Islay Hybrid Offshore Wind and Tidal Farm Scoping Document

May 2017

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PLEASE BE AWARE THAT THIS IS A FICTIONAL SCOPING REPORT PRODUCED ONLY FOR THE PURPOSE OF SUPPORTING OUR GROUP PROJECT CONCEPT. IT IS OF NO LEGAL VALIDITY.

Contents

1. Introduction

1.1. Background information

The proposed Islay Hybrid Offshore Wind and Tidal is located approximately 8 km off the south-west tip of the coast of Islay. **Figure 1-1** shows the location of the proposed farm. The current, indicative turbine layout is based on turbines which would provide an installed capacity of 7 MW each. The turbine layout and size will undergo an iterative design process as the Environmental Impact Assessment (EIA) progresses.

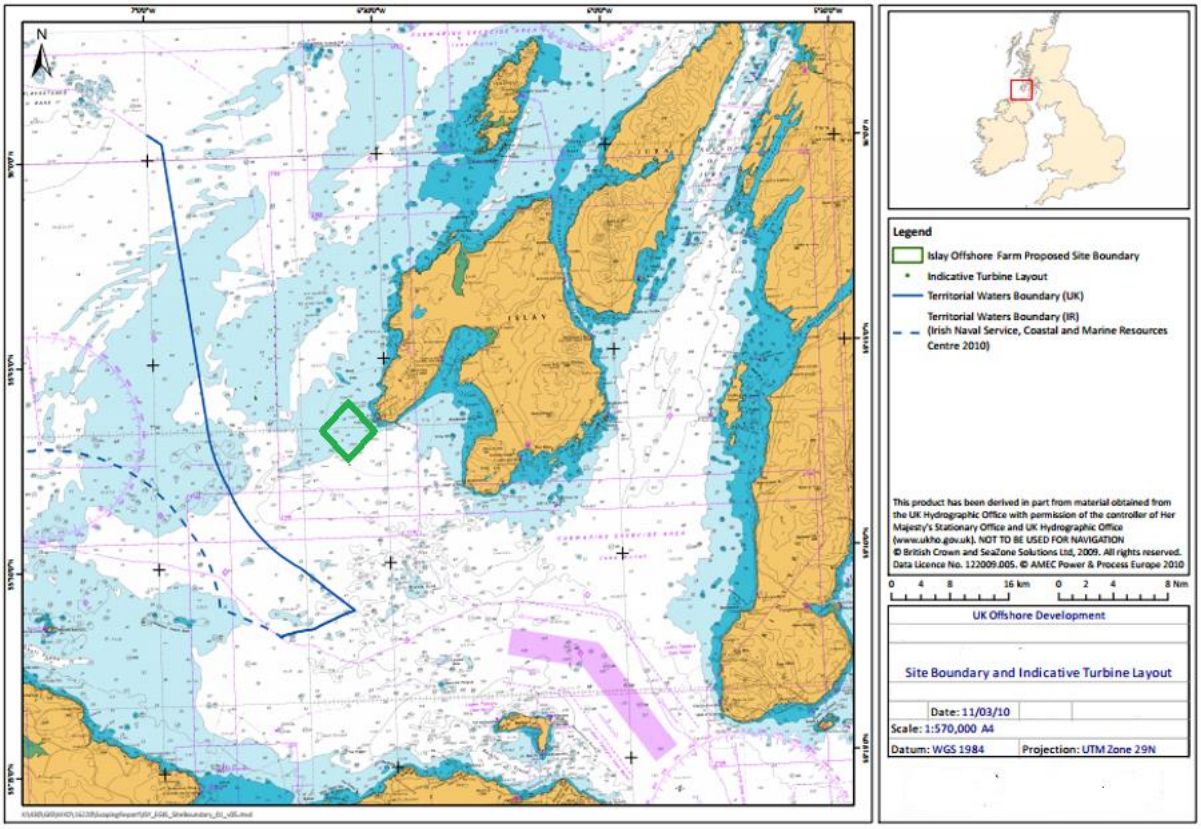

FIGURE 1-1

1.2. Aims of this Document

The key aims of this document are to:

- Set out the overall approach to the Environmental Impact Assessment (EIA)
- Provide available baseline information, identify the relevant assessment methodology, potential impacts at all stages of development and potential mitigation measures for each of the relevant environmental topics.
- Indicate the proposed content and structure of the Environmental Statement (ES)
- Invite comments on the above

1.3 Scope and Method Proposal

The technology proposals (device type), physical environment, biological environment and consequences of human activities will be assessed for the full life cycle of the wind-tidal farm including decommissioning.

The Environmental Statement (ES) shall meet the requirements of each of the following consents and licenses:

- Electricity Act 1989 – Section 36;
- Food and Environmental Protection Act 1985 – Section 5; and
- Coast Protection Act 1949 – Section 34.

As both wind and tidal energy technology are likely to advance significantly during the development process, the ES should provide enough environmental information to allow for this in the consent. The EIA for the proposed Islay Hybrid Offshore Wind and Tidal Farm will be carried out following the principles described as the **'Rochdale Envelope'** with assessments based on the most likely realistic worst case scenario(s).

1.4. Legislation and Guidance

1.4.1 Legislation

1.4.1.1 Consents and Licenses Required

1.4.1.1.1 Electricity Act 1989 – Section 36

Developers proposing the construction, extension or operation of a marine based generating station within Scottish territorial waters or the Scottish Renewable Energy Zone (REZ) will require Scottish Ministers consent under section 36 of the Electricity Act 1989.

1.4.1.1.2 Food and Environmental Protection Act (FEPA) 1985 – Section 5

Regarding work associated with the placing of materials, disposal or introduction of other activities in the marine environment a license is required from the Scottish Ministers.

1.4.1.1.3 Coastal Protection Act (CPA) 1949 – Section 34

Ministers must determine whether marine works will be detrimental to the safety of navigation.

1.4.1.2 The Marine (Scotland) Act

The Marine (Scotland) Act introduces:

- Marine planning
- Marine licensing
- Marine conservation

- Seal conservation
- Enforcement

1.4.1.3 European legislation

1.4.1.3.1 Strategic Environmental Assessment Directive (SEA Directive)

As stated in the terms of the SEA Directive (2001/42/EC), the Scottish Government is required to carry out a strategic environmental assessment to investigate the effects of 'certain plans or projects which are likely to have significant effects on the environment'.

1.4.1.3.2 Environmental Impact Assessment Directive (EIA Directive)

The legal framework for EIA is set by the European Commission EIA Directive 85/337/EEC (as amended by Directive 97/11/EC and 2003/35/EC) on the assessment of the effects of certain public and private projects on the environment. Offshore wind and tidal farms are listed in Annex II and will require an EIA where they are likely to have significant effects on the environment because of their size, nature or location.

1.4.1.3.3 The Habitats Directive

This directive is implemented in UK law through the Conservation (Natural Habitats & c.) Regulations 1994 (also known as the Habitats Regulations). New legislation was passed in 2007 extending this network to the offshore region through the Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007.

1.4.1.3.3.1 Special Areas of Conservation (SACs)

Sites designated under the Habitats Directive are known as Special Areas of Conservation (SACs). Designated SACs on Islay and the surrounding islands are shown on Figure 1-2.

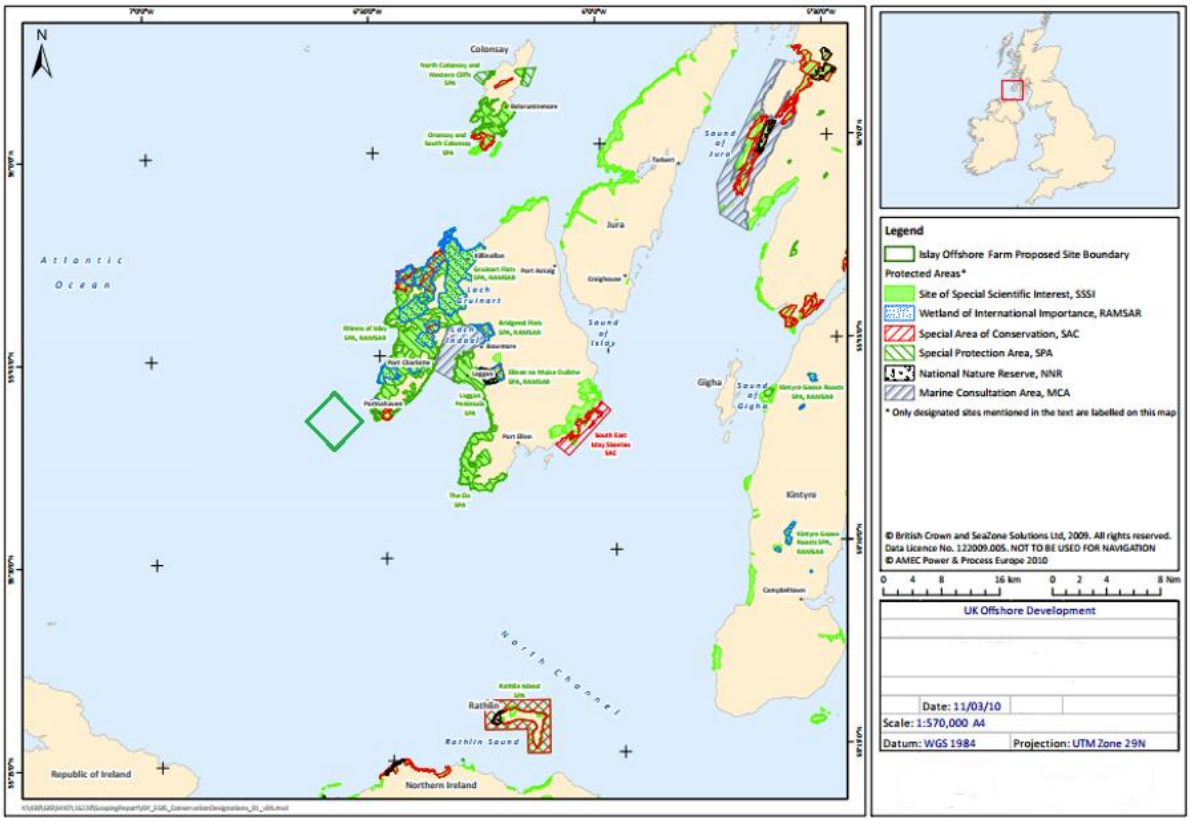

FIGURE 1-2

1.4.1.3.4 The Birds Directive

The Council Directive on the conservation of Wild Birds (79/409/EEC), generally known as The Birds Directive, is implemented in UK law through the same regulations as the Habitats Directive. It requires that certain species are given legal protection through a network of protected sites

1.4.1.3.4.1 Special Protection Areas (SPAs)

Special Protection Areas (SPAs) are classified under the EU Birds Directive, which requires the Member States of the European Community to identify and classify the most suitable territories, in size and number, for certain rare or vulnerable species (listed in Annex I of the Directive) and for regularly-occurring migratory species.

1.4.1.3.5 Appropriate Assessment (AA)

Where there is the potential for significant effect on a European designated site such as an SAC or SPA (or proposed site), an Appropriate Assessment (AA) as defined under the Habitats Directive would be required.

1.4.2 Guidance

Guidance for the scoping of the proposal has been taken from the Scottish Marine Renewables SEA and this report forms a key document in respect of developing the Islay EIA and consequently the Islay Scoping Document. However, although there have been number of small tidal demonstration projects, not many large scale commercial tidal farms have been developed. Therefore, whilst guidance does exist for marine energy devices it is perhaps best interpreted to be the result of anticipated impacts rather than clearly understood identified impacts.

Based on our hybrid systems nature we will associate our guidance for the offshore elements of other offshore developments in particular offshore wind farms, since they are a more mature and deployed technology.

2. Project description

The proposed Islay Hybrid Offshore Wind and Tidal Farm is located 8 km on the south-west tip of Islay. The proposed project would comprise:

- Offshore turbines and their foundation
- Interconnecting cables between turbines
- Offshore substations and their foundations
- A connection to the National Grid

Water depth within the site generally ranges from 25 m to 50 m above Lowest Astronomical Tide (LAT). The mean spring peak tidal velocities have been measured at approximately 3m/s. Mean neap peak tidal velocities were recorded at around 1.3 to 1.6m/s. Seabed sediments at the site are gravely sandy, becoming slightly rockier in the northern areas.

The site is centred on latitude 55^0 40.20N and longitude 06^0 38.50W, extending over an area of approximately 8.5km^2 .

The sections below describe baseline data collected to date and proposed activities.

Meteorological Conditions
Wind data is available from Port Ellen, Islay.

Wave and Current Data
The wind farm site is exposed to westerly ocean waves. Tidal current data have been provided using Metoc's hydrodynamic model (Metoc, 2009).

Bathymetry and Geology
Data are available from Admiralty Charts and BGS maps; bathymetry is shown in Figure 1-1 and seabed sediments are shown in Figure 2-1.

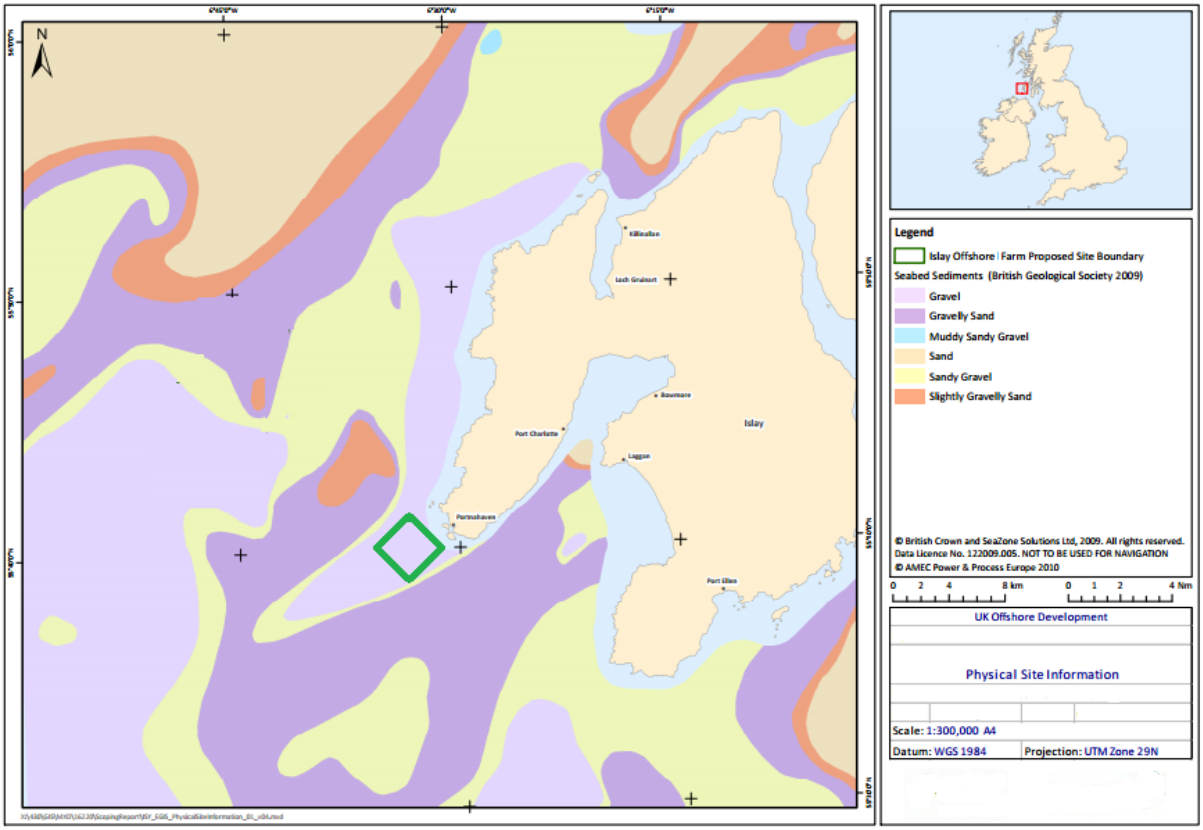

FIGURE 2-1

2.1. Site Selection

The selection phase for the Islay site began with an exhaustive screening exercise for potential hybrid offshore wind-tidal farm locations in the United Kingdom. Potential sites were then assessed in terms of viability and constructability.

Project viability was considered in terms of:

• Expected energy yield: The Islay site is exposed to the extremes of the north east Atlantic wave climate and therefore has good wind and tidal resource potential

• Water depth: Current installation techniques are economically viable in water depths of 50 m or less

• Grid connection: Islay

• Strategic setting: The coastal waters west of Islay were identified by a Scottish Government Report (IES, 2006) as having offshore wind and tidal resource potential

1.5 Grid connection

Grid connection cable routing is not yet known and is heavily dependent on onshore connection availability. Cables are not within the remit of this Scoping Document.

1.6 Turbine Design and Layout

Technology Neutral Approach – Purpose

The intent of identifying a generic device envelope is that in most cases if a location is considered environmentally suitable for a given tidal device it is likely to be suitable for another.

However, it is acknowledged that an entirely neutral approach.

The following generic design characteristics have been assumed for the purposes of the EIA.

• Horizontal axis tidal turbines (HATT) using either closed or open rotor;

• Sea bed mounted by drilling/piling or gravity mounting; and

• Surface piercing structure.

Choice of turbine would also depend on market availability.

1.7 Foundation Design and Layout

A detailed study to identify the physical parameters of the site would allow turbine sizes, foundation types and likely installation methodologies to be ascertained.

The optimum spacing of a multiple turbine array is essential to ensure minimal yield loss resulting from interaction with neighbouring turbines. Adequate spacing is also important to minimise wake and turbulence effects on blade mechanical integrity.

1.8 Electrical Layout

Turbines would be electrically connected to each other and offshore substations via inter-array cable circuits. Offshore substations would house transformer(s), associated switchgear equipment, accommodation and possibly a helipad.

1.9 Project Construction

A mobilisation and supply base will need to be identified and some components could be delivered directly to the site by sea from their places of manufacture. Marine plant would include jack-up platforms or self-elevating vessels, tugs, barges, cable-laying vessels and other support craft.

1.10 Project Operation and Maintenance

Once commissioned, the farm would operate for an estimate of 25 years. Computers will control individual hybrid turbines and be monitored from a central shore-based location. Access to turbines would be by boat or helicopter.

1.11 Project Decommissioning

Provision for the decommissioning of offshore installations is given in the Energy Act 2016. For sites in Scottish Territorial Waters, the Secretary of State must consult with Scottish Ministers before approving such a programme. Decommissioning impacts will be considered in the EIA.

To minimise development and device risks it is proposed to develop the hybrid farm in three phases.

1.11.1 Phase 1
Initially, a small array of devices will be installed to demonstrate lead technology. Preliminary phase devices will be heavily instrumented and monitored as site specific demonstrations of technology.

1.11.2 Phase 2
This phase featuring an excess of twenty devices. Further exhaustive control and monitoring.

1.11.3 Phase 3
Construction of full farm.

3. Physical Environment

3.1. Geology

3.1.1. Potential Impacts

3.1.1.1. Construction
The construction phase has the potential to create the most significant impacts in respect of seabed disturbance and increased sediment.

3.1.1.2. Operation
Referral to 3.2.1.2.

3.1.1.3. Decommissioning
Referral to 3.2.1.3.

3.1.2. Cumulative Impacts
Potential impacts on geology are likely to be site specific and localised.

3.1.3. Potential Mitigation and Monitoring
Referral to 3.2.3.

3.2. Marine & Coastal Processes
Our proposed farm has the potential to affect geomorphology and sedimentary processes, which in turn may impact the biological environment.

3.2.1. Potential Impacts

3.2.1.1. Construction
Increased sediment loading is likely to result from geotechnical survey work although this predicted to be localised and over a short period and therefore not considered significant. Similarly, sediment loading will increase during drilling work for turbine foundations.

Increased turbidity and release of contaminants could occur because of the foundation installation and cable laying.

3.2.1.2. Operation

- Alteration to wave height and direction
- Alteration to currents and water elevations
- Alteration to suspended sediment concentrations
- Alteration to seabed bathymetry / topography e.g. scour
- Consequent effects on coastal defences and coastal conservation

3.2.1.3. Decommissioning

Potential effects are predicted from some decommissioning activities.

3.2.2. Cumulative Impacts

Potential impacts on coastal processes are likely to be site specific and localised. Whilst localised scour may occur it is unlikely that there will be any interaction between sites (Royal Haskoning 2009).

3.2.3. Potential Mitigation and Monitoring

If required, localised scour around turbines would be mitigated through the addition of scour protection. This could be done using rock dumping or specialised sediment stabilisation mats, depending on the substrate type in the area. The need for such mitigation would depend on the results of the coastal processes assessment

3.3. Contamination and Water Quality

There are several directives associated with the targeted reduction of dumping at sea. However, one of the most far reaching, The Water Frameworks Directive (2000/60/EEC) which was transposed into Scottish law via "The Water Environment and Water Services Act 2003" only extends to 3nm (approx. 5.6 km) and therefore does not cover the farm.

Other more appropriate directives to be taken into consideration are:

- Bathing and Shellfish Waters Directive
- Urban Waste Water Treatment Directive
- London Convention
- Food and Environment Protection Act

3.3.1. Potential Impacts

3.3.1.1. Construction

- Disturbance of Natural Sediments
- Release of Additional Sediment
- Disturbance of Contaminated Sediments
- Accidental Release of Contaminants

3.3.1.2. Operation

- Accidental Release of Contaminant
- Contamination - Leakage of Hydraulic Fluids
- Contamination - Anti-fouling Compounds
- Changes in Sediment Dynamics

3.3.1.3. Decommissioning

Potential impacts are predicted to be similar to construction except that there will be less effect of release of additional sediment than during construction.

3.3.2. Cumulative Impact

Due to the localised nature of impacts, cumulative and / or in-combination impacts are unlikely.

3.3.3. Potential Mitigation

• Contaminant management through adherence to standard protocols, e.g.
MARPOL 73/78, the Merchant Shipping (Prevention of Pollution) Regulations 1983 and the Merchant Shipping (Prevention of Pollution by Garbage) Regulations 1988

• Adequate site management and transfer of spoil would be handled under the relevant guidance and in accordance with the requirements of statutory consultees

• Appropriate construction techniques could minimise increases in suspended sediments in the water column.

3.4. Biological Environment

Even though the site area itself is not designated as an offshore-protected site, as shown in Figure 3-2, there is always the potential that there may be site usage by protected species either foraging or transiting the site on passage. This will need to be assessed.

FIGURE 3-2 *(Source Joint Nature Conservation Comittee)*

3.4.1. Benthic Ecology

Benthic communities are important in terms of providing food for fish, marine mammals and bird species. Certain habitats and species may also be important in terms of their intrinsic conservation value, e.g. biogenic reef.

3.4.1.1. Potential Impacts

3.4.1.1.1. Construction

- Direct disturbance due to the installation of turbine foundations, inter-array cables and from construction vessels
- Secondary disturbance due to increases in suspended and deposited sediments
- Remobilisation of contaminants from seabed sediments leading to a reduction in water quality
- Discharge of contaminants from construction vessels leading to a reduction in water quality
- Underwater noise and vibration which could have a physiological impact on benthic species

3.4.1.1.2. Operation

- Direct loss of seabed habitat due to the presence of turbine and foundations and associated scour
- Decrease in water flow resulting from extraction of tidal energy, may potentially impact on habitats and species which are sensitive to changes to tidal flows and wave exposure.

• Provision of new habitat and an artificial reef impact due to the presence of turbine and foundations and, if required, scour protection
• Changes in sedimentary patterns, sediment transport rates and suspended sediment conditions also affected by potential leakage of toxic compounds or hydraulic fluids
• Leaching of toxic compounds from sacrificial anodes, antifouling paints or hydraulic fluids (if present) from a device.
• The potential for leakage of hydraulic fluids through accidental storm or collision damage could potentially present a significant impact if it occurred, but it is considered that there is a very low likelihood of such a leakage occurring.
• There is also potential for colonisation of structures causing increased biodiversity and leading to increased food availability for fisheries.
• Noise and vibration which may affect the behaviour of benthic species
• EMFs from inter-array cables which may affect the physiology or behaviour of marine benthos

3.4.1.1.3. <u>Decommissioning</u>

Potential effects are predicted to be similar to installation except that since much of the foundation will be left in situ the amount of sediment release is likely to be significantly lower than that released during construction. This is dependent on the depth of excavation required.

3.4.1.2. Cumulative Impacts

In most cases, wind farm construction is unlikely to lead to any significant change in seabed or sediment type. Only short term impacts would be experienced and recolonization by the surrounding in fauna is expected to take place rapidly (Royal Haskoning 2009). Due to the localised nature of impacts, cumulative and / or in-combination impacts are unlikely for our proposed project.

3.4.1.3. Potential Mitigation and Monitoring

• Appropriate construction techniques could minimise increases in suspended sediments in the water column
• Scour could be mitigated, if required, through the implementation of appropriate scour protection (rock armour, concrete mattressing or sediment stabilisation mats)

3.4.2. Fish and Shellfish

There is potential for the construction of the wind-tidal farm and subsea cables and the operation of the farm to have an adverse effect on fish and shellfish resources, including spawning, overwintering, nursery, feeding grounds and migratory pathways. An assessment is required to determine the extent of the interaction between the proposed development and the resources found at the site.

Table 3-1 and Figures 3-3 and 3-4 provide data from Centre for Environment, Fisheries and Aquaculture Science (Coull et al., 1998) which show the presence and extent of spawning and nursery grounds within and around the proposed Islay Offshore Hybrid Wind and Tidal Farm.

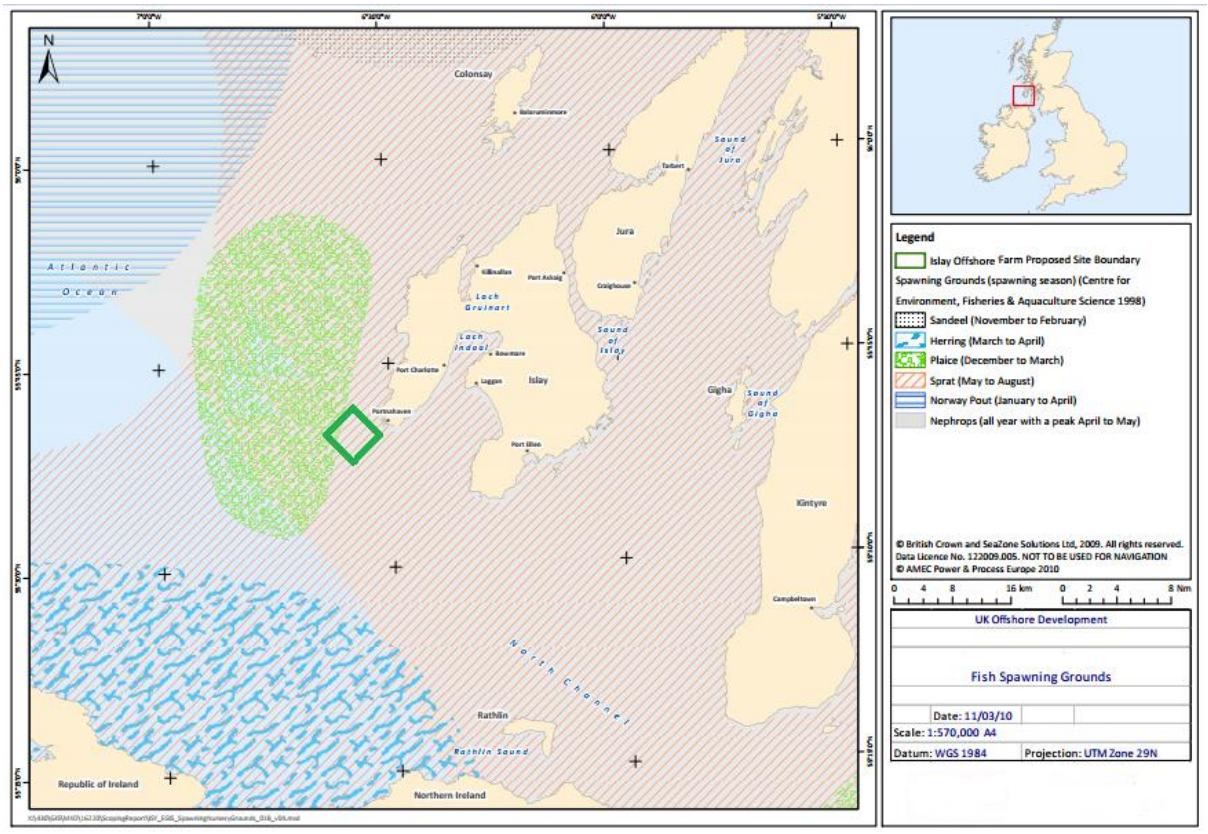

FIGURE 3-3

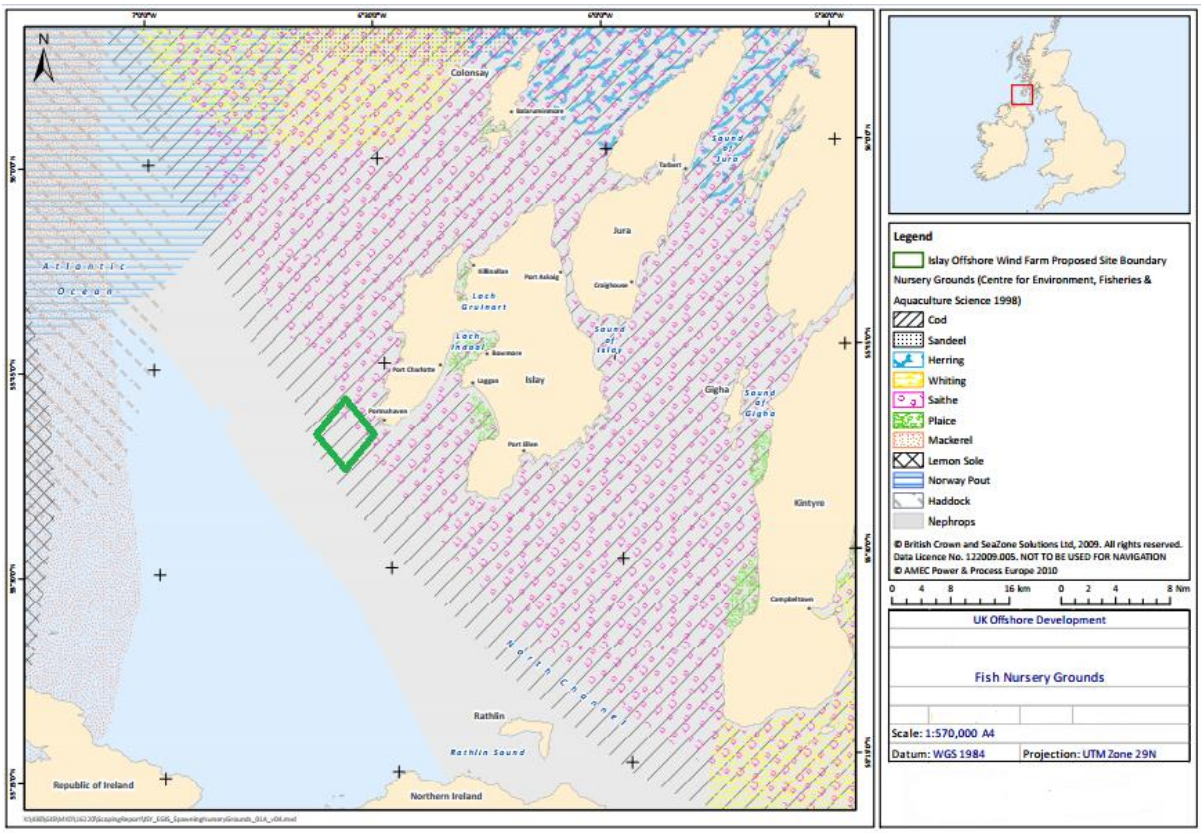

FIGURE 3-4

TABLE 3-1 Spawning and nursery areas within the proposed Islay site

Species	Spawning Grounds	Nursery Grounds	Seasonality of Spawning
Plaice	None	None	December to March
Whiting	None	None	February to June
Norway Lobster (Nephrops)	Occur across the whole of the Islay site	Occur across the whole of the Islay site	Throughout the year
Sprat	Occur across the whole of the Islay site	None	May to August
Saithe	None	Occur across a large area of the Islay site	January to April
Cod	None	Occur across the whole of the Islay site	January to April
Haddock	None	None	February to May
Norway Pout	None	None	January to April
Mackerel	None	None	March to July

Lemon sole	None	None	April to September
Herring	None	None	March to April
Sandeel	None	None	November to February

Source: Coull et al., (1998)

Some rivers within the area are known to support several diadromous species, specifically sea trout, Atlantic salmon and eels.

Table 3-2 shows approximate timings of migrations although these will vary depending on factors such as water temperature, food availability.

TABLE 3-2 Timings of migration for diadromous / andromous species

Species	Timing of upstream migration
Atlantic Salmon	Main run throughout August - October
Eel	Elver migrate upstream from January to June, with a May peak
Sea trout	Migrations occur from May through to October

Source: CEFAS

A number of fish of conservation importance have been recorded within the waters around Islay. A summary of these species along with the legislation through which they are afforded protection is presented in Table 3-3.

TABLE 3-3 Fish species of conservation importance recorded in the waters around Islay

Species	Relevant legislation and other protection
Allis shad	Bern Convention Appendix II Habitats Directive Annex II and V IUCN Red List OSPAR List of Threatened and/or Declining Species UK Wildlife and Countryside Act 1981(as amended in Scotland) UK BAP priority species
Atlantic Salmon	UK BAP priority species Habitats Directive Annex II and V
River lamprey	Bern Convention Appendix II Habitats Directive Annex II and V
Lesser sandeel	UK BAP priority species
Cod	IUCN Red List OSPAR List of Threatened and / or Declining Species UK BAP

Desk based data will need to be gathered from sources such as the following:

- Scottish Executive Marine SEA;
- Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements – June 2004;
- CEFAS – Interactive Spatial Explorer and Administrator (iSEA);
- Scottish Fisheries Protection Agency (SFPA) Database; and
- The Marine Life Information Network for Britain and Ireland (MarLIN).

The natural fisheries assessment will be carried out in line with, but not limited to, the following guidance:

- CEFAS (2004) Offshore Wind Farms: Guidance Note for Environmental Impact Assessments in respect of FEPA and CPA requirements. Version 2. Report by CEFAS on behalf of the MCEU

3.4.2.1. Potential Impacts

3.4.2.1.1. <u>Construction</u>

• Direct disturbance and loss of spawning and nursery grounds due to the installation of turbine foundations, cables and vessels

• Indirect impacts on spawning and nursery grounds, and on migration routes, due to increases in suspended and deposited sediments

• Disturbance to seabed habitats from increased sediment suspension and deposition

• Remobilisation of contaminants from seabed sediments leading to a reduction in water quality

• Discharge of contaminants from construction vessels leading to a reduction in water quality

• Noise and vibration which could have impacts on fish and shellfish species. Pile driving is anticipated to have the greatest potential effects on marine wildlife, as it generates very high sound pressure levels that are relatively broad-band (20 Hz - > 20 kHz).

3.4.2.1.2. <u>Operation</u>

• Direct loss of key fish habitats (spawning, nursery or feeding grounds) due to the presence of turbine (collision) and foundations and associated scour

• Introduction of new habitat from installation and scour protection, if required, resulting in possible enhancement of the fishery

• Underwater noise and vibration which could affect behaviour of fish and shellfish species

• EMFs which could affect physiology or behaviour of fish and shellfish species

3.4.2.1.3. Decommissioning

Potential effects are predicted to be like installation except that since much of the foundation will be left in situ the amount of sediment release is likely to be significantly lower than that released during construction. This is clearly dependent on the depth of excavation required.

3.4.2.2. Cumulative Impacts

Impacts on noise sensitive fish species, e.g. herring, may need further assessment in terms of cumulative impacts. Data collected for each of the west coast wind farms would be collated to provide a broad scale picture of the fish resource in the wider area.

3.4.2.3. Potential Mitigation and Monitoring

The type of foundations and turbines used will affect the level of noise generated. If foundations are piled, mitigation of piling noise would include a 'soft-start' to piling operations (a gradual increase in the force used to strike the pile).

Contaminant management would be managed through adherence to standard protocols.

3.5. Marine Birds

The EIA will include a description of the main distributions of bird species within the area, and the potential effects that the proposed farm will have on them.

Designated Areas and Protected Species

As described in previous sections of this scoping document (section 1.4.1.3.4.1.) Islay itself has significant avian interest, and there are a number of designated sites for both Species (SPAs) and Habitats (SAC/SSSIs) on the island. There are, however, no nearshore or offshore designated areas associated with avian species in the vicinity of the proposed farm development.

TABLE 3-4 Special Protected Areas (SPAs) and Ramsar sites within the region of the proposed Islay site

Site	Designation	Conservation Interest Qualifying Species (and species named in the assemblage)			Distance from proposed Islay Offshore Wind and Tidal Farm
		Breeding	Overwinter	Passage	
Rhinns of Islay	SPA, Ramsar	chough, corncrake, hen harrier, common scoter	Chough, Greenland white-fronted goose	whooper swan	16 km
Gruinart Flats, Islay	SPA		Greenland whitefronted goose, barnacle goose		32 km
Laggan Peninsula, Islay	SPA, Ramsar		Greenland whitefronted goose, barnacle goose		22 km
Bridgend Flats, Islay	SPA, Ramsar		Barnacle goose		22 km
Duich Moss (Eilean na Muice Duibhe), Islay	SPA, Ramsar		Greenland whitefronted goose		25 km
The Oa	SPA	chough			19 km
Oronsay and South Colonsay	SPA	corncrake, chough	Chough		40 km
North Colonsay and Western Cliffs +	SPA	chough (guillemot, kittiwake)	Chough		45 km
Rathlin Island +	SPA	peregrine, guillemot, razorbill, kittiwake (as above plus puffin, herring gull, lesser blackbacked gull, common gull, fulmar)			45 km
Kintyre Goose Roosts	SPA, Ramsar		Greenland whitefronted goose		60 km
Knapdale Lochs	SPA	black-throated diver			61 km

Ailsa Craig*	SPA	gannet, lesser black-backed gull (as above plus guillemot, kittiwake, herring gull)	98 km

*** Not shown in Figure 1-2**
+ Sites with marine extensions

The assessment will be carried out in line with, but not limited to, the following guidance:

• Camphuysen, K.C.J., Fox, A.D., Leopold, M.F. and Petersen, I.K. (2004) Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the UK. COWRIE-BAM-02-2002 38pp

• MacLean I.M.D., Wright, L.J, Showler, D.A. and Rehfisch, M.M. (2009) A review of assessment methodologies for offshore wind farms. COWRIE METH-08-08

• King, S., Prior, A., Maclean, I. and Norman, T. (2009) Developing guidance on ornithological cumulative impact assessment for offshore windfarm developers.

COWRIE

3.5.1. Potential Impacts

3.5.1.1. Construction

- Flying birds colliding with the surface structures of ships; or
- Ships colliding with birds rafting on the surface
- Physical disturbance through noise and presence of turbine
- Increased turbidity (reduced visibility)
- Disturbance of contaminated sediments

3.5.1.2. Operation

- Collision risk
- Habitat exclusion
- Noise produced during operation of devices could also potentially disrupt prey location and underwater navigation in marine birds, or even result in temporary or permanent hearing damage.
- Changes in Suspended Sediment Levels and Turbidity
- Contamination
- Creation of Resting and Breeding Habitat

3.5.1.3. Decommissioning

Potential effects from decommissioning will be the same as those referred to above except that the timescale will be considerably shorter.

3.5.2. Cummulative Impacts

Ornithological impacts have the potential to act cumulatively with other projects, particularly with offshore and onshore wind farm sites within the area (Royal Haskoning 2009). Also, as further marine renewables projects come on stream e.g. wave and tidal, these may also need to be considered.

3.5.3. Potential Mitigation and Monitoring

Potential methods, as described in the SNH policy statement: Marine renewable Energy and the Natural Heritage (SNH undated) may include:

- Use of 'considerate' access routes to avoid flocks of rafting birds
- Use of 'soft-start' procedures to minimise initial piling noise
- Amendments to turbine layout to avoid areas of high bird activity

3.6. Marine Mammals (and Basking Sharks)

Marine mammals are protected under conservation legislation including Annex IV of the Habitats Directive which prohibits the deliberate disturbance of listed marine mammal species and Annex II of the Habitats Directive which lists harbour porpoise, bottlenose dolphin, grey seal and harbour seal as species for which the establishment of SACs should be considered.

All cetaceans are categorised as European Protected Species (EPS) and a licence would be required from the Scottish Government for works which may affect EPS or their shelter/breeding places.

In UK waters, all cetacean species and basking sharks are protected as Schedule 5 species through Section 9 of the Wildlife and Countryside Act, 1981, and the Nature Conservation (Scotland) Act, 2004. For seals, protection is granted through the Conservation of Seals Act, 1970.

Seven species of cetacean are known to regularly occur in west coast waters. These are: the harbour porpoise, minke whale, bottlenose dolphin, white-beaked dolphin, Atlantic white-sided dolphin, killer whale and the Risso's dolphin with humpback, sperm and fin whales recommended to be considered within the assessment. Reports from the Islay Natural History Trust note that sightings of pilot whale, striped dolphin and common dolphin have become more frequent in recent years (Islay Natural History Trust, 1999).

The west coast of Scotland is an important area for basking sharks (Speedie et al., 2009). Special Areas of Conservation (SACs) within the vicinity of the site which have been designated for marine mammals are listed in Table 3-5.

TABLE 3-5 Special Areas of Conservation (SACs) within the vicinity of the proposed Islay Offshore Wind Farm

Site	Designation	Conservation Interest	Distance from proposed Islay Offshore Wind and Tidal Farm
South East Islay Skerries	SAC	Primary designation: Common seal. The Skerries, islands and rugged coastline are extensively used as pupping, moulting and haul-out sites by common seals, which represent between 1.5% and 2% of the UK population	39 km
Firth of Lorn*	SAC	Harbour porpoise is listed as present	82 km
Treshnish Isles*	SAC	Primary designation: Grey seal. This site is considered one of the most important sites in the UK for the grey seal, with a population of around 3,400 Harbour porpoise is listed as present	91 km
Eileanan agus Sgeiran Lios mor*	SAC	Primary designation: Common seal. The site is considered one of the best areas in the country for the species, supporting a population of between 501 and 1000 animals	117 km
Loch Creran*	SAC	Common seal is listed as present	129 km

*** Not shown in Figure 1-2**

The marine mammal assessment will be carried out in line with, but not limited to, the following guidance:

- CEFAS (2004) Offshore Wind Farms: Guidance Note for Environmental Impact Assessments in respect of FEPA and CPA requirements. Version 2. Report by CEFAS on behalf of the MCEU

3.6.1. Potential Impacts

3.6.1.1. Construction

- Underwater noise and vibration inducing physiological / behavioural changes, i.e. displacement
- Masking of communication from noise with energetic / reproductive consequences
- Disturbance effects resulting in displacement of prey species
- Increased vessel activity which may disturb or cause physical harm Increased visual activity which may disturb seals at haul out sites Pollution from associated use of diesel, hydraulic fluids, and antifouling compounds

- Potential reduction of the feeding resource due to effects on prey of noise and vibration, habitat disturbance and elevated suspended sediment concentrations
- Potential removal of habitat available for foraging / breeding
- Conflict with commercial fisheries because of increased effort within reduced fishing areas

3.6.1.2. Operation

• Underwater noise and vibration inducing behavioural / physiological changes

• Masking of communication with energetic / reproductive consequences

• Impacts of electromagnetic fields from subsea power cables

• Impacts on food resources due to presence of foundations (may be beneficial)

• Increased vessel activity causing disturbance or harm

• Potential removal of habitat available for foraging / breeding

3.6.1.3. Decommisioning

Potential effects are predicted to be like installation except that since much of the foundation will be left in situ the amount of sediment release is likely to be significantly lower than that released during construction. This is clearly dependent on the depth of excavation required.

3.6.2. Cumulative Impacts

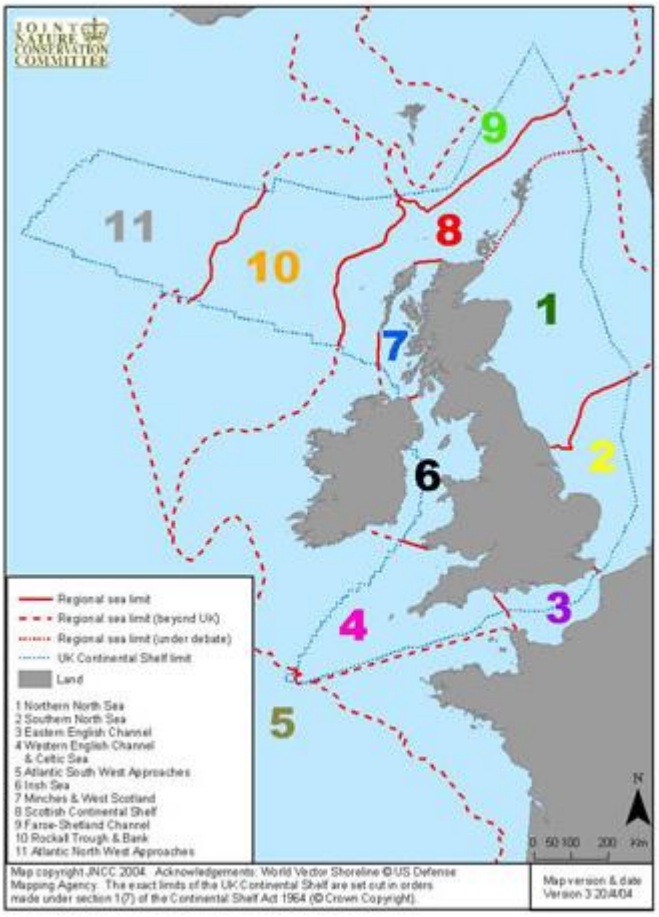

FIGURE 3-5 *(Source: Joint Nature Comittee)*

It is proposed that the study area for the cumulative assessment would focus on Regional Sea 4 as defined by the JNCC and DECC Offshore Energy SEA (DECC, 2009). However, due to the wide-ranging nature of marine mammals, inter-connectivity with Regional Sea 6 and 7 will be considered where appropriate.

3.6.3. Potential Mitigation and Monitoring

If piling is used, soft-start would be employed. A Marine Mammal Monitoring Protocol (MMMP) would also be designed with the aim of ensuring that no marine mammals are within a certain distance of the pile prior to or during pile driving activities. Guidance for this is provided by the JNCC (JNCC, 2009). The use of acoustic deterrents, and potentially new measures available at the time of construction would be discussed with relevant consultees.

Evidence from other wind farms has shown that although marine mammals tend to move away from the site when construction is underway, during operation numbers generally return to baseline levels (Danish Offshore Wind, 2006).

4. Human Environment

The human environment section would include the assessment of impacts of the proposed Islay Offshore Farm on shipping, military uses and airports, seabed archaeology and onshore cultural heritage, landscape and seascape character and views, tourism, commercial fishing and other marine users.

4.1. Navigation and Shipping

Shipping survey data up to summer 2008, which include vessels over 300 Gross Registered Tonnes (GRT) (Anatec, unpublished), have been mapped on Figure 4-1.

Western Scotland is a popular recreational sailing area; cruising routes are shown in Figure 4-5.

The shipping and navigation assessment will be carried out in line with, but not limited to the following guidance:

• Department of Trade and Industry (DTI) (2005) Guidance for Assessing theMarine Navigational Safety Risks of Offshore Wind Farms

• BERR (2007) Guidance Notes on Safety Zones

• International Maritime Organisation (IMO) (2002) Guidelines for Formal Safety Assessment

• Trinity House (2005) Lighthouse Services Guidance

• MCA (2007) Marine Guidance Note (MGN) (371) Guidance to Mariners Operating in the Vicinity of UK Offshore Renewable Energy Installations

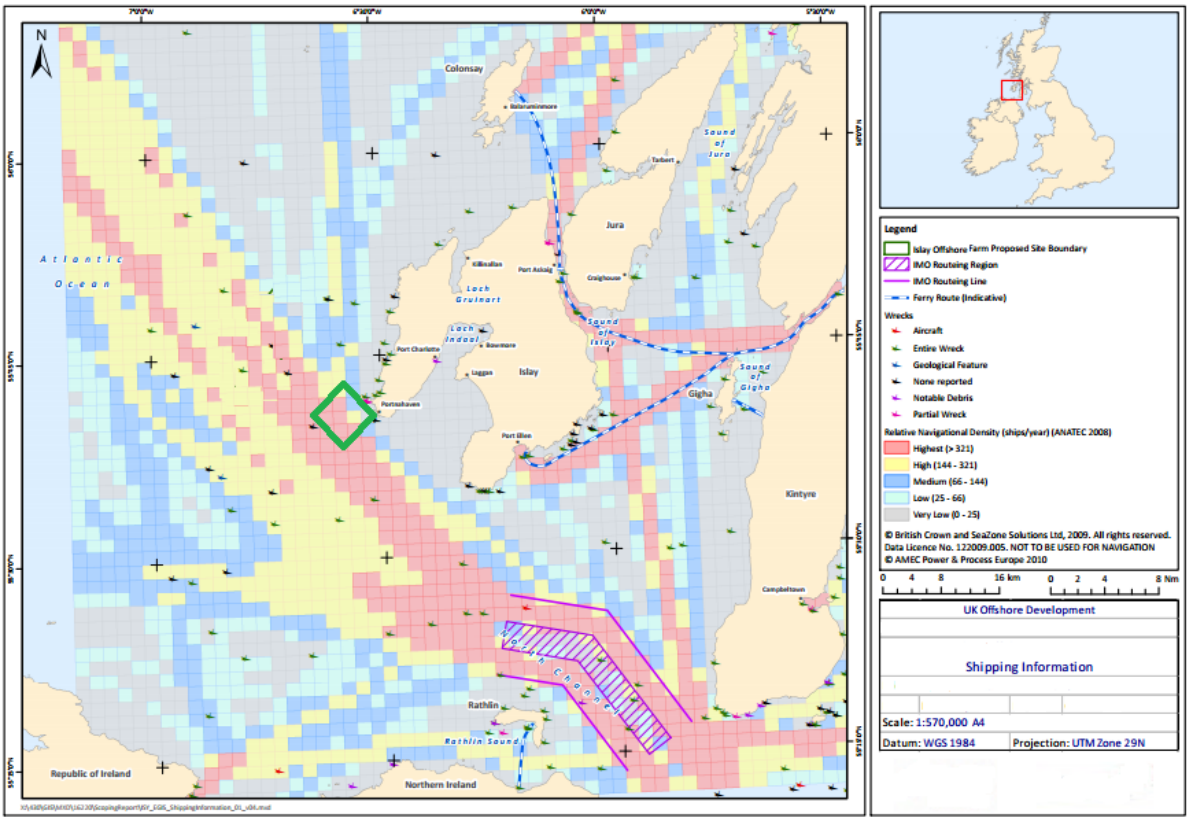

FIGURE 4-1

Data from the marine traffic surveys will be used to validate and update the existing shipping data and provide baseline information. The survey information will be supplemented by desk based research into each of the main vessel types in the area: commercial vessels, dredgers, fishing vessels and recreational vessels.

4.1.2. Potential Impacts

4.1.2.1. Construction

- Displacement impacts on commercial shipping, recreational vessels and fishing vessels and potential congestion / bunching of traffic in other areas
- Increased steaming times / distance and resultant changes in fuel costs
- Construction vessel collision on site (ship to ship or ship to turbine)
- Construction vessel encounter with underwater obstruction
- Man overboard during transfer operations
- Dropped object during lifting operations

4.1.2.2. Operation

- Displacement impacts on commercial shipping, recreational vessels and fishing vessels and potential congestion / bunching of traffic in other areas
- Increased steaming times / distance and resultant changes in fuel costs
- Collision (ship to ship or ship to turbine)
- Man-overboard during maintenance work

• Impacts on marine systems, including radar, very high frequency (VHF) radio and global positioning systems GPS, i.e. radar reflections, shadow areas or blind spots
• Impacts on navigation through visual obstruction and / or changes in water movement around the structures
• Impact on Search and Rescue, i.e. due to navigational and communication difficulties
• Potential impacts on anchorage and shelter areas

4.1.2.3. Decommissioning

The effects of decommissioning the development upon shipping and navigation will be similar to those experienced during the construction.

4.1.3. Cumulative Impacts

The distance between the west coast offshore sites and the relatively low levels of commercial activity associated with the west coast ports means that there should be little scope for cumulative impacts on shipping and navigation. Further consideration will be given to potential cumulative impacts on shipping-related tourism and recreation.

4.1.4. Potential Mitigation

A Navigation Risk Assessment (NRA) will enable navigational impact to be quantified and mitigation measures identified. Mitigation will include the use of marine navigational marking and lighting in accordance with advice from the Northern Lighthouse Board. Offshore activities will be advised of in advance via Notices to Mariners (NTM). If required, safety zones would be applied for under the provisions of the Energy Act 2008 for construction, operation and / or decommissioning.

4.2. Ministry of Defence, Radar and Aviation

Wind turbines can potentially interfere with communication and surveillance systems that use electromagnetic waves for transmission producing unwanted impacts. The main concerns for offshore wind farms are interference to Air Defence (AD) Primary Surveillance Radars and Air Traffic Control (ATC) systems. The physical presence of the turbines could also affect MOD activities and aviation flight paths.

Ministry Of Defence (MOD)

The area around the Islay site includes a number of Military Practice and Exercise Areas (PEXA). PEXA charts produced by the UK Hydrographical Office identify the military activity zones within the area. PEXAs are used for various military practise activities by the Royal Navy, the Army, the Royal Air Force and the Defence Estates. The locations of local PEXAs are shown in Figure 4-2. The proposed Islay Offshore Wind Farm lies within Islay PEXAs.

There are no active Royal Air Force (RAF) bases in close proximity to the Islay site.

Civil Aviation

Islay (Glenegedale) Airport is located approximately 25 km from the proposed Islay Offshore Farm (Figure 4-2).

National Air Traffic Services (NATS)

National Air Traffic Services (NATS) provides air traffic control services to aircraft flying in UK airspace, and over the eastern part of the North Atlantic from two locations; Swanwick in Hampshire and Prestwick in Ayrshire. NATS has identified areas where wind turbine developments may be of concern to operations. The scope of future assessments would be agreed in consultation with NATS.

The MOD, radar and aviation assessment will be carried out in line with, but not limited to, the following guidance:

- Qinetiq (2003) Wind Farms Impact on Radar Aviation Interests
- Roke Manor Research (2004) Scoping Study of the Effect of Wind Turbines on Aeronautical Radio Navigational Systems

The following Civil Aviation Publications will also be reviewed:

- CAA (2008) CAP 168 Licensing of Aerodromes
- CAA (2010) CAP 670 Air Traffic Services Safety Requirements
- CAA (2006) CAP 738 Safeguarding of Aerodromes
- CAA (2009) CAP 764 Policy and Guidelines on Wind Turbines

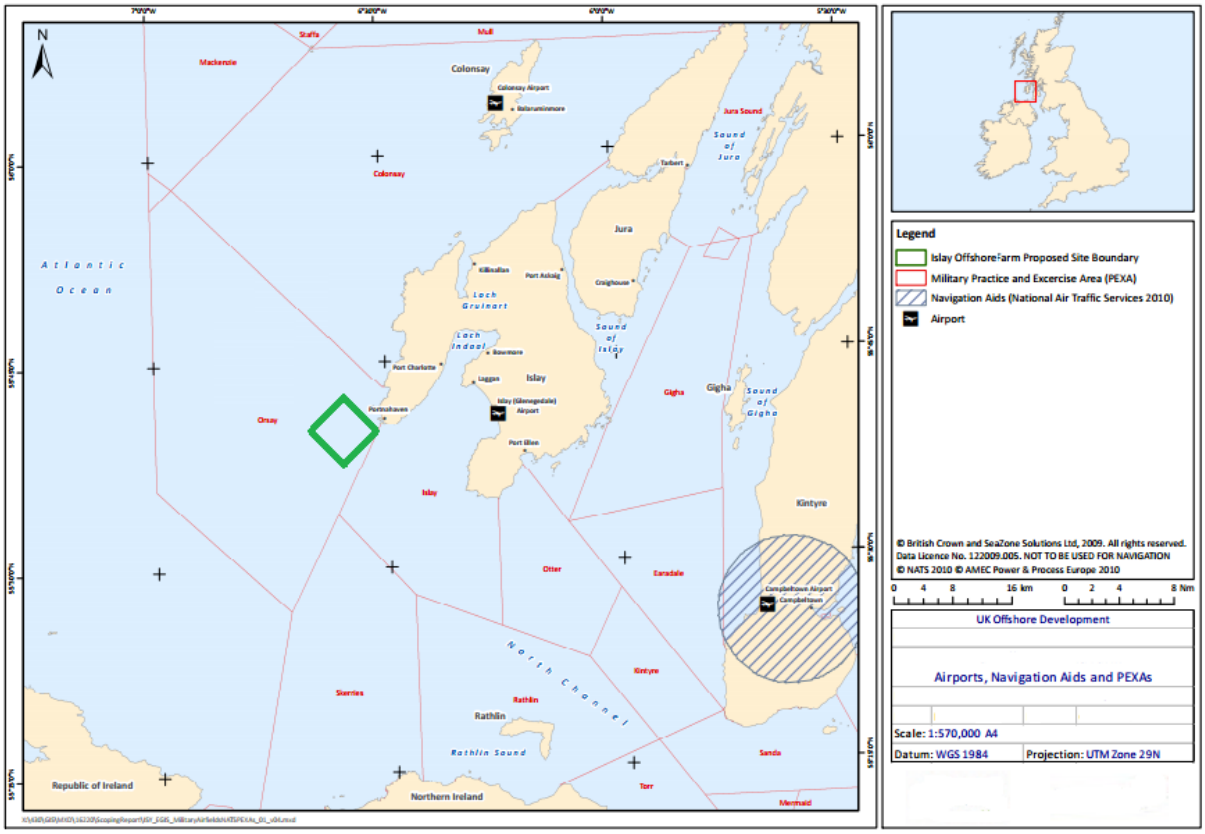

FIGURE 4-2

4.2.1. Potential Impacts

4.2.1.1. Construction

- Physical interference with MOD activities
- Interference with communications and surveillance systems
- Physical interference with MOD activities
- Physical interference with civil airports

4.2.1.2. Operation

- Interference with communications and surveillance systems
- Physical interference with MOD activities
- Physical interference with civil airports

4.2.1.3. Decommissioning

The effects of decommissioning the development upon aviation will be similar to those experienced during the installation.

4.2.2. Cumulative Impacts

The pre-scoping Cumulative Effects Discussion Document will need to be circulated for comment and further consultation will determine the need for any future joint impact study.

Consultation with relevant consultees will ascertain whether a cumulative assessment is required, and its scope.

4.2.3. Potential Mitigation

Mitigation measures, including wind-tidal farm design and the implementation of software modifications to radar systems, would be discussed with relevant consultees.

4.3. Cultural Heritage and Archaeology

The historic environment in the vicinity of the proposed development can be broken down into two sections:

- The marine environment including archaeological remains and wrecks (locations of these wrecks are shown on Figure 4-1) (tidal turbines and subsea cable); and
- The coastal environment including archaeologically designated areas, scheduled ancient monuments (SAM), listed buildings and archaeological remains (control building and onshore grid connection).

Consultation will need to be made with Historic Scotland.

The cultural heritage and archaeological assessment will be carried out in line with, but not limited to, the following guidance:

• The Joint Nautical Archaeological Policy Committee (JNAPC) (2006) Code of Practice for Seabed Development

• COWRIE/Wessex Archaeology (2007) Historic Environment Guidance for Offshore Renewable Energy Sector

• COWRIE/Oxford Archaeology (2007) Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy.

• Institute of Field Archaeologists (IFA) (2008)

Standards and Guidance relating to the following sources will be consulted for known archaeological records in the area:

- National Monuments Record of Scotland (NMRS)
- UK Hydrographic Office (Wreck Section)
- Receiver of Wreck (Maritime and Coastguard Agency (MCA))
- MOD for information on the Protection of Military Remains

4.3.1. Potential Impacts

4.3.1.1. Construction

- Direct damage to archaeological features

4.3.1.2. Operation

- Changing patterns of seabed sediment erosion / accretion

4.3.1.3. Decommissioning

Cables are normally not removed as part of the decommissioning process. The same ground will be disturbed for removal of devices so no potential impacts are predicted.

4.3.2. Cumulative Impact

It is anticipated that marine archaeology could be effectively assessed and mitigated on an individual project basis.

4.3.3. Potential Mitigation

Detailed mitigation and management practices would be developed for the construction phases of the project, both onshore and offshore, to reduce any impacts on the known and unforeseen archaeology, as required.

Turbine and cable placement would seek to avoid any features of historical interest as far as possible on the seabed and it is expected that the chance of accidental disturbance of features would be minimal. A Written Scheme of Investigation (WSI) detailing protocols for recording any finds would be provided in agreement with Historic Scotland.

4.4. Landscape, Seascape and Visual

Landscape

SNH Landscape Assessment of Argyll and the Firth of Clyde (14) describes Islay as having a "diverse landscape character" due in part to the complex geology of the island.

Seascape

In 2005, SNH published a report titled "An Assessment of the Sensitivity and Capacity of the Scottish Seascape in Relation to Windfarms", commissioned report no 103. With reference to Area 22 West Islay, the report identifies the seascape character type as "Predominantly Type 13 – Low Rocky Island Coasts with areas of Type 12 – Deposition Coasts of Islands". The Scottish Marine Renewables SEA describes the west facing coastline on Islay as "Rugged Coastal Shelf and Headlands with Open Views to Sea" and has assessed the proposed

development area as of moderate potential impact for surface point structures on seascape at distances greater than 5km from the shore.

Figure 4-3 provides an indication of the study area for the Landscape / Seascape and Visual Assessment (LSVIA) (35 km radius from the outer-most turbines) and the viewpoint locations.

Figure 4-4 illustrates the locations of landscape planning designations including national designations (National Scenic Areas) and local designations (Areas of Panoramic Quality). There are no Gardens and Designed Landscapes within the study area.

The Landscape, Seascape and Visual assessment will be carried out in line with, but not limited to, the following guidance:

- Scottish Natural Heritage (2009) Siting and designing windfarms in the landscape
- Scott, K.E., Anderson, C., Dunsford, H., Benson, J.F. and MacFarlane, R. (2005) An assessment of the sensitivity and capacity of the Scottish seascape in relation to offshore windfarms. Scottish Natural Heritage Commissioned Report No.103 (ROAME No. F03AA06)
- Scottish Natural Heritage (2005) Commissioned Report 109: The beaches of Scotland and associated area specific reports

Visual effects will be assessed using a Zone of Visual Influence (ZVI) map and a viewpoint analysis. A draft ZVI will be prepared to a 15km radius, which will indicate the theoretical visibility of the proposed farm.

A preliminary list of viewpoints developed from consultation with Argyll and Bute Council and SNH is provided in Table 4-1. Locations of these viewpoints are shown in Figure 4-3.

TABLE 4-1 Suggested list of viewpoints

4.4.1. Potential Impacts

4.4.1.1. Construction

Viewpoint Location	
1. Machir Bay	6. Kilchiaran
2. Kilchoman Settlement	7. BeinnTart a' Mhill
3. Loch Gorm	8. Mull of Oa
4. Saligo Bay Picnic Site	9. Kintra
5. Portnahaven	10. Colonsay: Oransay Priory

Temporary effect for both the marine farm and onshore infrastructure associated with the presence of construction vehicles and equipment.

Indirect effects on the landscape / seascape could potentially affect the key perceptual characteristics such as a sense of 'openness' and key characteristic views typical of Islay, Jura and Colonsay. National and local landscape designations such as NSAs and Areas of Panoramic Quality may also be indirectly affected by views of the farm.

4.4.1.2. Operation

There may be visibility of the farm/substation/control building from potentially sensitive viewpoints and there is the potential for the proposed development to influence the seascape.

4.4.1.3. Decommissioning

Decommissioning effects are likely to be as per installation though over a shorter period of time.

4.4.2. Cumulative Impact

- Landscape design and mitigation to avoid or minimise potential adverse impacts
- Design consideration of the turbine grid orientation, size, number and layout of the proposed Islay Offshore Wind and Tidal Farm
- Possible opportunities for landscape design and enhancement
- Design consideration of artistic / event and recreational opportunities

4.5. Tourism and Recreation

Tourism is important to the local economy of Islay and a detailed assessment of potential impacts would be required. Visit Scotland statistics show that during 2015 UK residents made 1.733 million tourism trips to Argyll, The Isles, Loch Lomond and Forth Valley spending £403 million. Visitors from overseas took 0.279 million trips and spent £92 million in the area. Tourism related employment accounts for 17 % of jobs in the area (Visit Scotland, 2015).

The SNH-commissioned review of marine and coastal recreation in Scotland (Land Use Consultants, 2006) indicates that the most popular specialist activities on the Scottish coastline are walking, sea fishing, sailing, kayaking, canoeing, and wildlife and bird watching. Coastal golf courses are also popular sites for recreation. Recreational sailing routes are shown on Figure 4-5.

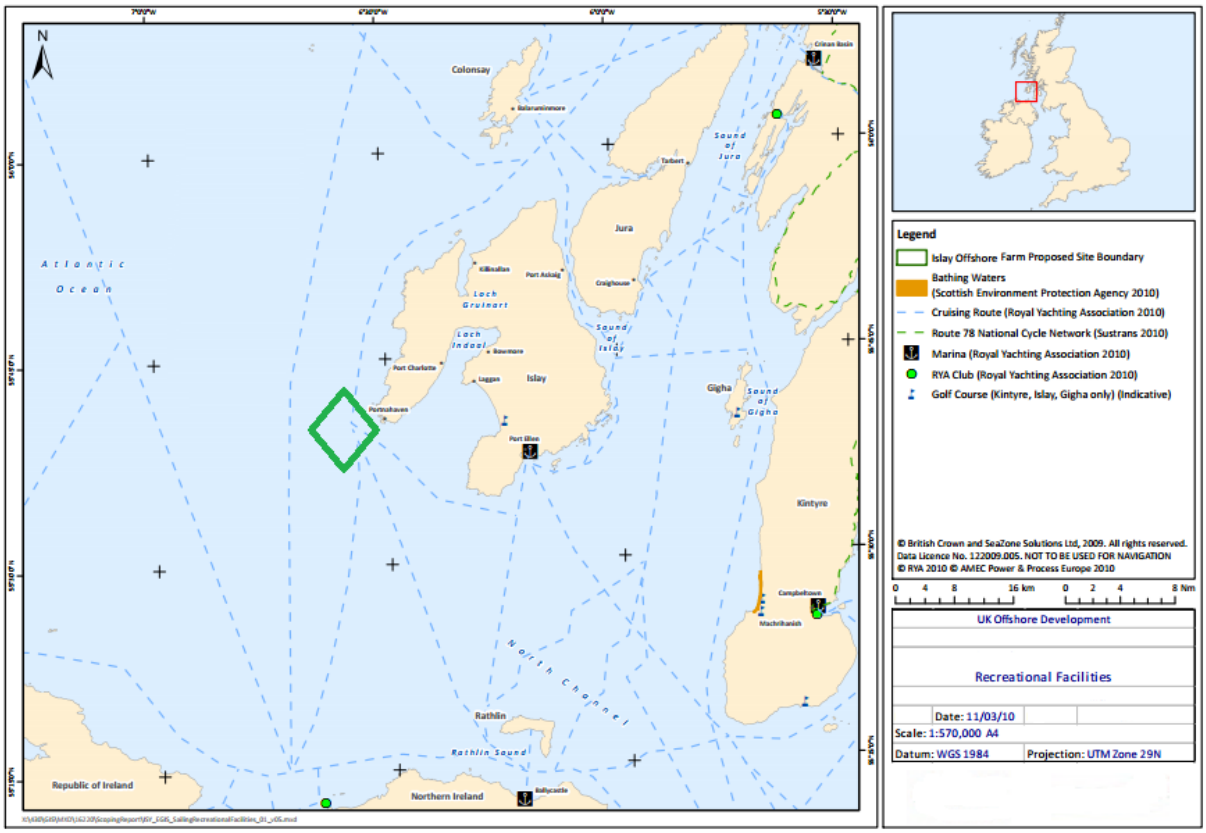

FIGURE 4-5

There is no specific guidance for assessing the impact of offshore wind farms on Tourism and Recreation, therefore the potential impacts of such will be assessed by reference to studies of operational wind farms in the UK and Europe.

4.5.1. Potential Impacts

4.5.1.1. Construction

- Visual impacts
- Noise
- Temporary transport and access disruption of offshore tourism and recreation

4.5.1.2. Operation

- Visual impacts
- Site access restriction for offshore tourism and recreation
- Marine navigational safety
- Creation of tourist attraction i.e. Isle of Eigg

4.5.1.3. Decommissioning

Very similar to the construction effects.

4.5.2. Cumulative Impacts

The need to assess tourism and recreational impacts cumulatively will be discussed with relevant consultees.

4.5.3. Potential Mitigation

A desk study and consultation will be undertaken to gain the views of the local tourist industry, and potentially consider ways of benefiting it.

4.6. Socio-Economics

Much of the open coastline on the west coast of Scotland is sparsely populated. Industries such as agriculture and fishing which have traditionally been important on the west coast of Scotland are being replaced by the tourism and recreation industry.

Islay has a population of approximately 3,228 inhabitants as reported in the latest census 2011 (http://www.islayinfo.com/facts.html). Islay is recognised as a 'fragile' area due to a relatively weak economy and past population decline (HIE, 2008). The island's economy has traditionally been based on agriculture, crofting and fishing, however, the most important sectors of Islay's economy in terms of employment are now the public sector, retail and tourism and the eight whisky distilleries on the Island (ARC, 2010).

There is no specific guidance for assessing the impact of offshore wind-tidal farms on socioeconomics.

4.6.1. Potential Impacts

4.6.1.1. Construction

- Increased employment in construction and supporting industries
- Increased expenditure through supply of goods and services required to develop the wind farm
- Change in population structure and consequent impacts on infrastructure requirements
- Academic research opportunities

4.6.1.2. Operation

- Increased employment due to maintenance and operation
- Change in population structure and consequent impacts on infrastructure requirements
- Academic research opportunities

4.6.1.3. Decommissioning

Similar to those of the construction phase.

4.6.2. Cumulative Impact

The assessment of impacts would be undertaken on a site-specific and cumulative basis to include other proposed renewable developments.

4.6.3. Potential Mitigation

- Use of local port facilities where possible

- Use of local vessels for survey and guard work where possible
- Consideration of employment and training for operations and maintenance work

4.7. Noise

The greatest noise emissions from the development of the proposed Islay Offshore Hybrid Farm would occur during construction and decommissioning. Noise sources could include piling equipment (if used), quayside operations and component delivery to site. Noise during operation is generally at a low level and modern turbines have significantly reduced noise levels compared with earlier models.

The in-air noise assessment will be carried out in line with, but not limited to, the following legislation and guidance:

• British Standard Institute (BSI) (1997) BS5228: Noise and Vibration on Construction and Open Sites - provides guidance and reference data for noise from piling operations

• Energy Technology Support Unit (ETSU) (1996) The Assessment and Rating of Noise from Wind Farms

• Argyll and Bute Council's Environmental Health Department Guidance Sensitive receptors to in-air acoustic impacts will include local residents, businesses and tourists.

4.7.1. Potential Impacts

4.7.1.1. Construction

The key sources of noise related to site preparation and device installation are broadly similar to those investigated for offshore wind farm construction these are:

- Shipping and machinery;
- Dredging; and
- Pile driving or drilling.

Additionally, cable burial may require the use of trenching or jetting machinery in soft sediments, rock cutting machinery in hard sea-beds, or rock or concrete mattress laying may be used to protect cables in areas where they cannot be buried.

4.7.1.2. Operation

The dominant operational noise propagation will be from the rotating equipment through its blade interaction with the sea. Additional mechanical and electrical noise sources are likely to be transmitted to the sea via direct coupling and from the interaction of the device structure with tidal currents. Additional noise will be propagated from service vessels during operation and maintenance activities.

4.7.1.3. Decommissioning

The noise effects of decommissioning the tidal development upon the environment are very similar to the installation effects except that piling or drilling which have been identified as major sources or noise, will not be required.

4.7.2. Cumulative Impacts

If required a cumulative assessment for all of the west coast wind farm projects, would be completed. The ability to carry out construction activities at two or more sites concurrently would be reviewed.

4.7.3. Potential Mitigation

In order to minimise noise levels, the following mitigation measures would be considered:

- Potential noise impacts would be considered in the design of the wind farm
- Noise would be considered when choosing plant
- Equipment would be maintained in good working order and fitted with silences, mufflers or acoustic covers where appropriate
- A site construction noise policy would be implemented

5. Summary

This Scoping Document has described the proposed Islay Offshore Wind and Tidal Farm project and outlined the consenting process and relevant legislation. For each area of the physical, biological and human environment.

Comments on this document are welcomed.

6. References

http://jncc.defra.gov.uk/default.aspx?page=5201&LAYERS=TwelveTS,UKCS,EEZ,SAC

http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/marinespas

DP Marine Energy Ltd (May 2009) Environmental Impact Assessment Scoping Report

SSE Renewable (March 2010) Islay Offshore Wind Farm Scoping Document

Centre for Environment Fisheries and Aquaculture Science (Science Series Technical Report no. 147) Spawning and nursery grounds of selected fish species in UK waters