 27.376' W	56° 40.730' N	-6.456260029	56.67884096
	6° 27' 4.732787" W	56° 40' 53.302544" N	6° 27.079' W	56° 40.888' N	-6.451314663	56.68147293
	6° 27' 13.299412" W	56° 41' 14.675863" N	6° 27.222' W	56° 41.245' N	-6.453694281	56.68740996
Mull - Iona	6° 23' 1.395096" W	56° 20' 54.155292" N	6° 23.023' W	56° 20.903' N	-6.38372086	56.34837647
	6° 21' 0.093146" W	56° 20' 38.947416" N	6° 21.002' W	56° 20.649' N	-6.350025874	56.34415206
	6° 21' 18.46539" W	56° 20' 27.592224" N	6° 21.308' W	56° 20.460' N	-6.355129275	56.34099784
	6° 21' 54.335174" W	56° 20' 4.053516" N	6° 21.906' W	56° 20.068' N	-6.365093104	56.33445931
	6° 21' 53.577148" W	56° 19' 30.454644" N	6° 21.893' W	56° 19.508' N	-6.364882541	56.32512629
	6° 22' 3.292097" W	56° 18' 50.703156" N	6° 22.055' W	56° 18.845' N	-6.367581138	56.31408421
	6° 23' 58.069176" W	56° 19' 30.326628" N	6° 23.968' W	56° 19.505' N	-6.39946366	56.32509073
	6° 23' 25.416748" W	56° 20' 1.472136" N	6° 23.424' W	56° 20.025' N	-6.390393541	56.33374226
Mull - Ulva	6° 9' 4.505116" W	56° 29' 7.098148" N	6° 9.075' W	56° 29.118' N	-6.151251421	56.48530504
	6° 8' 55.393454" W	56° 28' 56.620333" N	6° 8.923' W	56° 28.944' N	-6.148720404	56.48239454
	6° 8' 59.841794" W	56° 28' 53.103421" N	6° 8.997' W	56° 28.885' N	-6.149956054	56.48141762
	6° 8' 46.116658" W	56° 28' 47.734583" N	6° 8.769' W	56° 28.796' N	-6.146143516	56.47992627
	6° 8' 35.348935" W	56° 28' 46.820694" N	6° 8.589' W	56° 28.780' N	-6.143152482	56.47967242
	6° 8' 38.518976" W	56° 28' 43.268117" N	6° 8.642' W	56° 28.721' N	-6.144033049	56.47868559

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	6° 9' 6.819667" W	56° 28' 36.419084" N	6° 9.114' W	56° 28.607' N	-6.151894352	56.47678308
	6° 9' 4.885063" W	56° 28' 39.868518" N	6° 9.081' W	56° 28.664' N	-6.151356962	56.47774126
	6° 9' 15.927408" W	56° 28' 43.28382" N	6° 9.265' W	56° 28.721' N	-6.15442428	56.47868995
	6° 9' 9.979956" W	56° 28' 46.35386" N	6° 9.166' W	56° 28.773' N	-6.15277221	56.47954274
	6° 9' 15.313288" W	56° 28' 57.466333" N	6° 9.255' W	56° 28.958' N	-6.154253691	56.48262954
	6° 9' 27.92282" W	56° 28' 55.922675" N	6° 9.465' W	56° 28.932' N	-6.157756339	56.48220074
	6° 9' 30.481387" W	56° 28' 57.705542" N	6° 9.508' W	56° 28.962' N	-6.158467052	56.48269598
	6° 9' 26.184204" W	56° 29' 5.77972" N	6° 9.436' W	56° 29.096' N	-6.15727339	56.48493881
	6° 9' 8.482208" W	56° 28' 58.503655" N	6° 9.141' W	56° 28.975' N	-6.152356169	56.48291768
	6° 9' 9.261259" W	56° 29' 8.136391" N	6° 9.154' W	56° 29.136 N	-6.152572572	56.48559344
Seil - Easdale	5° 39' 5.65614" W	56° 17' 41.899672" N	5° 39.094' W	56° 17.698' N	-5.65157115	56.29497213
	5° 39' 4.300322" W	56° 17' 35.895556" N	5° 39.072' W	56° 17.598' N	-5.651194534	56.29330432
	5° 39' 1.337512" W	56° 17' 33.959515" N	5° 39.022' W	56° 17.566' N	-5.650371531	56.29276653
	5° 38' 31.10995" W	56° 17' 37.899071" N	5° 38.518' W	56° 17.6321' N	-5.641974986	56.29386085
	5° 38' 9.559658" W	56° 17' 28.715312" N	5° 38.159' W	56° 17.479' N	-5.635988794	56.29130981
	5° 38' 5.756114" W	56° 17' 28.568911" N	5° 38.096' W	56° 17.476' N	-5.634932254	56.29126914
	5° 38' 0.732264" W	56° 17' 27.061757" N	5° 38.012' W	56° 17.451' N	-5.63353674	56.29085049
	5° 37' 57.871459" W	56° 17' 22.041395" N	5° 37.965' W	56° 17.367' N	-5.632742072	56.28945594
	5° 38' 2.145221" W	56° 17' 18.116509" N	5° 38.036' W	56° 17.302' N	-5.633929228	56.2883657
	5° 39' 8.261341" W	56° 17' 13.33689" N	5° 39.138' W	56° 17.222' N	-5.652294817	56.28703803
	5° 39' 13.723038" W	56° 17' 22.990243" N	5° 39.229' W	56° 17.3831' N	-5.653811955	56.28971951
	5° 39' 7.811906" W	56° 17' 28.472536" N	5° 39.130' W	56° 17.475' N	-5.652169974	56.29124237
	5° 39' 8.152967" W	56° 17' 32.29966" N	5° 39.136' W	56° 17.538' N	-5.652264713	56.29230546

Cable Corridor	Co-ordinates for the survey works (WGS84) (the DMS are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for the survey works, (WGS84) (the DDM are not negative due to these being westerlies i.e. west of Greenwich meantime)		Co-ordinates for EPS licence application form and JNCC noise registry	
	Longitude DMS W	Latitude DMS N	Longitude DD W	Latitude DD N	Longitude DD	Latitude DD
	5° 39' 13.784004" W	56° 17' 33.704117" N	5° 39.230' W	56° 17.562' N	-5.65382889	56.29269559
	5° 39' 24.989882" W	56° 17' 39.969492" N	5° 39.416' W	56° 17.666' N	-5.656941634	56.29443597
	5° 39' 13.919342" W	56° 17' 46.252306" N	5° 39.232' W	56° 17.771' N	-5.653866484	56.2961812

9 APPENDIX B – INDIVIDUAL CORRIDOR/CABLE MAPS


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:150,000
Corridor: Coll - Tiree
Region: Argyll
Region Page: 2 / 19
6°48'W
6°46'W
6°44'W
6°42'W
6°40'W
6°38'W
56°36'N
56°34'N
56°32'N
56°30'N
Coll - Tiree
Cao lis
Vaul
Ruaig
Scarinish
Heanish
Cable Corridor Vertex
Cable Route
Cable Corridor
0
10
km
Sources and attributions:
Contains public sector information, licensed under the Open Government Licence v3.0, from the UKHO and OS.
Esri, HERE, Garmin, Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:15,000
Corridor: Eilean Loain
Region: Argyll
Region Page: 3 / 19
5°36'20"W
5°36'10"W
5°36'W
5°35'50"W
5°35'40"W
5°35'30"W
5°35'20"W
5°35'10"W
56°1'N
56°0'50"N
56°0'40"N
56°0'30"N
56°0'20"N
Sound of Jura
Eilean Loain
Sources and attributions:
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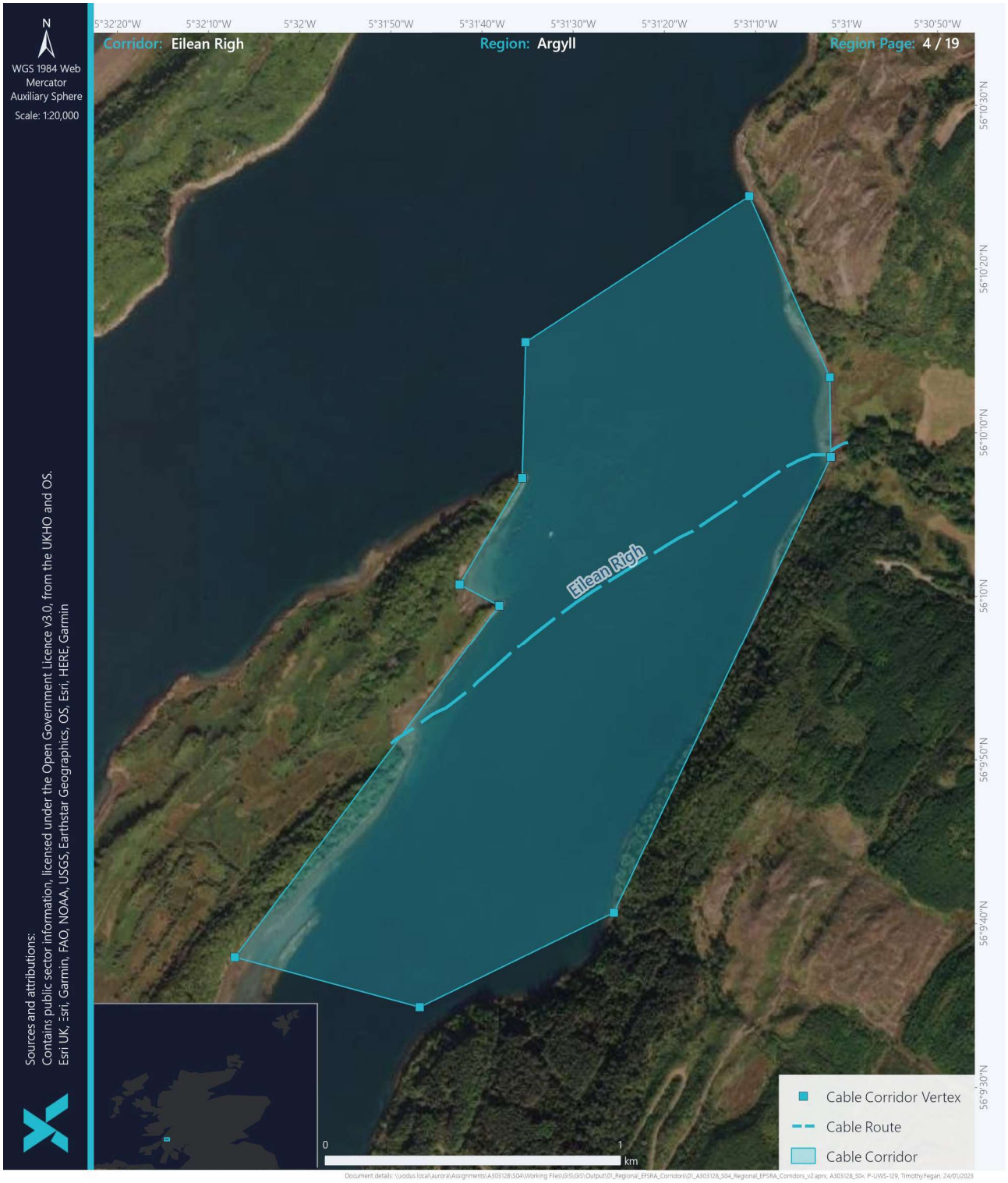
Maxar, Microsoft, Esri UK, Esri, Garmin, FAO, NOAA, USGS, OS, Esri, HERE, Garmin
0
1
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:20,000
Corridor: Eilean Righ
Region: Argyll
Region Page: 4 / 19
5°32'20"W
5°32'10"W
5°32'W
5°31'50"W
5°31'40"W
5°31'30"W
5°31'20"W
5°31'10"W
5°31'W
5°30'50"W
56°10'30"N
56°10'20"N
56°10'10"N
56°10'N
56°9'50"N
56°9'40"N
56°9'30"N
Eilean Righ
0
1
km
Cable Corridor Vertex
Cable Route
Cable Corridor
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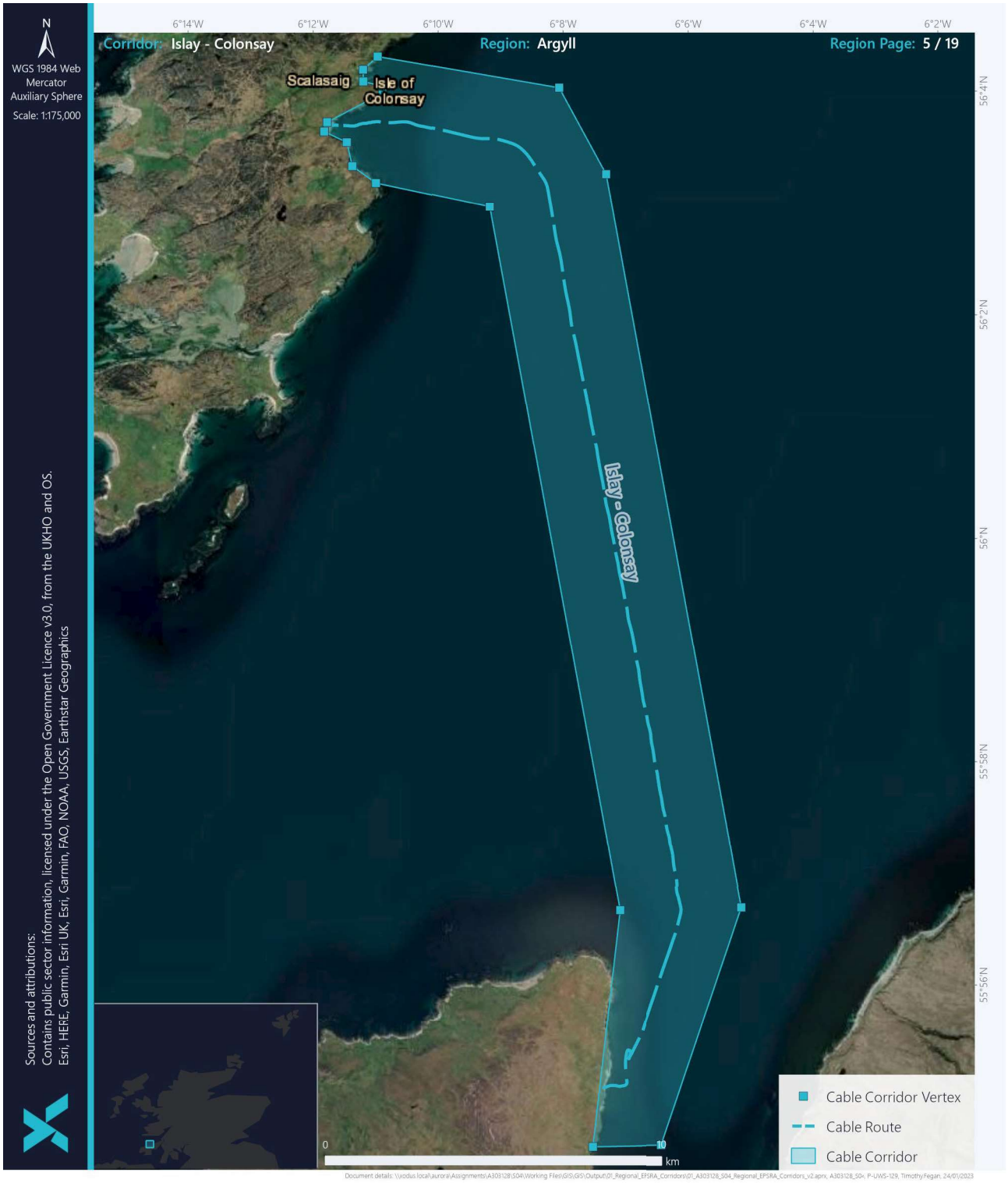
Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics, OS, Esri, HERE, Garmin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WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:175,000
Sources and attributions:
Contains public sector information, licensed under the Open Government Licence v3.0, from the UKHO and OS.
Esri, HERE, Garmin, Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics
6°14'W
6°12'W
6°10'W
6°8'W
6°6'W
6°4'W
6°2'W
56°4'N
56°2'N
56°N
55°58'N
55°56'N
Corridor: Islay - Colonsay
Region: Argyll
Region Page: 5 / 19
Scalasaig
Isle of Colonsay
Islay - Colonsay
0
10
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:15,000
Sources and attributions:
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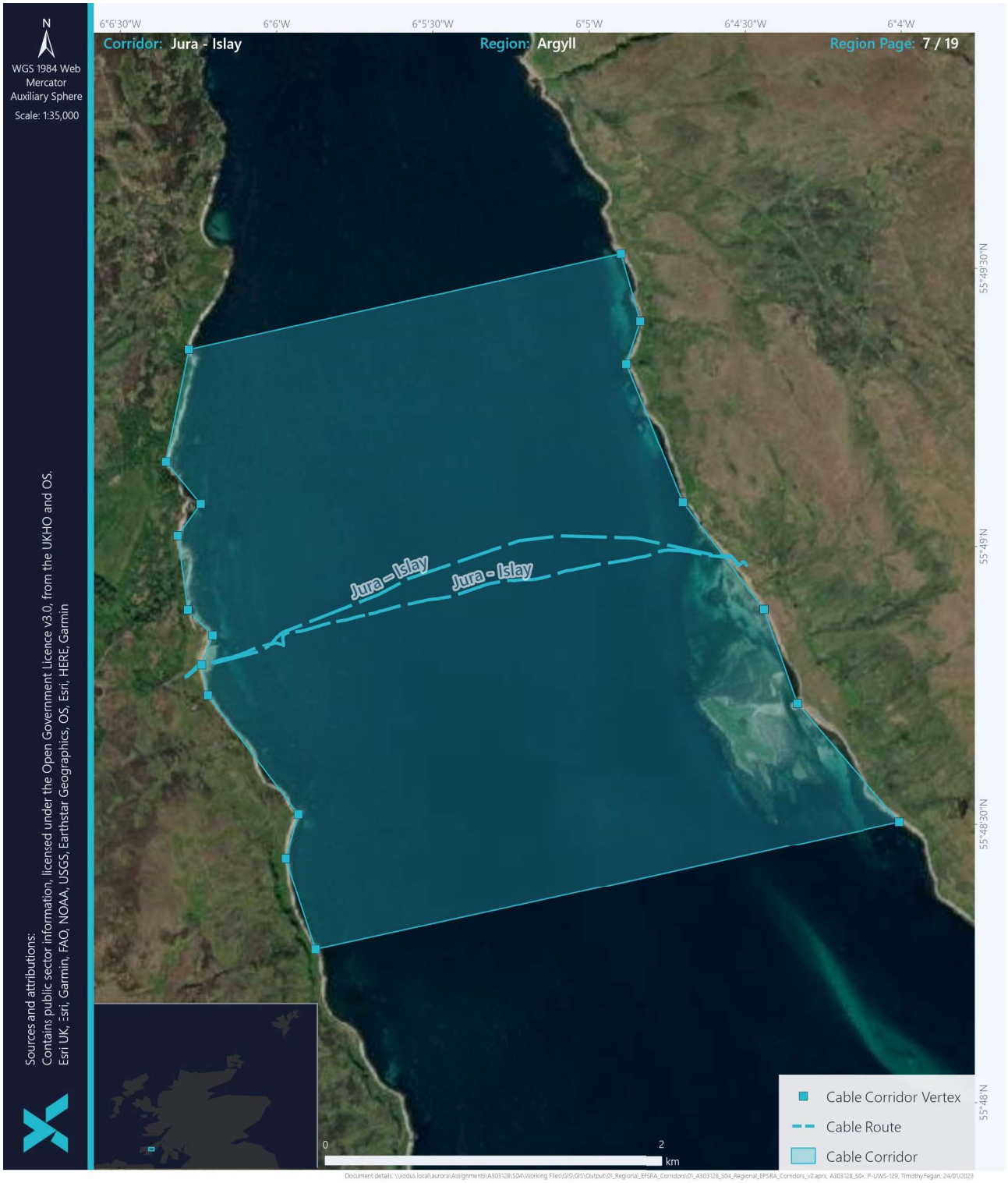
Maxar, Microsoft, Esri UK, Esri, Garmin, FAO, NOAA, USGS, OS, Esri, HERE, Garmin
6°31'W
6°30'50"W
6°30'40"W
6°30'30"W
6°30'20"W
6°30'10"W
6°30'W
6°29'50"W
Corridor: Islay - Orsay
Region: Argyll
Region Page: 6 / 19
Portnahaven
Port Wemyss
Islay - Orsay
55°40'50"N
55°40'40"N
55°40'30"N
55°40'20"N
55°40'10"N
0
1
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:35,000
Sources and attributions:
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Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics, OS, Esri, HERE, Garmin
6°6'30"W
6°6'W
6°5'30"W
6°5'W
6°4'30"W
6°4'W
Corridor: Jura - Islay
Region: Argyll
Region Page: 7 / 19
55°49'30"N
55°49'N
55°48'30"N
55°48'N
Jura - Islay
Jura - Islay
0
2
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:100,000
Corridor: Kerrera - Mull 2
Region: Argyll
Region Page: 8 / 19
5°39'W
5°38'W
5°37'W
5°36'W
5°35'W
5°34'W
5°33'W
5°32'W
56°28'N
56°27'N
56°26'N
56°25'N
56°24'N
56°23'N
Kerrera - Mull 2
Cable Corridor Vertex
Cable Route
Cable Corridor
0
7
km
Sources and attributions:
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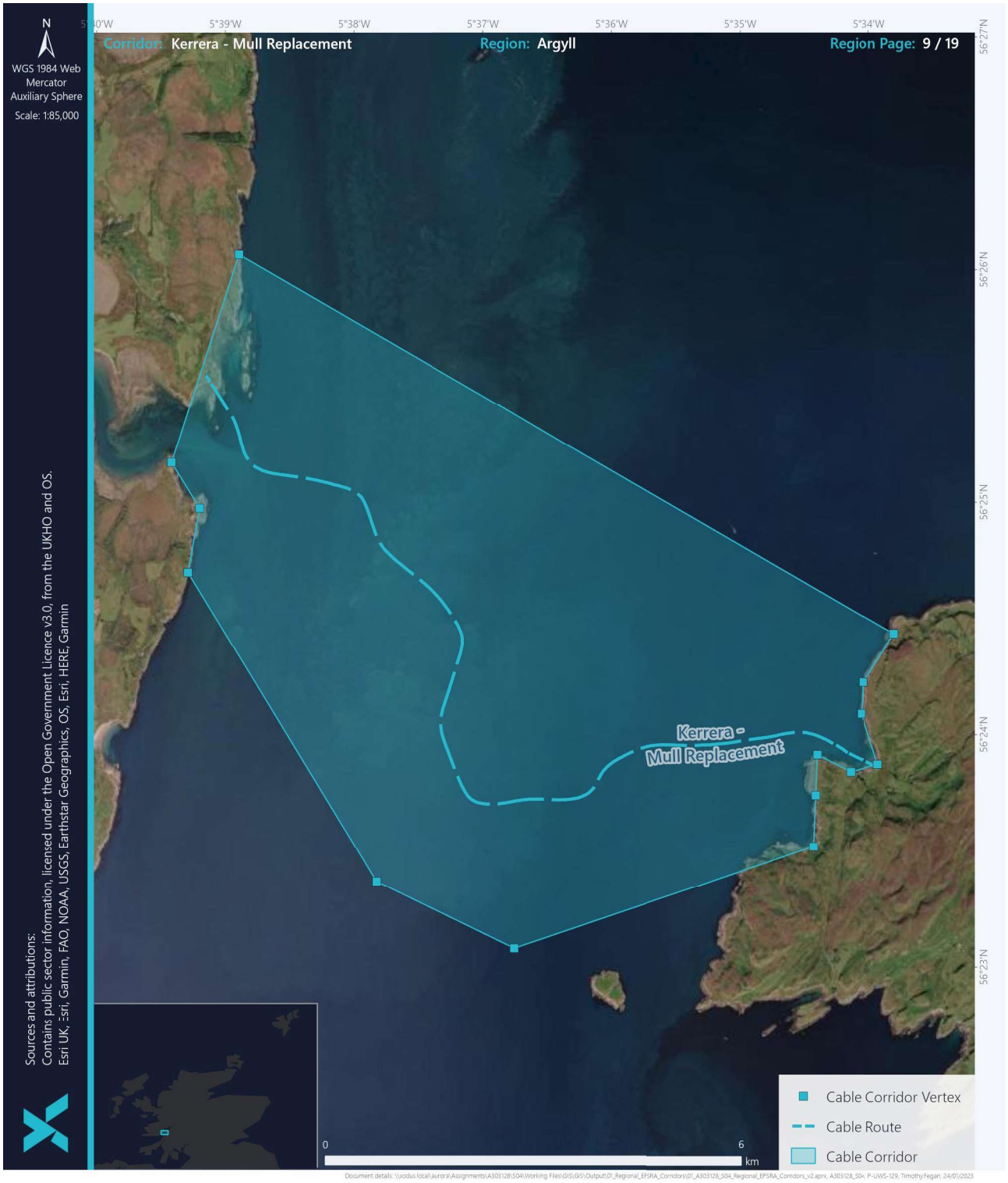
N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:85,000
Corridor: Kerrera - Mull Replacement
Region: Argyll
Region Page: 9 / 19
5°40'W
5°39'W
5°38'W
5°37'W
5°36'W
5°35'W
5°34'W
56°27'N
56°26'N
56°25'N
56°24'N
56°23'N
Kerrera - Mull Replacement
Cable Corridor Vertex
Cable Route
Cable Corridor
0
6
km
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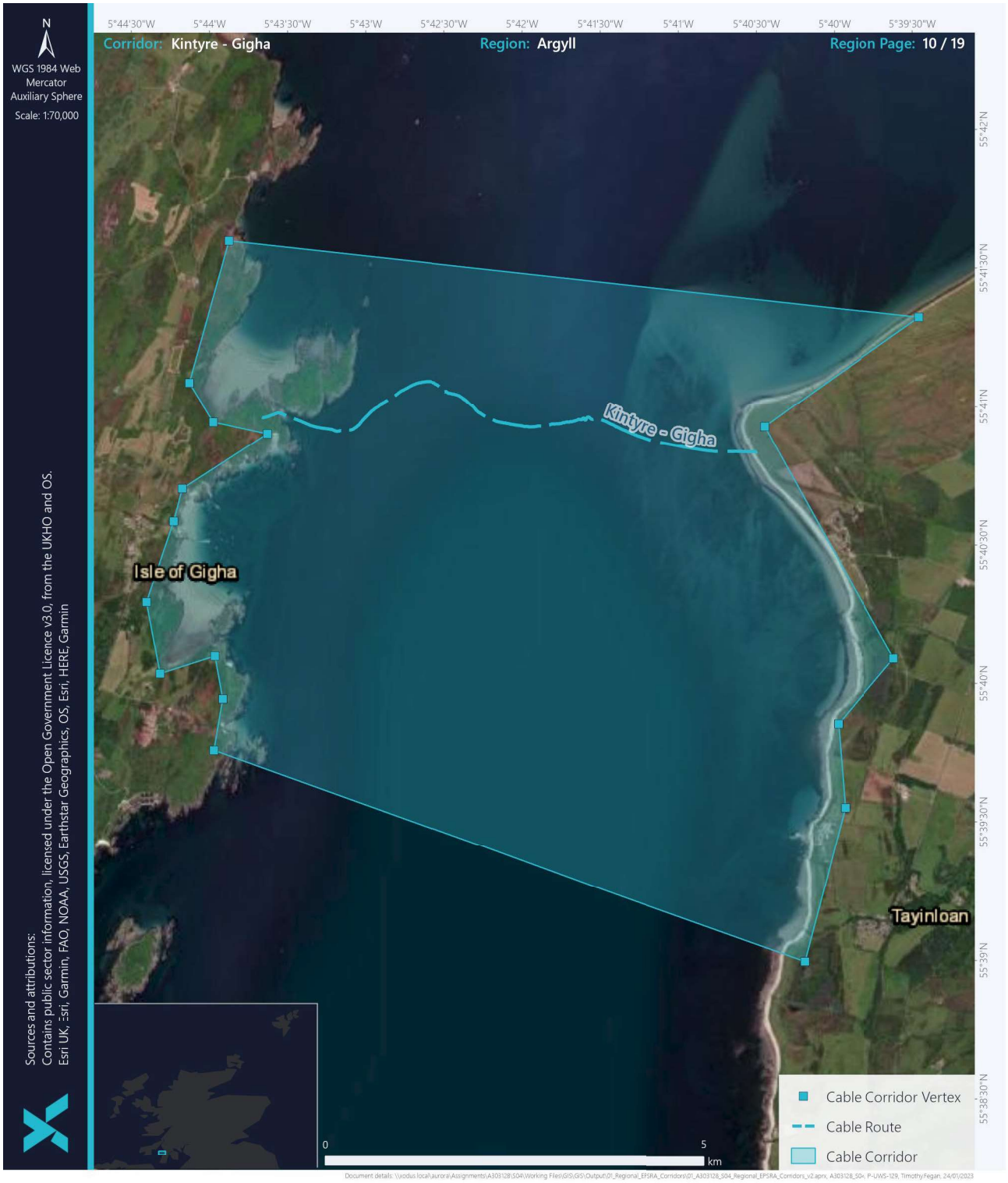
N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:70,000
Sources and attributions:
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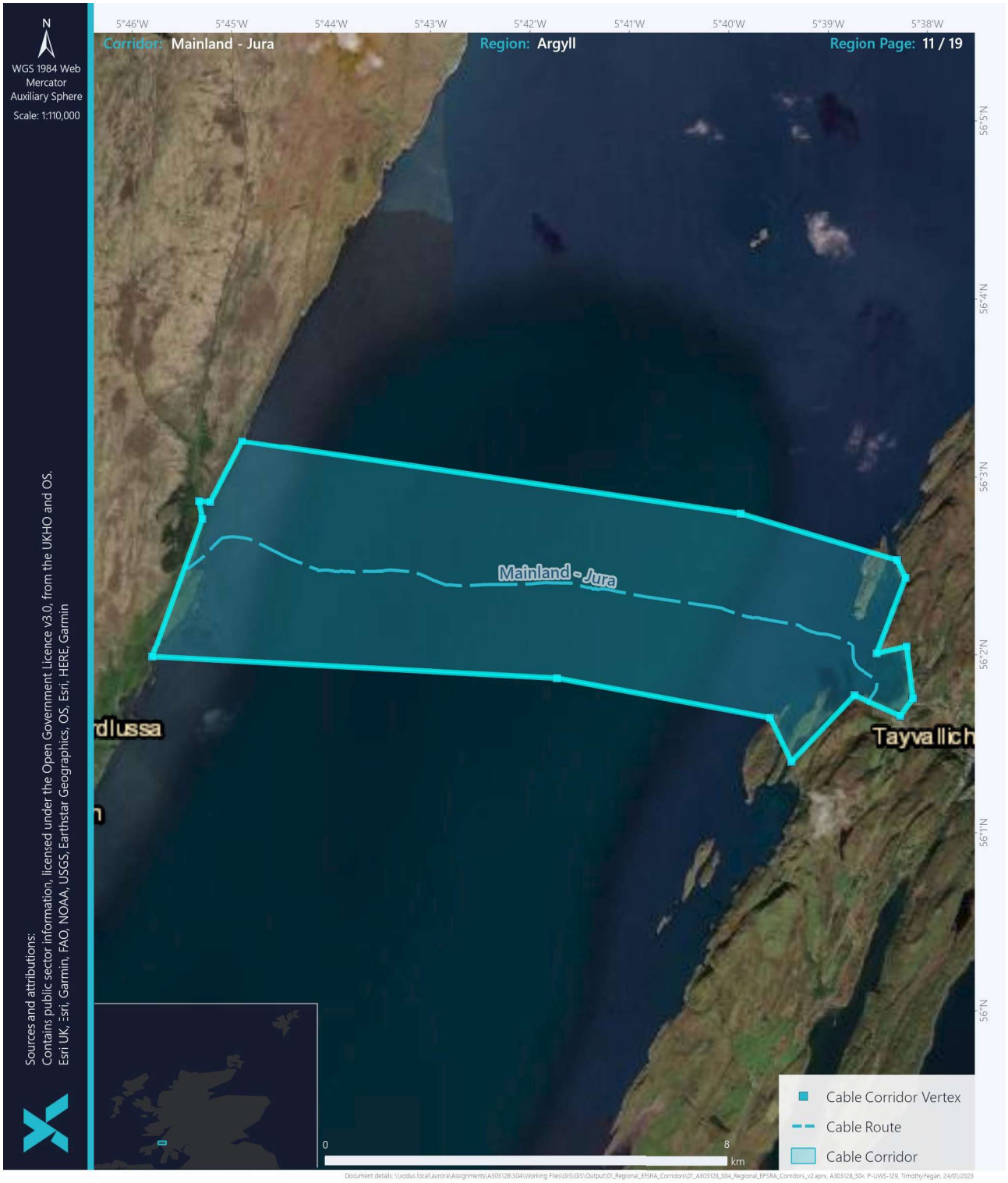
Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics, OS, Esri, HERE, Garmin
5°44'30"W
5°44'W
5°43'30"W
5°43'W
5°42'30"W
5°42'W
5°41'30"W
5°41'W
5°40'30"W
5°40'W
5°39'30"W
55°42'N
55°41'30"N
55°41'N
55°40'30"N
55°40'N
55°39'30"N
55°39'N
55°38'30"N
Corridor: Kintyre - Gigha
Region: Argyll
Region Page: 10 / 19
Kintyre - Gigha
Isle of Gigha
Tayinloan
0
5
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:110,000
5°46'W
5°45'W
5°44'W
5°43'W
5°42'W
5°41'W
5°40'W
5°39'W
5°38'W
Corridor: Mainland - Jura
Region: Argyll
Region Page: 11 / 19
56°5'N
56°4'N
56°3'N
56°2'N
56°1'N
56°N
Mainland - Jura
Tayvallich
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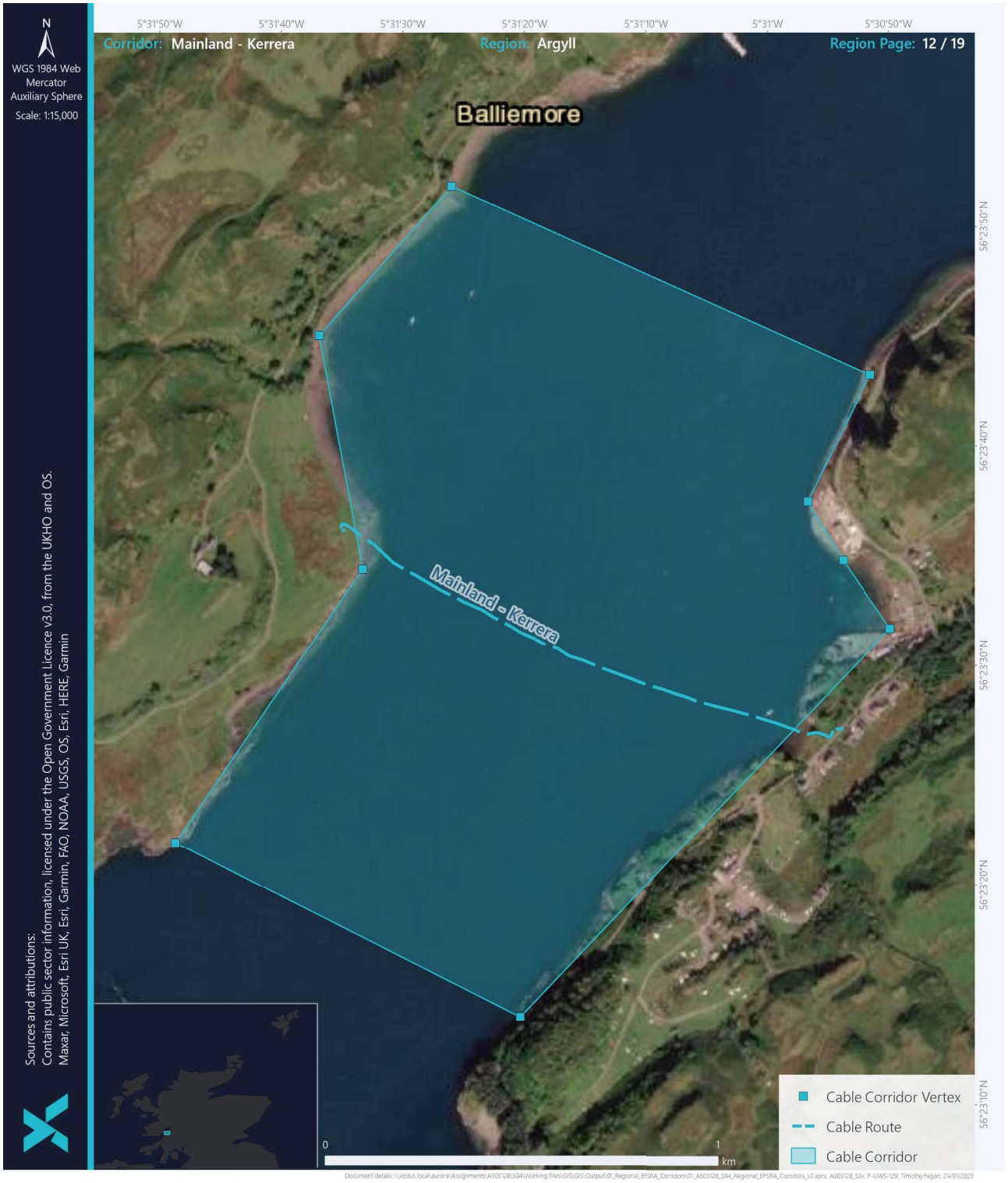
0
8
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:15,000
5°31'50"W
5°31'40"W
5°31'30"W
5°31'20"W
5°31'10"W
5°31'W
5°30'50"W
Corridor: Mainland - Kerrera
Region: Argyll
Region Page: 12 / 19
Balliemore
Mainland - Kerrera
56°23'50"N
56°23'40"N
56°23'30"N
56°23'20"N
56°23'10"N
Cable Corridor Vertex
Cable Route
Cable Corridor
0
1
km
Sources and attributions:
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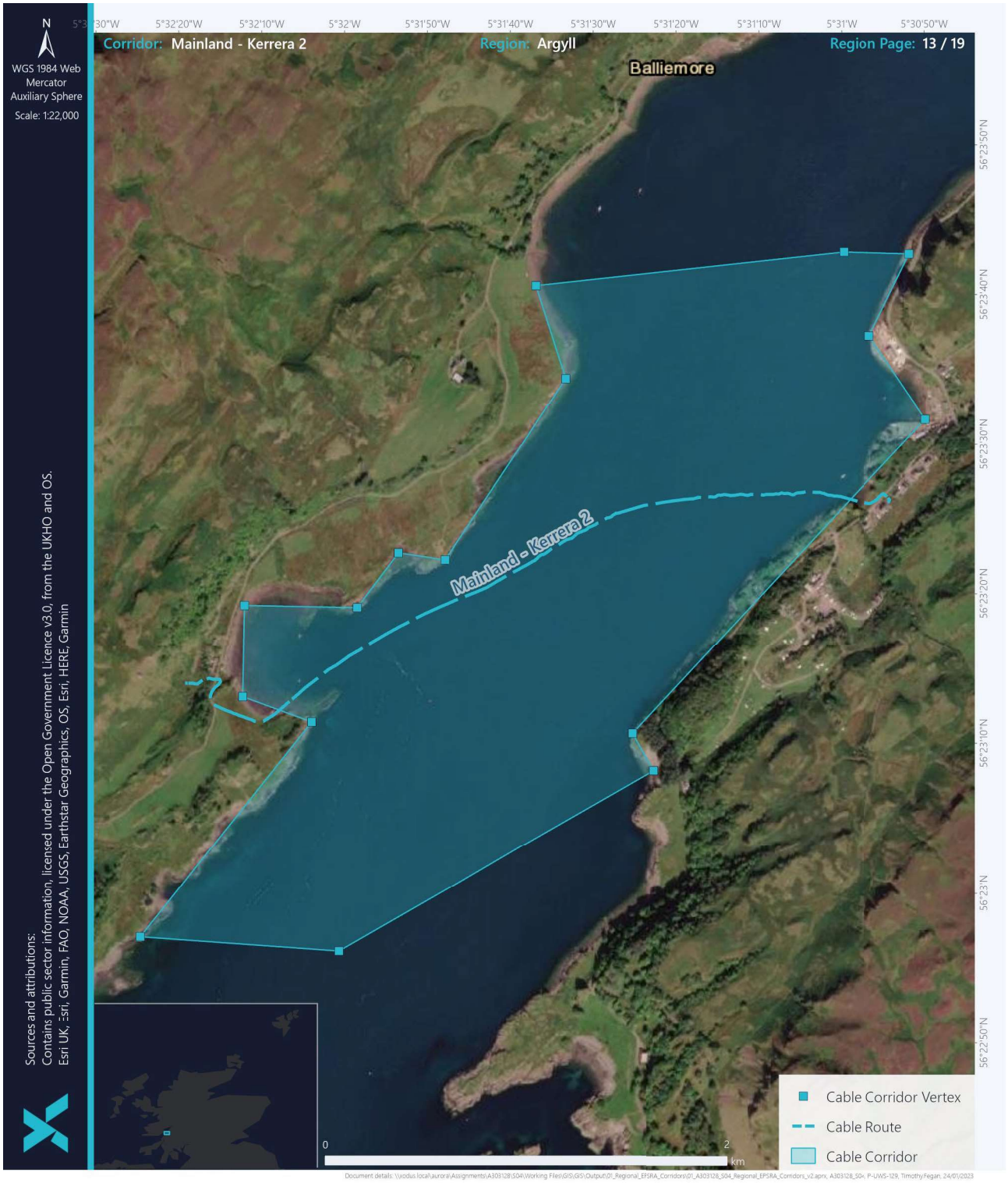
Maxar, Microsoft, Esri UK, Esri, Garmin, FAO, NOAA, USGS, OS, Esri, HERE, Garmin


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:22,000
Corridor: Mainland - Kerrera 2
Region: Argyll
Region Page: 13 / 19
Balliemore
Mainland - Kerrera 2
5°32'20"W
5°32'10"W
5°32'W
5°31'50"W
5°31'40"W
5°31'30"W
5°31'20"W
5°31'10"W
5°31'W
5°30'50"W
56°23'50"N
56°23'40"N
56°23'30"N
56°23'20"N
56°23'10"N
56°23'N
56°22'50"N
Cable Corridor Vertex
Cable Route
Cable Corridor
0
2
km
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N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:28,000
Sources and attributions:
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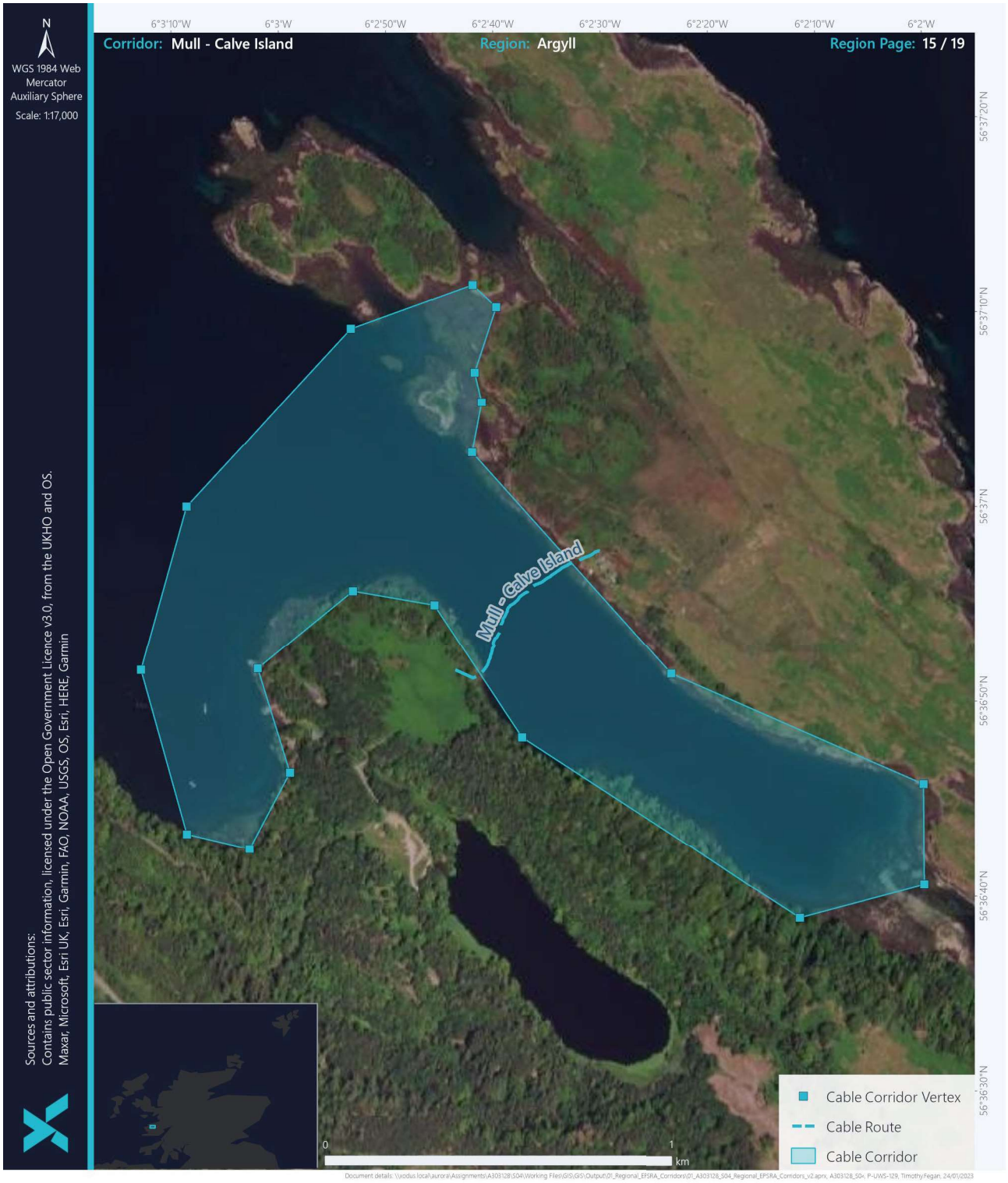
Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics, OS, Esri, HERE, Garmin
5°26'W
5°25'30"W
5°25'W
5°24'30"W
Corridor: Mainland - Lismore
Region: Argyll
Region Page: 14 / 19
56°34'N
56°33'30"N
56°33'N
56°32'30"N
Mainland - Lismore
Port Appin
0
2
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:17,000
Corridor: Mull - Calve Island
Region: Argyll
Region Page: 15 / 19
6°3'10"W
6°3'W
6°2'50"W
6°2'40"W
6°2'30"W
6°2'20"W
6°2'10"W
6°2'W
56°37'20"N
56°37'10"N
56°37'N
56°36'50"N
56°36'40"N
56°36'30"N
Mull - Calve Island
Cable Corridor Vertex
Cable Route
Cable Corridor
0
1
km
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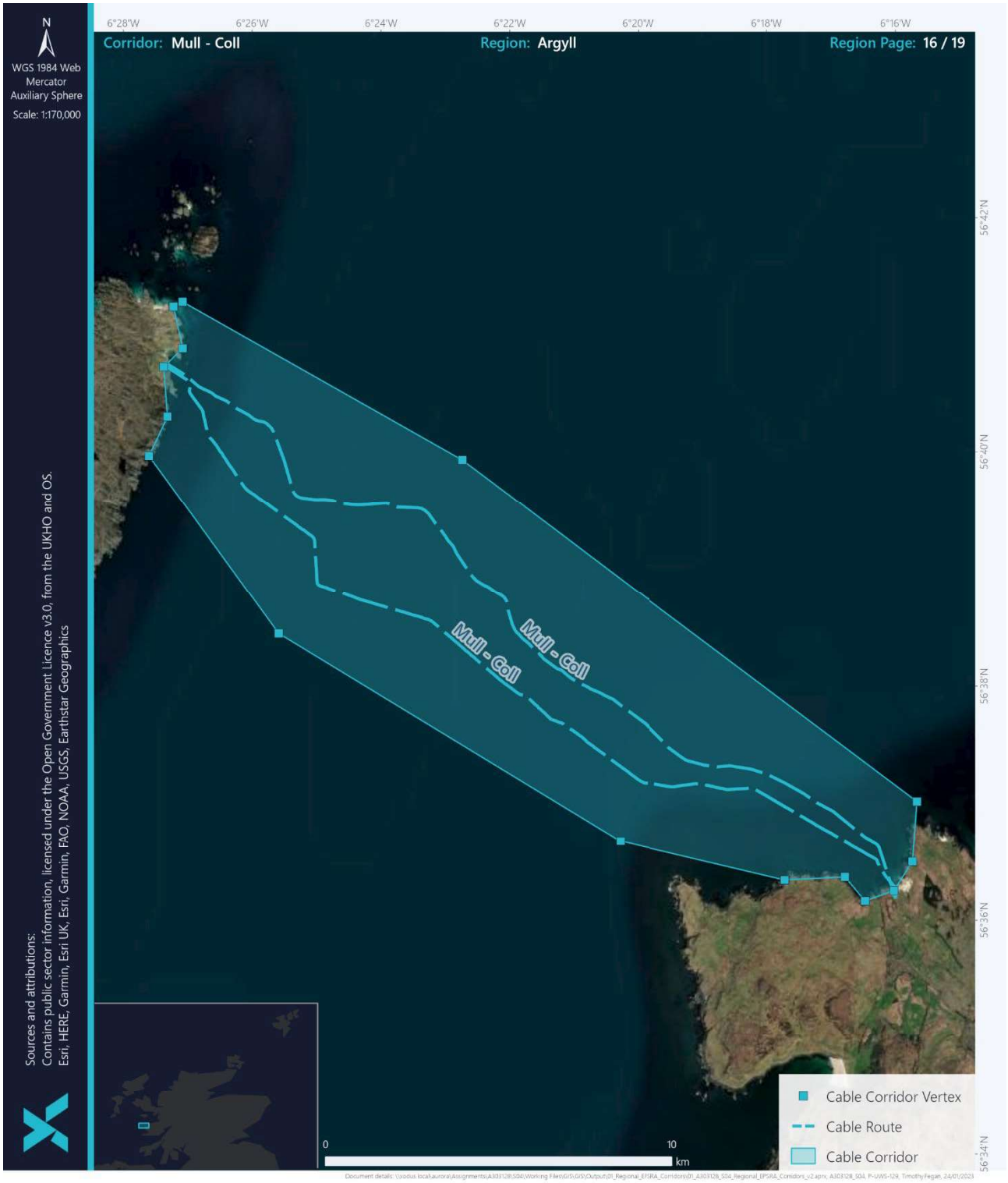
N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:170,000
Sources and attributions:
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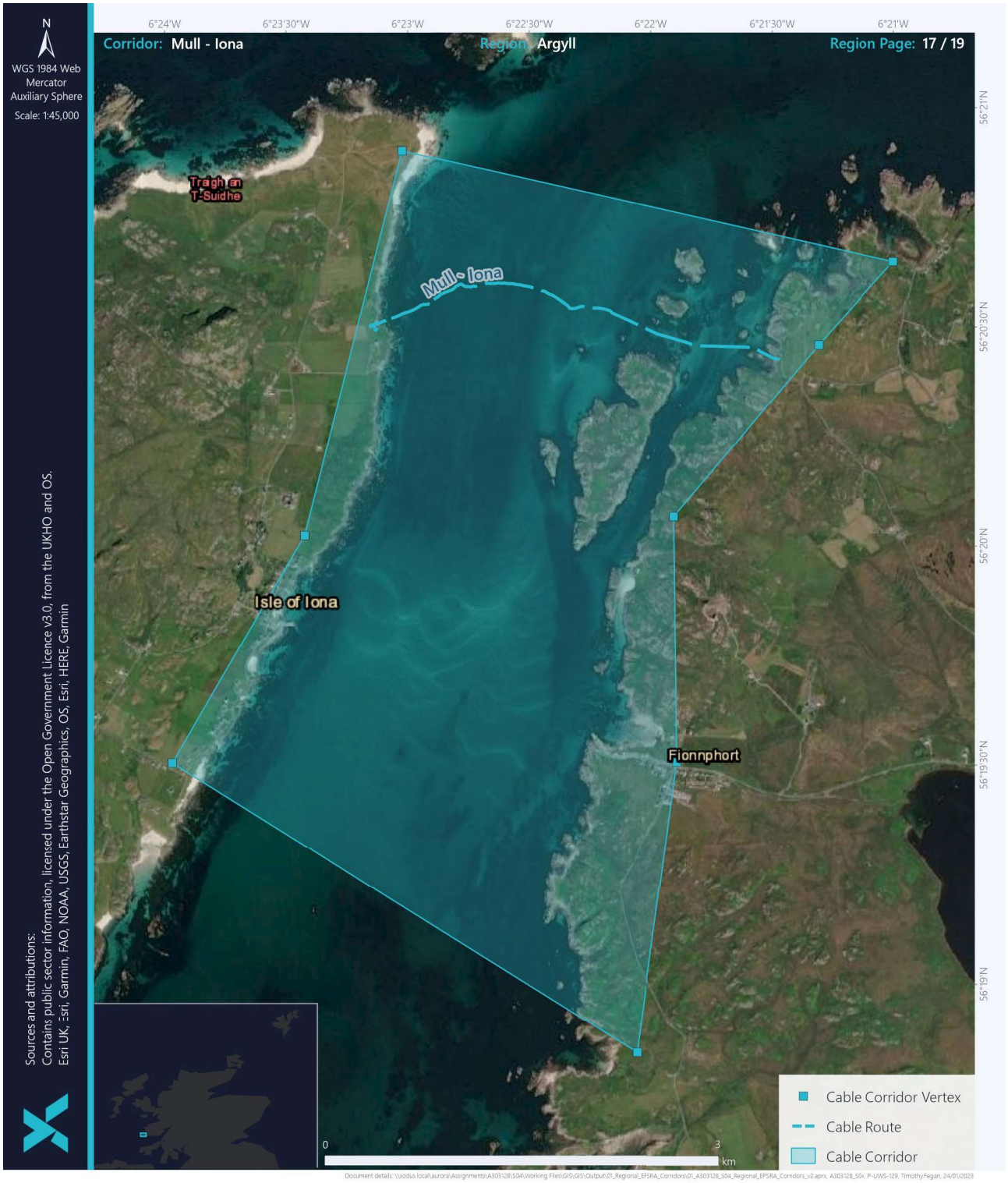
Esri, HERE, Garmin, Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics
6°28'W
6°26'W
6°24'W
6°22'W
6°20'W
6°18'W
6°16'W
Corridor: Mull - Coll
Region: Argyll
Region Page: 16 / 19
56°42'N
56°40'N
56°38'N
56°36'N
56°34'N
Mull - Coll
Mull - Coll
0
10
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:45,000
Sources and attributions:
Contains public sector information, licensed under the Open Government Licence v3.0, from the UKHO and OS.
Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics, OS, Esri, HERE, Garmin
6°24'W
6°23'30"W
6°23'W
6°22'30"W
6°22'W
6°21'30"W
6°21'W
Corridor: Mull - Iona
Region: Argyll
Region Page: 17 / 19
56°21'N
56°20'30"N
56°20'N
56°19'30"N
56°19'N
Traigh an T-Suidhe
Mull - Iona
Isle of Iona
Fionnphort
0
3
km
Cable Corridor Vertex
Cable Route
Cable Corridor


N
WGS 1984 Web Mercator Auxiliary Sphere
Scale: 1:20,000
Sources and attributions:
Contains public sector information, licensed under the Open Government Licence v3.0, from the UKHO and OS.
Esri UK, Esri, Garmin, FAO, NOAA, USGS, Earthstar Geographics, OS, Esri, HERE, Garmin
5°39'20"W
5°39'10"W
5°39'W
5°38'50"W
5°38'40"W
5°38'30"W
5°38'20"W
5°38'10"W
5°38'W
Corridor: Seil - Easdale
Region: Argyll
Region Page: 19 / 19
56°18'N
56°17'50"N
56°17'40"N
56°17'30"N
56°17'20"N
56°17'10"N
56°17'N
Ellenabeich
Easdale
Easdale Island
Seil - Easdale
0
1
km
Cable Corridor Vertex
Cable Route
Cable Corridor