MARINE CURRENT TURBINES LIMITED

THE SKERRIES TIDAL STREAM ARRAY

ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

REV 3 JULY 2006

Project Management Support Services Ltd

Responsible for	Function	Name	Date	Signature
Content	Environmental Manager	Mr. Jamie May	10/07/2006	
Checked	Renewable Energy Consultant	Mr. Sebastian Chivers	11/07/2006	
Approved	Director	Dr. David Bean	11/07/2006	

Project Management Support Services Limited
Tramshed Business Centre
Beehive Yard
Walcot Street
Bath BA1 5BD

T : (01225) 731 319
F : (01225) 731 301

REVISION SHEET

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1	Internal Drafting	April 2006
2	Issue to Client	May 2006
3	Final Issue	July 2006

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1 Background Information

1.1 The Proposed Development

Following an extensive project selection exercise in the waters off Wales, Marine Current Turbines Limited (MCT) are seeking to install a marine current turbine generator array of up to 7 units known as the Skerries Tidal Stream Array off West Anglesey.

The total capacity of the proposed Skerries Tidal Stream Array project is 10MW.

The location for a pre-commercial demonstrator farm is proposed to be located in the Sound between the group of rocks and islands known as the Skerries and Carmel Head on mainland Anglesey, less than 1km from the Anglesey coast, in approximately 20 to 40m water depth. The project comprises up to seven twin rotor machines consisting of a central monopile with two 18-20m (approx) diameter rotors mounted on either side of an axial cross-arm, as illustrated in Figure 1, which indicates the proposed structure above and below the surface, and dimensions of the turbine.

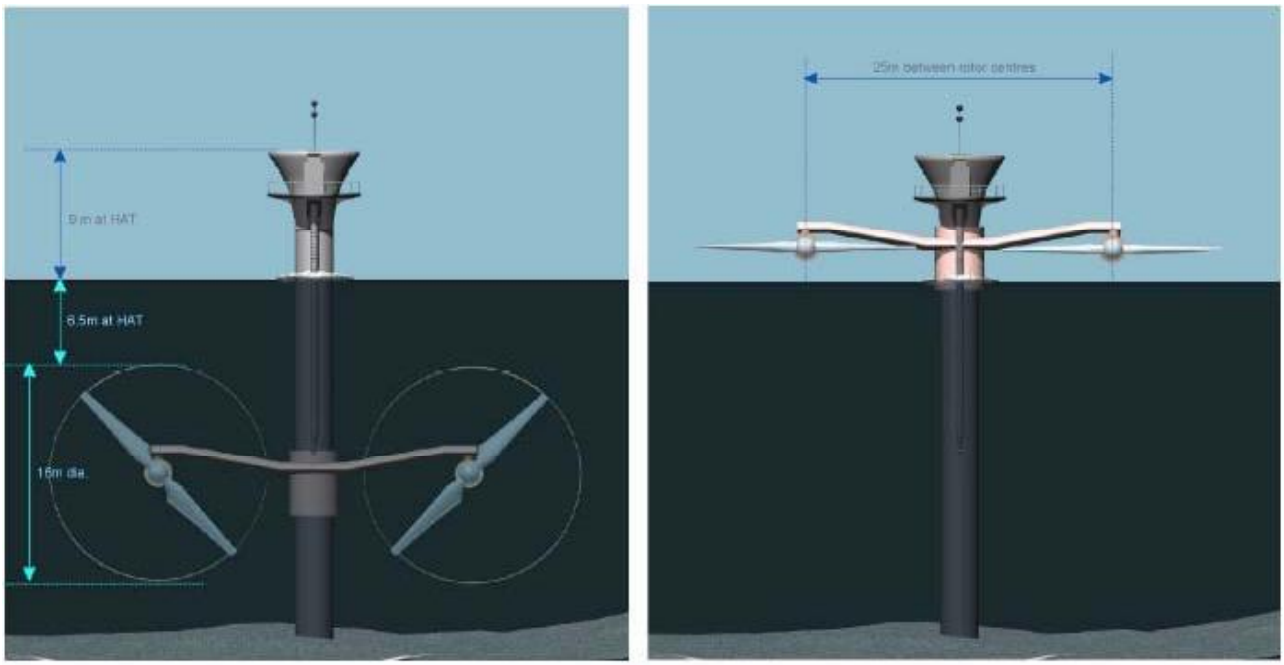

Figure 1 : Comparative positions of the twin turbine in operational position (left) (dimensions are nominal) and raised above the surface for maintenance (right)

In addition to the offshore device infrastructure including inter-array and export cables; ancillary onshore works and works in the inter-tidal zone, are required to connect the array to the electricity distribution network.

A new subsea cable will bring the generated electricity to shore. The landfall location has yet to be decided but is likely to be close to Wylfa, subject to feasibility work undertaken by SP Power Systems (Manweb).

This project forms a significant part of MCT Ltd's development programme intended to test the practical viability of deploying the Seagen turbine in a small array. It is proposed that the turbine array will be installed and operated for up to 25 years, where it will serve as a test case for the development of the technology as part of a programme of further multiple unit arrays.

The principle used by this technology is analogous to an 'underwater windmill', with the passing current turning large propeller-like rotors which drive generators from which electricity can be sent ashore through marine cables. As water is much denser than air, the currents needed to generate useful power are quite

slow, around 2 to 3 m/s (4 to 6 knots). Consequently, the rotors of the tidal turbines are relatively slow turning compared with wind turbines, typically at speeds of around 10 RPM, with tip velocities of no more than about 12 m/s (10.4 m/s based on 20m blade diameter).

Advantages of tidal current turbine power generation are:

- it produces no pollution;
- energy is delivered predictably (the tides can be predicted many years in advance);
- the potential exists for this source to make a significant and cost-effective contribution to future energy needs

Support for the development of energy resources such as tidal power is a key part of the UK government's strategy to develop renewable energy as a means to combat atmospheric pollution and mitigate climate change as agreed under the Kyoto Protocol. The rationale for developing this technology stems from the need to address escalating global energy consumption combined with the need to develop clean renewable energy (in line with the Protocol). However, key considerations are the socio-economic and environmental constraints associated with the construction and operation of large renewable energy production schemes from marine resources, due to the increasing difficulties associated with implementing large-scale renewable projects on land.

1.2 The Developer

The developer of the project is Marine Current Turbines Ltd, details as below :

Marine Current Turbines Ltd
The Court
The Green
Stoke Gifford
Bristol
BS34 8PD

Contact Person: David Ainsworth, Project Manager

MCT is a leader in the development of power systems capable of exploiting tidal and marine currents; the company has already successfully installed and operated a smaller 300kW single rotor experimental test system off the North Devon coast near Lynmouth. This device, known as 'Seaflow', was the world's first full scale tidal turbine installed in an offshore location.

MCT were recently awarded the necessary statutory consents to install and operate their second prototype "Seagen" in Strangford Lough. This system is expected to be installed during the second half of 2006, and is complemented by a comprehensive monitoring campaign.

Figure 2 : The Existing Single Rotor SeaFlow Unit off Lynmouth.

1.3 Need for the Development

The need for the development of renewable energy generation in the UK, including tidal stream energy, arises from the requirement to generate electricity, reduce emissions of greenhouse and acid rain gases, and to move towards a more sustainable future. This form of energy is a means of generating electricity that does not produce emissions of greenhouse or acid rain gases, does not produce toxic waste products, and is not dependent on finite reserves of fossil fuels. It is inherently sustainable, and this is explicitly recognised in the Government's approach to the deployment of the technology.

Successive UK Governments have made progressively more determined efforts to curb emissions of harmful gases through a reduction in dependence on fossil fuels. This has occurred, in part, as a response to the following:

- Acid rain has been identified as contributing towards environmental damage to forests, moor lands, lakes and rivers throughout Europe
- Greenhouse gas emissions have been identified as a major contributor to global warming and climate change

The UK Government White Paper "This Common Inheritance" (1990) described global warming as:

> *"one of the biggest environmental challenges now facing the world"*

In 1996, a Department of the Environment Newsletter recorded the Inter Governmental Panel on Climate Change (IPCC) as indicating that current trends in emissions of greenhouse gases:

> *"…may lead to a warming of the globe by 2ºC by 2100 representing an average rate of warming greater than has been seen at any time in the last 10,000 years… Climate change is likely to have wide ranging and mostly adverse impacts on human health with significant loss of life."*

In March 1999 the Government published a consultation paper: "New and Renewable Energy: Prospects for the 21st Century". The objective of the consultation exercise was to encourage contributions towards the Government's review of its renewable energy policy in order to identify what would be necessary to achieve 10% of the UK's electricity supply from renewable energy sources by 2010.

In March 2000, the Government launched its draft UK Climate Change Programme. The introduction to the document confirmed the Government's view that:

"Climate change is one of the most serious environmental threats facing the world today. The draft climate change programme sets out a far-reaching strategy for tackling climate change in the UK. It aims to ensure that the UK moves towards a more sustainable economy. It puts in place policies that give clear signals about the changes that need to be made and it outlines a variety of measures that will deliver cuts in greenhouse gas emissions…"

In October 2000, the DTI published its Preliminary Consultation Paper on the Renewables Obligation. In addition to confirming the Government's intention to secure the production of 5% of the UK's electricity supplies from renewables by 2003 and 10% by 2010, the document sets out the detailed proposals for a new Renewables Obligation, to replace the NFFO, placed on all electricity suppliers in October 2001 through the Utilities Act 2000.

The UK Government Energy White Paper "Our Energy Future – Creating a Low Carbon Economy" released in February 2003 quoted :

"…our aspiration is by 2020 to double renewables' share of electricity from our 2010 target and we will pursue policies to achieve this."

"If we are to achieve a 60% reduction in carbon emissions by 2050, we are likely to need renewables by then to be contributing at least 30% to 40% of our electricity generation and possibly more. We therefore need to develop a framework which encourages the development of a wide range of renewables."

At the inauguration of the UK's first commercial scale offshore wind farm in November 2003, The Prime Minister Rt Hon Tony Blair said :

"…b*ut while North Hoyle is proof of significant progress in developing renewable energies we must take care to remember that it is just one of the very first steps along the way to achieving our goal. It's got to be followed by many more like it."*

Most recently, the Government announced its plan to extend the Renewables Obligation from the stated goal of generating 10% of UK electricity by 2010 from renewable sources, to 15% by 2015. This announcement, in conjunction with other Government initiatives, is clear evidence of the Government's proactive approach to renewable energy generation.

In a speech given in London in September 2004, The Prime Minister Rt Hon Tony Blair argued that climate change is the world's greatest environmental challenge and that global warming is already 'alarming'. Without urgent counter measures, climate change threatens to 'alter radically human existence'. He indicated that this is what the science is telling us and the science, almost certainly, is correct."

"We need to develop the new green industrial revolution that develops the new technologies that can confront and overcome the challenge of climate change."

At the BWEA's Wave and Tidal Conference held in London in March 2005, former Energy and E-Commerce Minister, Mike O'Brian indicated that the UK would no longer be energy self sufficient by 2006, he endorsed an environmentally friendly and balanced mix of electricity supply stating :

"The development of marine renewables will provide an energy revolution in the course of our lifetimes."

and that :

"renewables were not just desirable but essential."

The National Assembly for Wales has a duty under Section 121 of the Government of Wales Act 1998 to promote sustainable development in the exercise of its functions, that is, in everything it does. In effect, the

incorporation of legislation on sustainable development required the National Assembly Government of Wales to prepare a Scheme setting out how it would fulfill this duty, and to regularly review performance.

Within The Sustainable Development Action Plan, 2004-2007 written by the Welsh Assembly Government, an objective of "*strengthening the knowledge/research base in Wales for emerging marine energy and hydrogen economy systems, including participating in a renewables strategic environmental assessment of Welsh waters"* was stated. The corresponding marine renewables study was completed in 2005 (ABPmer, 2005) and information presented in this work has been used by MCT and PMSS in the course of the project.

In 2005, the Welsh Assembly Government issued an Energy Route Map consultation document, setting out its intentions to meet the contrasting challenges of fuelling an internationally competitive economy while maintaining the highest environmental standards and mitigating global warming effects. The Energy Route Map stated that Welsh energy policy currently has five important strands (priority actions), one of which is to secure 4 TWHr per annum of renewable electricity production by 2010 and 7TWHr by 2020. As part of this, one objective is the development of marine (wave and tidal) energy systems with a key targets of major demonstration projects being located within Wales with the first such project being operational by 2008.

Most recently, DTI published the consent process for wave and tidal demonstration projects in England and Wales, thereby putting in place the conditions that will allow the sector-leading UK marine industry to demonstrate and fulfil the renewable energy potential of the seas around England and Wales.

1.4 Objectives of the Development

The primary objective of the development is the generation of energy from a renewable source, in line with the Government target of generating 10% of UK electricity demand from renewable sources by 2010. This figure has recently been increased to 15% by 2015.

The project will offset the emission of greenhouse gases, in line with the UK's commitments under the Kyoto Protocol, which came into force in February 2005.

Successful development, construction and operation of the Skerries Tidal Stream Array will create the first commercial scale offshore marine current farm to export electricity to the Welsh coast. Deployment of this larger scale marine current turbine farm development will enable MCT to strengthen their position as one of the leading developers of marine renewable power in the UK and indeed the world.

1.5 Clean Energy Generation / Electricity Supply

Under the "do nothing" scenario, the generation of electricity from conventional thermal sources, which comprise the majority of the supply mix in the UK, will generate emissions of greenhouse gases. Therefore it is worth calculating the emissions that will be output should neither the Skerries Tidal Stream Array nor any equivalent renewable generation project be commissioned. These emissions would include carbon dioxide (the main gas contributing to climate change), sulphur dioxide and nitrous oxides.

The emissions from a fossil fuel power station can be calculated as 597g CO_2/kWh, according to the DTI "Energy Trends" publication in March 2005. In this publication, emissions from electricity generation per unit of electricity supplied from fossil fuels were estimated to have been 163 tonnes of carbon per GWh in 2004 overall (1 tonne of carbon equates to 3.66 tonnes of CO_2). In Planning Policy Guidance Note: Renewable Energy (PPG22) it is assumed that marine current energy will have a sulphur dioxide offset figure of 11 g/kWh and a nitrogen dioxide offset figure of 2 g/kWh.

Subject to consent, the proposed Skerries Tidal Stream Array will be one of the first arrays powered by tidal streams, and its deployment is a precursor to larger multiple marine current turbine farms that will generate significant amounts of electricity (tidal power resource predictions indicate UK waters have up to 36 TWhr/year offshore economic potential (BWEA, 2004)). The Array will therefore make a contribution

towards the reduction of harmful greenhouse gases that would otherwise be emitted by conventional fossil fuelled electricity generation.

The net output each year for Skerries Tidal Stream Array is based upon a maximum power output of 1400kW per turbine and an estimated capacity factor of 25%, which includes an allowance for planned servicing, maintenance and repair operations. The capacity factor applied in the calculations below assumes that the device will be generating electricity (at differing levels) between 80 and 90% of the time. This capacity factor estimate will in practice be validated using on-site tidal measurements.

The annual net output is therefore:

14000 (kW) x 25% x 8760 hours ≈ 30,660,000 kWh/year

The table below summarises the amount of greenhouse gas emissions offset annually from the Skerries SeaGen Array (using PPG22 assumptions):

Emission Type	Annual Quantity Offset by Electricity Generated by SeaGen Array (tonnes)	Calculation
Carbon Dioxide	18304	0.000597 tonnes / kWh x 30,660,00
Sulphur Dioxide	337	0.000011 tonnes /kWh x 30,660,00
Nitrogen Dioxide	61	0.000002 tonnes /kWh x 30,660,00

Table 1: Predicted Annual Offset of Greenhouse Gas Emissions

The following table presents the total emissions offset, assuming a project lifespan of 25 years :

Emission Type	Quantity Offset by Electricity Generated by SeaGen Array (tonnes)	Calculation
Carbon Dioxide	457,600	18304 x 25
Sulphur Dioxide	8,431	337 x 25
Nitrogen Dioxide	1,533	61 x 25

Table 2: Predicted Offset of Greenhouse Gas Emissions during Project Life

The proposed Skerries Tidal Stream Array will generate enough electricity to supply enough electricity to supply the average domestic electricity supply of approximately 6500 homes. This assumes an average domestic electricity consumption of 4,700 kWh per household per year. The Digest of UK Energy Statistics 2005 gives 2004 domestic electricity consumption as 117.589 terawatt-hours (TWh) which, when taken with the 25.2 million households (based on Welsh homes = 1.213 million, England = 21.109 million, Scotland = 2.217 million, Northern Ireland = 652,000) gives an average electricity usage of 4,666 kWh per year per household.

The calculation for the equivalent number of domestic homes whose equivalent consumption will be met by the output from the development is as follows:

Equivalent number of homes supplied = 30,660,000 / 4,700
≈ 6500 homes

This is equivalent to over 20% of the domestic demand of Anglesey, based on the number of households in Anglesey (28,356 in 2001 Census) or, put another way, the equivalent electricity for the needs of all the neighbouring community council areas of North West Anglesey (covering the following: Cylch-y-Garn, Llanbradig, Mechel, Llanfaethlu, Tref Alaw, Llanfachraeth, Llannerch-y-Medd, Valley, Bodedern and

Bodffordd Community Council areas – total 4663[1] households based on a population of 10726 (2001 census and www.lgdu-wales.gov.uk)).

1.6 Site Location

The proposed development site area is located approximately adjacent to the coast off West Anglesey (see Figure 2). The tidal stream generators are likely to be placed within the box shown at an appropriate water depth, with subsea cable within the inshore zone. The perimeter of the area is as follows (co-ordinates are expressed in WGS 84) :

	Latitude	Longitude
A	53°23' 48"	4°37' 30"
B	53°26' 24"	4°33' 39"
C	53°26' 9"	4°32' 36"
D	53°26' 6"	4°35' 12"

Table 3 : Site Location Coordinates

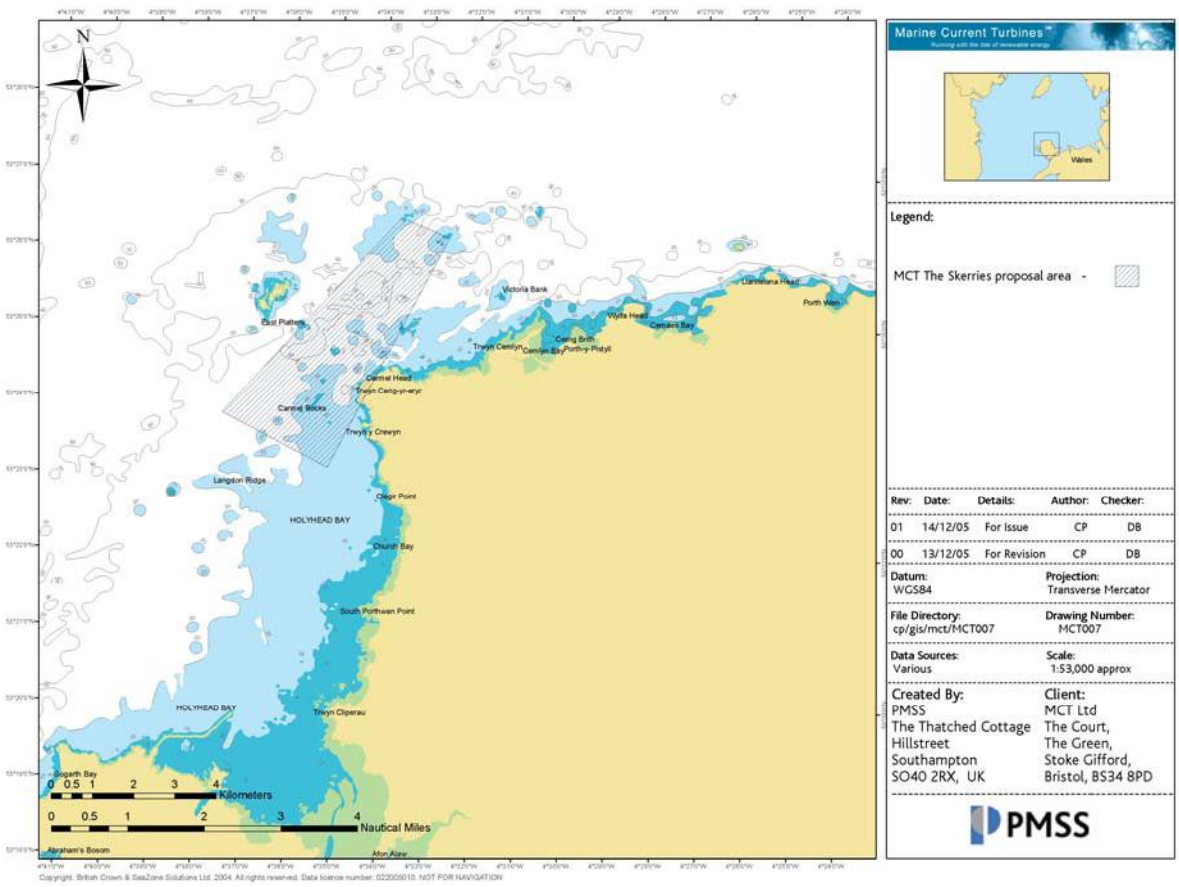

Figure 3 : Draft Proposal Area

Only a small proportion of the proposal area would make up the development area (device array) featuring the turbine structures. The total area within the perimeter under consideration is 12.9 km^2. Within the proposal area, the device array would take up a very small fraction of this space (in the order of 0.1 km^2).

[1] Based upon 2001 census data for Anglesey : Average number of people per household = 2.3.

In addition to the device array, one export cable is required in order to transmit the generated electricity to shore.

1.7 Physical Characteristics

1.7.1 Metocean Characteristics

The location for the marine current turbine array has the following metocean characteristics :

Water Depth Range	-20m to – 40m CD (within box co-ordinates)
Mean Surface Temperature	15°C (Summer) 7 – 7.5°C (Winter)
Salinity	< 34.7g/kg (Summer) >34.50g/kg (Winter)

Table 4 : Metocean Characteristics

Astronomical tidal levels relevant to the site, determined from the Admiralty tide tables for the nearby Standard Port of Holyhead are summarised in Table 5 below.

	Height in Metres above datum			
Tidal Level (mCD)	MLWS	MLWN	MHWN	MHWS
Holyhead	+0.7	+2.0	+4.4	+5.6

Table 5 : Tidal Levels (Chart Datum is -3.05m below Ordnance Datum (Newlyn)).

The tidal streams within the proposal area taken approximately 1.8km North West of Carmel Head are presented below in Table 6 :

Time from High Water at Holyhead (hrs)	**Tidal Diamond A: 53° 25'.1 N 4 34'.9 W**		
	Current Direction (°N)	**Spring Tide**	**Neap Tide**
-6	308	0.6	0.3
-5	043	3.5	1.7
-4	038	5.6	2.8
-3	036	6.2	3.1
-2	032	4.9	2.4
-1	026	2.9	1.5
High Water	050	0.6	0.3
+1	230	2.5	1.3
+2	236	4.5	2.3
+3	234	4.3	2.2
+4	233	3.7	1.9
+5	236	2.3	1.1
+6	258	1.0	0.5

Table 6: Tidal Streams for Skerries

1.7.2 Wave Climate

The site of the proposed marine current turbine array is directly exposed to waves from the west and south west. For the majority of these directions the height of waves will be limited by the fetch lengths within the Irish Sea. The largest waves that can propagate directly to the site are from the SW.

Annual Mean Significant Wave Height is calculated at between 1.2 and 1.6m at the proposed location (ABPmer, 2004). .

1.7.3 Geological Characteristics

The northwest coast of Anglesey adjacent to the proposal area off Carmel Head exhibits heavily metamorphosed Pre-Cambrian rocks from the Mona Complex. These rocks are intricately folded and highly altered in steep cliffs 25m to 50m high.

Pre-Cambrian Gneiss and Schist dominate bedrock geology in the proposal area with occasional NW-SE trending dolerite intrusions. The BGS Quaternary (1994) sheets illustrate mostly bedrock at seabed level in the proposal area.

The BGS Quaternary (1994) sheets illustrate mostly bedrock at seabed level in the proposed turbine location area, and therefore significant glacial deposits are unlikely to be encountered. This is supported by The Admiralty Chart (2001) that indicates bedrock with some coarse sand and shells in isolated patches. Along the preliminary export cable route Late Pleistocene glacial till may be encountered along the eastern extremity.

1.8 Tidal Stream Array - Components and Their Installation

The components for the project will not be procured until much later in the project programme, after the necessary statutory consents have been granted. The resulting assessment of environmental effects will correspond to all component options presented, during their construction, operation and decommissioning. The general principles of the Rochdale Verdict will be adhered to, i.e. the impact assessments will relate to the option giving rise to the largest potential impact.

1.8.1 Tidal Stream Turbine

The tidal stream turbine proposed for the Skerries Tidal Stream Array is similar to that planned for installation in Strangford Lough in the second half of 2006. The device is a twin rotor marine current energy converter with a rated capacity of 1400 kW (1.4MW).

The unit consists of axial flow rotors of 18m to 20m in diameter that drive a generator via a gearbox much like a hydro-electric turbine or a wind turbine. The use of twin rotors is preferred, mounted on wing-like extensions (cross beam) either side of a tubular steel monopile some 3-4m in diameter which is set into a hole drilled or driven into the sea bed. The cross beam is connected to the monopile via a sleeve or collar. The complete assembly of collar, cross beam and turbine assemblies can be hydraulically raised and lowered for maintenance/operation (see Figure 1 above).

A transformer platform will be installed inside the top of the pile to house the pre-fitted transformer, and a pod frame will be installed on top of the pile comprising a base, which is bolted to the bottom of the pile flange, and a pod enclosure to house electrical and control equipment and facilitate access inside the SeaGen unit. The transformer will be cast-resin or oil filled.

Drive trains for each turbine unit comprise the blades, hub, gearbox and generator. These will be assembled on shore and delivered to site by barge as a single component for fitting out onto the cross beam.

All hydraulic and electrical umbilicals will be connected to the pod and connected to the turbines via a component called the ‘lift leg’. This component governs the operation of lifting and lowering the collar and cross beam assembly and the hydraulic and electrical cabling will be ducted within the leg.

Approximate dimensions are as follows :

Nominal Radial Cross Arm length	28m
Rotor diameter	18-20m
Maximum height of structure above sea level	10m

(HAT)	
Minimum Clearance from top of blade to surface (LAT)	3m
Maximum width (based on max rotor diameter)	48m

It is anticipated that the "water-gap", i.e. the clearance between the highest arc of the rotor and water surface (subject to design), will be no less than 3m at LAT. At HAT this will increase to 9m water clearance.

The only distinguishing markings, discernable from a vessel, will be navigation markings and lighting protocol. Final decision on colour of the SeaGen unit will be made following the results of the navigation risk assessment and discussion with Trinity House Lighthouse Service and the Maritime and Coastguard Agency.

A preliminary estimate for the separation between turbines is 60-80m across the predominant tidal stream axis, and 200m along the tidal axis. The final design of array would be subject to detailed site survey.

1.8.2 Installation

Although offshore contractors have varying construction techniques, the installation of the tidal stream turbines will invariably require a jack-up barge, possibly one of the vessels currently in the market or a purpose-built turbine installation vessel.

The foundation and turbine components will either be stored at an adjacent port (Holyhead being the obvious candidate, but subject to terms) and transported to site by support barge, or transported directly from the manufacturer to the proposed site by the installation barge. Ancillary barges, tugs, safety vessels and personnel transfer vessels may also be required.

Following installation and grid energisation, the Skerries Tidal Stream Array would be commissioned and will be available to generate electricity.

1.8.3 Foundations

The Array will be supported on foundations secured to the seabed. The final configuration of foundation for the project will be subject to ground conditions, metocean conditions, design and operations philosophy and life-cycle cost. It is likely that the foundations for the SeaGen Array will comprise one of the following concepts :

- Steel monopile foundation These structures rely on the frictional properties of steel piles fixed into the seabed either by driving (using a hydraulic hammer) or drilled (using a bonding substance such as grout). The installation vessel would be a jack-up barge with attendant vessels.

- Installation, Driven Solution – The driven piles are installed using a hydraulic impact hammer, and driven to their target penetration depth. It is likely that sound power levels would be similar to those associated with offshore wind farms.

- Installation, Drilled Solution – A socket is drilled into rock, into which the pile(s) are inserted and fixed using a grouting substance. A variation on the above is where the foundations are driven, the socket is then drilled, and the pile is driven for a second time avoiding the requirement for grout. This solution generates spoil from within the pile, requiring a separate FEPA licence if disposed of away from site. The proposed method of disposal of the spoil will be presented in the Environmental Statement.

As part of the drilling process a steel cylindrical collar or casing several metres in length (possibly up to 20m) is required to be inserted in the top part of the hole, projecting about 1m above the seabed to prevent the current from sweeping debris into the hole or the hole collapsing and filling it up before the pile can be

installed. The drill will continue to work down to the required depth inside this casing (the collar effectively forming the outer wall of the bored hole).

In order to inform the final design of the monopile a programme of geological site investigation is required. Given the strong currents at the proposed site, a large drilling rig will be needed to extract rock cores of approximately 25 metres in length.

Figure 4 : Installation of the monopile for the "Seaflow" marine current turbine off Foreland Point near Lynmouth (Photographs from MCT Ltd)

The monopile is floated into position and presented to the jack-up, from where it will be picked up by the on-board crane ready for insertion into the drilled hole (Figure 4) through the aforementioned collar, or hammered straight into the seabed. This operation needs to take place during slack water and involves the pile being raised vertically and then lowered by crane into the hole. The pile is filled with seawater in order to sink it effectively into the hole. For grouted piles, the annulus surrounding the pile is filled with cement based polymer grout with anti washout properties (comprising OPC cement and PFA). No grout is expected for the driven pile.

The foundations also carry the access ladder, J-tubes (to prevent cable damage), corrosion protection methods and boat landing platform.

1.8.4 Corrosion Protection

Corrosion protection on the steel structure will be achieved by installing sacrificial anodes on the sub sea structure.

The anodes are standard products for offshore structures and are welded onto the steel structures. The anodes typically consist of zinc and aluminium; they are connected to the structure via doubler plates to ensure the integrity of the primary structure is maintained in the unlikely failure of an anode connection. The number and size of anodes would be confirmed during detailed design.

1.8.5 Scour Protection

The decision on whether to install scour protection (from a technical point of view) will be made once the detailed design of the support structures has been performed, i.e. post-consenting phase. The potential for scour to develop will be detailed in the Environmental Statement. The extent of any scour will depend upon the presence or absence of sea bed sediments at the turbine array).
The Environmental Statement will describe the forms of scour protection and their method of installation. Scour protection is expected to take the form of rock dumping or sand /grout filled bags to stabilise soft seabed sediments should a scour hole develop around the monopile (where soft surface sediments are susceptible to tide or wave scour around the foundation). Any material placed as an erosion mattress will be

of a suitable inert material, the grade of rock used should be of sufficient particle size to resist potential re-working by the marine forces acting around the pile base and as the result of extreme weather events.

In addition, the Environmental Statement will appraise other forms of scour protection, e.g. frond mats.

1.8.6 Cables

A sub sea power cable rated at 33kV is required to connect the Skerries Tidal Stream Array to the electricity distribution system. This cable will also comprise internal fibre optic communication links for control purposes. The 3-core cables being considered comprise copper conductors with integral insulation, core screening, and steel armour (for stiffness and impact resistance). The cable would have a polypropylene outer sleeve and cable diameter would be approximately 140mm.

At present the working assumption is to bury the export cable between the device and the landfall. This is subject to the precise ground conditions that will be established following detailed surveys. The need for cable burial is also linked to navigation risk assessment, density of fishing, ground conditions and metocean conditions. All these factors will be considered in the decision making process.

Two primary techniques have been considered; direct laying of a cable on the seabed and covering with rock or concrete mattresses or trenching the cable using a trenching plough. The principle considerations are summarised below.

A cable laid directly on the seabed in the proposed area from the development area to a position near to Holyhead would be particularly vulnerable to movement or impact from strong currents or the movement of coarse sediment and rocks along the seabed. The area is also used by recreational craft and is fished by potters. A cable fixed directly to the sea bed in this area may be vulnerable to physical damage from anchors or fishing gear.

The options of trenching the cable into the bedrock, or covering the cable in a protective blanket of rock or concrete mattresses have been considered but environmental and cost considerations of trenching or covering the cable could potentially rule out these options.

The precise route of the export cable has not been established, but will be proposed following an assessment of environmental, technical and economic aspects.

1.8.7 Cable Landfall

The potential cable landfall location is to the west of Wylfa Power Station – see Figure 5. As part of the EIA, consideration will be given to:

- Nature conservation designations and interests
- Local amenity for beach users, tourists and surfers particularly in the summer
- Security of any coast or flood defences
- Installation technique in the inter-tidal zone
- Length of onshore cabling required

1.8.8 Grid Connection and Onshore Works

The landfall of the export cable offshore will be made at an agreed position and connected to a buried landward electricity cable at an interconnection facility trench. The position of the landfall is expected to be in the vicinity of 234750 393600. The figure below is an extract from an SP Manweb grid feasibility report :

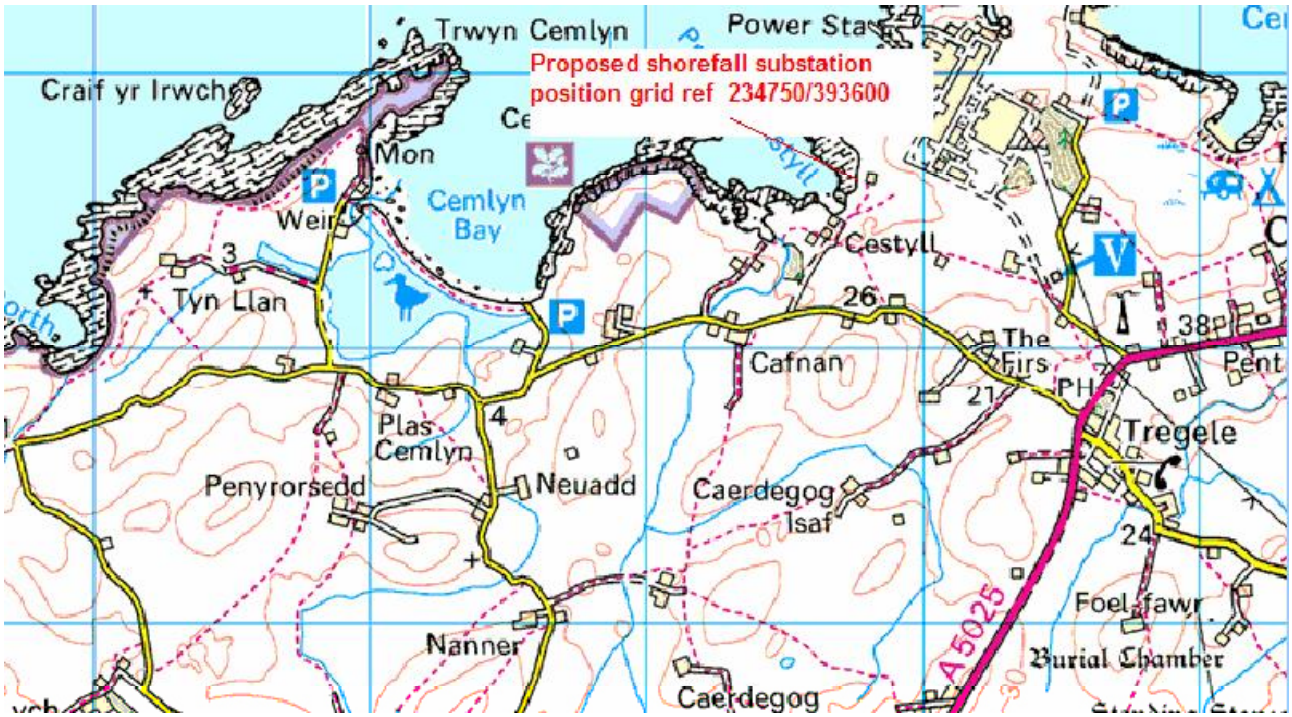

Figure 5 : Indicative Cable Landfall

The connection for The Skerries would be at the Wylfa Power Station. The Wylfa Power Station has 400kV and 132kV connection assets and the Skerries site would connect into the 132kV assets. Discussions with SP Manweb are ongoing.

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Any new building would be constructed using a similar vernacular style to existing buildings in accordance with the reasonable requirements of AONB and Local Authority.

1.9 SeaGen Array – Construction Phase

1.9.1 Access to Site

The construction phase for the SeaGen Array is scheduled to take place during all times of year. The marine part of the construction phase is scheduled to take place during the summer and autumn months as per the indicative construction programme below, where suitable weather conditions are statistically more likely to occur. However, MCT would expect no seasonal restrictions on the time of year for working, subject to the results of the EIA process.

Construction in the marine environment is potentially hazardous, and in the interests of safe working the project should be permitted to take advantage of as much construction time in favourable conditions as is possible. Construction activity is expected to continue, subject to site weather conditions, for 24 hours per day until construction is complete.

A navigation risk assessment for the construction phase will be undertaken in order to assess whether a safety zone would be necessary, and if so its extent.

1.9.2 Lighting and Marking

The construction area will be depicted on Admiralty Charts by the UK Hydrographic Office, and information pertaining to construction will be disseminated through the Notice to Mariners procedure and regular

communication with local and regional stakeholders. The construction area could also be marked by a series of temporary buoys around the perimeter.

Once certain construction activities have been completed, there is a need to mark such structures in a temporary fashion before full power from the grid connection has been obtained and the marking protocol as specified by Trinity House Lighthouse Service can be implemented.

It is proposed that the temporary lighting and marking of the site during construction is agreed between MCT and relevant authorities as conditions to the relevant consent(s).

1.9.3 Construction Programme

An indicative construction programme is presented below :

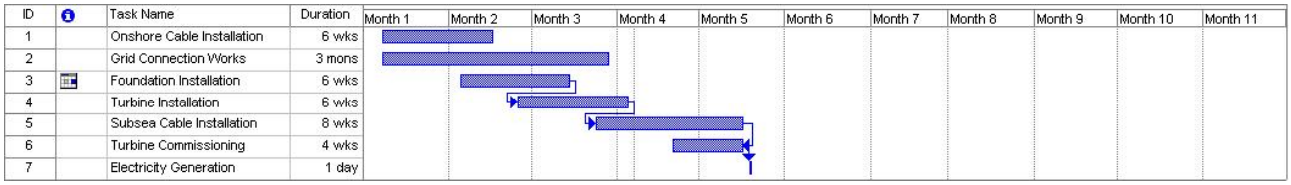

Figure 6 : Indicative Construction Programme

1.9.4 Construction Management (Environmental)

During construction (and decommissioning) some discharges to atmosphere will arise from the marine vessels required to undertake these stages of the development. In addition, there is a small risk of accidental discharges from the turbine array or marine vessels associated with construction and decommissioning. These are not considered to be significant.

There are no anticipated solid discharges into the marine environment during the construction phase.

A comprehensive Environmental Management System will be implemented prior to construction in consultation with statutory authorities, with a suite of complementary management plans corresponding to different aspects of the construction activity. The Environmental Management System will form a component part of the construction contract for the development. The documents, which will be tailored specifically to ensure compliance with the consent conditions for the project and current environmental best practice, will include the following:

- Environmental Management System
- Environmental Management Plan
- Monitoring Protocol (as per statutory consents)
- Incident Reporting and Non Conformance Procedure
- Emergency Response Plan
- Collision Risk Management Plan
- Marine Pollution Contingency Plan
- Dropped Objects and Materials Recovery Plan
- Archaeology Plan
- Noise, Dust and Vibration Management Plan
- Waste Management Plan

1.10 SeaGen Array – Operation Phase

The operation life of the Skerries project will be 20-25 years. The operational phase will be pre-empted by commissioning which will take approximately 6-12 weeks to undertake and comprise numerous tests on the turbine, electrical and foundation sub-systems. Following on from this, up to 6 months of characterisation

and type approval testing will occur to validate performance, optimise the equipment and undertake reliability runs.

The testing may utilise the deployment of Acoustic Doppler Current Profiling (ADCP) meters upstream and downstream of the system to measure the profile of the currents in real time through the entire water column.

1.10.1 Access to Site

Operation and maintenance of the offshore marine current device will continue 24 hours per day, 365 days per year, and therefore MCT will require access to site at any time.

It is recognised that the presence of the structure could present a hazard to navigation. As part of the EIA, a navigation risk assessment will be performed to investigate whether the structures should be subject to safety zones during the operation phase. Such an assessment will cover any risk to the project arising from commercial traffic, amenity craft and commercial fishing vessels, and will include an assessment of the resulting possible effects on such identified users of the sea.

1.10.2 Lighting and Marking

The lighting and marking of the device will be specified by Trinity House Lighthouse Services, upon the receipt of project information and the navigation risk assessment.

The positions of the device structures, moorings, and export cable and ancillary structures will be conveyed to the UK Hydrographic Office so that they can be incorporated into Admiralty Charts and the Notice to Mariners procedures.

1.10.3 Inspection and Maintenance

The units will be serviced and maintained throughout the life of the array (20-25 years) from a local port, most likely Holyhead.

Maintenance of the structure is normally separated into three different categories:

- Periodic overhauls
- Scheduled maintenance
- Un-scheduled maintenance

Periodic Overhauls

Periodic overhauls will be carried out in accordance with the turbine manufacturer's warranty. These overhaul campaigns will be planned for execution in the periods of the year with the best access conditions, preferably in summer.

Scheduled Maintenance

Scheduled maintenance applies primarily to inspections and work on wear parts susceptible to failure or deterioration in between the periodic overhauls. The tasks will typically be inspection on faults and minor fault rectification.

Scheduled maintenance will be performed using small personnel craft operated from the local harbour.

Unscheduled Maintenance

Unscheduled maintenance applies to any sudden defects. The scope of such maintenance would range from small defects to complete failure or breakdown of main components or the foundation structure. Such maintenance would require the intervention of construction vessels similar to those involved in the construction of the array.

Inspections of support structures and sub sea cables will be performed on a regular basis, as will ad-hoc visits for surveillance purposes.

1.10.4 Operation Management (Environmental)

There are no anticipated direct discharges to the atmosphere during normal operation of the Skerries Tidal Stream Array. The only moving parts in the structure are the turbines themselves, and the only potential contaminant is the transformer.

There are no anticipated solid discharges into the marine environment during normal operation of the devices. All waste generated during operation, for example associated with maintenance, will be collected and disposed of by licensed waste management contractors to licensed waste management facilities onshore.

There are no anticipated direct aqueous discharges to the marine environment during normal operation of the device. Based on the 'Seaflow' experience, and the design of the 'SeaGen' machine, it is not expected that there will be a requirement to introduce additional potential contaminants such as oils, hydraulic fluids and anti-foulants during this phase of the project.

During the operations phase of the project, an Environmental Management System, based upon the system implemented for the construction phase, will be in place. The system will ensure that the environmental monitoring, as specified in the statutory consents, is undertaken and reported, and that the device is operated and maintained in an environmentally responsible manner.

It is anticipated that the following aspects will be featured in the Environmental Management System during the operational phase:

- Environmental Management System
- Environmental Management Plan
- Environmental Monitoring Protocol
- Emergency Response
- Incident Reporting and Non Conformance Procedure
- Collision Risk Management Plan
- Marine Pollution Contingency Plan
- Waste Management Plan
- Dropped Objects and Materials Recovery Plan

The plans will generally be shorter versions of the corresponding construction plan – however, if major unscheduled maintenance works are required the construction plans may need to be invoked if larger construction vessels are required.

1.11 SeaGen Array - Decommissioning Phase

MCT recognises the importance of considering the decommissioning process at an early stage. Decommissioning of the device forms an integral part of the Environmental Statement.

1.11.1 Decommissioning Method

The objectives of the decommissioning process will be to minimise both the short and long term effects on the environment whilst making the sea safe for others to navigate. Based on current regulations and available technology, MCT proposes to perform the following level of decommissioning on the device:

- Electrically isolate the tidal stream array system from the grid
- Tidal Stream devices – to be removed completely using a reversal of the construction process
- Structures and substructures – to be removed to the natural seabed level or just below
- Foundation pile cut using high pressure steel cutter and void capped with boulders

- Export cables – to be left safely in-situ, buried to below the natural seabed level or protected by rock-dump
- Cable shore landing – to be either safely removed or left in-situ, with particular respect to the natural pattern of longshore drift
- Scour protection – to be left in-situ
- Onshore cabling – to be either safely removed if above ground or left in-situ if buried
- Onshore grid connection – equipment to be safely removed
- Onshore buildings – to be either converted to alternative uses or removed

The Environmental Statement will contain a brief description of the following :

- Decommissioning process (outline method statement) for all types of infrastructure (i.e. foundation type, etc) cited in the Project Description
- Possible methods of removal and likelihood of re-use or recycling of components, for example,
    - All steel components sold for scrap to be recycled.
    - The turbine blades to be disposed of in accordance with the relevant regulations in force at the time of decommissioning. One potential disposal method identified is to break down the fibre-glass into a pulp for use as cavity insulation in buildings
    - All heavy metals and toxic components (likely to be small in total) disposed of in accordance with relevant regulations
- Possible methods of disposal for products where re-use or recycling is not anticipated
- Decommissioning programme

1.11.2 Access to Site

It is envisaged that the requirements for access to site during the decommissioning phase will be similar to those required during the construction phase.

1.11.3 Ongoing Monitoring

The scope and duration of the monitoring requirements post decommissioning will be agreed between MCT and DEFRA in consultation with other Statutory Consultees and details will be included in the decommissioning programme. The operator will implement the arrangements for monitoring, maintenance and management of the decommissioned site and any remains of installations or cables that have been left in-situ in accordance with the agreement.

2 Scoping of Environmental Effects

2.1 Physical Environment

The potential for effects on the physical environment arise from the physical presence of the Skerries Tidal Stream Array, the construction methods and the materials & substances used, and the subsequent operation of the turbines.

2.1.1 Hydrodynamics and Suspended Sediments

The presence of the Skerries Tidal Stream Array may modify the wave and tidal conditions at the site introduced by the turbine foundations and ancillary structures and extraction of tidal energy from part of the water column. Such interactions provide the potential for localized changes in suspended sediment concentrations (due to scour and other sources). Potential sources of scour include the foundations and ancillary structures, and the cables should they be unburied or become exposed due to sedimentary processes.

As a result, marine current installations have the potential to create a range of effects on the sedimentary processes. In addition, the construction of each installation has potential to affect the geomorphology of the local seabed. These effects can in themselves constitute an impact and can also indirectly impact upon the biological environment. In addition physical effects can occur in the surrounding marine environment and potentially at the adjacent coastline.

Water quality can be affected by the mobilisation of sediments into the marine environment and by heavy metals or organic polymers associated with grouting and cementing materials, if required for structure foundations, and activities during the operations phase.

The potential effects on the physical environment include :

Construction Phase

- Increased turbidity during installation of drilled foundations, subsea cables, pipeline crossings, scour protection, and the indirect effect on benthos, fish and water quality in general.
- Release of or increased radioactivity inherent in rock strata extracted during the drilling process or contamination existing in the seabed from previous activities.
- Degraded water quality due to handling of fuel, waste materials, chemicals, grout, and indirect effects as above.
- Disposal of arisings, which may require a separate FEPA license depending on the disposal location;
- In-combination effects with other developments.

Operations Phase

Effects of the physical presence of the structures and operation of the turbines on hydrodynamics, i.e. :

- wave regime.
- tidal current regime.
- scour, local and potentially global.
- bathymetry, including bed features.
- Increased turbidity due to scour, and subsequent effects on benthos, fish, coastal processes etc
- Changes to seabed morphology with resulting changes in water depth. These changes depend on the degree of sediment transport at and around the site, water depth and hydrodynamic conditions and the nature of the sediments at and around the site.
- Localised deepening of the seabed in the vicinity of the turbine caused by scour.
- Effects further from site due to suspended sediments, e.g. changes to sediment transport at the coast. These effects depend on changes in wave climate and tidal current behaviour induced by the units and may lead to alteration of beach dynamics.

- Possible effects from marine spill due to increased navigational risk, e.g. oil spill, and subsequent effects.
- Degraded water quality through possible release of turbine lubricants and oils, corrosion protection materials, handling of fuel, waste materials, chemicals
- In combination effects with other developments

Decommissioning Phase
The potential effects during the decommissioning phase are thought to be similar to the construction phase.

2.1.2 Existing Environment

The potential for effects on the physical environment arise from the physical presence of the SeaGen Array, the construction methods and the materials & substances used, and the subsequent operation of the turbines.

A review of existing conditions presented below is largely based on information provided from available published sources.

2.1.3 Water Quality

There are two beaches that are monitored by the Environment Agency for bathing water quality in terms of bacteriological counts within the study area; these are Church Bay and Porth Dafarch. Both show 'excellent' water quality status for the last two years. (www.environment-agency.gov.uk).

The Marine Conservation Society (MCS) also identifies beach quality status for a range of beaches and have recommended Church Bay (SH29970089400) and Porth Dafarch (SH23307990) from 2002-04 with no routine sewage discharge sites being identified (www.goodbeachguide.co.uk).

2.1.4 Geology

The northwest coast of Anglesey adjacent to the proposal area off Carmel Head exhibits heavily metamorphosed Pre-Cambrian rocks from the Mona Complex. These rocks are intricately folded and highly altered in steep cliffs 25m to 50m high.

Pre-Cambrian Gneiss and Schist dominate bedrock geology in the proposal area with occasional NW-SE trending dolerite intrusions. The BGS Quaternary (1994) sheets illustrate mostly bedrock at seabed level in the proposal area.

The BGS Quaternary (1994) sheets illustrate mostly bedrock at seabed level in the proposed turbine location area, and therefore significant glacial deposits are unlikely to be encountered. This is supported by The Admiralty Chart (2001) that indicates bedrock with some coarse sand and shells in isolated patches. Along the preliminary export cable route Late Pleistocene glacial till may be encountered along the eastern extremity.

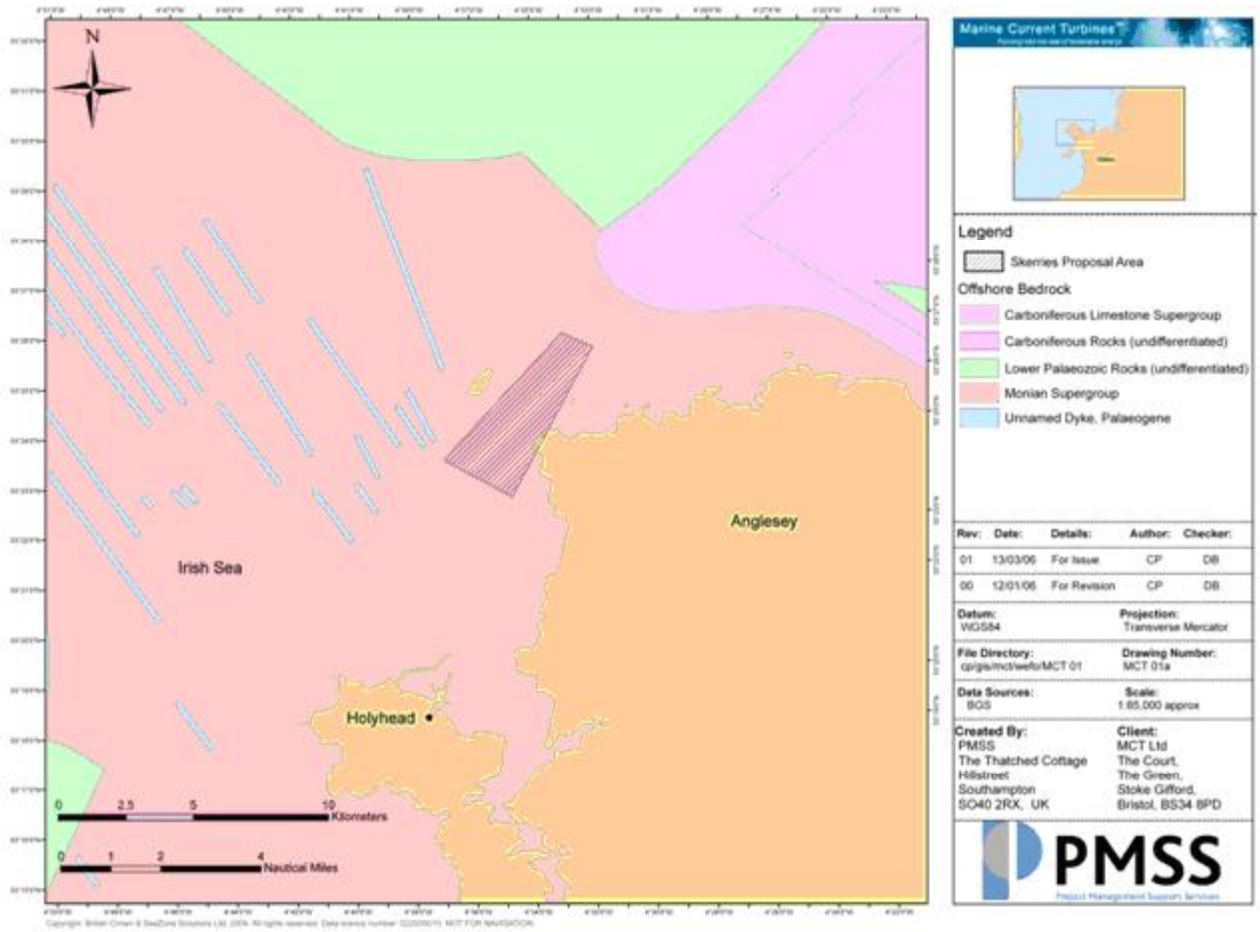

Figure 7 : Solid Bedrock Geology

Sea Bed Sediments

Due to the tidal currents at the proposal location, seabed sediments are likely to be either absent or very sparsely distributed on the seabed. Figure 8 below indictes there is virtually no Holocene seabed sediment within the proposal area, with some limited potential for unconsolidated Quaternary deposit being present.

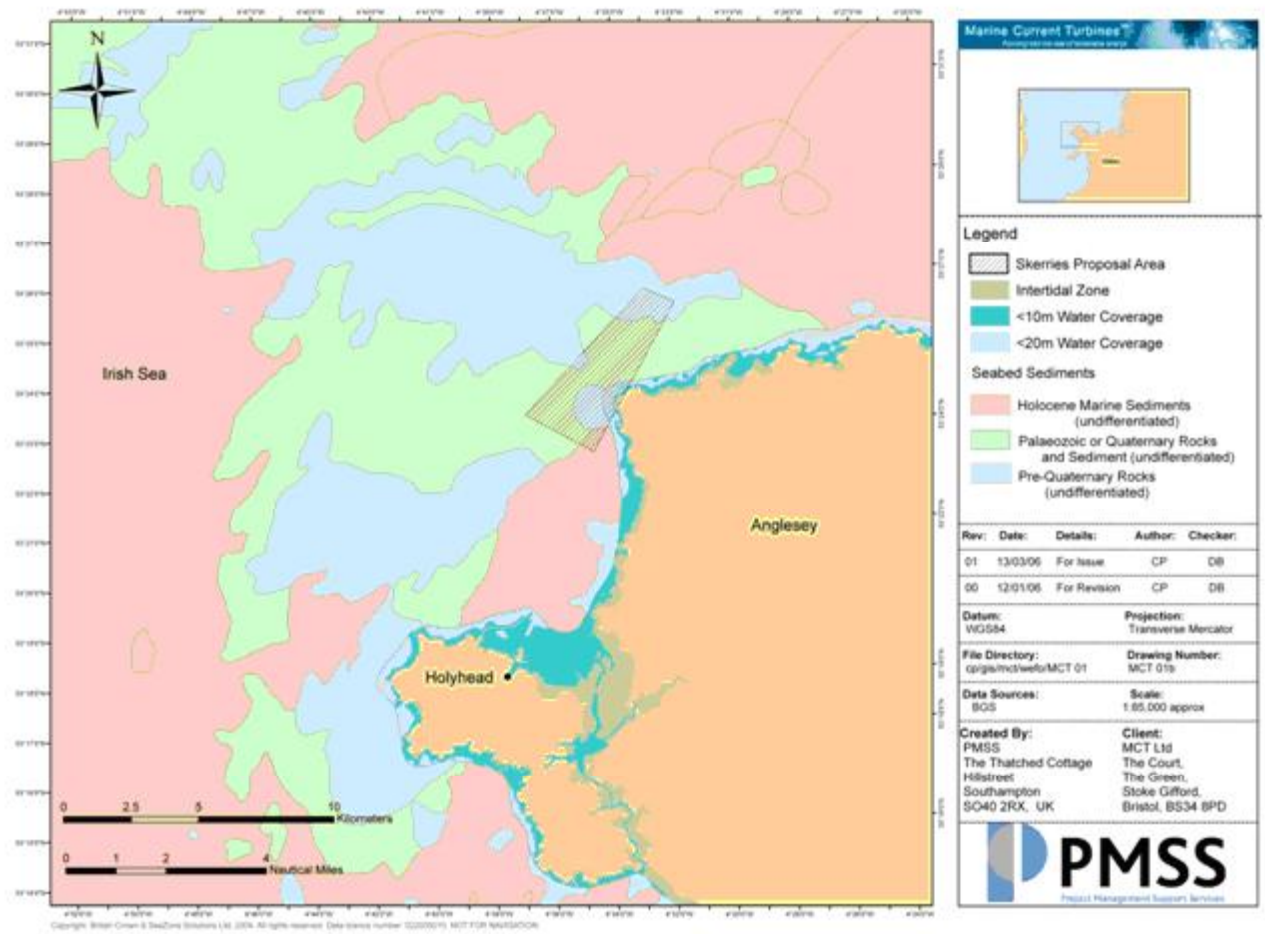

Figure 8 : Seabed Sediments

2.1.5 Sedimentary Processes

Based on satellite data, suspended sediment concentrations are highest between January an April off the west coast of Anglesey.

The nearshore sediment transport pathway is predominantly northerly on the N-S orientated sections of the coast and easterly on E-W orientated sections. Coastal and offshore transport pathways are aligned where the tides and wave forces are orientated in the same direction, i.e. northerly transport to the north of North Wales. Off the coast of Anglesey and north of the Lleyn Peninsula, sediment pathways are generally north or north eastwards.

One of the main nearshore divergences of sediments in the Irish Sea occurs off Anglesey.

An animation of Suspended Particle Matter (SPM) for UK waters for the year 1998 was conducted and is presented on the Inter-Agency Committee on Marine Science and Technology (IACMST) website. The animation is based on outputs from a numerical model. SPM concentrations for the Irish Sea results off the coast at Carmel Head and Anglesey genarally, range from 4 to 10 mg/l.

IACMST also indicate that analysis of satellite imagery (from NASA/PML Remote Sensing Group) (Satellite images of reflectance are closely related to SPM concentrations) shows the presence of two separate turbidity maxima in the region, one off Wicklow Bay, the other off Anglesey. These areas correspond to the

areas of strongest tidal currents, and it is considered that the high reflectance is produced by fine sediments maintained in suspension throughout the water column by tidal stirring.

2.1.6 Proposed Scope of Assessment

The scope of assessment comprises the following high level activities:

- Acquisition of oceanographic data from the site and the environs, if necessary
- Geophysical studies and ADCP surveys at the proposal area, and geophysical surveys along the potential export cable route
- Development of a coastal processes model, incorporating such data and information, together with preferred installation methodology to assess the effects
- Liaison with work on sub-tidal benthic ecology
- Prediction of the energy extracted from the device, and subsequent environmental effects on the marine physical environment and the coast
- Description of the measures during the construction phase to minimise the possibility to degrade water quality, increase turbidity etc.

A forthcoming ABPMer Ltd report on the impacts of energy extraction, commissioned by CCW, has recently been drafted. CCW has informally advised that the unpublished conclusions of this report suggest that initial CCW concerns that energy extraction would significantly affect coastal processes are now largely unsupported. The results of this study will be considered in depth once published.

Onshore Works

With regard to onshore works, a desk study will be undertaken to gather existing information on the coastline from aerial photographs and previous bathymetry and beach profile studies.

A geotechnical investigation will be undertaken comprising sediment cores along the transect of the proposed cable landfall across the inter-tidal zone to establish the nature of the mobile sediments and beach core and to inform the design burial depth of the cables. This may be performed during EIA or post-consent.

The geological, hydrogeological and hydrological aspects of the onshore cable route and sub-station will be assessed through desk study and the impacts from the development assessed against the baseline. A desk study of existing records will also be undertaken to establish the potential for suspected contamination levels in proximity to onshore works.

Effects on soil resources and agricultural land quality will be identified by desk study. Mitigation measures will be identified such as the reinstatement of existing agricultural land drainage systems and reinstatement of soils from temporary construction compounds and laydown area.

The relationship of the permanent development to land liable to flood and flood levels will be investigated in the EIA. This aspect will be assessed in terms of necessary engineering and foundation design for the cables and sub station foundation design should this option be pursued.

It is proposed that as effects will not be significant air quality is not specifically assessed in the Environmental Statement for the Skerries Tidal Stream Array project , i.e. air quality is scoped out of the assessment.

2.2 The Biological Environment

Potential impacts on the biological environment are categorised as follows :

- Designated Sites
- Sub-Tidal Benthic Ecology
- Fish (including commercial species)
- Marine Mammals

- Inter-Tidal and Terrestrial Ecology
- Birds

2.2.1 Designated Sites

The project has the potential to affect sites designated for nature conservation in the following ways:

- Direct impacts through the location and construction of the export cabling and onshore works
- Indirect impacts from construction activity
- Indirect impacts on Annex 1 bird species
- In-combination effects with other developments

The following designated sites are identified :

Ramsar Sites

Site Name	Grid Ref	Area (ha)	Date Designated	Qualifying Interest
Anglesey and Llyn Fens	53°19'N 004°18'W	625 ha	02/02/1998	The site supports a suite of base-rich, calcareous fens, which is a rare habitat type within the United Kingdom's biogeographical zone.
Llyn Idwal	53°07'N 004°01'W	14 ha	07/11/1991	The site is a small, shallow, oligotrophic corrie lake. The semi-circular rock basin (or *cwm*) containing the lake is one of the finest examples in Snowdonia.

Table 7: Ramsar Sites

Special Protection Areas (SPA's)

Site Name	Grid Ref	Area (ha)	Date Designated	Qualifying Interest
Ynys Feurig, Cemlyn Bay and The Skerries	SH331935	85.66	10/06/1992	This site supports populations of European importance of the following species: Arctic tern, Common tern, Roseate tern and Sandwich tern.
Holy Island Coast	SH208817	608.04	29/05/2002	Holy Island coast is a spectacular coastal heath and cliff site, with ornithological, botanical and geological interest. Part of the site is also a RSPB reserve.

Table 8: Special Protection Areas

Special Areas of Conservation (SAC's)

Site Name	Grid Ref	Area (ha)	Date Designated	Qualifying Interest
Holy Island Coast	SH208817	464.27	15/06/1995	Holy Island, off the north-west coast of Wales, has hard rock acidic cliffs and supports important examples of coastal cliff heathland vegetation.

Table 9: Special Areas of Conservation

Sites of Special Scientific Interest (SSSI)

Site Name	Grid Ref	Area (ha)
Holy Island Coast	SH 210845	399.4 ha
The Skerries	SH2709S0	17 ha

Table 10: Sites of Special Scientific Interest

Areas of Outstanding Natural Beauty (AONB)

Site Name	Area (ha)	Date Designated
Anglesey	18800	1956

Table 11: Areas of Outstanding Natural Beauty

Sites Identified by Statutory Agencies

Site Name / Designation	Identified By	Grid Ref	Date Designated
Holyhead Mountain, Heritage Coast	CCW	SH205823	1977
North Anglesey Coast, Heritage Coast	CCW	SH269949	1983

Table 12: Sites Identified by Statutory Agencies

Sites Identified by Non - Statutory Agencies

Site Name / Designation	Area (ha)	Grid Ref	Date Designated
South Stack cliffs, RSPB reserve	316	SH205823	1977
The Skerries, RSPB reserve	17	SH269949	1983

Table 13 Sites Identified by Non-Statutory Agencies

These designations are presented in Figure 9.

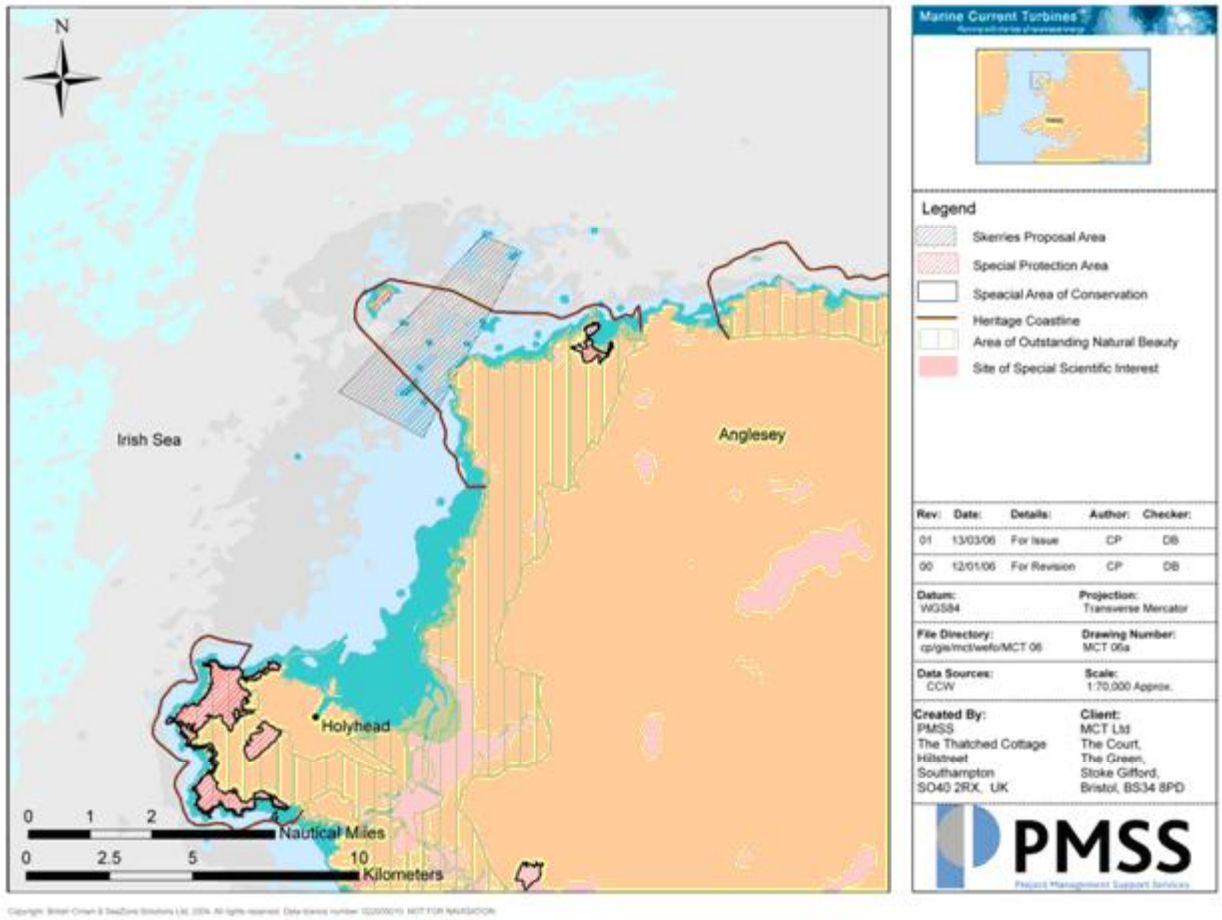

Figure 9 : Designated Sites

2.2.2 Sub-Tidal Benthic Ecology

The construction, operation and decommissioning of an offshore marine current device has the potential to affect sub-tidal benthic ecology in the following ways :

- Habitat loss or disturbance during construction from turbine placement and cabling, either due to the footprint of construction vessels or the width of cable laying equipment;
- Indirect effects through increased turbidity or smothering resulting from construction;
- Loss of habitats due to scour around turbine bases;
- Benthos loss due to movement of any cables which may have become unburied;
- Colonisation of the structures and the net environmental benefits that may accrue;
- Potential alterations to the sediment composition and associated communities due to changes in the current and wave regime, including localised scour (erosion) of seabed around the base of the anchor and cable;
- Disturbance effects of installation equipment on benthic organisms, particularly during spawning, nursery or migratory periods;
- Potential contamination of sediments and marine organisms from accidental release of oils/greases/chemicals during construction, and/or release of existing sediment bound contaminants (e.g. petrochemical deposits);
- Loss of habitats during decommissioning that have formed as a result of the foundation installation;
- Cumulative or in-combination effects.

From discussion with CEFAS there are no fixed beam trawl stations in proximity to the proposal area. Stations do, however, exist off the south west and north east facing coasts of Anglesey (Jim Ellis, CEFAS, pers comm, 2005).

The sub-tidal habitats found offshore between Carmel Head and The Skerries are predominantly associated with rocky seabed with a thin covering of sediment in places. A rich association of species can be found on rocky reefs. Where softer sediment exists it may be habited by polychaete worms, bivalve molluscs and amphipod crustaceans. A lot of site-specific information can be gathered on sub-littoral benthic types at the proposed location as number of surveys are recorded on the MNCR database managed by the JNCC.

Based on The Admiralty Chart (Wales Anglesey: Approaches to Holyhead, 1413) the sea bed within the proposal area is rather variable ranging from exposed bedrock to coarse sand and shells to Gravel. BGS mapping identified much of the seabed as bare bedrock with sediment covered bedrock elsewhere.

The composition of the biotopes is, therefore, likely to be variable, and will influenced by the depth, degree of water movement, and substrate. Sponges, ascidians, soft corals, anemones, hydroids, bryozoans, tubeworms, brittlestars, urchins, starfish, barnacles, crabs, spider crabs and other decapods, whelks and other gastropods, scallops and fish all tend to be abundant as epifauna, while there may also be coralline algae and other red seaweeds in shallower areas. A selection of sublittoral benthic surveys were reviewed and the salient points reproduced below, giving an indication of representative communities.

Middle Rock benthic MNCR site was surveyed in 1997 and is situated between Carmel Head and the Skerries (53º 24.65'N 04º 35.04'W). The area surveyed comprised slightly broken bedrock with some short cliffs and small gullies providing shelter for species not on the open rock surfaces. The rocks were dominated by sponges and *Tubularia indivisa, Abietinaria abietina* and patches of *Balanus crenatus* overgrowing *Sabellaria spinulosa* in places. Overall very rich for this area. The site was selected as an offshore tide swept rocks biotope: Lower circalittoral bedrock at 16-21 m dominated by sponges, *Tubularia indivisa* and barnacles. Dense Ascidians, bryzoans and hydroids on a crust of *Sabellaria spinulosa* on a tide swept circlittoral rock (JNCC, MNCR database).

To the east of the proposal area is a survey location at West Mouse (53 25.12'N 04 33.13'W). The site was situated to the E of West Mouse on tide-swept bedrock ridges pinnacles and gullies although to the S of initial position an infaunal gravel/pebble bed was present. The scoured bedrock was a patchwork of *Mytilus edulis*, *Dendrodoa grossularia*, *Urticina felina* and these were the dominant characterising species. *Tubularia individa* and *Flustra foliacea* were also dominant organisms. Large shoals of pollack cruised the area and many encrusting sponges and ascidians were also present. Overall a `rich` scoured community (JNCC, MNCR database).

West Platters survey site was situated at the south-east end of The Skerries (53 25.10'N 04 36.48'W). The whole area is very tide-swept with approximately 1 hour of slack water at highwater. Most rocky substrata covered in a turf of *Dendrodoa* and encrusting sponges with *Tubularia indivisa* protruding. Shallow water with dense *Mytilus edulis* and red algal turf. Wreckage was found at this site at the deepest point of the dive. The biotopes here were recorded as Infralittoral bedrock with dense *Mytillus edulis* and foliose red algae and Lower circalittoral bedrock with *Dendrodoa*, dense sponge and *Tubularia* (JNCC, MNCR database).

2.2.3 Proposed Scope of Assessment

The proposed scope of assessment is to use benthic organism survey monitoring to provide a baseline with which to assess potential impacts and also to benchmark any subsequent post construction surveys (biological indicator of potential changes in benthic conditions) within one tidal excursion of the proposed device using divers, drop down video or benthic grab sample methods dependant upon seabed and marine current conditions.

The locations of point surveys will be proposed following non-intrusive geophysical survey.

The broad approach taken for benthic survey work is to provide characterisation information on the communities in the development area (including within one tidal excursion) which will include developing

maps of benthic communities. Where hard substrates are encountered, there may be a requirement for an underwater video survey. Video samples would be taken at each ground type identified within the geophysical survey area, and selected areas within the ebb and flood envelope. Standard benthic techniques for the softer ground will be implemented.

Seabed types will be established from side-scan sonar surveys and knowledge from existing benthic ecology survey data. Suggestions for monitoring will be provided in the Environmental Statement for construction and post construction phases.

2.3 Fish (including Commercial Species)

The Anglesey coastline has numerous seabed types from rocky reef to sand banks and shingle. Commercial species comprise pelagic specifies (those fish that tend to occupy the mid water column in shoals) and demersal species (those fish found at or near the bottom of the sea). Demersal species are divided into four groups: the elasmobranchs (sharks, skates and rays), gadoids (cod family) flatfish and other demersal fish.

2.3.1 Exploited Sea Fish

Sprats are widely dispersed throughout the shallower areas of the region. They migrate to spawning areas that are widespread across the whole of the NW Wales coast and entire Irish Sea. Spawning takes place from May to August and is temperature dependant. Sprats migrate inshore to overwinter but have no clearly defined nursery areas (Barne et al, 1995, CEFAS, 1998).

No other spawning areas coincide with the proposal area, but Plaice spawning does occur in areas to the North and east of Anglesey extending from near shore out to sea.

There are no fish nursery areas coincident with the proposal areas. However, plaice forms nursery areas along the inshore coast along the east, northeast and southwest coasts of Anglesey (Barne et al, 1995).

Whiting also form nursery areas along the east Anglesey coast and N wales coast (CEFAS, 1998).

CEFAS have produced seismic sensitivity maps for each month of the year delineating areas where fish species may be susceptible to loud seismic or subsea noise from offshore human activity (CEFAS 1998). There are no sensitive areas in proximity to the proposal area.

2.3.2 Crustacea

In terms of crustaceans, lobsters are distributed around the entire coast of Anglesey located generally on rocky reefs. Similarly, edible crabs are found around the coastline on exposed or rocky shorelines often found on softer sediments than lobster (Barne et al, 1995).

Offshore, scallops live in sandy/gravely areas of seabed. Their distribution is concentrated across the north of Anglesey including the proposal area.

2.3.3 Species of conservation interest

The lampern and twaite shad are protected species and have both been recorded off the north coast of Anglesey in the British Marine Fisheries Database (Barne et al, 1995).

There are no Salmon or Trout rivers recorded on Anglesey (Barne et al, 1995).

Basking sharks tend to appear off the UK coast between May and October and are sighted either off headlands (most common), in bays or offshore. There were no sightings of basking sharks off the Welsh coast in 2004 (Marine Conservation Society Basking Shark Watch Project, 2005). There have been 4 recent

sightings of basking sharks within 20-30km, 3 off the north coast of Anglesey in deeper water, 1 on coast c.10km east along coast of the proposal area (ABPmer, 2005).

2.3.4 Proposed Scope of Assessment

The proposed scope of assessment is to undertake small 2m beam trawls or otter trawls as part of the benthic survey work to assess the fish assemblage off the Anglesey coast. Alongside this baseline work, data from any relevant CEFAS beam trawl stations in the vicinity will be assessed.

EMF – A COWRIE funded study (CMACS 2003) investigated EMF from subsea power cables, suggested a method to measure EMF in the field, provided guidance on mitigation measures to reduce EMF and provided preliminary guidance on the potential effects on electrosensitive fish species.

A further study is expected which will investigate the sensitivities of various fish species to electromagnetic fields including life cycle changes and comparison with the strength, frequencies and wavelength generated by offshore wind farm cabling.

Populations of electrosensitive species will be determined during fish baseline assessments. The proposed cabling arrangement will be known and the possible interaction of cables and sensitive fish populations will be determined on the basis of latest research from the UK and experience in Northern Europe.

2.4 Marine Mammals

The area is highly regarded for sightings of cetaceans (whales, dolphins and porpoises), in coastal and nearshore locations, and for populations of pinnipeds (namely grey seals). Information on status and distribution comes primarily from the national sightings database maintained by the Sea Watch Foundation, the JNCC Seabirds at Sea survey work, CCW and Marine Awareness North Wales.

2.4.1 Cetaceans

The commonest cetacean species in nearshore waters is the harbour porpoise. Numerous sighting positions around northern coast of Angelsey of groups between 1 and 132 with a concentration of sightings off Holy Island. The closest sighting to the proposal area off The Skerries c.5km offshore (group size 2-3) (ABPmer, 2005).

Marine Awareness North Wales is a volunteer association who are funded by CCW and Anglesey County Council to raise public awareness of the marine environment. One of their major current projects is the Harbour Porpoise Action Plan, a 3 year boat based study off Anglesey coast, identify frequency, density and feeding nursery locations, notably against the fishing by-catch mortality issue. Ad hoc sightings of harbour porpoise from Carmel Head noted 66 adults and 4 juveniles between October 2001 and July 2003 (www.saveourseas.co.uk).

Jones et al (2005) describes the results of a 3 year boat based survey, between 2002 and 2004, to obtain baseline data for harbour porpoise in Anglesey waters for the Isle Anglesey Biodiversity Action Plan (LBAP). Distance sampling from line transects was used to estimate density and abundance of harbour porpoise between Point Lynas on the north east coast and South Stack on the north west coast during the summer months.

The proposal area lies between 2 sectors within the porpoise boat survey programme; Holyhead Bay to the south and Carmel Head to the east. Harbour porpoise sightings were low in both of these sectors and consequently neither sector was noted as an area of importance (in terms of numbers). Over 60% of sightings were made within 5km of the inshore start of each transect (Jones et al, 2005). Density estimates for the Holyhead Bay/Carmel Head area indicated between 0.07 and 0.77 individuals per square km wer present between May and September and Holyhead Bay was the lowest of all sectors studied. Jones et al

(2005) suggests that Holyhead Bay is subject to disturbace from commercial shipping and ferries and will inevitably affect the density and behaviour of animals in the area.

There are also scattered common dolphin sightings off coast of Anglesey. The closest sighting is off The Skerries c.5km (group size 3-4). Larger groups have also been seen further east around the coast (c. 5-8km) of between 13 and 211 individuals (ABPmer, 2005).

There have been no whale sightings (Killer, Baleen, Pilot) within 20km of the proposal area (ABPmer, 2005).

2.4.2 Pinnipeds

Grey seals (*Halichoerus grypus*) occur throughout the region and qualify as protected species under Annex II of the EU Habitats Directive. The Conservation of Seals Act 1970 makes it an offence to kill or take seals at certain times of year or by use of prohibited means.

The Skerries SSSI is notified in part for its Grey seal population that use the numerous small rocky islets primarily as haul out sites. The presence of grey seals within the Holy Island Coast SAC is not a qualifying feature and JNCC class the site a 'Grade D' site.

Grey seal pup production has been noted on the North West coast of Anglesey (Barne, et al, 1995) concentrated on The Skerries and Holy Island coast, although grey seals spend most of the year at sea only coming ashore in autumn to breed (Barne et al, 1995 & www.jncc.co.uk). Grey seals also occupy areas south at Ynys Llanddwym and east at Ynys Dulas. The sites are not recognised as a significant breeding colonies. Parliament Cave, just south of the North Stack is home to low numbers of breeding Grey Seal (John Ratcliffe, CCW *pers comm*, 2005)

The CCW report for potential wave and tidal device development identifies the main site for grey seals at The Skerries islands and on Angelsey mainland near Carmel Head with annual mean pup production of 8.4 to 62.3 pups. Further down the coast at sites on NE side of Holy island grey seals occur with annual mean pup production of 8.4 to 62.3 pups (ABPmer, 2005).

The sites used by grey seals in North Wales are usually remote from human access and adjacent to tide races; most consist of rocky island shores or sea cave sites. Westcott and Stringell (2004) identify 3 areas around North Wales where grey seal distribution is restricted to; one district being a cluster of localities around Anglesey. The Skerries and Carmel Head are both specifically quoted within this context. No seals were seen at The Skerries within the observation period (August 2002-April 2003). At Carmel Head, pup production dropped from 9 in 2001 to 3 in 2002. Westcott & Stringell (2004) speculate that this is perhaps due to the fly tipping on to the main nursery beaches

In contrast, Common seals very rarely visit and do not breed in the region. There are anecdotal accounts of individuals or pairs in and around the Menai Strait (Barne et al, 1995).

2.4.3 Scope of Assessment

The first step would be to assess the importance of the site for marine mammals and species occurring.

Should the survey information taken so far indicate good survey quality and wide coverage, it is not proposed to undertake any long-term baseline monitoring.

The key issues will be potential impacts of construction activities and collision risk with turbines during operation. Information on effects of the moving rotor during operation will be gathered from the Strangford Lough prototype turbine.

The suggested approach will combine a review of experience gained through operation of the prototype turbines at Lynmouth and Strangford including modelling of collision risk and expert guidance from appropriate marine mammal authorities.

As part of the EIA, the following work requirements will be necessary:

- Desk study of the use of the area by marine mammals, drawing on records of the area and previous experience
- Additional survey effort where appropriate
- The assessment will then determine the risk of direct collision, displacement and assess the indirect barrier effects based on an assume level of mammal activity
- Obtain data about noise and vibration emissions during construction and from turbines once operational. A literature review into potential operational effects on marine mammals will be required
- A study of in-combination effects with other developments

CCW has advised that it would need to establish if the monitoring objectives of the MANW study matched the objectives for establishing a baseline for EIA with tidal schemes in mind, if this is the case then a desk based assessment approach may be acceptable.

Generic behavioural monitoring for seals and cetaceans is currently being undertaken in Strangford Lough by SMRU. MCT will work with SMRU to extrapolate this data for Irish Sea populations, and introduce additional monitoring if required (e.g. T-pod deployment).

2.5 Inter-Tidal and Terrestrial Ecology

Where cabling from the project comes ashore (landfall) and connects to the onshore infrastructure, there is the potential for ecological impacts associated with the construction phase of the project as follows :

- Physical disturbance from plant and machinery (cable installation equipment, diggers, trucks);
- Increased turbidity and subsequent indirect effects;
- In combination effects with other developments.

The location and timing of cabling works may also give rise to potential effects on the EC Bathing Water Directive (76/160/EC), which sets the standards for water quality at beaches. There is potential for the operations to adversely affect the rating of local beaches which, with careful consideration of location and timing together with consultation, could be avoided.

2.5.1 Intertidal Ecology

The nearest 33kV substation is at Cemaes Bay, east of Wylfa. The nearest 132kV assets are less than 1km from the coast, and there is a direct feed from Wylfa sub-station. The landfall position is likley to be to the south of Wylfa Power Station.

Several nearshore sublittoral surveys have been recorded on the MNCR database in the vicinity of Carmel Head. If a grid connection is sought at Wylfa well to the east then there are no representative survey locations on this north stretch of coast.

The following survey was taken at Porth-y-Dyfn situated to the W of Carmel Head at the NW corner of Anglesey in a W-facing cove with a narrow entrance (53 24.30'N 04 34.13'W). It is included here as the biotope and benthic organisms may be representative of typical nearshore sub littoral facies that could be encountered along the coast to the east. The bed of the cove was sandy with large boulders covered in silt. The biotopes recorded were a silt-covered vertical red algal turf in the kelp park zone and the kelp forest. The dominant organisms in the first biotope were *Cryptopleura ramosa*, *Delesseria sanguinea* and *Dicyota dichotoma*. The kelp forest biotope was dominated by *Laminaria hyperborea* and an understory of *Heterosiphonia plumosa*, *Calliblepharis ciliata* and *Rhodymenia pseudopalmata*. (JNCC, MNCR database).

The cable landfall and cabling to the connection point with the electricity distribution system has the potential to affect a range of habitats within a given corridor, although construction techniques will vary the magnitude of impact.

2.5.2 Terrestrial Ecology

It is not currently possible to establish the baseline ecology for the onshore works, however, the works will largely be restricted to existing roads and sub station locations within the built up area of Wylfa. The ecological value of the area will be established once a firm onshore grid connection location and onshore cable / overhead route have been established.

2.5.3 Proposed Scope of Assessment

The value of the intertidal environment will be assessed through the collection and analysis of sediment cores and biotope mapping; the general classification of an area by its habitat types and associated species. Biotope mapping will give a general indication of the habitats and species present within the area of the cable landfall. More specific data will be obtained through core sampling of sediments, a well-established technique for obtaining quantitative data on infauna (organisms living within sediments). Should any legally protected species be identified, appropriate surveys would be undertaken and mitigation measures drafted accordingly.

The impacts of the proposed development on intertidal and terrestrial habitats and species, excluding avian ecology, will be assessed following the Guidelines for Ecological Impact Assessment issued by the Institute of Ecology and Environmental Management (IEEM 2002). This will include the assessment of both the direct and indirect ecological impacts of the proposal, together with the identification of possible mitigation. The assessment will be undertaken with reference to other published guidance including:

- Planning Policy Guidance Note 9: Nature Conservation
- Planning Policy Guidance Note 22: Renewable Energy
- Biodiversity: The UK Action Plan

plus relevant wildlife protection legislation including

- Wildlife & Countryside Act 1981 (as amended)
- Conservation (Natural Habitats & c.) Regulations 1994
- Countryside & Rights of Way Act 2000
- Protection of Badgers Act 1992.

In the first instance the study would comprise a desk study, including consultation with appropriate bodies such as CCW, Ynys Mon Council and local wildlife trusts. A Phase I habitat survey and protected species survey will be carried out on the terrestrial route(s) between the proposed cable landfall and the connection point. The purpose of the survey will be to both identify and map the different vegetation habitats, especially those of particular ecological value, such as hedgerows or ditches, which are likely to be impacted by the routing of the power cables, and the siting of the associated infrastructure.

The Phase 1 survey will also indicate the suitability of the area for protected species (e.g. water vole, greater crested newt, etc) and if necessary further NVC and other specialist surveys will be commissioned.

The results of the intertidal and terrestrial surveys will be evaluated and recommendations provided for impact reduction or mitigation of any identified adverse ecological effects.

2.6 Birds

The potential impact of the Skerries Tidal Stream Array on ornithological interests is limited to those species that utilise nearshore marine waters for feeding and loafing. The impact of this form of energy production on birds is significantly less contentious and significant than the potential impact that wind turbines may potentially have. There are, however, still a number of routes by which birds could be affected:

- Disturbance (human activity and noise) during construction (indirect habitat loss);
- Collision by diving birds with submerged monopile structure or blades; and

- Loss of potential foraging habitat and food sources.
- Effects on wading birds during inter-tidal construction works
- Attraction of birds to lit structures

The area around the proposal area is known to have significant breeding seabird populations and also for onshore breeding seabirds. The relative importance of the seas here is recognised in terms of seabird vulnerability as having high vulnerability for 1 to 4 months of the year (Barne et al, 1995).

The SPA of Ynys Feurig, Cemlyn Bay and The Skerries is located on the north and west coasts of the island of Anglesey. The SPA comprises three separate areas. The three separate areas are treated as a single site as a consequence of regular movement by birds between the component parts. The Skerries SPA is designated for Puffin and Terns. The site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting breeding populations of European importance of the following:

- Arctic Tern *Sterna paradisaea*, 1,290 pairs representing at least 2.9% of the breeding population in Great Britain (5 year mean, 1992-1996).
- Common Tern *Sterna hirundo*, 189 pairs representing at least 1.5% of the breeding population in Great Britain (5 year mean, 1992-1996).
- Roseate Tern *Sterna dougallii*, 3 pairs representing at least 5.0% of the breeding population in Great Britain (5 year mean, 1992-1996).
- Sandwich Tern *Sterna sandvicensis*, 460 pairs representing at least 3.3% of the breeding population in Great Britain (5 year mean, 1993-1997).

The Skerries is also a SSSI, and the CCW citation is listed as follows:

> *"The most important breeding species is the puffin with approximately 50 pairs. The islands were formerly the site of one of the main terneries in the Irish Sea, but only the occasional pair of arctic terns now breeds. There is a gullery with herring, lesser black-backed and greater black-backed gulls. Other breeding species include shag, oystercatcher and rock pipit. Kittiwakes frequent the islands but do not breed."*

The part of the citation relating to tern populations is out of date as there is currently a large tern population around Anglesey, which is currently increasing in size. They feed in the top 1m of the water column, and there is a theory that terns and marine mammals are correlated in some way, as mammals corral fish which attract the terns (John Ratcliffe, CCW *pers comm*, 2006).

Skerries 2005 results from RSPB reserve wardens (courtesy of John Ratcliffe, CCW):

- Roseate tern - none
- Arctic terns - 2035 pairs (1.2 fledged/pr)
- Common tern - 101 pairs (1.6 fledged/pr)
- Herring gull - 1123 pairs
- L. Black Backed Gull - 522 pairs
- G. Black Backed Gull - 40 pairs
- Puffin - 161 + 115 AOB (adults on burrows)

Terns frequent the proposal area and dive within 1m of the surface for sprats and sand eels. Favorite feeding places include tidal falls and there is an emerging correlation with tern distribution and cetacean occurrence. Puffins are a vulnerable species and can dive to several metres and are therefore at potential risk if turbines are sited in favoured feed locations. Guillimots can dive up to 60m and are again at risk as are Cormorants (John Ratcliffe, CCW, *pers comm*).

2.6.1 Scope of Assessment

As part of any EIA, the following work requirements would be necessary:

- Determine existence of birds (feeding, roosting etc.) in the area of the proposed Skerries Tidal Stream Array site, cable route and cable landfall site. Data will be gathered from previous surveys, collated/casual data held by relevant organisations (e.g. BTO WeBS, JNCC Seabird surveys, RSPB data etc).
- Where data is absent discussions with CCW will need to be held to identify the need for boat based surveys to gather baseline data on usage of the proposal area by feeding and diving birds
- Consultation with CCW and RSPB in order to discuss methodologies for assessment of impacts which would be specifically designed to meet any issues which remain outstanding after collation of existing data for the proposed installation area.

For those species at potential risk the EIA will need address the availability of food resource and also the specific locations where birds feed. If published data does not exist to adequately understand these factors, then further survey work will be a requirement. As with marine mammals, detailed monitoring will be required should consent be granted, and this will be defined during discussions throughout the consent application process.

2.7 Human Environment

2.7.1 Socio-Economic and Cultural Heritage

The population of Anglesey is 66,828 (2001 Census). From the labour market profile, the number of working age individuals is 40,000; of these 74% are in employment. Total numbers of people within the County have reduced by 2% between 1991 and 2001.

Unemployment levels on Anglesey are at 4.7%.

More locally, the West Anglesey coast around Carmel Head is within the jurisdiction of Cylch-y-Garn Community Council. The 2001 population of this area was recorded as 675 and includes the closest settlement to the proposed tidal array, Llanfairynghornwy.

A lighthouse on the Skerries has been present since 1713. Trinity House purchased the site in 1841.

Carmel Head is also known as *Pen Bryn-yr-Eglwys* which translates as the Hill or Mount of the Church. It seems there was at one time a 6th Century small church on the headland. Carmel Head itself was the location of a significant copper ore mining industry. There are extensive copper mine works On Parys Mountain, along this north coast, just south of the historic port of Amlwch.

On the headland there is evidence to suggest it was the site of a fort or look-out tower. It is possible that such a building would have been used in the 9th and 10th centuries to report the approach of marauding Vikings in their longboats (Anglesey Today, 2006).

Tourism is now the most significant economic activity on the island. Agriculture provides the secondary source of income for the island's economy, with the local dairies being amongst the most productive in the region. There is also a nuclear power station, Wylfa Power Station, at Wylfa Head on the north coast.

Major industries are restricted to Holyhead which supports an aluminium smelter and the Amlwch area where the Wylfa nuclear power station is located close to a bromine extraction plant.

2.7.2 Proposed Scope of Assessment

As part of the EIA process, a socio-economic desk based assessment will be undertaken. The assessment will include predictions of employment and financial benefits arising from the construction and operation of the project on the local, regional and national economy context. The assessment may also comprise the following steps :

Consultations

Consultees are likely to include principle suppliers, local port operators, local businesses, and representatives from the appropriate local authorities and other public agencies in order to establish :

- The potential range of activity to be supported by the development
- The potential for additional private sector investment and public sector top-up in the area as a result of the development (including potential for spin-off tourism activity)
- The potential level of direct and indirect employment arising from the construction and operational phases of the development.

Impact Assessment
The assessment will summarise the results of the consultations and place these into context with respect to the local, regional and national economies. The assessment would also summarise the extent of consultations performed by the developer to date and to provide some evidence of the public perception of the development at that stage.

2.7.3 Landscape and Seascape

Definitions of the word “seascape” commonly refer to “a scene prominently including a portion of the sea”. However a more complete definition in these circumstances includes the following :

- Views from land to sea
- Views from sea to land
- Views along the coastline
- The effect on landscape of the conjunction of the sea and the land

The effects on the visual environment will be considered within the EIA for the project however, unlike wind turbines, much of the structures are permanently submerged beneath the sea. The potential for effects on the visual environment, throughout the lifetime of the project, is provided by the following :

Construction Phase
- Presence of construction vessels and associated craft in the seascape
- Lighting of construction vessels (24 hour working)
- Temporary navigation lighting protocol during construction
- Cable burial works adjacent to shore, within the inter-tidal range
- Cable installation and onshore construction works

Operations Phase
- Size and colour of the units and height of superstructure visible above the waterline
- Permanent lighting protocol, during day and night
- Cumulative and in combination effects with other developments

Decommissioning Phase
- Presence of decommissioning vessels and associated craft in the seascape
- Lighting of decommissioning vessels (24 hour working)
- Temporary lighting protocol during decommissioning

The North Anglesey Heritage Coast runs along the northern shore of the Isle of Anglesey from Church Bay in the west to Dulas Bay in the east and is 18 miles in length.

Almost the whole coastline of Anglesey falls within the Area of Outstanding Natural Beauty (AONB).

Although the island is generally low-lying, it contains a great variety of landscapes. Low cliffs, alternating with coves, pebble beaches and tucked away villages, line its northern shores. The east coast’s sheer limestone cliffs, interspersed with fine sandy beaches, contrast with the south’s wilderness of sand dunes.

Varied habitats from marine heaths to mudflats, give the AONB a high level of marine, botanical and ornithological interest. The dunes of Newborough Warren are a noted example of this complex habitat and the island's limestone cliffs are an important nesting site for sea birds.

The area is popular with tourists. The island's long sandy beaches and intimate coves attract thousands of visitors each year. The opportunities that the island offers for water sports and sailing add to its attraction as a major tourist destination.

The AONB is also important for its history and archaeology, with two areas warranting inclusion in the Register of Landscapes of Outstanding Historic Interest in Wales. Penmon, a promontory in the southeast corner of the island shows a continuity of land use and occupation from the late prehistoric period to modern times, with a substantial number of important monuments. The area includes an Iron Age hillfort at Bwrdd Arthur, hut settlements and fields, early Christian monastic sites, mediaeval settlements, defensive and religious sites and Beaumaris Castle, which is a World Heritage Site.

The extensive coastal limestone and marble quarries are also of industrial archaeological interest.

The second area, on the north coast –Amlwch and Parys Mountain – is only partly in the AONB. However, it is of great interest as a quarried landscape from the 18th and 19th centuries, when it became the largest copper mine in the world. It is also of interest for the remains of an associated transport system, the port of Amlwch and ore processing works. (Countryside Council for Wales – www.ccw.gov.uk)

Scope of Assessment

Offshore Works

The seascape assessment would focus on visual impacts and a careful analysis of the recreational use of the study area, both on land and sea. The methodology would be guided by several publications, including:

- Seascape and Visual Impact Assessment Guidance for Offshore Wind Farm Developers – Department of Trade and Industry (2005)
- Guide to Best Practice in Seascape Assessment, Countryside Council for Wales (CCW), Brady Shipman Martin, University College Dublin, March 2001
- Guidelines for Landscape & Visual Impact Assessment, published by the Landscape Institute and Institute of Environmental Assessment (1995)

CCW has advised that, due to proximity of the development to the coast (i.e. 1-2 km) and the nature of the designated coast (AONB/Heritage coast), the EIA would have to fully address the visual impact of the development from the coast. As part of any EIA, the following work requirements would be considered necessary:

- A seascape assessment would be undertaken which will draw on established guidance produced organisations such as the Countryside Council for Wales and Scottish Natural Heritage;
- Consultation should be undertaken with the local planning authorities to determine areas of visual sensitivity and policy issues relating to landscape/seascape issues; and
- Photomontages and a Zone of Theoretical Visibility (ZTV) should supplement the seascape assessment where necessary.

Onshore works

Where new above ground infrastructure is envisaged, a landscape assessment will be considered particularly regarding views affected by a new substation building. Any new structure is likely to be relatively small in a scale an therefore it predicted impact and scope of any assessment undertaken in the context of the AONB setting will be discussed with the appropriate authorities.

If an LVA is required the methodology will be based on the following published guidance:

- Landscape Character Assessment: Guidance for England and Scotland (Countryside Agency and Scottish Natural Heritage 2002); and
- Guidelines for Landscape and Visual Impact Assessment, 2nd edition (The Landscape Institute and Institute of Environmental Assessment 2002).

2.7.4 Commercial Fisheries

Statutory guidance exists on the generic issues that need to be considered in relation to the potential impacts on commercial fisheries arising from offshore wind development (CEFAS, 2002). The development of the Skerries Tidal Stream Array can be viewed from a similar perspective and, therefore, has the potential to affect commercial fishing operations in a variety of ways :

- Creating a physical obstacle to fishermen employing certain fishing methods such as nets, trawls and dredges;
- Increased probability in seabed debris following construction and during operation;
- Reduction in access to the site, either through statutory exclusion or establishment of safety zones, with the potential for reduction in catches and loss of income;
- Increased navigational risk;
- Displacement of, or reduction in, fish and shellfish resources due to direct effects of the SeaGen unit or changes to habitat resource;
- Indirect effects arising from effect on spawning and nursery areas;
- Loss or damage to fishing gear;
- Temporary effects from anchor mounds;
- Adverse impacts on fish and shellfish populations that are commercially exploited.

The majority of registered fishing vessels in Wales are less than 10m-registered length. The largest section of the Welsh fleet is made up of vessels of between five and six meters.

The main concentrations of sea fishing vessels around Wales are found in Milford Haven in the South and Holyhead in the North, although fishing vessels can be found in small ports all round the Welsh coast. For the purpose of this report offshore vessels are those vessels over 10m-registered length and offshore waters are those outside 12 nautical miles.

On Anglesey, 12 vessels are registered with only 1 being over 10m length. At Holyhead 26 vessels are registered with 5 being over 10m length.

The inshore fleet uses mainly static gear such as gill nets and pots to target demersal finfish and crustaceans such as lobster and crab but small otter trawls are also used to target demersal species. Potting for crustaceans is important around the Welsh coast around Anglesey. A profitable whelk fishery has also grown up around the Welsh coast in recent years including Anglesey (Nautilus Consultants, 2000).

On Anglesey, Holyhead is the main port for fish landings. The Holyhead Fish Dock Environmental Statement to 31 Oct 2002 (www.ynysmon.gov.uk) indicates that the local fishing fleet has reduced considerably in the last few years from 15 vessels of under 10 metres to 2 vessels of this size, and from 7 vessels of between 10 and 20 metres to 3 vessels between 15 and 19 metres in length. The fishing still includes netting, long lining, potting and scallop dredging but no longer includes trawling. Catches are landed at Holyhead for local processing or transportation elsewhere in the UK and Europe. Visiting vessels continue to land sole, plaice and scallops for transportation to markets elsewhere in the UK, and now also land dogfish.

The DEFRA UK Sea Fisheries Statistics report for 2003 does not cover landings from Holyhead or Anglesey, however, raw data from DEFRA for Holyhead can be summarised as follows:

	Foreign vessels		UK Vessels		Total Qty (tonnes)	Total Value (£)
Species	Qty (tonnes)	Value (£)	Qty (tonnes)	Value (£)		
BASS			0.00	12	0.00	12
BRILL			0.99	2,339	0.99	2,339
COD			10.60	11,828	10.60	11,828
CONGER EELS			0.08	28	0.08	28
GURNARD AND LATCHET			2.65	1,978	2.65	1,978
HADDOCK			0.24	139	0.24	139
HAKE			0.03	42	0.03	42
JOHN DORY			0.58	1,049	0.58	1,049
LEMON SOLE			1.56	3,859	1.56	3,859
LING			0.10	25	0.10	25
LOBSTERS			0.10	970	0.10	970
MIXED DEMERSAL			0.12	176	0.12	176
MONKS OR ANGLERS			2.58	5,775	2.58	5,775
OCTOPUS			0.06	23	0.06	23
PLAICE			3.35	3,069	3.35	3,069
POLLACK			0.43	359	0.43	359
QUEEN SCALLOPS			144.93	54,226	144.93	54,226
RED MULLET			0.00	5	0.00	5
SAITHE			0.00	2	0.00	2
SCALLOPS			19.86	25,120	19.86	25,120
SKATES AND RAYS			30.50	26,192	30.50	26,192
SOLE			11.89	89,416	11.89	89,416
SPURDOG			45.15	51,922	45.15	51,922
SQUID			0.25	668	0.25	668
TOPE			0.44	402	0.44	402
TURBOT			0.46	2,727	0.46	2,727
WHELKS	0.32	186	1,478.27	821,576	1,478.59	821,762
WHITING			0.11	51	0.11	51

Table 14: Commercial landings by species from UK and foreign vessels into Holyhead in 2003 (Source DEFRA).

Recreational Fishing

The Anglesey coastline is littered with different types of sea bed; ranging from rocks & reefs, sand banks, mud flats and shingled areas, all this together with quickly accessible inshore wrecks (there are over 200 around the Anglesey coast), general angling opportunities around our coast are excellent. Fishing grounds include some of the most prolific in North Wales and charter boat angling at Anglesey is the highest in North Wales covering: - Holyhead Bay, Holyhead deeps, Trearddur bay, Victoria bank, Caernarfon Bay and the Irish Sea.

Species include Bass, Bream, Bull huss, Cod, Coalie, Conger, Dab, Dogfish, Flounder, Herring, Gurnard, Ling, Rays, Tope, Scad, Spurdog, Smoothound, Plaice, Pollack Pouting Mini species Wrasse - Ballan, Cuckoo, Corkwing & Goldsinny.

The local charter boat angling industry is estimated to be £0.75m at Anglesey (Nautilus Consultants, 2000).

2.7.5 Scope of Assessment

The recently published "*BWEA Recommendations for Fisheries Liaison*" will be used as the starting point for the commercial fisheries assessment.

It is vital that dialogue is initiated between MCT Ltd and the fisheries community as soon as possible, to seek to map more accurately the scale and extent of effort from the various fisheries, to attempt to mitigate potential impacts that might arise from the development, and to attempt to engage in a constructive and long term dialogue with the industry.

A fisheries activity study will be commissioned to support the EIA process. This will involve extensive consultation with skippers, vessel operators, merchants, representative bodies and local Sea Fisheries Committee(s) and DEFRA personnel in the region in order to gain up to date information on precise locations of fishing, seasonality of effort and key target species. A detailed assessment of the species landed, fishing activity and economic value of catches from within the site and adjacent areas will be undertaken. This will include the use of DEFRA fisheries surveillance information, DEFRA landings and fishing effort data for ICES sub-rectangles, DEFRA registered vessels lists, and consultation with fishing organisations and committees, including the North Wales and North West Sea Fisheries Committee.

The effects of the construction activity on the local fishery will be assessed, together with possible working methods to increase the safety to all concerned.

During the operational phase, the probability and associated environmental risks relating to a collision between a ship and the units within the tidal stream turbines will be assessed.

A study of in-combination effects with other developments will be performed through all stages of the development.

2.7.6 Commercial Navigation

The construction process, operational phase and decommissioning of the Skerries Tidal Stream Array could impact upon the safety of navigation in a number of ways, including :

- Direct interference / obstruction
- Indirect interference, and resulting increase in vessel density elsewhere
- Weather effects on safe navigation
- Impacts on communications, radar and positioning systems
- Access to and navigation around the units, this point being linked to the issue of Safety Zones
- In-combination effects with other developments

AIS data has been gathered to cover the Holyhead area and specifically the Skerries site, recording took place in March 2005, and the traffic plot is shown in Figure 10 below:

It can be seen that the majority of east/west traffic leaving and entering Holyhead does not affect Skerries, and that the traffic in the traffic separation scheme is several miles to the north of the site. Therefore the Skerries site appears to be located away from the busiest areas for commercial shipping in the area.

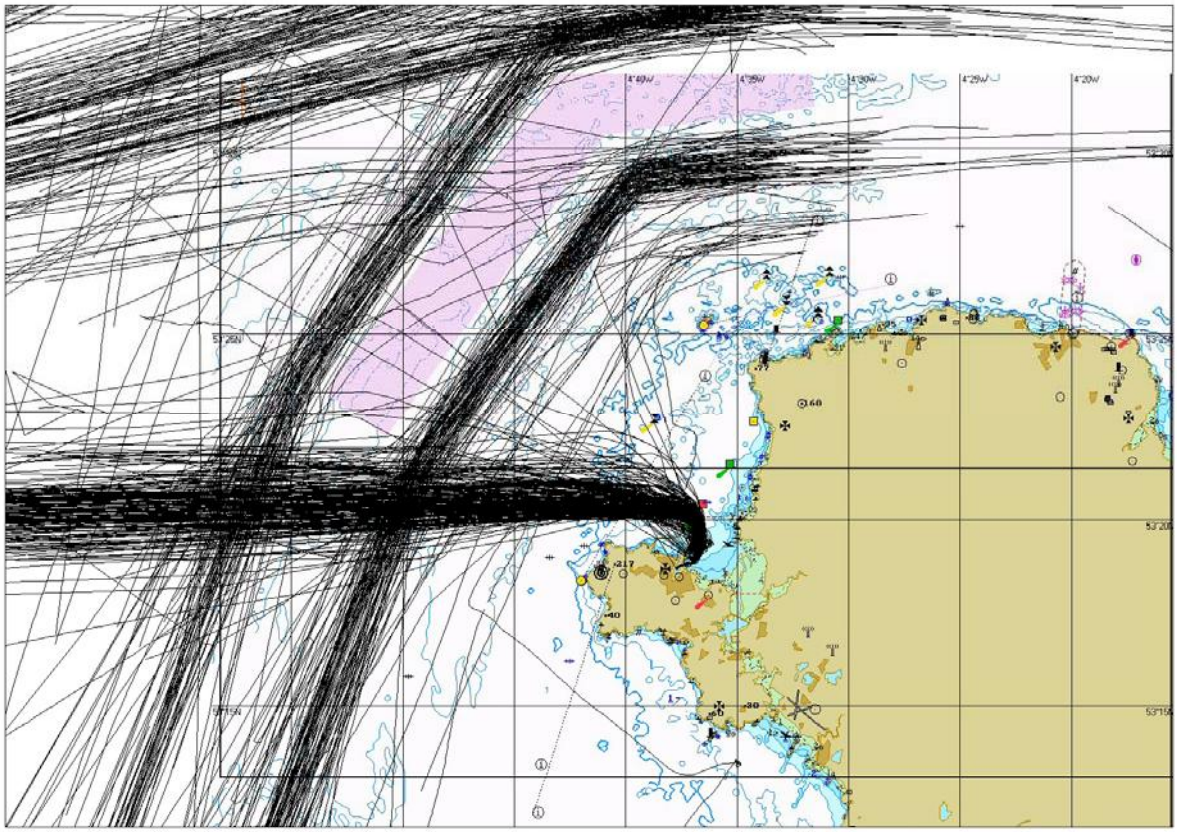

Figure 10 : Shipping Traffic (courtesy of Marico Marine)

2.7.7 Proposed Scope of Assessment

The guidelines issued by the Maritime and Coastguard Agency within Marine Guidance Note 275, and the guidance on the Methodology for Assessing the Marine Navigation Safety Risks of Offshore Wind Farms will form the basis for the assessment of the proposed development on navigational safety.

More specifically, the scope of the assessment will include :

- A detailed site-specific assessment of the existing traffic, which will be performed in accordance with the guidelines recently published by the Maritime and Coastguard Agency. This assessment will validate and update the shipping data where necessary based on consultation with relevant experts, such as local harbour masters, pilots, Ship Masters and Ship Operators. This will ensure the best available data is used to assess the navigational impact of the site and subsequent decision-making to minimise obstruction and danger to shipping.
- A request to local Port Authorities to analyse their ship radar archive.
- A Navigational Risk Assessment, again according to MCA guidelines. This involves assessing the base level of risk in the area (ship to ship collision and vessel grounding risks) and the additional risks as a result of the project being located in the area (change in ship to ship, collision, grounding risks and ship to turbine collision risks). Such an assessment will provide information on whether safety zones in or around the Array are necessary.
- An assessment of the potential of the Skerries Tidal Stream Array to interfere with communications, radar and positioning systems
- An assessment of the effects on marine recreation and amenity, following consultation with the Royal Yachting Association, local clubs and societies and the local councils.

- An unambiguous statement relating to the use of safety zones (if applicable) together with associated implications, for all phases of the project life
- A brief description of measures to be implemented during the construction and operation phases to ensure that the safety of navigation is given high priority
- A brief description of emergency response contingency plans
- A study of in-combination effects.

2.7.8 Archaeology and Cultural Heritage

It is acknowledged that the seas around Britain contain many archaeological sites and remains. Such sites reflect the changing nature of both the coastline around Britain and the activities of the country throughout previous centuries, and broadly include:

- Archaeological landscapes formed when parts of the UK seas were still dry land
- Remains and sites, including but not limited to shipwrecks, evidence of Britain's early history
- More recent sites, reflecting Britain's role as a major naval, mercantile, industrial and imperial power

The placement of foundations, cables and ancillary structures provide the potential for damage, either directly or indirectly, to sites of archaeological potential inside or in close proximity to the SeaGen unit, cable route, landfall or onshore infrastructure. Potential impacts may include :

- Damage to archaeological remains in or on the seabed arising from placement of foundations, cables
- De-stabilisation of sites through changed sedimentary regimes
- Damage to archaeological remains in the inter-tidal zone from excavations or cable installation
- Damage or contamination of archaeological remains at sea or on land from the disposal of spoil, use of chemicals/oils etc
- Damage to archaeological remains or their settings on land arising from cable installation or construction of electrical infrastructure

A search for wrecks, obstructions and war graves has been undertaken by the UK Hydrographic Office covering the following area:

Extents	Lat	Long
A	53° 26' 24''	4° 33' 39''
B	53° 26' 09''	4° 32' 36''
C	53° 23' 48''	4° 37' 30''
D	53° 23' 06''	4° 35' 12''

Table 15 : Wreck Site search extents

From the search, the following charted wrecks were found, as follows :

UKHO Ref No.	Latitude	Longitude	Vessel Name	Status
7310	53 25'.131 N	004 33'.569 W	GULF OF ST VINCENT	LIVE
7406	53 25'.065 N	004 33'.669 W	GILBERT THOMPSON	LIVE
7296	53 24'.315 N	004 34'.186 W	-	LIVE
7294	53 24'.065 N	004 34'.519 W	RENOWN	LIVE

Table 16 : UKHO Wrecks information in the area off the coast of Anglesey

2.7.9 Scope of Assessment

As part of the EIA process, an Archaeological Impact Assessment will be undertaken by an experienced consultant or contractor specialising in marine archaeology. The scope will follow the non-statutory *Code of Practice for Seabed Developers* (recently updated as Maritime Cultural Heritage & Seabed Development: JNAPC Code of Practice) produced by the Joint Nautical Archaeology Policy Committee, and, where applicable, following the following guidance and legislation :

- Planning Policy Guidance Note 16 "Archaeology and Planning"
- Protection of Wrecks Act 1973
- The Merchant Shipping Act 1979
- The Ancient Monuments and Archaeological Areas Act 1979
- Protection of Military Remains Act 1986

The assessment will adopt the following methodology sequence :

a) Desktop assessment of archaeological potential and significance.
This would involve consultation with CADW and the collation of existing documentary evidence from a variety of sources in order to predict the likely character and extent of archaeological remains at the site and inter-tidal region, to inform further fieldwork. Such an assessment would be undertaken for the onshore components of the development by a suitably qualified consultant / contractor.

b) Field assessment of archaeological potential and significance.
Such an assessment is likely to include :

- Interpretation of geophysical data by a qualified marine archaeologist, the results of this assessment being incorporated into the constraint map for the site layout
- Survey and interpretation of 10% of proposed grab samples, the total number of surveys being governed by ground conditions
- Archaeological-diver inspection of anomalies, if necessary
- Archaeological walk-over of the sites and routes of proposed onshore infrastructure

It should be noted that if any offshore wreck material is recovered, the developer will inform the Receiver of Wrecks under Section 236 of The Merchant Shipping Act 1995, and await further instruction.

c) Proposed measures for mitigating impact.
An assessment of potential mitigation measures will be undertaken during the design phase in order to reduce the predicted impacts. The range of potential mitigation measures includes avoidance, re-positioning of components or adoption of specific construction techniques to reduce impact.

This section of the assessment will also briefly describe the management practices which will be developed for the construction phases of the project, both onshore and offshore, to reduce any effects on the known and unforeseen archaeology. Such practices would include surveying, reporting, auditing and implementation of contingency plans.

Onshore Works

As part of the EIA process, an Archaeological Impact Assessment will be undertaken by an experienced an IFA Registered Archaeological Organisation. The scope will follow the guidance set out in accordance with the *Standard and Guidance for Archaeological Desk-Based Assessments* issued by the Institute of Field Archaeologists (IFA) in 1999, and, where applicable, following the following guidance and legislation :

- Planning Policy Guidance Note 16 "Archaeology and Planning"
- The Ancient Monuments and Archaeological Areas Act 1979

The desk based assessment will include the examination of existing written, cartographic, pictorial and technical information to assess the character, extent, significance and vulnerability of the archaeological resource within the survey area. The desk based search will include the following:

- Search of County Sites and Monuments Record and National Monuments Record for information on known sites within, and around, the survey area.
- Search of cartographic sources held in national and county records offices and other repositories for archaeological information.
- Examination of aerial photographic coverage.
- Research of published sources such as local histories.

The assessment will form an appraisal of the archaeological resource within the survey area, and to assess their character, extent, significance and vulnerability. Any mitigation measures will be presented including the need for further archaeological investigation to fully assess their character, extent, significance and vulnerability, or the establishment of avoidance measures.

2.7.10 Noise

Noise emissions during the construction and operational phase of the SeaGen array, both airborne and within the water column, are likely to occur.

The effects during the construction phase, predominantly as a result of piling operations (if this option is used) or pile socket drilling, inter-tidal and onshore works, have the potential to be audible at the shore, and the effects within the water column could be more acute. Noise during the operational phase will be low and will be limited to turbine operational noise, and activities arising from remedial works should any be required.

2.7.11 Scope of Assessment

The requirement for a baseline airborne noise survey will be determined following discussion with the Local Authority Environmental Health Officer. Any existing information on subsea noise from relevant COWRIE drilling records or from operational noise of the Seaflow device will be included within the assessment.

If piling is not being considered, a background noise survey may not be required.

The noise levels for the construction, operational and decommissioning phases, both underwater and airborne, will be predicted using industry standard techniques, and the spatial and temporal effects will be assessed. Sources of noise will include :

- General construction activity
- Piling/Pile drilling –using monitored data from previous marine projects
- Load-out
- Beach works
- Onshore works (potential sheet piling etc)
- Turbine operation – using warranted noise levels and industry standard prediction techniques

Underwater noise monitoring will be undertaken by Subacoustech Limited for the forthcoming SeaGen at Strangford Lough during operation. The results of this monitoring will be used to inform predicted levels of noise in the South Stack ES.

Such noise predictions will inform other parts of the EIA process, notably :

- Marine Mammals
- Fish
- Commercial fisheries
- Marine Recreation and Amenity

Mitigation measures and noise management techniques will be incorporated into the construction phase of the project, and these will be described in the Environmental Statement.

2.7.12 Traffic

There will be temporary minor increases in traffic (road, rail and sea) resulting from the transportation of materials and equipment to the development location, particularly during construction and decommissioning of the project. It is anticipated that the main traffic movements will be marine based.

2.7.13 Scope of Assessment

The existing traffic infrastructure and road network will be investigated. The levels of land-based traffic will be established for the construction, operations and decommissioning phases of the project. The traffic for the operations phase will include an estimate of the traffic requirements for planned maintenance.

2.7.14 Marine Recreation and Amenity

The construction process, operational phase and decommissioning of the SeaGen Array could impact upon marine recreation and amenity in a number of ways, including :

- Direct interference / obstruction
- Indirect interference, and resulting increase in vessel density elsewhere
- Weather effects on safe navigation
- Impacts on communications, radar and positioning systems
- Access and navigation within and past the project, this being linked to the issue of Safety Zones
- In-combination effects with other developments

The Anglesey coastline is home to six RYA registered sailing clubs within proximity of the proposal area. They are as follows:

- Indefatigable S.T.C
- Menai Bridge Boat Club
  North West Venturers Yacht Club
- Rhosneigr Boatowners Sailing Club
- Royal Anglesey Yacht Club
- Traeth Coch Sailing Club

Discussion was held with the Royal Yachting Association about the Skerries site. RYA had also consulted with the Welsh Yachting Association on the proposal. RYA confirmed that Anglesey was perhaps the busiest area for leisure boating in Wales, with transit routes to the Isle of Man, Ireland and Northern England, as well as many well established clubs.

The points raised by RYA on this project include the following :

- Holyhead is one of the few major ports that yachts can get into
- Holyhead is a stopping point for sailors to and from Anglesey to Ireland, the Isle of Man, Conwy
- There is a large yacht club at Holyhead
- Vessels do sail through this area and use the area for day sailing and as a picnic area where they can get out of the tide in the bays. The tidal stream array should make sure that access to the Skerries is not compromised
- Day sailing should be explored in more detail – do people cross tide at slack water – could also be when turbines are stationary/ not powered – how long is the access period ?
- A passage should be designed through the tidal stream, buoyed from south to north

2.7.15 Scope of Assessment

The key to minimising impacts on recreational use is the sensitive siting of infrastructure and good consultation and promulgation of information.

It is essential that all local clubs, societies, emergency services are aware of the project from an early stage, and MCT will engage with such organisations. It is proposed that the RYA be the central point of contact with affiliated clubs, and the point of reference for offshore racing societies, cruising clubs etc.

The RYA believes that the threat to recreational yachts can be minimised by addressing navigational hazards through appropriate warnings and markings in accordance with Trinity House protocol and to engage with the yachting community directly.

The effects of the project on recreational angling will be assessed.

An assessment of the cumulative effects of the project and other relevant projects will also be performed.

2.7.16 Military and Civil Aviation, and Other Military Usage

There are no known military, civil aviation or other military uses in the vicinity of the study area.

2.7.17 Scope of Assessment

The assessment of abandoned munitions will be an extension of the marine archaeology assessment. It is intended that the interpretation of geophysical data from within and around the site will be analysed for signs of potential abandoned munitions. Should there be any suspicion about any particular remains, the developer will contact MoD, Receiver of Wreck, and English Heritage, and await further instruction.

In addition, an assessment of the likely impact of the development on abandoned munitions will be stated, together with a contingency procedure to be effected in the event of unforeseen munitions during the construction and operation phases of the development.

2.8 Relevant Projects and Studies

2.8.1 Offshore Wind Farms

There are no proposed offshore wind farms in the vicinity of the proposed SeaGen Array. The proposed Gwynt-y-Mor Offshore Wind Farm is the only planned offshore wind farm in the region and is located over 60km to the east in Liverpool Bay. It will comprise over 200 wind turbines turbines and be located some 13km offshore from Denbighshire.

2.8.2 Marine Renewable Energy

MCT is proposing another tidal stream array in the vicinity of the South Stack, Holy Island. A cumulative impact assessment for these two projects will be undertaken.

2.8.3 Marine Aggregate Extraction

There are no aggregate extraction licences operating in the area.

2.8.4 Offshore Oil and Gas

There are no operating offshore oil and gas interests in the area. There is a proposal for a LNG facility at Amlych, with associated jetties, which will be taken into account in cumulative impact assessments.

2.8.5 Marine Disposal and Dumping of Dredged Material

The dumping of waste at sea, as opposed to discharge into the sea via outfalls, along with the use of materials during coastal defence works or construction works is controlled by means of licenses issued under Part IIA of FEPA. Licences are granted by the National Assembly for Wales. Scientists from CEFAS recommend license conditions and undertake visits to construction sites, treatment works, disposal vessels and storage facilities to ensure compliance.

Marine renewable devices have the potential to indirectly cause the release of such disposed materials through coastal processes effects, and as such, assessment of the effect on waste disposal sites is necessary.

There are no disposal areas in the vicinity of the proposal area. However, there are four extant marine dredging disposal sites in the region of the proposal area, IS040 Holyhead Deep, IS041 Holyhead South IS042 Holyhead East and IS050 point Lynas.

Year	ISO40		ISO42	ISO50
	CD	MD	CD	MD
1985		8,520		
1986		3,050		
1987		15,800		398,989
1988		8,800		171,465
1989		0		45,543
1990		0		
1991		0	10,400	
1992		3,500	0	
1993	0	34,800		0
1994	24,000	42,000		0
1995	451,129	0		
1996	0	0		
1997		0		
1998		34,350		
1999		11,290		
2000	218,162	39,353		0
2001	0	0		
2002	270,377	0		
2003	0	0		

Table 17 : Marine Dredge Disposal Sites

Scope of Assessment

Consultation with CEFAS will provide a valuable insight into the existing and previous licensed areas for the disposal of marine waste. The results of the coastal processes assessment will be interpreted and any effects on disposal sites will be assessed.

2.8.6 Subsea Cables and Pipelines

Based on The Admiralty Chart (Wales Anglesey: Approaches to Holyhead, 1413) there are no known subsea cables or pipelines within the proposal area.

3 References

Admiralty Chart (1413). Approaches to Holyhead. UKHO

ABPmer (2004) Atlas of UK Marine Renewable Energy Resources: Technical Report. A Strategic Environmental Assessment Report. DTI Report in assoc. with ABPmer, Met Office, Garrad Hassan, Proudman Oceanographic Laboratory.

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CCW (2005) Personal Communication

CEFAS (1998) Fisheries sensitivity Maps in British Waters. Edition 1.

Coull, K.A., Johnstone, R., and S.I. Rogers. 1998. Fisheries Sensitivity Maps in British Waters. Published and distributed by UKOOA Ltd.

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HMSO : Environmental Assessment: A Guide to the Procedures, 1998.

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Jones, N.H., Shucksmith, R, Dicks, E.F. & Stoyle G.W (2005) Abundance and Distribution of Harbour Porpoise (Phocaena phocaena) in North Anglesey waters determined from 2002, 2003 & 2004 boat-based surveys. Marine Awareness North Wales report commissioined by CCW (CC SCF Report 04/01/02).

Marine Current Turbines (2006), Feasibility Study and Identification of Flagship Tidal Stream Projects in Welsh WatersNautilus Consultants (2000) Study Into Inland and Sea Fisbheries in Wales. Final Report, Prepared for National Assembley for Wales

Westcott, S.M. & Stringell, T.B. (2004) Grey seal distribution and abundance in North Wales, 2002-2003. CCW Marine Monitoring Report No: 13.

www.anglesey-today.com

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www.goodbeachguide.co.uk

www.jncc.co.uk

www.lgdu-wales.gov.uk

www.marine.gov.uk

www.saveourseas.co.uk

APPENDIX 1 – Recipients of the EIA Scoping Report

Department of Trade and Industry	Ynys Mon County Council
Department of Environment, Food and Rural Affairs – Marine Consents and Environment Unit	Cylch-y-Garn Community Council
Department for Culture, Media and Sport	Energy Wales
The Crown Estate	Marine Awareness North Wales
Countryside Council for Wales	Marine Conservation Society
CEFAS	Greenpeace
Welsh Assembly Government	Friends of the Earth
Environment Agency Wales	Royal Society for the Protection of Birds
MoD Defence Estates	Royal Yachting Association
Directorate of Airspace Policy	Welsh Yachting Association
National Air Traffic Service	Royal National Lifeboat Institution
CADW	Royal Ocean Racing Club
Port of Holyhead	Council for the Protection of Rural Wales
Chamber of Shipping	Wildlife and Wetlands Trust
Maritime and Coastguard Agency	British Sub Aqua Club
Trinity House Lighthouse Service	Sea Mammal Research Unit
UK Hydrographic Office	Whale and Dolphin Conservation Society
Receiver of Wreck	Association of Sea Fisheries Committees of England and Wales
DEFRA Sea Fisheries Inspectorate	Tref Alaw Community Council
National Federation of Fishermen's Organisations	Llanfachraeth Community Council
National Federation of Sea Anglers	Llannerch-y-Medd Community Council
Llanbradig Community Council	Mechel Community Council
Llanfaethlu Community Council	

APPENDIX 2 – Structure of the Environmental Statement

Skerries Tidal Stream Array
Environmental Statement

Volume 1 : Non Technical Summary
Volume 2: Text
Volume 3: Drawings and Figures

Volume 2

1 Introduction
- 1.1 The Proposed Development
- 1.2 The Developer
- 1.3 The Project
- 1.4 Statutory Consents and Permissions
- 1.5 Need for the Project
- 1.6 Effects of Climate Change
- 1.7 Emissions Offset
- 1.8 Project Team

2 Environmental Impact Assessment
- 2.1 EIA Process
- 2.2 Terminology
- 2.3 Strategic Environmental Assessment
- 2.4 Regualtory Context
- 2.5 Impact Assessment Methodology
- 2.6 Best Practice
- 2.7 Structure of the Environmental Statement
- 2.8 Technical Reports

3 Scoping
- 3.1 Introduction
- 3.2 Project Scoping
- 3.3 Consultation during Scoping
- 3.4 Summary of Scoping Responses
- 3.5 Scoping of Cumulative and In-Combination Effects

4 Consultation
- 4.1 Introduction
- 4.2 Methods of Communication
- 4.3 Project Briefing
- 4.4 Public Consultation
- 4.5 Consultation Register

5 Regulatory and Policy Context
- 5.1 Statutory Consents and Permissions
- 5.2 Requirement for Environmental Impact Assessment
- 5.3 Marine Energy in the UK
- 5.4 Summary of Regulation and Policy
- 5.5 Conclusion

6 Description of the Project

10 **Assessment of Environment Impacts**
- 10.1 Physical Environment (sub-sections as above)
- 10.2 Biological Environment (sub-sections as above)
- 10.3 Human Environment (sub-sections as above)
- 10.4 Cumulative and in-combination Effects

11 **Mitigation Measures**
- 10.1 Physical Environment (sub-sections as above)
- 10.2 Biological Environment (sub-sections as above)
- 10.3 Human Environment (sub-sections as above)

12 **Monitoring**
- 10.1 Physical Environment (sub-sections as above)
- 10.2 Biological Environment (sub-sections as above)
- 10.3 Human Environment (sub-sections as above)

13 **Conclusions**
- 10.1 Physical Environment (sub-sections as above)
- 10.2 Biological Environment (sub-sections as above)
- 10.3 Human Environment (sub-sections as above)

Department of Trade and Industry
In association with the
Marine Consents & Environment Unit*

dti

Department of Trade & Industry
Energy Group

Bay 2117
1 Victoria Street
London SW1H 0ET

Tel +44 (0)20 7215 0478
Fax +44 (0)20 7215 2601
Enquiries +44 (0)20 7215 5000

Minicom +44 (0)20 7215 6740

www.dti.gov.uk
www.mceu.gov.uk

Jamie May
Environmental Manager
PMSS Ltd
Tramshed Business Centre
Beehive Yard
Walcot Street
Bath
BA1 5BD

13 September 2006

Dear Jamie

Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 200: The Skerries Tidal Stream Array - Scope of the Environmental Statement

I refer to your letter of 12 July 2006 requesting a scoping opinion under regulation 7 of the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 enclosing a scoping report dated July 2006 (REV3). The scoping report sets out the information that you intend to provide in the Environmental Statement (ES) required in respect of the necessary consent application under section 36 of the Electricity Act 1989 and a licence under the Food and Environment Protection Act 1985. Whilst separate consents maybe envisaged under the Town and Country Planning Act 1990 in respect of the onshore aspects of the project it is recommended that all these elements should be covered by a single ES.

It is understood that the proposed development will comprise seven tidal stream generation units, located off West Anglesey. The array will be located in 20 - 40m water depth located in the Sound between the group of rocks and islands known as the Skerries and Carmel Head on mainland Anglesey, less than 1km from the coast.

The proposed development will include seven twin rotor devices consisting of a central monopole with two 18-20m diameter rotors. In addition, the proposed development proposes the installation of offshore infrastructure including, inter-array and export cables; ancillary onshore and intertidal works. It is anticipated that a new subsea cable will bring generated electricity ashore, however, the landfall location has yet to be decided subject to feasibility studies undertaken by SP Power Systems (Manweb). The total capacity of the proposed is 10MW.

* MCEU is a joint Unit of the Department for the Environment, Food & Rural Affairs and the Welsh Assembly Government responsible for administering marine works consents for which each has responsibility.

3 The Secretary of State has considered your request for an opinion on the proposed content of the ES in accordance with regulations. In formulating this opinion, he has consulted with the Countryside Council for Wales, Holyhead Port, Trinity House Lighthouse Services and the Welsh Assembly Government. Scoping responses from the Maritime and Coastguard Agency, Environment Agenvcy Wales and Anglesey County Council have been sought but not yet received. Once comments from these organisations have been received, they will be forwarded as an addendum to this scoping opinion.

General points on the scoping report

4 Please note that the EIA process is vital in generating an understanding of the biological and physical processes that operate in the area and may be impacted by the proposed Skerries Tidal Stream development. We would however state that references made within the scoping document with regard to the significance of impacts should not prejudice the outcome of the EIA process.

5 It is important that any development of renewable energy sources should be accompanied by a robust assessment of its environmental impacts. The assessment should also consider how any negative environmental impacts could be avoided or minimised, through the use of mitigating technologies or regulatory safeguards, so that the quality and diversity of Britain's wildlife and natural features are maintained and enhanced. We welcome the commitment given in the report that the EIA process will identify mitigation measures in order to avoid, minimise or reduce any adverse impacts. We would suggest that the range of options considered should not be unduly constrained at this stage, and that detailed design and construction proposals should be informed by the EIA process in order that these objectives can be achieved. Consultation with the relevant nature conservation agencies is essential and it is advised that this is undertaken as appropriate.

Scoping Opinion

6 The Secretary of State considers that the key issues, which have been identified in the scoping report should properly be included in an ES in respect to the consent applications. In addition, it is considered that other matters mentioned in paragraphs 8 to 86 below should also be covered. It is appreciated that you may have already intended to include many of these additional matters in the ES.

7 Some comments are based on general observations and advice. In addition, a majority of comments are directly referenced to particular sections of the scoping report. All comments are detailed under specific topic headings.

Content of an ES

8 A tabular form of the potential environmental impacts and development activities should be used to summarise the scoping exercise, such as a matrix table. It is not unusual for an ES to omit information on impact significance criteria. Criteria used to establish impact magnitude and significance should be clearly defined. Tabular presentation should be used to summarise key direct and indirect impacts. Within an ES it is important that all mitigating measures should be:

- clearly stated;
- fully described with accuracy;
- assessed for their environmental effects;
- assessed for their effectiveness;
- their implementation should be fully described;
- how commitments will be monitored; and

- if necessary, how they relate to any consents or conditions.

Background information

9. ***Recipients of the scoping document***. It has been noted that the document has been sent to the National Federation of Sea Anglers, which is an English Governing body for Angling and The National Federation of Fishermen's Organisations which again is mainly an English Body. It is recommended that the Welsh Federation of Sea Anglers, which is the governing body for anglers in Wales should be consulted, as should the Welsh Federation of Fisherman's Associations Ltd which represent commercial fishermen in Wales.

10. ***Proposed development*** [page 5] **–** Somewhere in the ES it will be necessary to explain what influenced final site selection for the tidal energy device and in particular which other site alternatives where considered. As this demonstrator will be building on experience gained from other prototypes, it will be important to cover what lessons have been learnt from deployment of that prototype. Care will need to be taken when extrapolating the findings of monitoring from single devices to the proposed array and from monitoring undertaken for common seals, grey seals and cetaceans.

11. ***Need for the development*** [Section 1.3, page 7] - An ecosystem-based approach to managing activities in the marine environment is paramount. This should be underpinned by six key principles – Sustainable Development, Integrated Management, Conservation of Biodiversity, robust science, the Precautionary Principle and Stakeholder Involvement. Consideration of these principles must be clearly visible within the ES. More specifically, the National Assembly for Wales has a legal commitment to promote Sustainable Development as part of the Government of Wales Act (1999). The contractors should be asked to make sure that this overarching approach is fully accommodated as the process moves on.

    A note should also be included on the UK Government present Energy Policy documents; the Energy Review Consultation Document: 'Our Energy Challenge – Securing clean, affordable energy for the long-term', published 23 January 2006.

    Reference should also be made to the European Union Habitats and Birds Directive, which the developer will have to adhere to. They will need to ensure that any marine work complies with the European Union Habitats and Birds Directive

12. ***Clean Energy Generation and Electricity Supply*** [Section 1.5, page 9] - Section 1.5 refers to PPG 22, which is policy guidance in England and not applicable in Wales. The relevant documents here are Planning Policy Wales and TAN 8 and will need to be taken into consideration by the applicant.

    There are two sets of calculations within the reports that require further explanation:

    i) Annual net outputs: South Stack 19.6GWh/year; Skerries 30.6GWh/year. Difference in capacity factors (16% vs. 25%) despite both projects having the same number of turbines and the same installed capacity (10MW)

ii) Calculation of 'equivalent number of homes supplied' in Skerries Report (p. 10)

For both of the above, a thorough explanation of the calculations used to achieve the given results must be included in the EIA in order to minimise the possibility of confusion.

13. ***Quality of figures***. The quality of figures, particularly the maps has made interpretation difficult and for the purposes of the ES any maps and figures should be clearly presented.

14. ***25-year demonstrator project and choice of site*** [page 5] – The ES will need to be a very robust document designed to assess impacts on a commercial scale and the overall lifetime of the array.

    Though the recent DTI guidance (Guidance on consenting arrangements in England and Wales for a pre-commercial demonstration phase for wave and tidal stream energy devices - November 2005) did not actively encourage developers to avoid sites of high environmental sensitivity, it did make it clear that "consenting costs in areas of environmental sensitivity may be high". In addition the guidance states "projects will only be required to provide levels of data for EIA and Habitats Regulations, as applicable, that are proportionate to the perceived risk and scale of adverse impacts". It is our view that sensitive locations will have a higher level of risk of damage and therefore the EIA for proposals in these locations will need to be robust in this context also.

15. ***Table 6*** [page 12] – It has been assumed that the tidal data is in m/s, but there is no indication of the units.

16. ***Rochdale principle*** [Section 1.8, page 13] – Though the use of the Rochdale Principle is welcomed, where '*impact assessments will relate to the option giving rise to the largest potential impact*', any application for approval that went beyond the parameters of the ES would be unlawful, as the possible environmental effects would not have been assessed prior to approval. Therefore, it is recommended that all options are covered, outlining the advantages and disadvantages of <u>all</u> options, and then making a final selection based on environmental best practice/option (including device configuration, installation methods, cable route etc.).

17. ***Cumulative issues.*** Cumulative effects are likely to be significant in a busy area like this and the EIA will need to address the implications that additional activities in the area will have on environmental resources e.g. bird displacement. In addition, the cumulative impacts of the other proposed tidal stream array in the vicinity of the Skerries must also be accounted for.

18. ***Monitoring.*** Detailed information on the monitoring that is proposed, should this development proceed, must be included within the ES. The monitoring package will need to cover the period before and during construction, operation and decommissioning. There is a need to make the most of any opportunities so that lessons can be learned from pre-commercial deployments of devices prior to any commercial scale deployments. Key to this will be the understanding of the interaction between the devices and marine mammals and how the tidal flows behave in the lea of the structures. In addition we suggest that the developer should investigate the possibility of working with other projects to maximise the

usefulness of their monitoring work for example through DTI's Research Advisory group.

19. ***Mitigation procedures.*** For the purposes of the ES, any mitigation measures proposed should be detailed and include the potential residual impacts.

Installation and maintenance of device

20. ***Configuration of tidal devices*** [page 11 and 13] – For the purposes of the ES, configuration of the tidal devices will need to be finalised subject to a detailed site survey.

21. ***Device components*** [Section 1.8, page 13] – Although the device components will not be procured until a later date, the developer should have some idea of components needed/installation procedures required and possible alternatives to these. It should be noted that any subsequent components procured after ES is submitted would be subject to further environmental assessment. See point 12.

22. ***Jack-up barge requirement*** [Section 1.8.2, page 14] – Though temporary in nature, for the purposes of the ES, the barge footprint of each monopole installation would need to be accounted for with respect to potential benthic and sediment disturbance.

23. ***Drill solution*** [Section 1.8.3, page 14] – For the purposes of the ES, the cuttings disposal option must be described and potential environmental impacts assessed, taking into account quantity, quality, persistence and dispersion characteristics (which may require modeling). Finalisation of disposal site is also necessary. Any requirement for disposal of offshore arising from construction would require consent under FEPA.

24. It has been noted that only seawater will be used to aid the drilling process, eliminating any drilling fluid contaminants.

25. ***Corrosion protection*** [section 1.8.4, page 15] – It will be necessary to include information on the likely life span of anodes and how regularly these would need to be replaced. In addition it will be necessary to consider whether there is any evidence to demonstrate any potential long-term impacts and whether any impacts would be significant.

26. **Sc*our protection*** [page 15] – In view of the uncertainty, for the purposes of the ES, a final decision and sufficient information (i.e. quantity, type, area of coverage) should be available at the ES stage to determine whether scour protection is necessary. For the purposes of the ES, implementation and potential impacts should be fully described.

27. ***Subsea cables*** [Section 1.8.6, page 16] – MCT need to be careful not to make presumptive conclusions at this stage (para. 5). The environmental integrity of the cabling with respect to the overall project is critical to the success of the development, especially in light of high tidal velocities. Careful and robust consideration of cabling installation options is paramount. All options should be considered, including the use of frond mats, construction methods and access to site.

28. ***Landfall option*** [page 16-17] – Within the ES, the developer will need to detail the 'best' landfall option in terms of related environmental sensitivity and designated sites and describe environmental impacts of each option considered to demonstrate an informed choice. Terrestrially, the proposed landfall option appears to route through high quality maritime heath (Annex 1 habitat) within the Holy Island Coast SAC. MCT Ltd. should be aware that recent works by Dwr Cymru took a pipeline along a similar route using directional drilling techniques from outside the site.

    Depending on the proposed routing of the cable, the EIA may need to consider any potential impact on the following SSSI's; Carmel Head SSSI, Cemlyn Bay SSSI and Henborth SSSI.

29. In addition, it is essential that any Shoreline Management Plans (SMP) be taken into consideration and that any stabilisation works associated with the landfall should not conflict with SMP policy.

30. ***Access to site*** [Section 1.9.1, page 17] – The conclusions in paragraph 1 seem to be presumptive. For the purposes of the ES seasonal restrictions need to be detailed and all options need to be assessed.

    Further consideration to security/safety needs to be given within the ES. The structure, if built, is likely to arouse public interest and collisions whether by accident or design will need to be considered. Also the monitoring of an exclusion zone, if any, should be included.

    Given the relatively new nature of the technology, monitoring in the first year should be more comprehensive. Inspection of turbine house, perimeter wall, electrical equipment, turbine and generator seals, lubricants, mechanical clearances, cable fall out switchgear and control/relay equipment should be done quarterly for the first year, or until a reasonable time has passed where the technology can be deemed to have demonstrated its viability.

31. ***Discharges of solids*** [Section 1.9.4, page 18] – The scoping document states, "*There are no anticipated solid discharges into the marine environment during the construction phase*". Section 2.1.1 seems to contradict this statement with respect to the disposal of arisings.

32. ***FEPA license***. Anything that disturbs the seabed in the area of the proposed project will require a FEPA license, including the disposal of arising from the construction phase.

33. ***Environmental Management System (EMS)*** [Section 1.9.4, page 18 and Section 1.10.4, page 20] – The Secretary of State welcomes the implementation of an EMS and associated activity management plans. Please consult with CCW and the DTI in the preparation of this document and clarification of the following points within the ES would be beneficial:
    - MCT Ltd. need to demonstrate how the EMS and compliance with contractors will be met;
    - How will EMS commitments be acted upon/communicated to contractors;

    For the purposes of the ES a list of all commitments and those responsible for action should be included.

34. ***Device testing*** [Section 1.10, page 18] – For the purposes of the ES a more detailed description of the tests, characterisation, validation, and optimisation phases should be included.

35. ***Inspection and maintenance*** [Section 1.10.3, page 19] – The scoping report adequately addresses these issues, however, an estimation of timings of maintenance categories would be useful, especially with respect to navigational implications. This should include estimates of the number and routes and methods of unplanned maintenance visits and the assessment of these with respect to potential disturbance impacts on birds and seals.

Decommissioning [Section 1.11.1, page 20] – the DTI has recently consulted on guidance for offshore renewables developers to implement the framework provisions on decommissioning set out in the Energy Act 2004. MCT should make themselves aware of this guidance once it is in the public domain (end 2006) and take account of its provisions. The guidance will take account of both national and international obligations for decommissioning energy installations.

Decommissioning will also have to adhere to Wales' waste strategy: Wise about Waste – Waste Strategy for Wales – June 2002.

Physical Environment

36. ***Research on energy extraction*** [Section 2.1.6, page 26] - The ABPmer work commissioned by CCW referred to in the scoping document has now finished and the report is available[1]. Copies have been provided to PMSS Ltd. The report identifies a number of habitats and species, which are likely to be intolerant of any reduction in energy in the environment for example resulting from the extraction of energy by renewable energy devices.

The Secretary of State disagrees with the statement in the scoping report (page 27) that the concerns that energy extraction would affect coastal processes are now largely unsupported. However we would say that the ABPmer work has looked at the foot print of energy reduction for tidal stream devices and concluded that it is likely to remain within a few hundreds meters of the device. We advise that the results of this work should be reviewed in the development EIA in the context of the proposed development site and proposals particularly with respect of the scaling up from individual devices to arrays and the distance from the coast and important species and habitats which have been identified as being intolerant or sensitive to energy reduction.

In addition, the following publications may also be useful with respect to research on energy extraction and the environmental implications such extraction may have. [2]

[1] ABPmer (2006). The Potential Nature Conservation Impacts of Wave and Tidal Energy Extraction by Marine Renewable Developments. CCW Policy Research Report 06/7.

[2] Black & Veatch (2005) UK, Europe and Global Tidal Stream Energy Resource Assessment. Commissioned by the Carbon Trust. Report No. 107799/D/2100/05/1

Bryden, I.G., Grinsted, T., and Melville, G.T (2005) Assessing the potential of a simple tidal channel to deliver useful energy. *Applied Ocean Research*. Vol 26, *pp*. 198-204

37. ***Additional effects of operations phase*** [Section 2.1.1, page 22] – For the purposes of the ES, MCT Ltd. may need to include additional effects, such as:

    - potential water column disturbances caused by the vorticity effects of the rotor blade;
    - potential liquefaction due to excessive vibration of the monopiles.

38. ***Proposed scope of assessment of potential hydrodynamic and sedimentation effects*** [Section 2.1.6, page 26] – Generally, the scoping report comprehensively details the assessment needs with respect to potential changes in hydrodynamics and sedimentation on both a localised and wider-scale level.

39. ***Computer modelling***. – MCT Ltd., should be aware that whilst computer modelling is welcome for the purposes of the ES, it must be stressed that validation of such modelling is essential and should include confidence limits, errors and any other shortcomings. It will be important to undertake an assessment of the impacts associated with potential wave and tidal effects caused by the presence of the device. In this context long-term wave and current records of the site would be essential.

40. As scour may be an issue within the location, swathe-bathymetry and side-scan sonar of the site and cable route would be required.

41. ***Onshore works*** [Section 1.8.7, page 16] – As stated in the scoping report, the implications of landfall and security of flood risk will be addressed in the ES. In addition to engineering and foundation design considerations, possible effects on hard and soft 'natural' defences that may need to be negotiated in order to lay cables should also be assessed.

42. It is recommended that any new 'on-shore' buildings should be located out-with the tidal flood risk area, or if linking into the existing substation, should be designed so as to remain operational during a 1 in 200 Year Tidal Level scenario, should the existing substation be within the flood risk area.

43. In addition, an allowance for the effect of sea level rise for the lifetime of the project should also be incorporated. Failure to do so may jeopardise power distribution if the 'on-shore' link were placed out of action in the event of tidal inundation.

44. It is recommended that Technical Advice Note (TAN) 15 – "Development and Flood Risk" be referred to in conjunction with the relevant section in Planning Policy Wales.

45. Consultation is required with CCW prior to conducting any geotechnical surveying across an SSSI or any other designated site.

Ecological Environment

46. ***Designated Sites*** [Section 2.2.1, page 27] – It is helpful that 'designated sites' have been drawn together in one section. However, for the purposes of the ES, it would be helpful to detail distances of designated sites from proposed project area both in tabular and graphic format.

Please note there is a non-statutory Regionally Important Geological and geomorphological Site (RIGS) site between Porth Namarch and the breakwater.

Please be aware that CCW can provide information on the designated sites in the vicinity of the development and their conservation objectives. The conservation objectives are the nature conservation aspirations for the site, and essentially seek to ensure the maintenance (or restoration) of the habitats and/or species populations for which the site is designated at a favourable conservation status. The EIA should concentrate on impacts on marine and coastal sites and those adjacent to the cable route.

Bae Cemlyn / Cemlyn Bay Special Area of Conservation (SAC) is missing from the table.

47. ***Biodiversity Action Plan (BAP)***. The scoping document does not include details of Biodiversity Action Plan (BAP) species or habitats which will be covered in the EIA. Information on UK BAP habitats and species and their associated UK targets can be found on the UK BAP website www.ukbap.org.uk and details of the locations of these can be found in the CCW contract science report number 5091. Of particular concern are the species and habitats typically associated with highly tide-swept conditions such as tidal rapids, which are a UK Biodiversity Action Plan Priority Habitat.

    The EIA should address potential impacts on this and any relevant actions within the Habitat Action Plan which can be found at http://www.ukbap.org.uk/UKPlans.aspx?ID=39. Tidal rapids are also on the List of Species and Habitats of Principal Importance for the Conservation of Biological Diversity in Wales, prepared under Section 74 (Biological Diversity) of the Countryside and Rights of Way Act 2000 by the National Assembly for Wales.

48. ***Appropriate Assessment***. Since the development is adjacent to the Bae Cemlyn / Cemlyn Bay Special Area of Conservation (SAC) and to the Ynys Feurig, Cemlyn Bay and The Skerries Special Protection Area (SPA) there will be a requirement for the Competent Authorities to carry out a Significance Test under Regulation 48 of the Conservation (Natural Habitats, &c.) Regulations 1994. Depending on the outcome of the Significance Test, there may be a need for an Appropriate Assessment. Consequently, we would recommend that the EIA contain sufficient information to allow the Competent Authorities to carry out this assessment if required.

49. ***Sub-tidal benthic ecology*** [page 29] – Sampling plans need to be derived from an understanding of the proposed site and the potential environmental impacts and on this basis and as stated in the scoping report a targeted approach to biological survey work is recommended. It is recommended that side-scan surveys be initially carried out in order to inform where it would be possible/efficient to deploy grab samples and to focus on features/anomalies that may require photographic equipment. Whilst still photography and video are useful sampling and recording techniques, some diving survey may also be needed to check for particularly rare and/or sensitive species, which may not necessarily be picked up by video footage. There is a likelihood of rich algal communities including the nationally rare red alga *Schmitzia hiscockiana* occurring inshore along the coast in this area.

50. ***Colonisation of structures*** [Section 2.2.2, page 29] – Please note that statutory authorities do not consider colonisation of artificial substrates as a biodiversity benefit.

51. ***Benthic surveys*** – CEFAS would probably appreciate an opportunity to review and consider any benthic survey design prior to commencement. As the developer will need to use best practice techniques and therefore it is recommended to seek advice from CCW/JNCC.

52. ***Fish and crustacea: Scope of Assessment*** [Section 2.3.4, page 32] – Concern has been expressed with respect to small, 2m beam or otter trawls. In this area where there is extensive bedrock, a comprehensive assessment of populations of electro sensitive species may not be feasible. Anglers report that large female Tope in pup are often caught in the area in late summer. The EIA would need to cover potential impacts on this and other electro sensitive species. In addition to any assessment of the impact on local fisheries and nursery areas knock on effects, particularly on the benthos, of displacing any fisheries elsewhere would also need to be considered.

53. ***Crustacea*** [Section 2.3.4, page 32] – In addition to lobster potting occurring around the South Stack, potting also takes place around the North Stack area as well.

54. ***Marine mammals*** [Page 32] – The near shore and inshore waters of the Anglesey coast are important for cetaceans. Of the several species of cetacean present the most notable are the harbour porpoise and bottlenose dolphin protected under Schedule 5 of the Wildlife and Countryside Act 1981 and under Article 12 of the Habitats and Species Directive. The coast and inshore waters of Anglesey are also important for grey seals which breed and haul out on undisturbed sections of the coast and which feed extensively within the near shore and inshore waters. The use of the site and surrounding area by marine mammals would need to be assessed both spatially and temporally.

    It is paramount that MCT Ltd. ensure that all available information regarding marine mammals in the area of the proposed development from local sources should be collated, including data from Sea Mammal Research Unit (SMRU) and JNCC if necessary.

    The Secretary of State welcomes the commissioned studies on potential noise disturbance through turbine operation, especially relating to the use of experience gained from the SeaFlow prototype. The key issues would appear at this stage to relate to displacement and collision during operation and noise impacts during construction, operation and decommissioning. Indirect effects on prey species and cumulative effects must also be addressed [See point 60].

    During construction the Secretary of State will expect that some visual monitoring will be provided, so that piling/drilling activity will not be started with animals in sight. Bearing this in mind, it is advisable that piling/drilling operations be conducted in daylights hours only.

    Visual monitoring should also be supported by some form of passive acoustic monitoring (PAM) and depending on the technology required to install the turbine bases, there may also be a requirement to use some form of acoustic deterrent. Please seek advice from JNCC.

55. ***Basking Sharks*** [Section 2.3.3, page 31] – Sightings will need to be collated and assessed. Possible sources of information include The Shark Trust and Marine Conservation Society.

56. ***Intertidal issues*** [Section 2.5, page 34] – Intertidally, the proposed landfall site appears to be an exposed rocky gently sloping shore approximately 50m wide dominated by lichens, barnacles and kelps. Proposed cores of the intertidal (section 2.1.6) at landfall wont be possible on the bedrock. Possible mitigation by direct drilling under the intertidal should be considered in the EIA at this site.

    It should be noted that CCW has been conducting phase I intertidal surveys around the coast of Wales. The CCW holds aerial photographs and phase I survey results of this area and can provide this information to the developers if required.

57. ***Proposed scope of assessment*** [Section 2.5.3, page 35] - Section 2.5.3 refers to planning policy for England (PPG 9 and PPG 22). Neither of these are applicable in Wales. The relevant documents in Welsh planning Policy are Technical Advice Note 5: Nature Conservation and Planning and TAN 8: Renewable Energy, respectively.

58. ***Birds*** [Section 2.6, page 35-37] – The scoping report adequately outlines and addresses the potential direct and indirect impacts on birds and any further assessment required. However, consultation with CCW/JNCC/DTI and the RSPB for guidance on whether boat-based or aerial surveys are necessary is recommended.

    Within the ES it is important that the most up-to-date data is used and any comments relating to 'significance' are fully substantiated. As yet, the impact of underwater devices with large moving parts is unknown and therefore the statement in paragraph 1, *"The impact of this form of energy production on birds is significantly less contentious and significant than the potential impact wind turbines may have…"* and *"…the direct impacts of the turbines on birds are likely to be few and not significant"* is presumptuous and unsubstantiated.

    The scoping report states that the potential impact is limited to those bird species that use inshore waters for feeding. We advise that these inshore waters are also important to birds for non-foraging activities such as loafing and roosting and the EIA should address the potential impacts on these uses of the development area as well. The potential direct impacts, such as the collision with turbines while birds are diving would also need to be assessed. Currently the scoping document refers only to indirect impacts on Annex 1 bird species in section 2.2.1. In addition it is our view that the devices may also aggregate fish and therefore attract birds potentially increasing the likelihood of direct collision impacts and that this risk should be assessed. While use of existing data is acceptable for an assessment of impacts, these impacts can only be reasonably assessed against data that are contemporary. Data from within the last two years must be included; information from more than one year will be needed; any anecdotal observations, while of value, will need to be supported by empirical data.

    The Ynys Feurig, Cemlyn Bay and The Skerries SPA are cited in paragraph 5 as being designated for terns and puffins. For clarification, it is only the four tern species (arctic, common, sandwich and roseate) that are qualifying features of the SPA; puffin is a feature of the SSSI.

59. ***Noise and vibration emissions*** [Section 2.4.3, page 33] – Though consideration of data on noise/vibration emissions during construction and operations activities has been detailed, further consideration of potential impacts is recommended including an assessment of the following for fish and marine mammals:

    - injury and mortality;
    - hearing damage and loss;
    - behavioural changes;
    - sound masking; and
    - effects on food sources.

    The assessment should use data and compare with known fish and marine mammal hearing thresholds.

60. ***Noise monitoring*** [Section 2.7.11, page 46] – Subject to the marine mammal assessment and the up-to-date findings of COWRIE and other relevant noise studies, there may be a requirement to carry out some trial noise monitoring prior to construction starting.

61. ***Landscape and seascape*** [Section 2.7.3, page 38] – The proposed development has the potential to affect the character of the seascape in which it is set, have indirect effects on nearby landscapes, and may have consequential effects on nearby seascape and landscape character. There will be a need to illustrate effectively the proposals with photomontages from a small selection of key view points, so that an assessment can be made on the development within context of the setting. This should include the associated infrastructure e.g. navigation lights or markings. CCW can assist in the choice of photomontage view points which should include the effect of morning, high sun and low evening lighting conditions, night lighting, high and low tide differences. In addition since this site is conspicuous from the Holyhead to Ireland ferry routes consideration of the impacts and significance of these views from sea to land needs including in the assessment.

    In the assessment, reference should be made to the AONB management plan, with particular attention paid to the area's special qualities, and the status of Anglesey AONB as a nationally important protected landscape. In addition, the Holyhead Mountain is a very popular recreational area and many people will see the development from there. Concerns that any development in the sea by Holyhead Mountain will detract from the special qualities of relative wildness, remoteness and tranquility that exist there should be addressed.

    An ASIDOHL assessment should be undertaken to assess the visual impacts on the relevant historic landscape areas using the published methodology featured in the Technical Annex of the Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process. For the onshore works if no new overhead cables will cross land, then landscape and visual issues for this may be negligible (subject to siting and design details). However this should be demonstrated through a landscape and visual impact assessment of the areas concerned. The Anglesey LANDMAP assessment will provide some context to the more detailed and specific assessment needed here and Anglesey County Council should be able to provide a copy of the relevant reports. The acceptability of the project lies in the detail, especially of colour, any lighting and location. Options for colours and markings have implications for visual impact and where there is uncertainty the various options must be presented and considered in the impact assessment.

Consideration of how to minimize visual impact from land based view points is required.

Socio-Economic Environment

62. ***Turbine layout*** – It has also been suggested that an impact assessment is also made of different device configurations, to establish a layout with the minimal landscape and seascape impact.

63. ***Commercial Fisheries*** [Section 2.7.4, page 40] – The proposed scope of assessment is good and addresses all of the issues concerning the SeaGen Array. However, for the purposes of the ES, it is recommended that 2002-2005 fisheries data be used for commercial fisheries statistics, which can be obtained from CEFAS. Data on commercial fisheries is inaccurate but the consultation process proposed in Section 2.7.5, should address these anomalies.

64. It must be noted by MCT Ltd., that trawling is carried out from Holyhead.

65. ***Regional sea fisheries committee*** [Section 2.7.5, page 42] – the relevant sea fisheries committee (SFC) is the North Western and North Wales SFC rather than the North Wales and North West SFC.

66. ***Marine disposal and dumping of dredged material*** [Section 2.8.5, page 49] – There is a misunderstanding of the role of CEFAS in compliance under FEPA. It is Marine Fisheries Agency officials who will carry out site visits and not CEFAS representatives.

67. ***Shipping data*** [page 42] – Shipping statistics need to be formulated using the most recent data available.

68. ***Marine recreation and amenity*** [Section 2.7.14, page 47] – the scoping document only appears to consider sailing. The Anglesey coast and inshore areas are of high importance for tourism through recreational boating use including various water sports including diving and angling as well as more terrestrial pursuits such as walking. There is a considerable amount of recreation craft traffic in the area with peak use during the summer and holiday periods. The potential impact of this development on this sector must be considered.

    There is also a need to link recreation with the landscape/seascape issues, since recreational pursuits along the coast of this part of Anglesey will potentially be affected by their landscape/seascape setting. In addition, the EIA should also include an assessment of the wider implications and impact on tourism in the area, in consultation with the regional and local tourist board.

69. ***Licensed disposal site*** – located to the west and northwest of the proposal area is the licensed Holyhead deep disposal site. This disposal site is important economically and environmentally. Any change to the dispersal characteristics of this site will need to be very carefully assessed.

70. ***Marine Pollution Contingency Plan***. The project has the potential to be hazardous to shipping. A marine pollution contingency plan will be required.

71. ***Project description –*** In addition to the basic information, it is important the EIA details of the associated infrastructure for example lighting required on the structures.

72. ***Traffic*** [Section 2.7.12, page 47] - The scoping document states that there will be temporary minor increases in traffic (road, rail and sea) particularly during construction and decommissioning. There should be a Transport Appraisal to quantify traffic generated during construction, operation and decommissioning and to assess the effects on the existing road network.

73. ***Archaeology and cultural heritage*** [Section 2.7.8, page 44] - This section appears to recognise the potential impact of the works on the elements of the marine historic environment most likely to be encountered by the project. The requirement for contracting appropriately experienced professional archaeologists to undertake the ES assessment is accepted and the appropriate sources of information and consultees are listed. The assessment methodology and mitigation measures are reasonable, though paragraph 2.7.9b mentions archaeological scrutiny of geophysical data, implying that the ES specialists would merely examine geophysical data from surveys undertaken for industry to industrial standards. This is insufficient as experience shows that geophysical survey undertaken to determine features of archaeological interest must be to a standard not usually required by industrial survey. It is important, therefore, that the ES incorporates geophysical data from survey commissioned specifically for archaeological data collection, and the archaeological contractors scrutinise this rather than inadequate or inappropriate data.

    The impact on the known on-shore and off-shore archaeological resource should be thoroughly assessed, with consultation with the Gwynedd Archaeological Trust, Cadw and the Royal Commission on the Ancient and Historical Monuments of Wales. The impact on the setting of any scheduled structures or intervisible Historic Landscapes or Parks and Gardens should also be assessed with appropriate viewpoint photographs. This is not mentioned in section 2.7.9, though visual impact is mentioned elsewhere. It is important, however, that the impact on setting of specifically historic components of the landscape, especially where these are on the Register is assessed separately.

    The assessment of the impact on the unknown historic resource, especially that of the marine environment is often challenging. Nonetheless the impact of sea-bed cabling, underground cabling and substation on unknown archaeology can be considerable and it is recommended that geophysical survey is undertaken on the marine and on-shore routes to ensure that, as far as possible, features of interest are avoided. The ES should, therefore, recommend a programme of appropriate archaeological survey as part of the mitigation for the proposals. It will be necessary to ensure that such a programme of work is planned as a component of the project from the commencement.

    Finally, the relevant historic environment guidance in Wales includes, Planning Policy Wales and Welsh Office Circulars, Planning and the Historic Environment - 60/96 : Archaeology, 61/96 : Historic Buildings and Conservation Areas and 1/98 : Directions by the Secretary of State for Wales.

74. ***Military usage*** [Section 2.7.17, page 48] - this section should refer to CADW instead of English Heritage given the project is proposed in Welsh waters.

Navigation, lighting and marking

75. ***Hazard to navigation*** [Section 2.7.6, page 43] – Sub-paragraph 2 "…*the presence of the structures could present a hazard to navigation*…" This should be amended to "…*the presence of the structures* ***will*** *present a hazard to navigation. The impact of the hazard will however be proportionate and that will require assessment…*"

76. ***Commercial Navigation*** [Section 2.7.7, page 43] - Our primary concern, so far as this project is concerned, is with the potential impact on all types of marine navigation in the area and therefore the navigational marking required. It is noted that the Coal Rock lighted buoy provided by Trinity House lies on the northern boundary of the Skerries site. In the event that this required to be moved, or reconfigured, as a result of the Skerries development then THLS would expect any one off costs incurred to be reimbursed by the developer.

77. The proposed development site is clear of established commercial shipping routes and there is, therefore, no objection in principle to development in this area. However recreational craft routes exist through both sites as evidenced by both the information contained in the UK Coastal Atlas of Recreational Boating published by the RYA in 2005 and the consultations undertaken by the developer and included in the Scoping Report. The EIA therefore needs to establish and address by way of physical surveys the actual vessel movements through these areas taking account of seasonal variations.

78. The results of the traffic surveys together with indicative layouts of the structures in each array will be necessary for Trinity House to specify the exact navigational marking that will be required to mitigate the risk to shipping that will be presented by these structures. The marking will be based on the recommendations of the International Association of Marine Aids to Navigation & Lighthouse Authorities (IALA). In particular IALA recommendation O-131 entitled, " The marking of Offshore Wave and Tidal Energy Devices", which is available on the IALA website:-

    (http://www.ialathree.org/iala/pages/publications/documentspdf/doc_152_eng.pdf)

79. ***Buoy markings***. A further consideration, regardless of any safety zones that may be discussed and established, will be the marking by buoys of the boundary of the structures to clearly indicate to all types of shipping that they should avoid the structures because of the underwater blades protruding from them, potentially at a depth of only 3 metres below the surface of the sea. MCT Ltd. should therefore engage in discussions with Trinity House at an early stage in the compilation of the environmental statements so that, together with other nautical stakeholders, may influence the exact configuration in which the structures are established to minimise the navigational risk.

80. The scoping report mentions the possibility of a buoyed channel being marked through the SeaGen Array for recreational craft. Without detailed knowledge of what may be intended, the initial preference would be to establish the array in such a position that measures could be avoided.

81. ***Lighting Considerations.*** Subject to its layout, it is likely that each array will need marking by at least a North, an East, a South and a West Cardinal lighted buoy, established close north, east, south and west respectively of the boundary of the structures. In addition, lighted Special Mark buoys may be needed at each "corner" of the layout. The specific light characteristics to be employed for marking will need to be agreed with us, but as a general principle the lights should have a nominal range of 5 nautical miles and the buoys be of a similar size to our standard Class 2 buoy (ie 2 – 3 metres diameter buoy body with a focal plane height of 4 – 5 metres). The turbine structures themselves should be coloured yellow (BS No. 381-C-356) and consideration will need to be given in due course to whether any lighted aids to navigation are required. If such is the case, then flashing yellow lights visible all round to shipping are likely to be specified (character and range to be determined). If any identification marking required for search and rescue purposes is required to be lighted, then the lighting should be low intensity and shielded such that it does not interfere with the night vision of Mariners. In view of the height of the structures it has been assumed that lighting for aeronautical purposes would not be required. However, should such lighting be a requirement, then it should be shielded such that it cannot be seen by mariners, thus avoiding any potential confusion with a marine aid to navigation or the navigation lights of a vessel.

82. ***Fog signals***. There is a possibility that fog signals may need to be fitted to some of the structures for hazard warning purposes in reduced visibility, subject to the layout and the navigational risk assessment. If this is the case then omnidirectional fog signals with an IALA Usual Range of 2 nautical miles will be required with a character of 1 blast of 2 seconds duration every 30 seconds, to sound at least when the visibility is 2 nautical miles or less.

83. ***Risk Mitigation***. The developer may need to take all these risk mitigation measures into account when considering the environmental impact of the development, for example when considering the effect of noise and the visual impacts.

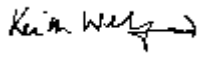
84. ***Marking during construction***. There will also be a requirement for marking during the construction of each development. The marking will need to be specified by ourselves and will depend on the method of construction used and the way in which construction is progressed. It is likely to include the establishment of buoys around the development site (similar to the permanent marking) and possibly the temporary marking of individual structures by lights flashing yellow every 2.5 seconds with a nominal range of 2 nautical miles.

85. It should be noted that any marine navigational lighting specified should have an availability of better than 99%. In addition any aids to navigation required will be subject to Trinity House inspection & audit regime as applied to the aids to navigation exhibited from other offshore structures.

86. ***Decommissioning Issues.*** The scoping report only briefly touches on eventual decommissioning, however the developer should bear in mind that if there were any remains on site that were considered at that time to be a danger to navigation, there could be a residual liability to provide continued marking of them by whatever means are appropriate at that time.

Copies of this letter are being sent to those listed in a paragraph 3 of this letter. If you have any queries relating to the comments above, please do not hesitate to contact me or Sarah Dacre (DTI) on 01224 254098.

Yours sincerely,



KEITH WELFORD
Offshore Renewables Consents Manager

RECEIVED
8 - AUG 2006

CYNGOR SIR
YNYS MÔN
ISLE OF ANGLESEY
COUNTY COUNCIL

PETER J DUNNING
Cynghorydd • Councillor

Seavale
Lôn Towyn Capel
TREARDDUR BAY
Ynys Môn
LL65 2TU

☎ 01407 860846
Mob: 07746 662483

E-bost • E-mail:
Ein Cyf • Our Ref:
Eich Cyf • Your Ref:

7/8/06.

Dear Mr. Ainsworth,
As the local member on the Isle of Anglesey County Council for the area between South Stack and North Stack I have recently received a copy of the Environmental Impact Assessment Scoping Report for the proposed South Stack array.
This is a very interesting project which I am anxious to learn more about.
There are a couple of points in the report which require correction namely:-

1. 2:7.1 The west Anglesey coast around South Stack is within the jurisdiction of Trearddur Community Council (of which I am a member) and myself NOT Holyhead Town Council. The proposed landfall for the cable is within the Holyhead Town Council area.
2. 2:7.14 The Trearddur Bay Sailing Club should also be included on this list.

Both I and Trearddur Community Council would wish to benefit from a talk regarding this project if you could arrange such an event at some point in the future.
The Clerk to the Community Council, Mr. Gwilym Evans, may be contacted at
Hedfan,
Newborough,
Anglesey.
LL61 6TN.
Tel. 01248 440611.

Yours faithfully,

Peter J. Dunning

Cllr. Peter J. Dunning.

Marine Awareness North Wales / North Wales Wildlife Trust
376 High Street, Bangor, Gwynedd, LL57 1YE

Jamie May
PMSS Ltd.
The Tramshed Business Centre
Beehive Yard
Walcot Street
Bath
BA1 5BD

22nd September 2006

Dear Jamie

Re: The request for a scoping opinion on the proposed Skerries tidal stream array project in waters off the Anglesey coast

The North Wales Wildlife Trust is a registered charity and one of the leading non-governmental conservation organisations in North Wales. We have over 4000 members and 33 nature reserves across North Wales (6 of which are on Anglesey). In addition to the management of these nature reserves we work with a wide range of other organisations to further the protection of biodiversity in the countryside and marine environment.

In 2006, Marine Awareness North Wales, a voluntary organisation working to conserve the marine environment and to raise community awareness joined the North Wales Wildlife Trust (NWWT) as their marine team. Since its inception in 2001 Marine Awareness North Wales has become a leading organisation in the study and conservation of marine wildlife in North Wales waters.

Marine Awareness North Wales (MANW) have met with the team from PMSS Ltd during the consultation period and have given general advice on the distribution and behaviour of marine mammals present around the coast of Anglesey, especially with reference to the population of harbour porpoise.

We have identified several gaps in the proposed environmental impact assessment (EIA) with regard to the extent and nature of the research. Our comments are listed below.

General Comments

The legislative background in relation to biodiversity should be described in section 5 of ES (as referred to in Appendix 2 of the Scoping Report). This should include LBAP and be relevant to Wales i.e. refer to TAN and not PPG as in 2.5.3 of the Scoping Report.

Given the experimental nature of the proposals the “precautionary principle” should be applied in an area known to have high conservation value. This principle is enshrined in the Welsh Assembly Government Sustainability Development Plan. The reasons why alternative sites were not acceptable should be covered.

Relevant UKBAP and LBAP species and habitats such as Tidal Rapids; which is a UKBAP priority habitat and an HSPI listed habitat under Section 74 of the CROW Act 2000 by the NAW should be taken into consideration.

Relevant UKBAP and LBAP species and habitats such as Tidal Rapids; which is a UKBAP priority habitat and a HSPI listed habitat under Section 74 of the CROW Act 2000 by the NAW should be taken into consideration. The ES should also give full consideration to the impacts of the Natural Environment and Rural Communities Bill.

Physical Environment

Consideration must be given to the fact that specific species associated with tidal habitats require a high energy environment, CCW commissioned research (ABPMer) on energy extraction shows that the energy reduction caused by energy extraction devices is considerable.

The Biological Environment

Designated Sites

Designated for its coastal lagoon Cemlyn Bay SAC (Grid Ref: SH331934) should be taken into consideration (see 2.2.1). This is due to the unique physical processes that form the shingle ridge creating the coastal lagoon. Indirect effects of possible changes in current profiles and thus ridge formation should be investigated.

Sub-Tidal Benthic Ecology

A non-intrusive geo-physical acoustic survey is necessary before any benthic organism surveys take place. Fine scale side-scan sonar data of the entire site, including all possible inshore routes for the cable and preferably a buffer zone around the proposed array site is needed. This substrate type data can inform further survey techniques to ensure that appropriate methods are used according to sediment type.

Locations and frequency of sample sites for various methods of benthic organism survey need to be planned following acoustic information and must be adequate to cover all broad habitats repeatedly within the proposed area.

Benthic grab and beam trawl methods must be appropriate to sediment type. On rocky substrate beam or otter trawls may not be provide adequate sampling of demersal fish and crustacean species. Tidal swept bedrock with convoluted gullies and pinnacles may provide habitat for various electro-sensitive elasmobranch species. An alternative method for sampling demersal species must be devised for areas of bedrock. Specific attention may also be given to the important seasonal sea bird and cetacean prey species *Ammodytes tobianus.*

Drop-down and/or towed video survey techniques are effective to give broad characteristics of rocky biotopes, ground truthing for rare and species such as hydroids, bryozoans and fine algae is necessary using experienced diving surveyors.

Data collected should be high quality detailed data using the MNCR marine habitat classification system of broad habitats and associated biotopes with species lists.

It should be taken into consideration that measures to combat scour threat are unclear and could potentially change the seabed composition completely.

Fish (including Commercial Species)

The effect, direct and in-direct, of the proposed project must be taken into consideration. Fish are essential in marine food chains and the effect that the project may have on fish populations will have a knock-on effect on a number of trophic levels within the ecosystem within and around the proposed project area.

It is also suggested that the presence of electro-sensitive species i.e. elasmobranch fishes should be monitored. The EIA should cover potential impacts of such developments on the behaviour and possible displacement of such species.

Marine Mammals

The Harbour Porpoise Action Plan was established in 2001 with the aims of achieving goals outlined in 'Working for the Wealth of Wildlife', Anglesey's Local Biodiversity Action Plan for the species. The study therefore contributes toward local and national efforts in conserving this species. The study incorporates a land and boat-based study as well the collection of incidental sightings of marine mammals across north Wales (see 2.4.1).

The coastal waters of Anglesey are extremely important for cetaceans, most notably, the harbour porpoise (*Phocoena phocoena*) and the bottlenose dolphin (*Tursiops truncatus*). In addition there are regular sightings of Risso's dolphin (*Grampus griseus*), minke whale (*Balaenoptera acutorostrata*), pilot whales (*Globicephala melaena*) and common dolphins (*Delphinus delphis*). All are protected under Schedule 5 of the Wildlife and Countryside Act 1981 and under Article 12 of the Habitats and Species Directive.

Information on the status and distribution of cetaceans in Anglesey waters must not be taken solely from the sources mentioned (see 2.4). Consideration must be given to long-term data sets such as cetacean sightings recorded at RSPB South Stack, those recorded from fishing and research vessels such as the RV Prince Madoc, those recorded from the Skerries wardens, and those kept and updated by Marine Awareness North Wales land based sightings database. A number of sightings sources must be sought in order to gather the larger picture and thus a more accurate estimation of species encountered, their numbers and their distribution.

There were many discrepancies between the cited literature and the wording of the Scoping Report, this should be checked and corrected before being used in the EIA.

For example (2.4.1) should read…
Harbour porpoise sightings were low in the Holyhead Bay sector (0.07 individuals/km^2) however this should not be considered as an accurate representation of the true density due to the fact that, although sample size is corrected for during analysis, the sample size is extremely low due to the difficulties in surveying this area. Further study in this area is recommended and it should not be inferred that this area is not considered as important for harbour porpoises in terms of numbers. The fact that there are no fine scale habitat use data for this area should also be considered.

The density estimate for the Carmel Head sector was lower than that for Point Lynas and South Stack however is <u>not</u> considered as an unimportant area for harbour porpoises. No direct inferences can be made from boat surveys alone with regard to fine scale habitat use of porpoises in this area. Further studies, both land and boat based surveys should be made in this area to determine habitat use.

We suggest that the boat-based data (2002-2004) be re-examined to incorporate a density estimate for harbour porpoises in the proposed project area.

The fact that there is very little data regarding the distribution and habitat use of cetaceans in this area means that additional survey work and long term monitoring in this area is deemed essential.

Fine scale habitat use is one of the most important factors determining the importance of the areas for this species and is equally as important as the amount of animals in the area. Due to the fact that there is very little data regarding the fine scale habitat use of harbour porpoises and indeed any cetacean we insist that a desk study of the use of the area by marine mammals is inadequate and additional survey work must be undertaken. This study should be long-term, looking at both temporal and spatial distribution, habitat use and behaviour in the area. The results of this study should then be used to determine the direct risk of collision,

displacement and assess the indirect barrier effects based on a known not 'assumed' level of mammal activity.

Consideration for potential impacts on marine mammals must be considered not only for the construction and operational stage but must also include potential effects of maintenance and decommissioning.

The fact that marine mammals are extremely sensitive to underwater noise means that an extensive literature review with regard to acoustic data and the effect of noise and vibration emissions should be undertaken during the EIA process. It should also be taken into consideration that there is very little literature regarding the effects of the proposed devices and thus an in-depth study may be necessary. This study should take into consideration the effect of noise during the construction phase, operational phase, maintenance and during decommissioning. It is felt that there should be an extensive study of the acoustic effects of the proposed project. This is of paramount importance.

Consideration must also be taken of the fact that the proposed development has potential impacts on the food source and the physical properties (the flow of current and the benthos). Marine mammals cannot be considered as separate entities to the ecosystem. The knock-on effect of the proposed development should be considered on an ecosystem level rather than as separate groups of animals.

For example (2.2.2 Sub-Tidal Benthic Ecology).
"Habitat loss or disturbance during construction from the turbine placement and cabling, either due to footprint of construction vessels or the width of cable laying equipment."

It has not been taken into consideration that this may have an indirect effect on harbour porpoises through the collapse of its food source in the area due to the loss of its habitat.

Porpoises feed in the tidal races within the proposed area. The fact that the proposed development may affect the physical properties of the tidal race, essential for porpoises, must be considered.

The objectives of the MANW study does not match objectives for establishing a baseline for EIA with tidal schemes in mind and thus a desktop study should be deemed unacceptable.

We are concerned that data is being extrapolated from behavioural monitoring of seals and cetaceans in the Strangford Lough area. This data should certainly be taken into consideration however additional monitoring in the proposed site should be undertaken. Different species composition would mean lack of accurate data. Whereas Strangford Lough has many seals it is not an area noted for its cetacean population. We feel that data from the Strangford Lough project would not extrapolate adequate data with regard to cetaceans.

Much of the above apply also to Grey Seal (*Haliochoerus grypus*) which breed and haul out in the proposed areas. As with cetaceans the indirect effect of habitat loss on their food source should be addressed. The temporal and spatial habitat use of seals in the proposed area should be monitored on a long-term basis.

Inter-Tidal and Terrestrial Ecology

The ecological value of the area for onshore works should form part of the criteria for the selection of onshore grid connection location and onshore cable / overhead route and not a matter to be dealt with afterwards (see 2.5.2). The survey of this area should go beyond Phase 1 to provide adequate locational data. Recommendations from the intertidal and terrestrial survey should aim to provide biodiversity gain and not merely mitigate for adverse ecological effects.

Birds

The consideration of birds, especially terns, needs to be undertaken with the most up to date data. Along with detailed consideration of the ecology of each species, for terns the movement patterns of the Anglesey meta-

population should also be considered. The Wildlife Trust can provide detailed colony counts for that part of the SPA tern colony at Cemlyn. At this stage we can say that the current five year average (2002-2006) for the Sandwich tern colony at Cemlyn is 1214 pairs, approximately 10% of the UK population and the only colony in Wales. The assessment (as described in 2.6.1) should include detailed consideration of the use of the study area during movements of birds: it should also consider the distribution of prey items/feeding sites (indirectly through boat surveys). The implications of sedimentary processes etc on the location of food supply should be also given consideration. Indeed the inter-relationship between geomorphological or oceanographic factors (as described in section 2.1.5) and ecological aspects should be explored.

Discussion with CCW and other agencies should be held to identify the scope of boat based surveys to gather baseline data on usage of the proposal area by feeding and diving birds.

Human Environment

A consideration of Landscape (Section 2.7.3) should also take into account that the Anglesey Coastal Footpath now covers the whole of the island. An assessment of the level of use of the section of the Footpath in the study area should also be taken into account.

Relevant Projects and Studies

It should be noted that there is a proposal for a windfarm at Holyhead. The in-cumulative impact of this proposal should also be taken into account.

More research is needed on existing SEAFLOW and SEAGEN prototypes in Lynmouth and Strangford Lough respectively before full scale demonstration arrays are placed in sites of considerable environmental sensitivity.

Experience gained from a single device will require careful extrapolation to model the possible impacts of an array of devices placed at intervals across the tidal resource.

Please feel free to contact us if you require any clarification on our comments on the scoping report. Any issue regarding marine life should be addressed to Marine Awareness North Wales whilst North Wales Wildlife Trust will happy to clarify issues related to terrestrial matters including Cemlyn.

Yours sincerely

Nia Hâf Jones

Marine Awareness North Wales

nia@saveourseas.co.uk

(01248) 355 030
07855454132

Chris Wynne

North Wales Wildlife Trust

chriswynne@wildlifetrustswales.org

(01248) 351 541

DTI MCA response

From: Welford Keith (Mr K) EDU [Keith.Welford@dti.gsi.gov.uk]
Sent: 12 October 2006 15:05
To: jm@pmss.co.uk
Subject: FW: South Stack and Skerries Scoping Request

Jamie,

Sorry for the delay in passing this on - I had thought that it would be better to provide both the MCA response (below) and Anglesey CC`s comments together. That, however, is not going to be possible on any reasonable timescale.

Not sure yet how to pass on these comments formally - my earlier e-mail that accompanied the Scoping Opinion mentioned an addendum - but will consider further and get back to you.

Regards,

Keith

-----Original Message-----
From: Paul Townsend [mailto:Paul.Townsend@mcga.gov.uk]
Sent: 21 September 2006 18:26
To: Welford Keith (Mr K) EDU
Subject: Re: South Stack and Skerries Scoping Request

Keith

Apologies for the delay

We note from pages 44 and 45 that MGN 275 and the DTI Guidance on OWF will be used as the basis for the assessment of the proposed development on navigational safety.

We would like to remind PMSS that compliance with the relevant parts of MGN 275 (including the Annexes) and the DTI Guidance will be used by the MCA to assess the impact on Navigational Safety. Therefore the scope of the PSSM assessment should not necessarily be limited to the bulleted points on pages 44 and 45.

Regards

Paul

Capt Paul Townsend
Navigation Manager
Navigation Safety Branch
MCA Headquarters
Bay 2/29 Spring Place
105 Commercial Road
Southampton SO15 1EG
Tel: 02380 329100
Dir: 02380 329523
Fax: 02380 329204
paul.townsend@mcga.gov.uk

>>> "Welford Keith (Mr K) EDU" <Keith.Welford@dti.gsi.gov.uk> 09/04/06 04:22pm >>>
Paul,

I wrote to Simon Gooder on 18 July to seek MCA comments on scoping reports prepared in respect of the proposed South Stack and Skerries wave turbine electricity generating devices that could be sited off the west coast of Anglesey (a copy of my e-mail is attached).

<<FW: Request for Comments on Scoping Reports for Marine Energy Devices off Anglesey >>

I wonder whether you are in a position to offer a response (or responses) to the request for comments.

Regards,

Keith
Keith Welford
Offshore Renewables Consents
Energy Development Unit
Department for Trade and Industry
T: 020 7215 0478
F: 020 7215 2601

Government quality mark initiative for information security products and services. For more information about this please visit www.cctmark.gov.uk

RYA House
Ensign Way, Hamble
Southampton SO31 4YA
United Kingdom

Tel +44 (0) 23 8060 4100
Fax +44 (0) 23 8060 4299
www.rya.org.uk

Mr Jamie May
Environmental Manager
PMSS Ltd
The Tramshed Business Centre
Beehive Yard
Walcot Street
Bath, BA1 5BD

7th September 2006

Dear Mr. May,

Thank you for seeking our comments regarding the Skerries Seagen Array Project. We have read through the EIA scoping report and discussed the development with our local RYA representatives in Wales . Our response attached follows our current position statement on offshore renewable energy developments and our current understanding on the impacts of marine current turbines. I also enclose an updated copy of the 'RYA Position on Offshore Energy Developments' for your information. Should you require further information or comment, please do not hesitate to contact me.

Yours sincerely,

Kate Moore
RYA Planning and Environmental Advisor

SOUTH STACK TIDAL STREAM ARRAY PROJECT

SCOPING REPORT RESPONSE FROM THE RYA

1 The Royal Yachting Association

The Royal Yachting Association (RYA) is the national body for all forms of recreational boating, under power and sail, on inland and tidal waters, with 100,000 personal members, 1500 affiliated clubs (which in turn have over 400,000 members), and over 1600 recognised Training Centres. The RYA represents the interests of an estimated 2 million participants who annually take part in recreational boating around the UK. We represent the following activities:

- Yacht Cruising
- Motor Cruising
- Yacht and Dinghy Racing
- Sportsboats and Ribs
- Powerboat Racing
- Windsurfing

We are the recognised national authority on training people on the safe use of all recreational craft from windsurfers, small dinghies and power boats up to ocean going yachts; over 150,000 training courses a year are delivered in the UK under RYA auspices. RYA courses are now taken as the template for training in many other countries throughout the world, and in the UK form the basis for the small craft training of lifeboat crews, police officers and the Royal Navy.

In summary the concerns of recreational boating and offshore energy developments relate to:

1. Navigational safety
    - Collision risk
    - Risk management and emergency response
    - Marking and lighting
    - Effect on small craft navigational and communication equipment
    - Weather
2. Location
    - Loss of cruising routes
    - Squeeze into commercial routes
    - Effect on sailing and racing areas
    - Cumulative effects
    - Visual intrusion and noise
3. End of life
    - Dereliction
    - Decommissioning
4. Consultation

2 Navigational Safety – collision risk

Within section 1.8 of the Scoping Report, titled ***Tidal Seagen Array – Components and their Installation*** , the dimensions for the tidal turbines are given as following:–

- Depth of Water - 20-35 metres (approx)
- Diameter of Blades – 18-20 metres (approx)
- Minimum Clearance Depth - 3 metres below LAT

The RYA is concerned that the developers have not proposed a suitable clearance from mean low water to the rotor blade tip that is acceptable for the safety of recreational craft. The RYA position statement requests a minimum rotor depth of 3.5 metres below Mean Low Water Springs.

3 Navigational Safety – risk management and emergency response

The RYA accepts the suggestions in sections 1.9.1 and 1.11.2, regarding site access, that a navigation risk assessment, will be carried out for the construction and decommissioning phases to decipher whether safety zones will be needed. The RYA requests that small craft issues are taken into account within this Risk Assessment.

In section 1.10.1, the RYA accepts that a Navigation Risk Assessment should be carried out for the operational phase of the project. However, the RYA would like to take this opportunity to suggest that the creation of a zone that excludes recreational vessels on a general basis is usually unnecessary and impracticable. In principle the RYA has no objection to the creation of advisory or precautionary zones which should warn vessels to navigate with particular caution while not permanently restricting or excluding recreational vessels.

The RYA appreciate the points in sections 1.9.4 and 1.10.4, titled '***Construction' and 'Operational Management (Environmental)'*** respectively, which state that there will be en emergency response plan for these two phases of the project. The RYA would expect the EIA to contain clear details of the emergency response procedure that will be operational at the South Stack Site. The RYA suggest that there is also an emergency response plan developed for the decommissioning phase, as there does not seem to be such a plan proposed in the current scoping report.

4 Navigational safety - Lighting and Marking

The RYA welcomes the statement that the lighting and marking of the turbine devices during all phases of the development will follow the guidelines set out by Trinity House. We are also pleased to read that the developers plan to inform the UK Hydrographic Office of the positions of devices, moorings and additional structures so that they are incorporated onto navigational charts and that there will be specific Notices to Mariners according to the phase the project is in. All these sources of information are important for recreational boat users and we expect the location of the tidal turbines, and all other renewable energy devices will be readily available for mariners through various sources at any time.

5 Location - Cruising Routes

The RYA has carried out a detailed mapping process for the whole of the UK and produced a UK Atlas of Recreational Boating. This identifies 4 cruising routes with medium use within the South Stack site. The four routes join another medium use route in a 'hub' to the north of the site. The developer must be aware of the high use of the site by recreational craft and the situations that can develop when small craft are excluded from previously navigable areas such as this. Whilst the RYA do not see navigating in this area as a problem, we do request that the turbines should follow requirements laid out by the RYA for navigational safety. Copies of the Atlas are available from the RYA, contact kate.moore@rya.org.uk

6 End of Life - Decommissioning

The RYA welcomes the proposal for appropriate lighting and marking of the site as set out by Trinity House during the decommissioning phase. We accept the restrictions to navigation that may apply during the decommissioning of the tidal turbine field. The RYA also support the point made in section 1.11.2, titled ***Decommissioning Method***, confirming that all structures and substructures will be removed to natural seabed level or below. This requirement must be clearly understood and imposed as remaining sections of tower bases left protruding above the sea bed would pose a threat to navigation.

7 Consultation – Royal Yachting Association

The RYA welcomes the point made in section 2.7.7, titled ***Proposed Scope of Assessments*****,** which states that the developers will include looking at the effect on marine recreation and consultation will take place with the RYA as well as local clubs and councils. The RYA appreciate the opportunity to be involved and can act as the central point to help engage with the local yachting community directly.

If you have any further questions regarding the RYA position on offshore developments do not hesitate to contact Kate Moore on 02380 604222 or kate.moore@rya.org.uk