

**Pembrokeshire Marine Energy Working Group  
Contract Service Requirements  
Prepared by Tidal Energy Limited**

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The following tables identify the variety of services required in carrying out the development, manufacturing and operation of marine technology and site development. This has been based on Tidal Energy Limited's (TEL) experience in developing the DeltaStream demonstration project at Ramsey Sound. TEL has chosen to carry out project management of its contractors in-house and therefore manages several contracts; other organisations may choose to commission a lead project management, environmental or engineering organisation to manage the sub-contractors on its behalf.

TEL has endeavoured to use local companies where possible and a register of local skills and experience would be helpful

**Site Development and Planning Issues**

<b>Ref.</b>	<b>Contract</b>	<b>Scope of Services/Subcontracts</b>
<b>1</b>	<b>Environmental Issues</b>	
1.1	Marine Mammal Observer	
1.2	Ornithological Observer	
1.3	Marine Mammal Assessor	
1.4	Oceanographic Assessor	
1.5	Ornithological Assessor	
1.6	Archaeological Consultant	
1.7	Marine Ecology Consultant	
1.8	Fish and Commercial Fisheries	
1.9	Ecology Assessor	
1.10	Landscape Assessor	
1.11	Navigation Consultant	
<b>2</b>	<b>Physical Site Assessment:</b>	
2.1	Oceanographic Surveys	Tidal flow measurement (ADCP), Wave measurement, Seabed video Survey, Benthic sampling, Hydrophone Surveys, Side Scan Sonar, Magnetometer,

		Multi beam echo sounder
2.2	Seabed Survey	Ground Investigation – Cone Penetration Tests, Boreholes, Rock coring Diver Surveys – Video survey, Rock Coring Geotechnical assessments
2.3	Land Agent	
2.4	Electrical Connectivity Designer	
<b>3</b>	<b>Consent</b>	
3.1	Legal Planning Advice	
3.2	Legal Estate Advice	
3.3	Planning Consultant	
3.4	Engineering Design Consultant	
3.5	Public Relations Advisors	Printers, designers, website designers
<b>4</b>	<b>Other</b>	
4.1	Insurance Advisors	
4.2	Intellectual Property Attorney	
	Commercial Advisors/Auditors	

#### Device Manufacturing

Ref.	Contract	Scope of Services/Subcontracts
01	Electrical Generation and Power Conversion	Electrical Design Manufacture/procurement/assembly: Generators, Transformers, Switch gear, Control system, Design, Programming, Hardware, software, Transportation, Craneage
02	Electrical Cabling	Cable Design Manufacture/procurement: Cables, joints, fibre optic Transportation, Craneage
03	Turbine Blades	Design, Manufacture/procurement of moving parts: steelwork, composite, carbon fibre
04	Manufacture and Assembly	Structural Design

		Manufacture Transportation Craneage Assembly/erection of structural steelwork Painting, Corrosion protection, Anti-fouling
05	Marine Installation Contract	Design, Health and Safety advice Certification Craneage Transportation Subsea cable laying Moorings; chains, Marker buoys/signage Installation Vessels Support Vessels Tugs Safety Boats Divers Remote Operating Vehicles
06	Drive Train, Gearing and auxiliary equipments	Design Forged steelwork elements Gear boxes Hydraulic design and supply Shaft alignment Mechanical Assembly

### Engineering

Ref.	Contract	Scope of Services/Subcontracts
01	Onshore Design	Design of civil engineering works and electrical system to transmit electrical power from shore to substation.
02	Onshore Works	Design and build substation. Civil elements to include road and foundation construction, fencing and conduit/ducting.

		Electrical works to include electrical cabling, jointing connections and communication routing between shore and compound and within compound.
04	Mechanical and Structural Integration Design	
05	Marine Consultant	Design method of operation to deploy and recover devices. Vessel identification and charting

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