Cable Route Environmental Information

Project: Sound of Islay Demonstration Tidal Array
Date: May 2013

SCOTTISHPOWER RENEWABLES

1.0 Introduction

ScottishPower Renewable Energy Limited, the parent company of ScottishPower Renewables (UK) Limited, is a wholly owned subsidiary of ScottishPower UK plc. At April 2013 SPR had an onshore wind portfolio of over 1,239MW, and was the first company to attain 1GW of installed onshore wind in the UK.

SPR aims to continue to expand its renewables capacity in the UK order to help the Scottish and UK Governments to meet their 2020 electricity generation targets from renewable sources. This includes the development of some of the newer renewable technologies including wave and tidal.

In July 2010, ScottishPower Renewables (UK) Limited (hereafter referred to as SPR) submitted an application under Section 36 of the Electricity Act 1989 to construct and operate a demonstration tidal array in the Sound of Islay, Argyll and Bute. The application comprised a ten turbine development with an installed capacity of 10MW, which will be wholly owned and operated by SPR.

The proposed Development could be the first tidal array in UK waters and it will deliver power directly into the National Grid. This will assist both the Scottish and UK Governments in meeting their future energy targets and their reduction of greenhouse gas emissions. The Development capacity of 10MW equates to an average production of 26.3GWh p.a., which is enough to supply approximately 5400 average domestic households.

SPR currently holds consent to construct, install and operate a demonstration tidal power array within the Sound of Islay (Figure 1.1). The Development will utilise the tidal flow running through the Sound to power tidal turbines during the flood and ebb tidal flows and generate electricity throughout these flow periods.

Post-consent discussions were held with the regulator and, as a result of these discussions related to the interpretation of planning legislation, a number of amendments have been made to the Development. The principal change in relation to this Marine Licence application relates to a new cable route to shore, which is now planned to make landfall on Islay instead of Jura as previously consented (Figure 1.2).

The preparation of this Marine Licence application and its supporting documentation has been an integral component in ensuring that the investigation of any environmental impacts of the proposed project is robust and comprehensive. This document and the supporting Marine Licence application will assist Scottish Ministers in reaching a decision as to whether permission should be granted for the proposed new cable route to shore.

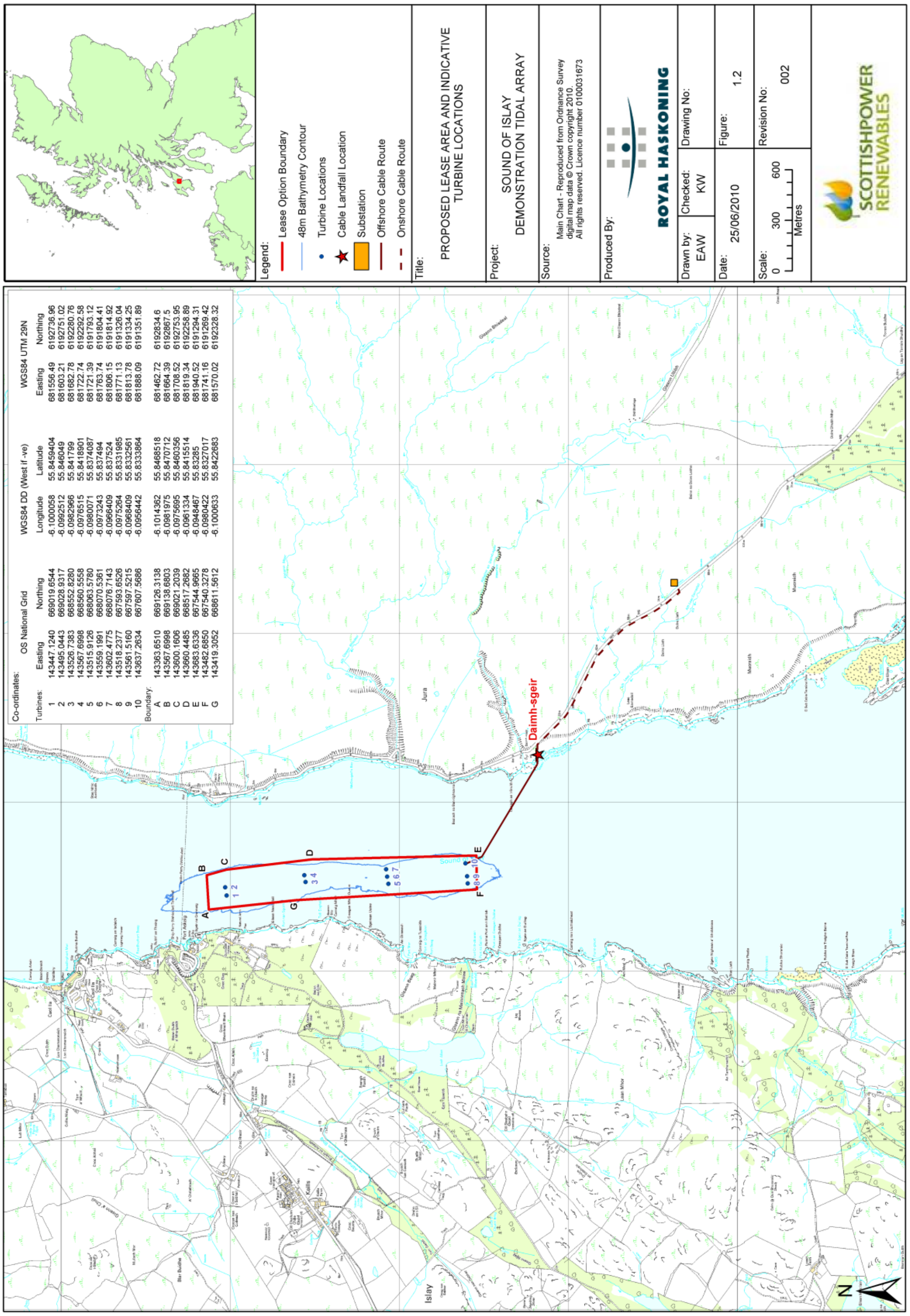


Figure 1.1: Development site showing turbine locations, cable route and onshore infrastructure as consented in 2011.

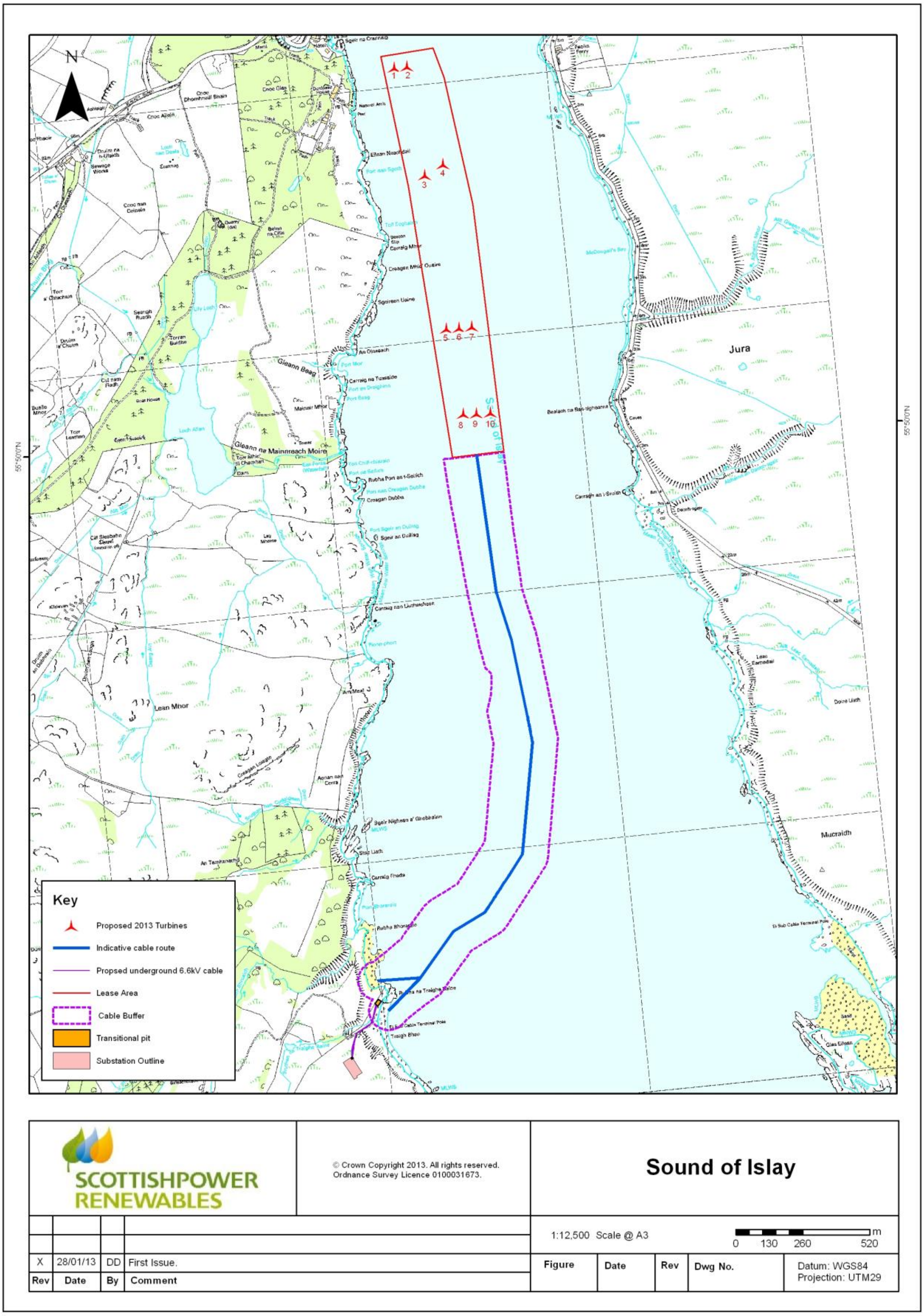


Figure 1.2: Development site showing turbine locations, cable route (incl. buffer) and onshore infrastructure as proposed in 2013.

2.0 Project Description

2.1 Introduction

SPR is proposing changes to their consented Sound of Islay Demonstration Tidal Array. The proposed change in relation to this document and the supporting Marine Licence application relates specifically to a proposed new cable route which will connect the array to Islay rather than Jura (as previously proposed and consented).

The Tidal Array will consist of up to ten submerged pre-commercial demonstration tidal stream-generating devices, deployed in an array. The candidate tidal device will be the HS1000, developed by ANDRITZ HYDRO Hammerfest. This design is based on an existing 300kW prototype device developed by Hammerfest Strøm AS and a 1MW device developed by Hammerfest Strøm UK (at that time a subsidiary of Hammerfest Strøm AS). This 1MW device has been adapted for UK tidal conditions. This device was deployed at the European Marine Energy Centre (EMEC) in December 2011 for a period of testing.

In addition to these tidal devices, there will be associated offshore infrastructure (incl. subsea and landfall cable(s) (this document)) and onshore infrastructure (incl. a control building, substation and onshore access (separate application)).

2.2 Site Location

Islay is the most southerly of the main Inner Hebridean Islands and is located south west of the island of Jura on the west coast of Scotland. The Sound of Islay is the stretch of water that separates the islands of Jura and Islay. The Sound is approximately 1km wide and reaches 62m in depth. The Development site is shown on Figures 1.1 and 1.2 and lies within the local authority area of Argyll and Bute Council.

There will be a number of export power cables (up to a maximum of ten) from the Tidal Array as well as associated onshore infrastructure components. The location for these components has altered from the 2010 submission and 2011 consent and is now being proposed for the island of Islay. The landfall location selected on Islay is approximately 2.5km south of the turbine array and is close to the point where the Islay/Jura 33kV interconnector comes ashore.

2.3 Offshore Site Description

The stretch of water known as the Sound of Islay lies between the islands of Jura and Islay and is a deep-water U-shaped channel. The bathymetry of this channel constitutes a relatively flat and deep seabed (depths of up to 62m) with very steeply sloped sides. The steepest slope is on the Islay side close to Port Askaig with the Jura side of the channel having a slightly gentler gradient. The Sound is generally sheltered from the wave action which affects the west coast of the island. At the northern end of the Sound the bathymetry shallows to only 10-11m, whereas to the south it remains at up to 20m in depth.

The benthic environment consists of various sediment types ranging from sandy areas to areas dominated by pebbles, cobbles and boulders. The biological environment is typical of that found in highly tidal areas along the west coast of Scotland. This constitutes high abundances of filter-feeding organisms such as soft corals, hydroids, bryozoans, large sponges and anemones. In shallow water, kelp is a major constituent of the biological environment with areas of maerl also identified within the Sound.

Two potential cable landfall locations have been identified (Figure 1.2). The northern landfall site is deemed to be the most appropriate as it allows for bend radius parameters to be fully considered when laying the cables and maintains an appropriate working distance from the already present SSE cable that connects Islay and Jura. The southerly landfall location would mean that the bend radius of the cable would be tight and potentially lead to a greater need for future maintenance or replacement operations.

The protection and stability operations proposed for the cable are outlined in Section 2.5.2. It is unlikely that burial operations will take place in any area other than the intertidal and shallow subtidal environments. By the time the proposed cable route reaches the nearshore extent of the maerl bed the cable will be layed with armour protection and intermittent mattressing, particularly at the points in the cable length where it curves across the predominant tidal flow.

2.4 Cable Description

The final cable design, and ultimately the size of any cables, will be dependent on the electrical system design, cable layout, installation methods and soil characteristics. However, the preferred design is to have one cable per device, thus approximate dimensions can be given and, as can be seen from the list below, will be in the order of 83mm per cable.

Cable specification, assuming that each device has its own cable (therefore a total maximum of 10 cables will be installed) is likely to be of the order:

- 3 x 95 sq mm 6.6kV
- 3 x 16 sq mm 3.3kV
- 1 x optical cable - 10 x s/m fibres
- 10 x 3.5km, double armoured
- Cable OD = 83mm (including armouring)
- Weight in air = 16,150kg/km

A cable protection assessment has been undertaken and points to the best solution as being a combination of free lay of the cable whilst adding a steel casing cable protection system with intermittent mattressing along the cable route. Burial of cable using land-based equipment is likely to only be a solution close to shore (within 500m); however this is compounded by environmental factors that need to be considered (e.g. the adjacent maerl bed).

2.5 Cable Installation

2.5.1 Pre-installation works

SPR would undertake pre-construction geophysical and geotechnical surveys of the preferred cable route to locate any obstacles that may obstruct cable laying. Any obstruction located would be assessed and a strategy would be established to remove or avoid them. Any large items will be mapped and the route will be laid with a typical safe distance of approximately 50-100m from the cable.

The geophysical surveys would also serve to identify the location of slopes, sand waves, potential free-span areas along the cable route so that an assessment can be made as to whether such features can be avoided.

Careful consideration will be given to all subsea activities being monitored to prevent the potential for damage to the cables, either when installing cables at the touch down point, recovery of the subsea half connector or when laying back down the bights on the seabed.

Monitoring the installation and recovery processes within the construction phase can be used to ensure quality control of the installation. Without monitoring then the potential for damage to the subsea cables and equipment during installation is increased. Monitoring can prevent potential compromise of the cable minimum bend radius during laying and touchdown and detect possible large free-spanning over the rough seabed topography. There is an element of stiffness in the cables with the casing, but the subsea visual confirmation is needed to confirmed acceptable installation.

2.5.2 Installation and Protection

The design of the installation methodology can only be finalised after the completion of the pre-installation geophysical and geotechnical surveys. The Sound of Islay has a very uneven seabed with little or no sediment in the central channel. Therefore, there is high potential for free-spanning.

The cable vessel is likely to only require sufficient deck space to accommodate a reel lay system including cable tensioner, cable trays and overboard chute and capacity for any spare reels for installation due to the short cable lengths.

2.5.2.1 Casing Protection and Mattress Stability

During cable installation activities it is proposed to fit armour casings to the cable to afford a degree of protection from the fatigue likely to be produced within such a tidal area. This, in conjunction with the use of mattresses) offers the best combination of protection and stability.

The cable laying vessel could also be utilised to lay the mattresses once the cable laying operations and testing have concluded. Mattresses would be placed along the cable at pre-determined spacing, likely to be in the order of thirty mattresses per cable given the 2.5km length. The actual locations of these would be determined during the pre-installation surveys, but are likely to be in areas where the cables curve towards the shore and would avoid environmentally sensitive locations (e.g. within the maerl bed).

2.5.2.2 Burial

Burial into the seabed is generally recognised as the optimum means for providing protection from hazards (both environmental and mechanical), provided that the seabed material is conducive to burial and the metocean conditions are conducive to such burial operations taking place.

In soils, the cable is protected by a layer of seabed material; the stronger the soil resistance to penetration by hazardous equipment, the better the cable is protected. In rock, the cable is protected by the rock shoulders on either side of the trench, and potentially by backfilling material which is typically deposited over time through natural sediment transport.

Burial operations can be conducted pre, during, or post-lay by a wide range of different equipment. Most commonly used are ploughs, which depress the cable below the seabed, and jetters, which fluidise the soil allowing the cable to sink below the surface. In hard soils and rock mechanical cutters may be used, but efficacy is highly dependent on topography and geotechnical parameters. Some machines require diver assistance; others require the removal of the surface veneer before cutting can begin.

Determination of the appropriate burial depth for the Sound of Islay cables will take into consideration both the on-site soil conditions and the specific hazards in the area.

There is currently no proposal to bury large offshore sections of the cable (e.g. the main north-south length) and the section that crosses the maerl bed. Armour casings and mattressing (see Section 2.5.2.1) are the most likely forms of protection and stability which will be employed. The only likely location for burial operations to occur would be the nearshore shallow subtidal environment out to the start of the maerl bed (a maximum of 340m). However, it is currently expected that trenching will only occur in the intertidal and very shallow subtidal environments, with the cable being laid on the seabed thereafter, as there is a second priority marine feature (PMF) inshore of the maerl bed. Therefore, in order to least impact upon this PMF (**SS.SMp.KSwSS.LsacR.Sa**) the cable is proposed to be laid rather than buried in this area.

Onshore works will include the cabling up the shore and the creation of a transition pit above MHWS. All of these works can be undertaken using land-based excavators. Within the intertidal zone to the low water mark during low water tidal windows, land-based excavators can carry out trenching operations dependent on soils and overburden of sediments. This is in order to protect the cable to limit any environmental impact and third party interaction within these areas. Once all the cables have been pulled in, tested and terminated, all excavated material will be placed back over the cable for protection and stability.

2.5.3 Offshore Cable Installation

The installation would typically commence from the landfall site to the offshore array with a potential sequence of events being described in the following bullet points. The cables would likely be installed prior to the tidal turbines.

- Vessel will be mobilised with the cables on reels ready to be installed. All vessel checks and equipment calibrations will be carried out prior to commencing operations;
- On completion of landfall site preparations, the landfall winch wire messenger wire is readied for transfer to the installation vessel;
- The cable installation vessel arrives at a location close to the landfall point, approaching the shore at high water;
- The winch wire messenger wire is collected via a small craft and brought to the installation vessel where it is pulled in until the winch wire is on board. The messenger wire is removed and the winch wire is connected onto the cable pulling head;
- The winch wire is pulled in towards the shore whilst the installation vessel pays out via the reel system and tensioner;
- Floatation devices are installed as the cable is paid out until the cable has been fully floated ashore.
- Once the cable reaches the shore, portable under-rollers can be used and placed under the cable to prevent abrasion and friction on the cable until it reaches the termination point and the hold back rigging is secured;
- The floatation devices are removed;
- On completion of the beach works the cable installation vessel slowly moves away from the shore, establishing catenaries and tensions on the cable for free lay to the field. During the lay the deck crew will install the cable protection system over the cable;
- Once the cable installation vessel reaches the cable designated lay down for that cable (each subsequent cable will have its own RPL and lay down area defined for each installation) it will hold station and prepare for the cable lay down;
- Cable testing would take place by Optical Time Domain Reflectometer (OTDR) and insulation and core continuity testing (IR) to ensure the cables are still fit for purpose after lay operations;
- The half dry-mate connector is installed on the end of the cable;
- The connector and cable is then laid down on the seabed; and
- This methodology will be carried out for each cable installation as required.

Ideally the nearshore and intertidal cable trench will be backfilled for some distance before the cable lay vessel (CLV) lays away to further secure the cable. Where multiple cables are to be installed however, nearshore burial will be delayed until all cables are in place. The ultimate choice of strategy will depend on the number of cables, delay between pull-in operations, burial method selected and local met ocean conditions.

2.5.4 Mattress Installation

Mattress installation would commence after the cable installation has been completed. The CLVs equipment would be de-mobilised and the vessel then remobilised for mattress installation i.e. for concrete mats and mattress handling frame.

- The vessel would locate at the first mattress location;
- The vessel would have already deployed a mattress into the handling frame ready for over boarding;
- The vessel would choose the optimal tidal window to deploy the ROV subsea;
- The mattress would be over boarded;
- The ROV would guide the mattress on to the cable;
- The ROV would release the mattress from the frame;
- If the tidal window allows the ROV will stay subsea whilst the vessel moves to the next mattress location;
- The mattress will be fixed;
- The next mattress will be laid as the above outlined method along the cable route for each cable.

2.5.5 Cable/Dry-Mate Connector Installation/Recovery

2.5.5.1 Wet-Mate Connectors

Given the current state of wet-mate connector development it is highly unlikely that wet-mate connectors would be used for the Sound of Islay project.

2.5.5.2 Dry-Mate Connectors

Given the current lack of suitable wet-mate connectors it is likely that dry-mate connectors will be used on cable ‘flying leads’ from the turbine nacelles.

2.5.5.3 Connector Installation

Dry-mate connector terminations can either be factory installed or spliced on-board the CLV. If this is done onshore then it would reduce vessel time and allow for greater confidence in splice quality.

The installation process would require either:

- The connection to be made on the deck of the CLV prior to deployment of the tidal turbine; or

- Require pre-laid terminations to be retrieved from the seabed with the connection then being made on board the installation vessel before the final lay-down of the cable.

A similar procedure would be required during subsequent maintenance operations in which the turbine nacelle is removed.

2.5.6 Landfall Design

Although both landfall sites are constructible, the preferred option is the use of the northern site (see Figure 1.2). This landfall location is both easier with regards offshore routing and angle of approach from the sea to the proposed transition pit area; additionally it avoids any potential conflict with the incumbent cabling infrastructure owned by SSE.

The method being proposed for the landfall location is that of open-cut trenching. This method involves the excavation of a trench across the landing area, which is then back-filled following installation of the cable(s). A beach transition pit will be required above the high water mark and acts as the point between the onshore and offshore cable routes where the two cable types are jointed together.

The landfall trench can be divided into two sections; the inshore section, which can be undertaken by land-based equipment; and the offshore section, which has to be undertaken by specialist dredging or trenching equipment. Where the depth of excavation is large, temporary trench support may be required, usually in the form of steel sheet piling. Sheet piled cofferdam construction is usually adopted where a large trench is required, and can be extended from the back of the beach (or behind the beach dunes) seawards to an interface where offshore trenching can commence.

Cables in the inshore region typically have a burial depth in the order of 2m below lowest beach levels.

3.0 Benthic Ecology

3.1 Introduction

This chapter provides information on the presence, character and sensitivity of seabed communities along the route of the amended Sound of Islay Demonstration Tidal Array export cable route.

All other potential effects of the development are assumed to have been covered by the original 2010 ES (SPR, 2010) or will be covered in separate licence applications. If required, potential mitigation measures to reduce these impacts are also discussed, along with the residual impact that remains post-mitigation.

Summary of cable route impacts:

Four algal habitats of conservation importance were recorded during the proposed cable route survey. Two of these PMFs are expected to be directly impacted, one of which is of high conservation value. The impact is likely to be of medium magnitude; therefore, the significance of the potential effect is expected to be major reducing to minor after mitigation.

3.2 Potential Effects

The footprint of the cables will lead to a loss of benthic habitat for the duration of the 25 year project, where the cable and cable protection/stability systems are laid on the surface of the seabed. However, installation in the very shallow subtidal softer sediment environments may be undertaken by trenching and infilling; however, care would be taken not to trench through either of the two PMFs present along this portion of the cable route. Therefore, in this shallow subtidal area there may be a level of disturbance during cable laying operations, but this is likely to return to pristine condition shortly thereafter.

Increased suspended sediments during cable laying and possible trenching operations can smother benthic organisms, particularly sessile filter feeders and maerl. To date surveys have shown limited sediment available for re-suspension, particularly in the central areas of the Sound. However, this will be different in the intertidal and shallow subtidal zones where the cable is likely to be trenched and the release of sediments from these areas may have an impact, particularly on the maerl bed that the cable route is proposed to run across.

3.3 Methodology

3.3.1 Legislation, Guidelines and Policy Framework

The majority of the seabed in the Sound of Islay (all of the rock and cobble areas) is classed as Reef, an Annex 1 Marine Habitat listed on the Habitats Directive (JNCC website) and the Sound would also be classed as a Tidal Rapids, a UK Biological Action Plan (BAP) Priority Habitat.

Scottish Natural Heritage has recently produced a list of Priority Marine Features (PMFs) to support the advice they provide on marine biodiversity and planning issues (Howson *et al.*, 2009; Scottish Natural Heritage, 2012). Four algal dominated PMFs were found during the cable route survey (see Appendix 1). These are listed in Table 3.1, along with their extent and conservation importance as defined in the survey report.

Table 3.1: Algal PMFs identified along the proposed cable route.

Algal PMF	Extent (km^2)	Description	Direct Cable Route Impact (Y/N)	High Conservation Value (Y/N)
IR.MIR.KR.LhypTX	0.334	This biotope covered the largest area during the survey. Often structurally complex and species rich (Howson *et al.*, 2009), this did not appear to be the case in the Sound.	N	N
SS.SMp.Mrl.Pcal	0.129	These beds have a complex structure and are species rich. They are fragile, easily damaged and can be of long-term benefit to fisheries. Maerl beds of this relatively small size are not uncommon on the west coast of Scotland and, whilst	Y	Y

Table 3.1: Algal PMFs identified along the proposed cable route.				
Algal PMF	**Extent (km^2)**	**Description**	**Direct Cable Route Impact (Y/N)**	**High Conservation Value (Y/N)**
		maerl beds are of high intrinsic conservation value, no judgement can be made on the significance of this particular bed in terms of its species composition.		
IR.HIR.KSed.XKHal	0.096	This PMF was found in three areas around the edge of the maerl bed. There appeared to be a rich associated scour tolerant flora on the sand but species identification could not be made using the methodology employed.	N	N
SS.SMp.KSwSS.LsacR.Sa	0.058	This PMF biotope was found in shallow water (c. 1.5 to 6m bcd) inshore of the maerl bed. It also occurred as a sub-biotope or mosaic with maerl. In the shallowest water there was sand and gravel with *Laminaria saccharina* (also known as *Saccharina*	Y	N

Table 3.1: Algal PMFs identified along the proposed cable route.				
Algal PMF	**Extent (km^2)**	**Description**	**Direct Cable Route Impact (Y/N)**	**High Conservation Value (Y/N)**
		latissima), scattered foliose algae and lug worms *Arenicola marina*.		

Species of importance that were found during the recent proposed cable route survey were *Lithothamnion glaciale* (maerl) and *Phymatolithon calcareum* (maerl). Maerl beds are a UK BAP priority habitat, and *P. calcareum* is also UK BAP species under the Habitats Directive Annex V species (animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures).

The application for the proposed cable route will come under the new Marine Licensing regime as set out in the Marine (Scotland) Act 2010 and will be managed by Marine Scotland.

3.3.2. Consultation

Consultation on how the application should be made and the issues that required addressing within this report were agreed with Marine Scotland.

3.3.3 Data collection

The presence, distribution and character of potential Annex I habitat and Annex II species (Habitats Directive EC/92/43/EEC) along the newly proposed cable route has been assessed by drop down video.

11 long video transects were recorded covering the proposed cable route, as well as an additional 22 shorter transects covering the area around the cable landfall location at Rubha na Traighe Baine (Appendix 1). The transects ranged in length from 35m to 1,599m with an approximate total of 19km of seabed being surveyed.

An initial survey identified a maerl bed (as was previously noted in the original SeaStar survey (SeaStar, 2009)) at Traigh Baine. As maerl beds are a UK BAP priority habitat, and *P. calcareum* is also UK BAP species under the Habitats Directive Annex V species (animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures) additional drops to those originally planned were carried out in March 2012 to determine the extent of the maerl. This constituted 22 additional short tows (SP01 – SP22; see Appendix 1).

Biotopes were assigned to all the video data points with the resultant predictive map of their distribution being shown in Figure 3.1. Only the four PMFs will be treated in any detail within this chapter as the other biotopes are considered not to have a high conservation value, and therefore result in negligible impact. Additionally, only two of the PMFs are likely to be directly affected by the cable route. One of these is the maerl bed; therefore, given the conservation status of this biotope, it is assumed that mitigation to protect this PMF will be sufficient in nature to afford appropriate and sufficient protection to the other three algal PMFs.

The baseline conditions within the proposed development area and original cable route were previously determined from various sources of information as well as targeted surveys. Development specific surveys included a drop down video survey in June 2009 (SeaStar Survey Ltd, 2009); a drop down video survey of two potential cable routes was undertaken in March 2010 (Royal Haskoning, 2010); finally, intertidal surveys close to the proposed cable landfall locations were undertaken in August 2009 (Royal Haskoning, 2009). The latter of these surveys covered the intertidal habitats in the Rubha na Traighe Baine area; therefore, no further surveys have been proposed or undertaken in the intertidal zone.

3.3.4 Assessment of significance

The significance of the effect imposed by the newly proposed cable route is based on the intensity or degree of disturbance to baseline conditions and is categorised into four levels of magnitude; high, medium, low or negligible. The definitions of each of these are given in Table 3.2.

Table 3.2: Description of magnitude.

Magnitude of Impact	Definition
High	Fundamental change to the baseline condition of the receptor. Resulting in major alteration of the habitats, species or biodiversity.
Medium	Detectable change resulting in non-fundamental temporary or permanent consequential changes. Some deterioration observed in the quality of the most sensitive receptor leading to a partial alteration of habitats, species or biodiversity.
Low	Minor change with only slight detectable changes, which do not (or only temporarily) alter the baseline condition of the receptor.
Negligible	An imperceptible change to the baseline condition of the benthic community

To consider the sensitivity of the species and biotopes present in the development area and immediately surrounding area, the protocols and advice available from the Marine Life Information Network (MarLIN, accessed February 2013) have been used. The MarLIN sensitivity assessment allows a comparative assessment to be made of the sensitivity and recoverability of marine habitats and species.

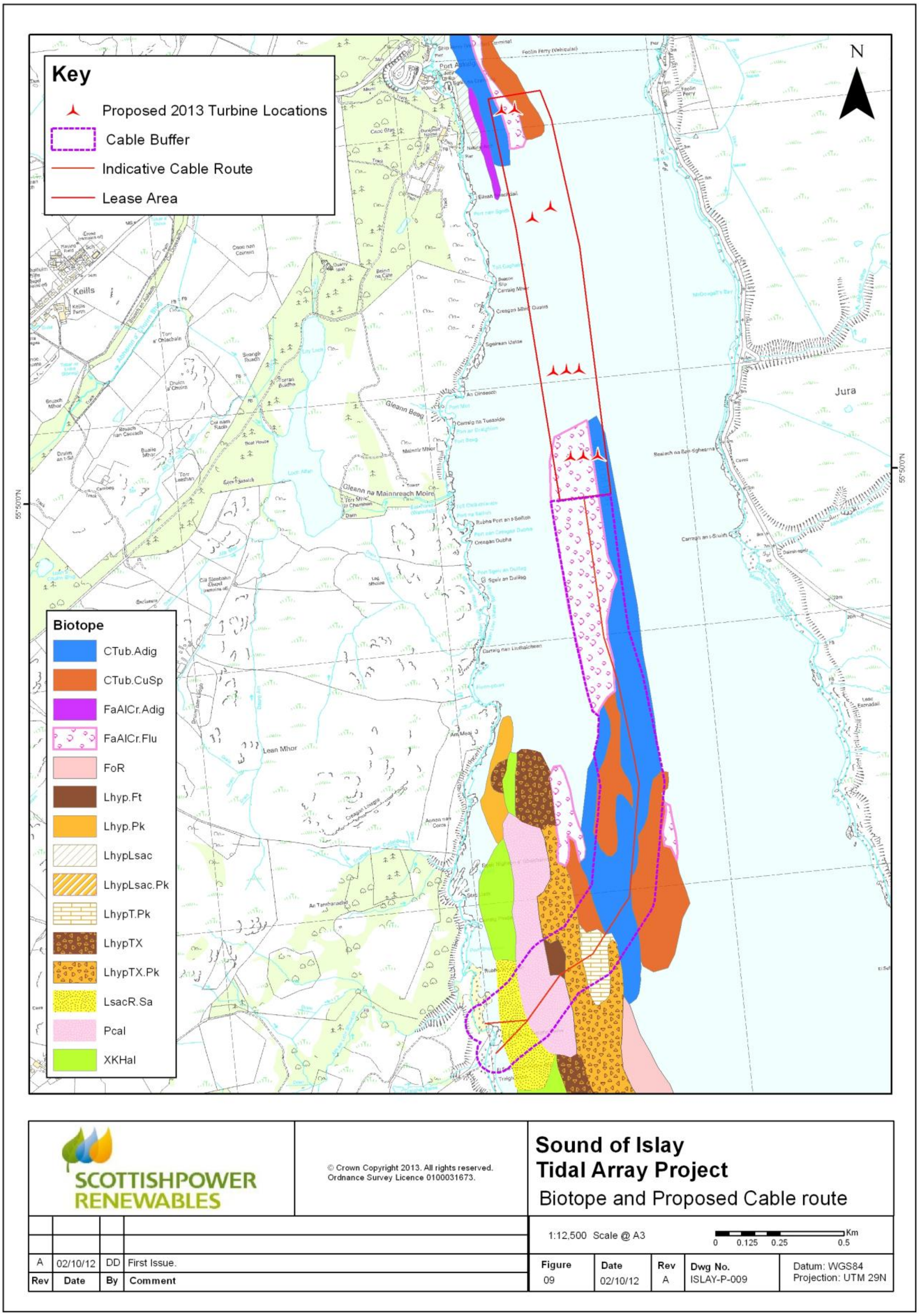


Figure 3.1: Biotopes in relation to newly proposed cable route.

The sensitivity/value/importance of the receptor for each effect is characterised as one of four levels, high, medium, low or negligible. The definition of each level is given below in Table 3.3.

Table 3.3: Sensitivity/Value/importance of marine flora and fauna environment.		
Receptor Sensitivity/Value	**Marine flora and fauna Importance**	**Site designations**
High	International/National	Sites or species that have been designated for their internationally or nationally important biodiversity or habitat (SACs, SPAs, Ramsar, SSSIs, NNR, UK BAP Priority Habitat).
Medium	Regional	Sites or species that have been designated for their regionally important biodiversity or habitat (LBAP species).
Low	Local	Sites or species that have been designated locally for their flora or fauna (LNR) or undesignated sites of some locally important biodiversity or habitat.
Negligible	-	Other sites or species with little or no locally important biodiversity

Table 3.4 combines the definitions of magnitude with the level of sensitivity/value/importance of receptor to provide a prediction of overall significance of the effect.

Table 3.4: Significance Prediction Matrix				
Magnitude of Impact	**Receptor Sensitivity/Value/Importance**			
	Negligible	**Low**	**Medium**	**High**
High	No significant effect	Moderate	Major	Major
Medium	No significant effect	Minor	Moderate	Major
Low	No significant effect	Negligible	Minor	Moderate
Negligible	No significant effect	Negligible	Negligible	Minor

Once the significance of the effect is determined, a suffix of "adverse" or "beneficial" can be attached to indicate the perceived nature of impact. It is not always clear whether an effect will be adverse or beneficial and as a consequence this approach is only taken when describing some of the impacts. The impacts are identified in Section 3.5.

It should be noted that any residual effect (the effect after the implementation of mitigation) which remains at the level of '**Moderate**' or '**Major**' is regarded by the EIA Regulations as being significant.

3.4 Existing Environment

3.4.1 Habitats along the newly proposed cable route

A newly proposed cable route with a potential landfall location at Rubha na Traighe Baine has been investigated (the landfall location was assessed as part of the original EIA process and reported on in the 2010 ES (SPR, 2010); see Appendix 2).

The seabed where the current speeds are highest consisted of rugged bedrock and boulders interspersed with areas of rounded, mobile cobbles, many of which were very bare. A number of low ridges, crevices, fissures and small overhangs were present providing a variety of microhabitats. This seabed topography is likely to create localised areas of shelter behind and below the rock ridges.

The shallower shelf close to the proposed landfall location was out of the very fastest tidal streams. This shelf consisted primarily of coarse sand and gravel with cobbles and boulders, and an area of maerl. Closer inshore there was an area of finer sand, part of which was also an algal PMF.

The communities present in the area are all characteristic of current swept Sounds. Bedrock was the largest habitat by area within the Sound and was heavily encrusted with low-lying fauna. Particular species were patchy in their distribution, which was probably an effect of localised variation in current strength. Three major circalittoral biotopes were identified: **CR.HCR.FaT.CTub.CuSp**; **CR.HCR.FaT.CTub.Adig** and **CR.HCR.XFa.FluCoAs**. There was considerable overlap in their distribution and features, with similar species present in each but in differing abundance. **CR.HCR.FaT.CTub.CuSp** was dominated by cushion sponges and hydroids whilst *Alcyonium digitatum* was particularly abundant in **CR.HCR.FaT.CTub.Adig**. **CR.HCR.XFa.FluCoAs** was found predominantly on cobbles.

In the areas of strongest current the hydroids *Tubularia indivisa*, *Sertularia argentea* and *Abietinaria abietina* and cushion sponges including *Halichondria panicea*, *Esperiopsis fucorum* and *Myxilla* sp. were abundant, with hydroids often growing through the sponges. Dead men's fingers *A. digitatum* were present but in low abundance whereas in places the dahlia anemone *Urticina felina* was superabundant. These current-swept bedrock communities appeared to have a rich associated fauna of anemones (*Sagartia elegans*, *Actinothoe sphyrodeta*), hydroids including *Hydrallmania falcata* and *Halecium* spp., the barnacle *Balanus crenatus*, other sponges such as *Pachymatisma johnstonia*, ascidians and bryozoans (notably *Flustra foliacea* and *Alcyonidium diaphanum*). Mobile species included the dog whelk *Nucella lapillus*, often seen in deeper tidal rapids, the edible crab *Cancer pagurus* and the starfish *Henricia* sp. and *Asterias rubens*.

Vertical faces with fissures and overhangs greatly increased the diversity of the bedrock and it was clear that there were additional ascidians, sponges, bryozoans and anemones on these. These communities were classified as **CR.HCR.FaT.CTub.CuSp** "*Tubularia indivisa* and cushion sponges on tide-swept turbid circalittoral bedrock" as they closely fitted the description of this biotope in Connor *et al.* (2004).

The seabed in shallower water was dominated by forest and park of the kelp species *Laminaria hyperborea* on mixed boulder, cobble and sediment. In the tidesewpt conditions this was classified as **IR.MIR.KR.LhypTX** "*Laminaria hyperborea* on tide-swept, infralittoral mixed substrata". Coralline crusts were common on the cobbles and some areas had a rich understorey of red algae; however, there were also extensive areas of scoured and apparently bare cobbles. Kelp was found down to a maximum depth of approximately 20m.

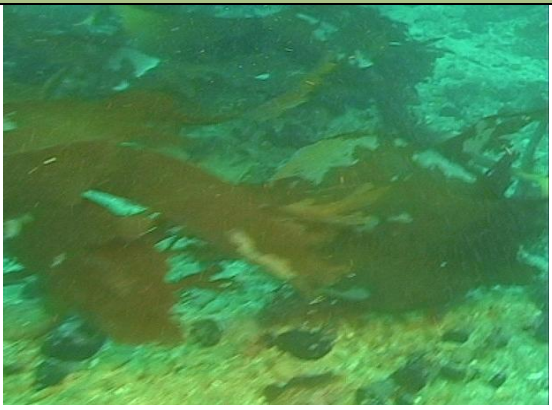
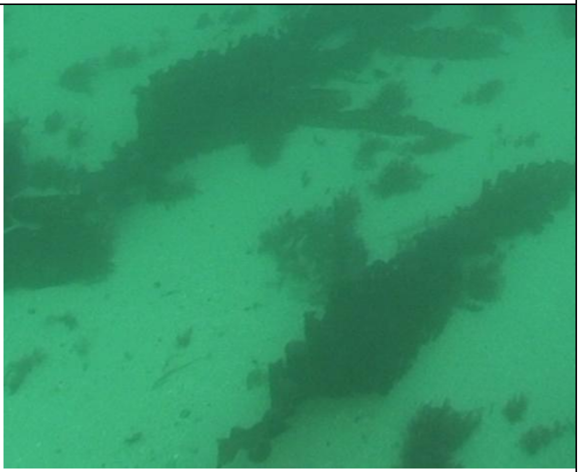
Below the kelp forest there was a zone dominated by foliose red algae **IR.HIR.KFaR.FoR** "Foliose red seaweeds on exposed lower infralittoral rock". This was found in depths of approximately 15 to 20m. Red algae were also frequent in the circalittoral biotopes.

Further inshore close to the proposed landfall location of Rubha na Traighe Baine, the tides were less strong and there was an increasing amount of sediment. The main feature of this area was a bed of maerl *Phymatolithon calcareum* which covered an area of approximately 0.13km^2. This was classified as **SS.SMp.Mrl.Pcal** "*Phymatolithon calcareum* maerl beds in infralittoral clean gravel or coarse sand". The maerl was mixed with cobble, gravel and occasional boulders and both *L. hyperborea* and *Laminaria saccharina* (now known as *Saccharina latissima*) were frequent.

Surrounding the maerl bed on the mixed sediment shelf were several kelp-dominated biotopes. The brown algal *Halidrys siliquosa* was found on gravel and sand in inshore areas (**IR.HIR.KSed.XKHal**), with an understorey of scour-tolerant algae. In the shallowest water there was sand and gravel with *L. saccharina* (*S. latissima*), scattered foliose algae and lug worms *Arenicola marina* (**SS.SMp.KSwSS.LsacR.Sa**). A kelp forest and park of mixed *L. hyperborea* and *L. saccharina* (*S. latissima*) (**IR.LIR.K.LhypLsac**) occurred to the south of the proposed landfall location of Rubha na Traighe Baine.

It was notable that there was little dense kelp forest found – most of the kelp seen was sparsely distributed. This is probably a reflection of the absence of much bedrock in the shallower water with a preponderance of unstable substrata.

Plate 3.1: Drop down images in relation to the four PMFs identified during the newly proposed cable route survey (see Appendix 1). Biotope codes according to Connor *et al.* (2004)

	
Biotope **SS.SMp.Mrl.Pcal**	Biotope **IR.MIR.KR.LhypTX**
	
Biotope **IR.HIR.KSed.XKHal**	Biotope **SS.SMp.KSwSS.LsacR.Sa**

3.4.2 Intertidal habitats at the proposed cable landfall locations

Although the location of the Sound of Islay Demonstration Tidal Array has not altered since the original application received consent in 2011, the cable route and landfall location have. Thus, the supporting surveys that are detailed in the original 2010 ES (SeaStar Survey Ltd, 2009) remain valid for the area in which the tidal turbines are to be located; however, additional surveys were undertaken for the proposed new cable route as detailed in this report. The landfall location for this new cable route is in an area previously surveyed for its intertidal ecology. Therefore, no further intertidal surveys have been undertaken in this area and the original study (Royal Haskoning, 2009) is deemed to remain valid. Thus, any associated affects with regards the proposed changes to the installation methodology are assessed with reference to these original surveys and their corresponding results and conclusions.

There are two proposed landfall locations – one to the north and one to the south of the rocky outcrop known as Rubha na Traighe Baine. The Royal Haskoning (2009) (see Appendix 2) intertidal assessment undertook a transect in the bay to the south of this outcrop (Traigh Bhan), in the vicinity of the current SSE cable (which was noted to provide an artificial reef habitat currently well colonised by seaweeds), and one on the rocky outcrop of Rubha na Traighe Baine itself. In combination these give a good indication of the soft sediment and hard substrata intertidal biotopes present in this area, as well as those associated with the artificial substrate of the incumbent cable. There is also a small stream present that enters onto Traigh Bhan and possesses an abundance of *Ulva intestinalis* and *Fucus spiralis* on the cobbles at that point of the shore.

The first transect within Traigh Bhan took the line of the existing SSE cable to determine the species which had established on the artificial reef created by the cable armouring as well as the softer sediments inshore of this. Biotopes for this transect are described in Royal Haskoning (2009) (see Appendix 2), but are generally dominated by *Fucus serratus* biotopes (**LR.LLR.F.Fserr.FS**) on the artificial reef (cable) substrata and polychaetes in littoral fine sand (**LS.LSa.FiSa.Po**) away from the cable structure itself. At the very lowest section of the transect the dominant biotope was **IR.MIR.KR.Ldig.Bo** with *F. serratus* still being the predominant algae on the cable itself.

The second transect assessed the bedrock/rock pool outcrop of Rubha na Traighe Baine itself. Biotopes for this transect are also described in Royal Haskoning (2009) (see Appendix 2). These consist of a wide lichen zone (biotopes **LR.FLR.Lic.YG** and **LR.FLR.Lic.Ver.Ver**) at the top of the shore. The mid shore biotopes consisted of **LR.MLR.BF.PelB** and a narrow band of **LR.LLR.F.Fspi.FS**. Finally, the lower shore into the subtidal zone was dominated by **LR.HLR.FT.AscT** with **IR.MIR.KR.Ldig.Ldig** being present at the lowest point of the transect.

Whilst undertaking the surveys harbour seals were observed close to shore, with one being hauled out at the north end of Rubha na Traighe Baine. The marine mammal fauna is dealt with in more detail in Chapter 4.0 of this Environmental Report. Additionally, otter (*Lutra lutra*) spraints and anal jelly were found on bedrock outcrops near the transect across the rocky outcrop, along with crustacean remains.

It should be noted that during the surveys no rare or protected biotopes were found and the zonation of biotopes identified (lichens through fucoids to kelp) were typical of the area.

Whilst the area of the proposed cable landfall locations was noted to possess a beautiful landscape with good quality intertidal habitat, it was also clear that the presence of cable infrastructure and access tracks appear not to have had a negative impact on the landscape or the quality of the habitat. Quite the contrary, the cable already present appears to have created an artificial reef structure providing substrate for a diversity of seaweeds (Royal Haskoning, 2009; Appendix 2).

3.5 Impact Assessment

3.5.1 Do nothing Scenario

Due to the lack of detailed historical datasets or ongoing monitoring in this area, it is not possible to know how the benthic community has changed naturally over time. However, in high energy environments, such as the Sound of Islay, natural changes will occur frequently within benthic communities.

During a 'do nothing scenario' the substrate type and tidal currents would not be expected to show any non natural change in the benthic environment.

3.5.2 Potential Impacts during Installation Phase

IMPACT 3.1: Habitat loss

The original 2010 ES (SPR, 2010) covered the installation of a cable from the array to the shores of Jura. This has since been altered and the newly proposed cable route will be laid and make landfall on the Islay side of the Sound.

The cable route from the array to the south of the Sound will predominantly impact upon the biotope **CR.HCR.FaT.CTub.Adig**, which is the most abundant biotope in the centre of the channel (Appendix 1). It is not anticipated that the laying of a cable through this biotope will result in permanent long-term damage, as has been the case in Strangford Narrows (SNH, 2009).

Once the southerly route of the cable is clear of the most energetic part of the flow and the seabed gradient becomes shallower then the cable route will turn to the west and make landfall either to the north (preferred) or to the south of Rubha na Traighe Baine in order to connect into the proposed transition pit. This route places the cable route directly over two PMFs: the first is an area of maerl (**SS.SMp.Mrl.Pcal**) and the second is the biotope **SS.SMp.KSwSS.LsacR.Sa**, both of which cannot be avoided if landfall is to be made either side of Rubha na Traighe Baine and both of which are sensitive to habitat loss (http://www.marlin.ac.uk/speciesbenchmarks.php?speciesID=4121#substratum_loss and http://www.marlin.ac.uk/speciesbenchmarks.php?speciesID=4280#substratum_loss; accessed February 2013). As stated in Section 2.5.2.2 burial is the best form of protection, especially when crossing the flow, it is not proposed to trench through either of these biotopes. Neither is it proposed to mattress the cables within these biotopes, unless pre-construction studies show this to be essential to the integrity of the cables. The proposed area of PMF seabed that the cables will occupy will be in the region of $7100m^2$ $(0.0071km^2)$[1]. This comes from the ten cables and their associated horizontal spacing occupying a width of seabed in the order of 20m and the 355m wide extent of these biotopes (it should be noted that this includes cable spacing); therefore, this cable width area is very much a worst case scenario. Inshore of these biotopes there may be some trenching activity in the shallow subtidal; however, this would create smothering issues through disturbing the sediments and is unlikely to be required as this has not been undertaken for the incumbent cable already present in the area (armour casing and potentially

[1] This footprint will impact approximately 3.10% of the maerl bed and 4.66% of the **LsacR.Sa** biotope.

mattressing would be sufficient). The laying of the cables on top of the maerl biotope will create some initial disturbance; however, the cables will settle into the substrate over time. Laying, unlike trenching, is not expected to result in areas of sedimentation. Therefore, although the laying of the cables will disturb the biotope it will not produce the levels of sedimentation that trenching would.

The **SS.SMp.Mrl.Pcal** and the **SS.SMp.KSwSS.LsacR.Sa** biotopes are PMFs, in addition to the species *P. calcareum* and the maerl habitat being of national importance (BAP listed). Therefore, the sensitivity of the receptor to the activity of cabling is high. The footprint of habitat loss will be relatively small compared to the total extent of these particular habitats and the available resource of similar habitats within the Sound, and the effect will be temporary giving a medium impact magnitude. The effects of habitat loss are therefore expected to be of **major** significance.

MITIGATION IN RELATION TO IMPACT 3.1
• Annual monitoring of the extent of the two affected PMFs for the first 5-years and then every 5-years thereafter using a drop-down video survey methodology

Residual impact

The impact of habitat loss on the nearshore benthic ecology (principally maerl habitat given its conservation status) during installation of the cables will remain of **minor** significance.

IMPACT 3.2: Increased suspended sediments / smothering

Smothering may occur within the immediate vicinity of works with disturbed finer sediments carried in suspension potentially affecting sessile filter feeding species as well as the maerl bed, which is sensitive to such disturbance. There are limited quantities of fine sediments present in the central areas of the Sound; however, the level of available sediment increases closer to the shore. Therefore, the nearshore cabling activities are likely to have the greatest potential with regards increasing the level of sediment in suspension, particularly the potential activities related to the trenching of the cables in the shallow subtidal and nearshore environment[2].

Given the high energy nature of the environment within the Sound of Islay, rapid dispersal of any disturbed fine sediments will mean that the effects will be temporary and short term providing low magnitude. This combined with the high receptor sensitivity (particularly in the case of the maerl bed, but also the **SS.SMp.KSwSS.LsacR.Sa** biotope as it is sensitive to smothering but not suspended sediments) means that the effects of increased suspended sediments and/or smothering are likely to be of **moderate** significance.

[2] It should be noted that laying and not trenching is the preferred option.

MITIGATION IN RELATION TO IMPACT 3.2
• Annual monitoring of the extent of the two affected PMFs for the first 5-years and then every 5-years thereafter using a drop-down video survey methodology

Residual impact

The impact of suspended sediments and/or smothering on the benthic ecology during installation of the cables will remain of **minor** significance.

IMPACT 3.3: Habitat disturbance / alteration

Cable laying through the maerl biotope has the potential to impact on this sensitive BAP habitat and the species *P. calcareum* (both of which are of high conservation value) which is its main constituent. Modification to this biotope and **SS.SMp.KSwSS.LsacR.Sa** has the potential to result in long term effects on the richness and diversity of benthic flora and fauna. By laying the cables across both biotopes the effects are deemed to be less significant than trenching.

The potential colonisation of the armouring surrounding the cables may increase the biodiversity along the cable route by providing an artificial substrate, as shown with the incumbent cable at Traigh Bhan, and ultimately a beneficial effect (*L. saccharina* (*S. latissima*) rapidly colonizes cleared areas of substratum – MarLIN, accessed February 2013). However, such an artificial substrate may also alter the nature and composition of the species present and a bare surface could potentially enable non-native species to colonise providing an adverse effect.

Although species and habitats are likely to be affected, no benthic species or habitats of local, national or European importance are expected to be lost. However the receptor value, given the potential impact on the two PMF biotopes, is likely to be high combined with a medium magnitude of impact giving an overall effect of is likely to be of **major** significance.

MITIGATION IN RELATION TO IMPACT 3.3
• Annual monitoring of the extent of the two affected PMFs for the first 5-years and then every 5-years thereafter using a drop-down video survey methodology

Residual impact

Following mitigation the impact of habitat alteration on the benthic ecology during operation/maintenance will remain of **minor** significance.

IMPACT 3.4: Risk of pollution incident during installation

The risk of spillage of contaminants, such as oils, during the installation phase was originally considered within the original 2010 ES (*Chapter 21: Water and Sediment Quality;* In SPR, 2010).

The risk of any pollution events occurring will be minimised by following standard good practice, such as the Pollution Prevention Guidelines issued by SEPA (e.g. PPG 5: Works and maintenance in or near water).

The cable lay contractors will have in place prior to any works occurring an agreed and appropriate Site Environmental Management Plan and Pollution Control and Spillage Response Plan. These plans will act to reduce the potential for accidental pollution and in the unlikely event of a pollution incident, will ensure a rapid and appropriate response.

Given the high energy marine environment within the Sound, contaminants can be expected to disperse rapidly; therefore, should a spill occur, its scale and the nature of the contaminant will be limited.

As a result a negligible magnitude is predicted and, given the high receptor sensitivity, the impact is predicted to be of **minor** significant effect.

MITIGATION IN RELATION TO IMPACT 3.4
• No mitigation required

Residual Impact

As a result of the importance of the PMFs (especially maerl) as a receptor the significance of pollution risk must remain of **minor** significant effect.

IMPACT 3.5: Noise disturbance

The risk of noise disturbance on sessile benthic species from the construction vessels during installation was considered within the original 2010 ES (SPR, 2010). As seaweeds and algae have no known mechanism for the perception of noise and the PMFs are algal biotopes it is not felt that the PMFs will be affected. With regards other benthic organisms it is not felt that this impact will have materially altered since the original assessment in the 2010 ES (SPR, 2010); therefore, no further assessment has been made in this regard and the residual impact remains **negligible**, with no requirement for mitigation.

MITIGATION IN RELATION TO IMPACT 3.5
• No mitigation required

Residual Impact

The residual impact in relation to noise will remain **negligible**.

3.5.3 Potential Impacts during O&M Phase

Given the nature of cable laying operations it is not expected that there will be any extensive operations with regards maintenance throughout the life of the project. Therefore, on the rare occasion that any works are required to the main export cables, they will likely involve the lifting and/or replacement of cables. The impacts in relation to such operations, should they be required, will be the same in nature as the installation phase of the project. This is reflected in the table in Section 3.7; however, this table should be read with the caveat that such operations are not planned and are unlikely to occur.

The potential effects relating to the cable acting as an artificial substrate throughout the operational phase are covered in Section 3.5.2 under Impact 3.3.

3.5.4 Potential Impacts during the Decommissioning Phase

The potential impacts during the decommissioning phase of the Development are not thought to have materially changed with regards the benthic ecology with the loss of habitat during installation transposing into a loss of artificial habitat during decommissioning. Thus, any impacts are likely to be well aligned with the installation procedure. A return to the natural state has not been considered as an impact and due to the dynamic and changeable nature of a high energy environment, such as the Sound of Islay, it is expected that recoverability would be quick for most habitats and assemblages present, with the exception of maerl, which has specific mitigation in place. Therefore, as it is not felt that this impact has materially altered since the time assessments were made in the 2010 ES (SPR, 2010); no further assessment has been made in this regard.

As mentioned above, the decommissioning of the cable crossing the maerl (**SS.SMp.Mrl.Pcal**) and the **SS.SMp.KSwSS.LsacR.Sa** biotopes is likely to lead to disturbance of these in line with that of the cable laying operation. Both of these biotopes are PMFs as well as *P. calcareum* and the maerl habitat being of national importance (BAP listed). Therefore, the sensitivity of the receptor to the activity of cable decommissioning is high. The disturbance footprint will be relatively small compared to the total extent of these particular habitats (see footnote in relation to Impact 3.1) and the available resource of similar habitats within the Sound. Additionally, the effects will be temporary giving a medium impact magnitude. The effects of cable removal and resultant habitat disturbance are therefore expected to be of **major** significance.

MITIGATION IN RELATION TO IMPACTS DURING THE DECOMMISSIONING PHASE
• Annual monitoring of the extent of the two affected PMFs for the first 5-years. A review will then be undertaken as to whether surveys should be continued beyond this point

Residual impact

The impact of cable removal and the resultant disturbance to the maerl habitat during decommissioning will remain of **minor** significance.

3.5.5 Cumulative Impacts

Cumulative impacts are not thought to have altered since the original assessment made in the 2010 ES (SPR, 2010) and are not expected to have altered with regards the change in cable route from Jura to Islay.

3.6 Proposed Monitoring

Post installation mitigation and monitoring is detailed within the 2010 ES (SPR, 2010) as well as throughout Section 3.5.2 of this report.

3.7 Statement of Significance

It is anticipated that the proposed preferred cable route and landfall location will have, at worst, a pre-mitigation major effect on the benthic ecology of the Sound (see Section 3.7). Continued monitoring to detect impacts, and the implementation of necessary mitigation measures, will reduce these effects to minor.

3.8 Conclusions

The previous Development layout and original 2010 ES (SPR, 2010) did not impact upon any rare and threatened species or habitats or those of conservation importance (e.g. UK BAP). However, this is not the case along the nearshore portion of the proposed new cable route, where there are two PMF biotopes, one of which is a maerl bed.

However, the impacts in relation to the cable laying operations are expected to be relatively localised in nature and will only impact a very small percentage of the PMFs present. It is considered that any disturbance to the benthic ecology of the Sound along the entire length of the proposed cable route will be reversible and occur within an already dynamic and changing biological environment. In high energy environments, such as the Sound of Islay, natural changes will occur frequently within benthic communities (with the exception of the maerl bed). Therefore, any changes as a result of the proposed works will be of overall **minor/no significant effect** significance. However, it is worth noting that this significance level is only after mitigation has been considered due to the sensitive nature of the PMF habitats present.

3.9 Summary

- Four algal PMFs were identified during the 2012 cable route surveys;
- Two of the PMFs are likely to be directly affected by the laying of cables – cables will not be trenched in these PMFs;
- One of the PMFs is of particular conservation importance – maerl is a UK BAP Habitat;
- Only a very small proportion of the PMFs will be directly affected; and
- Post mitigation effects are expected to be minor in nature.

3.9.1 Impact Summary Table

Construction / Decommissioning				
Impact	**Magnitude of Impact**	**Receptor Sensitivity**	**Significance Level**	**Residual Impact**
Habitat loss	Medium	High	Major	Minor
Increased suspended sediment / smothering	Low	High	Moderate	Minor
Habitat loss / disturbance / alteration	Medium	High	Major	Minor
Risk of pollution incident	Negligible	High	Minor	Minor
Noise disturbance	Negligible	Negligible	No significant effect	No significant effect
Operation / Maintenance				
Impact	**Magnitude of Impact**	**Receptor Sensitivity**	**Significance Level**	**Residual Impact**
Habitat loss	Medium	High	Major	Minor
Increased suspended sediment / smothering	Low	High	Moderate	Minor
Habitat disturbance / alteration	Medium	High	Major	Minor
Risk of pollution incident	Negligible	High	Minor	Minor
Noise disturbance	Negligible	Negligible	No significant effect	No significant effect
Decommissioning				
Impact	**Magnitude of Impact**	**Receptor Sensitivity**	**Significance Level**	**Residual Impact**
Habitat loss	Medium	High	Major	Minor
Increased suspended sediment / smothering	Low	High	Moderate	Minor
Habitat disturbance / alteration	Medium	High	Major	Minor
Risk of pollution incident	Negligible	High	Minor	Minor
Noise disturbance	Negligible	Negligible	No significant effect	No significant effect

3.10 References

Connor, D.W., Allen, J.H., Golding, N., Howell, K.H., Lieberknecht, L.M., Northen, K.O., & Reker, J.B. (2004). The Marine Habitat Classification for Britain and Ireland Version 04.05 © 2004 Copyright JNCC, Peterborough. ISBN 1 861 07561 8 (internet version).

Howson, C. M., Steel. L. and Gillham, K. (2009). Identification of priority marine features in Scottish territorial waters. Scottish Natural Heritage Commissioned Report No. 388.

Royal Haskoning (2009). Sound of Islay Demonstration Tidal Array: Inter-tidal survey of potential cable routes. Final Report 9T3474.

Royal Haskoning (2010). Sound of Islay Proposed Tidal Array Cable Route: Drop Down Video Survey.

Scottish Natural Heritage (2009). Sharing Best Practice Conference, Seagen Project. Available online at http://www.snh.org.uk/pdfs/sgp/A303239.pdf (Accessed February 2013).

Scottish Natural Heritage (2012). Advice to Marine Scotland on Priority Marine Features in Scotland's seas. Available online at http://www.snh.gov.uk/docs/B1140045.pdf (Accessed February 2013).

ScottishPower Renewables (2010). Sound of Islay Demonstration Tidal Array: Volume 1 Environmental Statement. Copyright ScottishPower Renewables (UK) Ltd. 2010.

SeaStar Survey Ltd (2009). Islay Demonstration Tidal Array – Site Surveys 2009, drop-down camera survey report. Unpublished.

4.0 Marine Mammals

4.1 Introduction

This Chapter provides information on the 2-year monitoring programme (initiated in April 2009) looking specifically at marine mammals (but also including basking sharks and otters). The monitoring programme was designed to provide data on species present, how and when they use the area, and preferred areas of use.

The 2010 ES (SPR, 2010) and supporting documentation (SMRU Ltd., 2010) presented the results of the first full year of monitoring (up to August 2010). This chapter and supporting technical report (Appendix 2) provides an update to this baseline with the addition of a second years worth of data (collected between September 2010 and August 2011).

Additionally, since the submission of the 2010 ES (SPR, 2010) there have been further studies by the Sea Mammal Research Unit (SMRU) in the Sound of Islay area and its surrounds. These studies have been focussed on the deployment of telemetry tags on harbour seals. The technical report (Appendix 2) provides a basic summary of these seal tracking results.

All other potential effects of the development on marine mammals not covered in this chapter are assumed to have been covered by the original 2010 ES (SPR, 2010) or will be covered in separate licence applications. If required, potential mitigation measures to reduce these impacts are also discussed, along with the residual impact that remains post-mitigation.

Summary of Impact on Marine Mammals:

From the survey data and additional telemetry data the Sound of Islay appears to be an area of high usage for seals but not cetacean species.

SPR is committed to monitoring marine mammals during and following any installation operations and providing mitigation to protect marine mammals if deemed necessary in the light of monitoring results. We anticipate that the significance of effects can be reduced to minor upon implementation of mitigation.

4.2 Potential Effects

The principal effects from the installation of the cables connecting the tidal turbine array to the shore on Islay will be the presence and activities in relation to the installation vessels themselves as well as the onshore construction, which may disturb seals hauled out on the shoreline. Once installed the actual presence of the cabling infrastructure for the duration of the 25 year project is unlikely to affect marine mammals, basking sharks or otters in the area.

4.3 Methodology

4.3.1 Legislation, Guidelines and Policy Framework

Legislation concerning marine mammals has altered slightly since the submission of the 2010 ES (SPR, 2010). The principal change that is relevant to this chapter since the original submission has been the replacement of The Conservation of Seals Act 1970 by Section 130 of the Marine (Scotland) Act 2010. Under the Marine (Scotland) Act it is an offence to kill, injure or take a seal at any time of year except to alleviate suffering or where a licence has been issued to do so by the Scottish Government. It is also an offence to harass seals at haul-out sites. This contrasts with the lower level of protection under The Conservation of Seals Act 1970, under which restrictions were only placed on the management of seals at prescribed times of the year, coinciding with breeding and moulting.

Additionally, there has been the introduction of the Basking Shark (BS) licence (similar in nature to the current European Protected Species (EPS) licence). Where there is potential for disturbance to occur to basking sharks and/or EPS as a result of a plan or project (such as the Sound of Islay Demonstration Tidal Array), an application for a licence to undertake such disturbance can be made to the competent authority. Therefore, it is intended that SPR will seek to apply for both a EPS and a BS licence in relation to this development.

4.3.2. Consultation

Consultation on how the application should be made and the issues that required addressing within this Environmental Report were agreed with Marine Scotland.

4.3.3 Data collection

Methods of data collection for the second year of marine mammal data were as previously reported (SMRU Ltd., 2010; SPR, 2010). Four land-based visual observation sites were utilised on both the Islay and Jura sides of the Sound (see Appendix 2, Figure 2).

4.3.4 Assessment of significance

The significance of the effect due to the newly proposed cable route is based on the intensity or degree of disturbance to baseline conditions and is categorised into four levels of magnitude; high, medium, low or negligible. The definitions of each of these are given in Table 4.1.

Table 4.1: Description of magnitude

Magnitude of Impact	Definition
High	Affect an entire population / habitat causing a decline in abundance and / or change in distribution beyond which natural recruitment would not return that population / habitat, or any population / habitat dependent upon it, to its former level within several generations of the species being affected.
Medium	Damage or disturbance to habitats or populations above those experienced

Table 4.1: Description of magnitude	
Magnitude of Impact	**Definition**
	under natural conditions, over one or more generation, but which does not threaten the integrity of that population or any population dependent on it.
Low	Small-scale or short-term disturbance to habitats or species, with rapid recovery rates, and no long-term noticeable effects above the levels of natural variation experienced in the area. The impacts are not sufficient to be observed at the population level.
Negligible	An imperceptible and/or no change to the baseline condition of the receptor.

As all marine mammals in UK waters are of national or international importance for nature conservation they are, therefore, all assessed to be of high sensitivity.

Table 4.2 outlines the matrix used in assessing the significance of effect of each impact to marine mammals using both the importance of the receptor (in this case the marine mammals) and the magnitude of impact should it occur. This provides a worst case scenario and does not take into consideration the likelihood of occurrence.

Table 4.2 combines the definitions of magnitude with the level of sensitivity/value/importance of receptor to provide a prediction of overall significance of the effect.

Table 4.2: Significance Prediction Matrix				
Magnitude of Impact	**Receptor Sensitivity/Value/Importance**			
	Negligible	**Low**	**Medium**	**High**
High	No significant effect	Moderate	Major	Major
Medium	No significant effect	Minor	Moderate	Major
Low	No significant effect	Negligible	Minor	Moderate
Negligible	No significant effect	Negligible	Negligible	Minor

Any residual effect (the effect after the implementation of mitigation) which remains at the level of ‘Moderate’ or ‘Major’ is regarded by the EIA Regulations as being significant.

As all marine mammals within the study area are of national or international importance and therefore of high sensitivity, the level of significance cannot be assessed as less than ‘Minor’ and may necessarily be ‘Moderate’, even if the magnitude of a particular impact is considered to be low.

Table 4.3 outlines the sensitivities of marine mammal species to the specific impacts predicted for the Development as discussed by Scottish Executive (2007). While this is not considered directly during the impact assessment it provides some additional context when considering potential impacts.

Table 4.3: Marine mammal sensitivities					
		Sensitivity			
Species	**Presence in Sound of Islay**	**Noise & Vibration**	**Increased Suspended Sediments**	**Release of Contaminants**	**Habitat Exclusion**
Harbour seal	Highly likely	High	High	Low-Medium	Medium
Grey seal	Highly likely	High	High	Low-Medium	Medium
Harbour porpoise	Highly likely	High	Medium	Low	High
Bottlenose dolphin	Likely	High	Medium	Low	Medium-High
Killer whale	Likely	High	Medium	Low	Medium-High
Common dolphin	Unlikely	High	Medium	Low	Medium-High
Risso's dolphin	Unlikely	High	Medium	Low	Medium-High
White beaked dolphin	Unlikely	High	Medium	Low	Medium-High
Atlantic white-side dolphin	Unlikely	High	Medium	Low	Medium-High
Long finned pilot whale	Unlikely	High	Medium	Low	Medium-High
Minke whale	Unlikely	Medium	Medium	Low	Medium-High
Humpback Whale	Unlikely	Medium	Medium	Low	Medium-High

Note: Adapted from the 2010 ES (SPR, 2010).

4.4 Existing Environment

4.4.1 Seals

4.4.1.1 In water

Harbour seals (*Phoca vitulina*) were the most common species sighted and was recorded in all months of the year. Sightings rates for all seal species were 1.94 per hour in Year 1 of the survey and 0.96 in Year 2 giving an average sighting rate of 1.43 over the two years of survey.

Peak harbour seal sighting rates in 2010 occurred in July before declining over the winter months. They then rose again through April-July 2011.

Grey seals (*Halichoerus grypus*) were much less common, but were again sighted during all months of the year. There was a peak in grey seal sighting rates in March 2010 with a subsequent decrease through April and May, with sightings increasing again in June before declining in July and August 2010.

Grey seal rates remained low but variable over winter 2010 and spring 2011 rising to a peak in August 2011.

4.4.1.2 Hauled out

Seals that were hauled out accounted for 55% of total seal sightings. Peaks in harbour seals hauled out were during January to March 2010, July and August 2010, December 2010 and January 2011.

The majority of haul-out sightings were on the west side of the Sound (the Islay shoreline). The number of sightings of harbour seals also changed over the tidal cycle, with more sightings over the low tide period (the period between 2 hours before and 2 hours after low tide). The proportion of seals hauled out relative to those sighted in the water also varied. For harbour seals proportionately more sightings were of hauled out seals over low tide, with the opposite being true for the hour prior to high tide where there were more sightings in the water than hauled out.

For grey seals, most sightings were of animals in the water and there were relatively few sightings of hauled out grey seals.

4.4.1.3 Behaviour

Hauled out seals represented the majority of all seal sightings over the whole survey period in both years.

The majority of harbour seals and grey seals sighted in the water were either resting (“bottling” or “logging”) or swimming.

In a non-related study, seventeen adult harbour seals were tagged on Islay during 2011 and 2012. Seven of these were tagged at the South East Islay Skerries Special Area of Conservation (SAC) in 2011, two at Bunnahabhain Bay in 2011 and a further eight at haul-out sites within the Sound along the Islay coastline – approximately 500m north of the proposed preferred cable landfall location.

None of the seals tagged at the SAC entered the Sound of Islay. However, half the seals tagged in the Sound itself did travel to the SAC. The seals that showed the highest use of the Sound and the area around the development site were tagged at haul-outs within the Sound itself. Some tagged individuals also moved to the north of Islay, as far afield as Mull, Colonsay and Tiree.

4.4.2 Basking Sharks

Basking sharks were not frequently sighted in the Sound of Islay during Year 2, with only a single individual being recorded.

4.4.2.1 Behaviour

In Year 1, twenty six per cent of basking shark sightings had no behavioural codes associated with them and the remaining 74% were swimming. In Year 2 100% of sightings were recorded as swimming.

4.4.3 Bottlenose Dolphins

Bottlenose dolphins (*Tursiops truncatus*) were recorded during September, October and November 2010 and in January, June and July 2011. These were all made from the Jura shore (in contrast to the Year 1 data where all bottlenose dolphin sightings were made from the Islay shore). Group sizes ranged from a single individual to a group of 13 animals. Sighting rates were generally low with 2% of all watches recording sightings of bottlenose dolphins. This resulted in too few sightings to make any robust conclusions about patterns.

4.4.3.1 Behaviour

In the Year 1 survey, 80% of dolphin sightings were categorised as 'breaching' at first sighting, the remaining 20% were swimming. This pattern was the opposite in Year 2 with 76% recorded as swimming and 12% breaching.

4.4.4 Harbour Porpoise

Harbour porpoise (*Phocoena phocoena*) have only been sighted twice over two years of surveys.

4.4.4.1 Behaviour

The single harbour porpoise sighting in Year 1 was of an animal breaching; the only harbour porpoise sighting in Year 2 was recorded as 'fast swimming'.

4.4.5 Otter

Otters (*Lutra lutra*) were seen regularly throughout the survey period with sightings higher during the winter months and lowest during the summer months. Sightings were generally coastal in nature and varied with the tidal cycle with sighting rates being highest around low tide.

4.4.5.1 Behaviour

In Year 1, 36% of otter sightings were at the surface of the water, 27% of otters were 'diving' when first sighted, and 9% of otter sightings were observed to be eating. In Year 2, 30% were at the surface, 23% were swimming and 10% eating.

4.5 Impact Assessment

The installation of the proposed cable route is likely to have a greatest impact on seals in and around the cable landfall location. This is due to the proximity of the proposed cable landfall locations to seal haul-out areas and the potential connectivity of the seals in the Sound with the South East Islay Skerries SAC.

To characterise the usage of the shore in the vicinity of the proposed cable landfall sites, all records of sightings of hauled out harbour seals were mapped (Appendix 2). The maps within Appendix 2 indicate that there are regularly small groups of harbour seals hauling out along the coastline north of the preferred northern cable landfall location (with the closest haul out site being approximately 70-100m away). Although monthly variability exists in relation to the numbers hauling out, there is no apparent pattern in the dataset.

4.5.1 Do nothing Scenario

As stated in the 2010 ES (SPR, 2010) grey and harbour seal abundances in the South East Islay Skerries SAC have increased between 1990 and 2007.

The increase in the local population is expected to result in increased movements and numbers hauled-out within the Sound. Therefore, during a 'do nothing scenario' seals in the area could be expected to fluctuate naturally around the current population level.

4.5.2 Potential Impacts during Installation Phase

IMPACT 4.1: Increased suspended sediments

Disturbance of sediment during cable laying activities may cause localised (nearshore) and short term increases in turbidity. This will have the effect of reducing visibility. Harbour and grey seals have been reported as having high sensitivity to poor visibility.

Given the energy within the Sound it would expected that any suspended sediment would quickly settle out of suspension, with any fine sediment dispersing rapidly. Therefore, as in the 2010 ES (SPR, 2010), the magnitude of this impact is considered to be negligible. Given the high sensitivity / value of marine mammals, the impact has been assessed as being of **minor** significant effect.

MITIGATION IN RELATION TO IMPACT 4.1
• No mitigation required

Residual Impact

As a result of the importance of marine mammals as a receptor the significance of suspended sediments must remain of **minor** significant effect.

IMPACT 4.2: Habitat disturbance

Noise disturbance and visual presence of the installation vessels and onshore cabling equipment could potentially displace marine mammals (seals) from habitats and haul-out sites within the Sound of Islay.

Haul-out areas are present within 70-100m of the proposed preferred cable landfall location. Therefore, some disturbance to animals using these may occur; however, given the limited timescale of the construction works it is expected that the effect will be short term.

With regards the cable installation vessels, an appropriate vessel management protocol will be put in place before works commence. The protocol will identify known haul-out areas in the vicinity of the proposed works and associated activity, and reasonable measures will be taken to minimise disturbance to these locations.

Evidence from the installation of SeaGen, inside a site designated for seals, indicates no disturbance to the activity of marine mammals as a result of the installation (SNH, 2009), or subsequently.

Based on the limited potential for disturbance indicated by the scale and duration of the works, evidence from other tidal device installations, and the already present cable in this area of Islay, the magnitude of the potential impact is assessed as negligible. However, given the high receptor sensitivity the significance of effect of habitat disturbance has been assessed as **minor**.

MITIGATION IN RELATION TO IMPACT 4.2
• Appropriate vessel management measures will be put in place to minimise potential disturbance to haul-out areas within the Sound

Residual Impact

As a result of the importance of marine mammals (seals) as a receptor the significance of habitat disturbance must remain of **minor** significant effect.

IMPACT 4.3: Risk of pollution

The risk of spillage of contaminants, such as oils, during the installation phase was originally considered within the original 2010 ES (*Chapter 21: Water and Sediment Quality*: In SPR, 2010).

The risk of any pollution events occurring will be minimised by following standard good practice, such as the Pollution Prevention Guidelines issued by SEPA (e.g. PPG 5: Works and maintenance in or near water).

The cable lay contractors will have in place prior to any works occurring an agreed and appropriate Site Environmental Management Plan and Pollution Control and Spillage Response Plan. These plans will act to reduce the potential for accidental pollution and in the unlikely event of a pollution incident, will ensure a rapid and appropriate response.

Given the high energy marine environment within the Sound, contaminants can be expected to disperse rapidly; therefore, should a spill occur, its scale and the nature of the contaminant will be limited.

As a result a negligible magnitude is predicted and, given the high receptor sensitivity, the impact is predicted to be of **minor** significant effect.

MITIGATION IN RELATION TO IMPACT 4.3
• No mitigation required

Residual Impact

As a result of the importance of marine mammals as a receptor the significance of pollution risk must remain of **minor** significant effect.

IMPACT 4.4: Noise and Vibration

A general increase in the levels of marine traffic within the Sound during cable laying operations is likely to be a significant source of noise. However, due to the number of vessels already using the Sound of Islay, the relatively limited duration over which increased levels of vessel activity will occur, and the existing levels of background noise, the impact is expected to be relatively low.

Marine mammals travelling through the Sound of Islay, or seals hauled out close to the proposed works, could theoretically be temporarily displaced by the noise generated during cable lay operations. However, shore based marine mammal surveys undertaken during the installation of the SeaGen turbine in Strangford Lough, Northern Ireland, showed no evidence of change in relative seal abundance or distribution in the area. Measures of harbour porpoise activity (echolocation 'clicks' collected via passive acoustic monitoring) within the Strangford Lough narrows also indicated that passage in and out of the lough remained at similar levels pre and post installation (SNH, 2009). It suggested that existing high levels of background noise and vibration may have played a role in this lack of response.

Based upon the evidence showing a lack of disturbance effects during the installation of the SeaGen device and considering the potential noise of cable laying operations in the context of the existing, considerable, noise environment of the Sound a negligible magnitude is predicted for the Sound of Islay, with no measurable response or change anticipated. Given that receptor sensitivity must be considered high, the impact is predicted to be of **minor** significant effect.

MITIGATION IN RELATION TO IMPACT 4.4
• There is a potential to cause disturbance to marine mammals (particularly seals) during cable laying operations and while our judgement is that this is of minor significance in this instance, based on industry experience and wider assessments, knowledge is incomplete and effects are unknown. A strategy of ongoing monitoring, linked to management of the Development, is proposed and will include all operations.

Residual impact

Due to the sensitivity of marine mammals as a receptor the significance of the impact remains **minor**.

IMPACT 4.5: Collision Risk

Shipping collisions are a recognised cause of marine mammal mortality (Scottish Executive, 2007). Given the number of vessels already using the Sound and the vessel type and duration over which activity will increase as a result of cable laying operations it is considered that the likelihood of collision is low.

A protocol will be established to ensure installation vessels travelling in to the area maintain a suitably safe speed. The vessels involved in the cable laying operations will move at a steady speed and in a predictable and planned manner throughout the operation.

Based on existing levels of vessel activity in the Sound, the limited scale and timeframe for cable laying and the lack of evidence of collisions from other similar installation works, a negligible magnitude is predicted. However, given the high receptor sensitivity, collision risk is predicted to be **minor**.

MITIGATION IN RELATION TO IMPACT 4.5
• The available evidence from similar installation processes indicates that collision risk during construction is minimal, with no evidence of any interactions • Application of a vessel management protocol based on existing 'best practice' will ensure reasonable mitigation is in place to reduce the potential for collision

Residual Impact

As a result of the importance of marine mammals as a receptor the significance of collision risk will remain of **minor** significant effect.

4.5.3 Potential Impacts during O&M Phase

Given the nature of cable laying operations it is not expected that there will be any extensive operations with regards maintenance throughout the life of the project. Therefore, any works required will likely involve the lifting and/or replacement of cables. The impacts in relation to such operations will be the same in nature as the installation phase of the project.

4.5.4 Potential Impacts during the Decommissioning Phase

The potential impacts during decommissioning are expected to be of the same nature and significance as the impacts during the installation phase.

4.5.5 Cumulative Impacts

Cumulative impacts are not thought to have altered since the original assessment made in the 2010 ES (SPR, 2010) and are not expected to have altered with regards the change in cable route from Jura to Islay.

4.6 Proposed Monitoring

Post installation mitigation and monitoring is detailed within the 2010 ES (SPR, 2010) as well as throughout Section 4.5.2 of this report.

4.7 Statement of Significance

It is anticipated that the proposed preferred cable route and landfall location will have, at worst, a pre-mitigation minor effect on marine mammals (see Section 4.7). Continued monitoring to detect impacts, and the implementation of necessary mitigation measures, will maintain the effect at minor.

4.8 Conclusions

4.8.1 General Trends

The Year 2 data utilised in the writing of this chapter are well aligned with the data already presented in the 2010 ES (SPR, 2010). Once again harbour seals were by far the most commonly sighted marine mammal species, with most sightings of hauled out seals at low tide. Sightings were highest in summer months and lowest over the winter, although the peak in the summer of 2011 was not as high as in previous years. Overall sightings rates were lower during Year 2 of data collection; however, it is currently unclear, without further analysis, if this is statistically significant. Seal haul-outs were concentrated in the south of the Sound and on the Islay shoreline; therefore, potentially close (within 70-100m) to the proposed preferred cable landfall location on Islay.

Sightings of non-seal marine mammals remained very low, a similar trend as seen during Year 1 of data collection. Given the 2 years of visual data and the towed acoustic work undertaken by the Scottish Government in the Sound, there is a high degree of confidence that the Sound itself is not an important area for echolocating cetaceans.

Further analysis, similar to that undertaken with the Year 1 dataset (Mackenzie, Donovan and Sparling, 2011), would have to be undertaken before any potential significant trends in the dataset could be teased out. However, the statistical analysis undertaken of the Year 1 dataset did not provide any unexpected results when compared to the general patterns seen in the initial analysis of sightings rates. Therefore, there is confidence that the patterns described within this chapter are reflective of baseline conditions.

4.8.2 Haul-out Interactions

There were several haul-out sites identified on the Islay coastline just to the north of the proposed preferred cable landfall location. These sites had no clear seasonal pattern of use, with haul-outs occurring in all months of the year. The southern limit with regards haul-out sites within the Sound of Islay appears from the data to be 70-100m north of the proposed preferred cable landfall location, with this haul-out site likely to represent a true southern boundary of haul-outs. However, the sites with the highest numbers of seal counts were generally a few hundred metres to several kilometres to the north of the proposed preferred cable landfall location. It should also be noted that none of the haul-out sites identified during this survey were in the recent Scottish Government consultation for the designation of 'significant' seal haul-outs to protect them from disturbance or harassment.

4.8.3 SAC Connectivity

SMRU harbour seal tracking data from 2011 and 2012 showed that none of the seals tagged at the South East Islay Skerries SAC travelled into the Sound at any point. However, seals that were tagged at locations within the Sound itself showed some degree of interaction with the South East Islay Skerries SAC. Additionally, some of the seals tagged within the Sound also showed connectivity with areas to the north of Islay, including as far north as Mull, Colonsay and Tiree. Certain tagged individuals showed very high use of the Sound itself, which was likely related to foraging.

4.9 Summary

- Harbour seals were the most frequently sighted marine mammal species;
- Harbour seals were present throughout the year;
- Harbour seal sightings were predominantly of hauled out individuals on the Islay side of the Sound. These sightings were south of the array area and north of the proposed preferred cable landfall location;
- Grey seals were recorded much less frequently with most sightings being in the water;
- Otters were seen frequently along the coast at low tide;
- Cetaceans and basking sharks were rarely recorded; and
- Seal telemetry studies revealed high usage of the Sound and a degree of movement between haul-out sites in the Sound and elsewhere, including the South East Islay Skerries SAC.

4.9.1 Impact Summary Table

Cable Installation				
Impact	**Magnitude of Impact**	**Receptor Sensitivity**	**Significance Level**	**Residual Impact**
Increased suspended sediments	Negligible	High	Minor	Minor
Habitat disturbance	Negligible	High	Minor	Minor
Risk of pollution	Negligible	High	Minor	Minor
Noise and vibration	Negligible	High	Minor	Minor
Collision risk	Negligible	High	Minor	Minor
Operation / Maintenance				
Impact	**Magnitude of Impact**	**Receptor Sensitivity**	**Significance Level**	**Residual Impact**
Increased suspended sediments	Negligible	High	Minor	Minor
Habitat disturbance	Negligible	High	Minor	Minor
Risk of pollution	Negligible	High	Minor	Minor
Noise and vibration	Negligible	High	Minor	Minor
Collision risk	Negligible	High	Minor	Minor
Decommissioning				
Impact	**Magnitude of Impact**	**Receptor Sensitivity**	**Significance Level**	**Residual Impact**
Increased suspended sediments	Negligible	High	Minor	Minor
Habitat disturbance	Negligible	High	Minor	Minor
Risk of pollution	Negligible	High	Minor	Minor
Noise and vibration	Negligible	High	Minor	Minor
Collision risk	Negligible	High	Minor	Minor

4.10 References

Cunningham, L. B. (2009). Harbour seal movements and haul out patterns: implications for monitoring and management. Aquatic Conservation: Marine and Freshwater Ecosystems, **19**, 398-407.

Mackenzie, M.L., Donovan, C.D. and Sparling, C.E. (2011). Statistical Analysis of seal data from the Sound of Islay. Report by DMP and SMRU Ltd. to ScottishPower Renewables.

Scottish Executive (2007). Scottish Marine Renewables SEA.

Scottish Natural Heritage (2009). Sharing Best Practice Conference, Seagen Project. Available online at http://www.snh.org.uk/pdfs/sgp/A303239.pdf (Accessed February 2013).

ScottishPower Renewables (2010). Sound of Islay Demonstration Tidal Array: Volume 1 Environmental Statement. Copyright ScottishPower Renewables (UK) Ltd. 2010.

SMRU Ltd (2010). Sound of Islay – Marine Mammal Data from Shore Based Observations. Year 1 baseline report to ScottishPower Renewables.

Appendix 1 Video Survey for the Sound Of Islay Cable Route

This page left intentionally blank

Appendix 2 Sound of Islay Demonstration Tidal Array: Inter-tidal survey of potential cable routes

This page left intentionally blank

Appendix 3 Sound of Islay Marine Mammal Baseline Data – Year 2 Update

This page left intentionally blank