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ENFAIT
ENABLING FUTURE ARRAYS IN TIDAL

Final Decommissioning Plan

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IDETA NOVA INNOVATION CATAPULT Offshore Renewable Energy THE UNIVERSITY OF EDINBURGH RSK wood. SKF

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Contents

1 The Project

1.1 Introduction

A Funding Grant was awarded from the European Union's Horizon 2020 research and innovation programme in January 2017 to demonstrate a grid-connected tidal energy array at a real-world tidal energy site, propelling tidal energy towards competing on a commercial basis with alternative renewable sources of energy generation – Enabling Future Arrays in Tidal (EnFAIT). This was in response to the call *LCE-15-2016: Scaling up in the ocean energy sector to arrays* to generate significant learning through demonstration of cost-effective tidal arrays.

This document is produced as the final decommissioning plan for the Shetland Tidal Array developed following consultation with stakeholders and review of best practice. It is to be submitted to satisfy deliverable D7.3 of the EnFAIT project and to be also made available for public dissemination.

2 Scope of the Final Decommissioning Plan

Decommissioning as part of the EnFAIT project at the Shetland Tidal Array is defined as the removal of the original M100 tidal stream turbines (T1-3) and associated infrastructure in order to gain and share learnings of the full lifecycle of a tidal stream array. The decommissioning plan (DP) presented here is based on the original Decommissioning Programme for the three M100 turbines (T1-3) produced by Nova Innovation. This was consulted on and will need to be approved by the UK Secretary of State for Business Energy & Industrial Strategy (BEIS) prior to decommissioning, as per the conditions of the original Marine Licence for the construction and operation of the Shetland Tidal Array issued by Marine Scotland, and the requirements of the UK Energy Act (2004). A separate Marine Licence will be required from Marine Scotland to cover decommissioning activity to be undertaken in the EnFAIT project. The application will be supported by a detailed Decommissioning Method Statement and other environmental and risk assessments, according to the legislative requirements and best practice at the time.

2.1 Policy, Legislative Framework and Statutory Requirements

This section of the document provides an overview of the existing policies in place and legislative framework for developing decommissioning plans.

Sections 105-114 of the Energy Act 2004 (as amended) require a developer to submit to the Secretary of State at the Department of Business, Energy, & Industrial Strategy a draft Decommissioning Programme for the decommissioning of energy generation infrastructure. The decommissioning of the Development will be undertaken in accordance with the legislation and guidance at the time of the works commencing, including but not limited to:

- United Nations Convention on the Law of the Sea ("UNCLOS"), 1982;
- International Maritime Organisation ("IMO") Standards;
- OSPAR Convention for the protection of the Marine Environment of the North East Atlantic;
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended);
- Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended);
- The Pollution Prevention and Control (Scotland) Regulations 2012;
- The Special Waste Regulations 1996 (as amended);
- Health and Safety at Work etc. Act 1974; and

- Construction (Design and Management) ("CDM") Regulations 2015.

This DP is written in accordance with legislation and guidance as it stood at the point of report publishing.

2.2 Proposed Scope of Decommissioning

Decommissioning of the Shetland Tidal Array will involve complete removal of all cables, turbines, foundation, and associated array equipment from the seabed of the three installed M100 devices (T1-T3).

2.3 Key Assumptions

I. This DP will be reviewed in advance of decommissioning. The review will draw upon:
    a. Environmental monitoring conducted to date and during the lifetime of the project.
    b. Stakeholder consultation to be conducted in advance of decommissioning as part of the Marine Licence required for decommissioning.
    c. Legislation and regulation in force at the time.

II. A detailed Decommissioning Method Statement will be produced prior to activity commencing, in support of an application to Marine Scotland for a Marine Licence to decommission the three M100 turbines and cables.

III. The application for a Marine Licence will also be supported by an environmental assessment, a navigational risk assessment and any other supporting information required at the time, to comply with current legislation and guidance.

IV. Surveys will be undertaken with underwater video camera to verify the removal of all works and restoration of the site.

V. All material and equipment removed will be disposed of responsibly, using local recycling facilities in Shetland as far as possible.

VI. All equipment can be removed using standard offshore workboats, as used for device and cable deployment.

VII. One lift will be required for each turbine nacelle, simultaneously lifting the cable; and one additional lift will be required for each foundation.

VIII. The gravity foundation can be lifted in its entirety from the seabed without the need for offshore cutting or any other operations.

2.4 Consultation

This DP is based on consultations undertaken by Nova Innovation. The following organisations were consulted:

- Marine Scotland[1]
- Maritime and Coastguard Agency

[1] Marine Scotland carried out their own consultation for Nova's application for a marine licence for decommissioning. Consultees included those listed above, as well as RSPB and Whale and Dolphin Conservation.

- Shetland Ports and Harbours
- NatureScot (previously Scottish National Heritage)
- Northern Lighthouse Board
- Shetland Fishermen's Association
- Shetland Shellfish Management Organisation
- Shetland Coastguard Operations Centre
- UK Hydrographic Office
- Shetland Islands Council
- Recreational Boating Associations
- Recreational Angling Associations
- Scottish Environment Protection Agency (SEPA)
- Joint Nature Conservation Committee (JNCC)
- Crown Estate Scotland

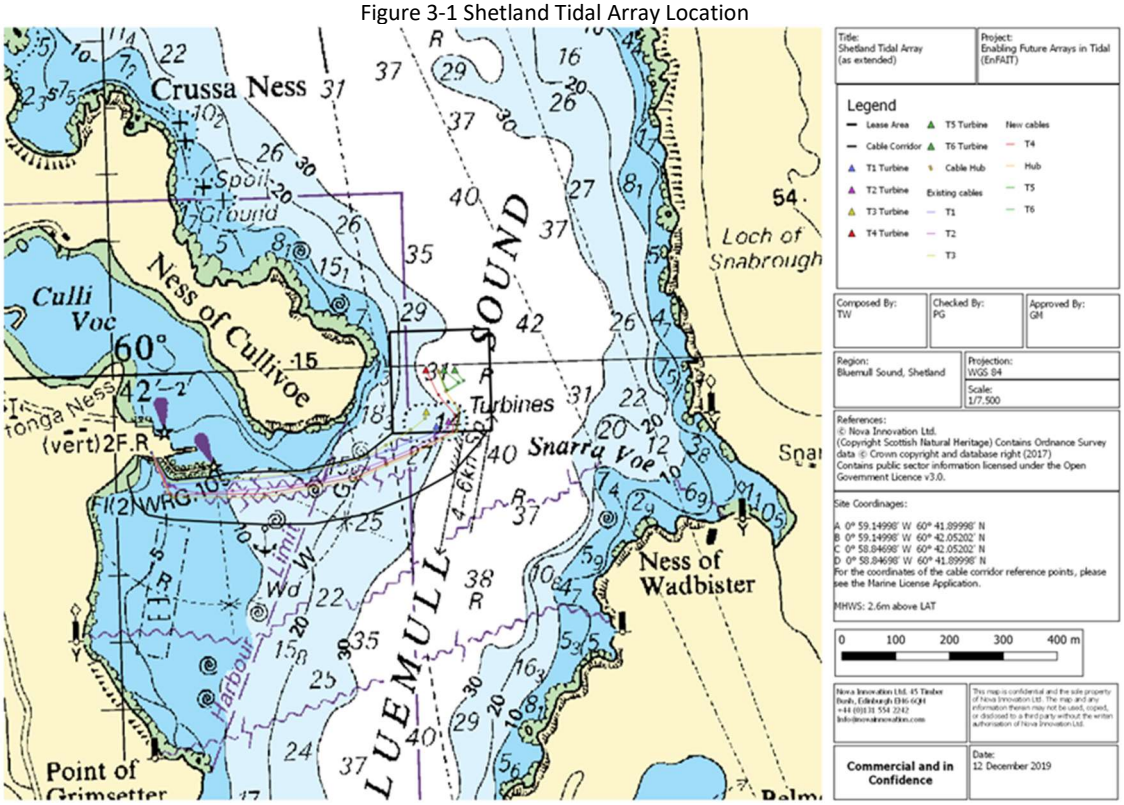
3 Background Information

3.1 Layout of the Facilities to be Decommissioned

The tidal array consists of three 100 kW M100 tidal turbines (T1-T3) and three 100kW M100-D tidal turbines (T4-T6). Four of these turbines (T1-4) export electricity to the shore using their own dedicated sub-sea cable (one for each turbine), two other turbines (T5,6) are connected to a subsea hub with a single export cable connecting the subsea hub to the shore. The M100 devices (T1-T3) are covered by this DP.

The array is located at Bluemull Sound, situated between the Shetland Islands of Yell and Unst. The array site is east of the Ness of Cullivoe. Figure 3-1 shows the location and layout of the array.

Figure 3-1 Shetland Tidal Array Location



Source: Copyright Nova Innovation 2019 ©

The Sound is approximately 800m wide and up to 40m deep in the central channel. The seabed in the channel consists largely of shattered rock and occasional boulders on a substrate of solid rock, with sandy sediment in shallow waters close to shore.

3.2 Other Infrastructure

A number of subsea cables run across the Bluemull Sound at a distance of at least 250m south of the array site (purple wavy lines in Figure 3-1)

3.3 Information on Prevailing Weather

Currents at the site can reach 6-8 knots during spring tides. Regarding wave conditions, the Bluemull Sound is classified by the MCA[2] as Category D, meaning "Tidal rivers and estuaries where the significant wave height could not be expected to exceed 2.0 metres at any time". Wind data for Lerwick is shown in Figure 3-7.

3.4 Traffic Survey

A marine traffic survey was conducted drawing on the following information sources:

- Automatic Identification System (AIS) receiver located on Cullivoe Pier by Nova.
- Fishing activity data from the NAFC Marine Centre (NAFC).
- Consultation with the Shetland Fishermen's Association and the Shetland Shellfish Management Organisation.

3.4.1 Shetland Isles Overview

Shipping passes around the islands and several ferry routes and regular dry cargo trades run from the mainland and between the individual islands in Shetland. The oil terminal at Sullom Voe generates calls by tankers in excess of 250 metres in length together with oil rig and other support services. Construction work at Sullom Voe and at surrounding oil fields and development projects also generate vessel traffic. Shallow water and restricted navigation mean that these larger vessels avoid Bluemull Sound.

3.4.2 Cullivoe Pier

The Harbour at Cullivoe has an icehouse used by the fishing industry. The pier is primarily used by fishing and service vessels although there is also some leisure traffic and a small marina.

3.4.3 Ferry Services

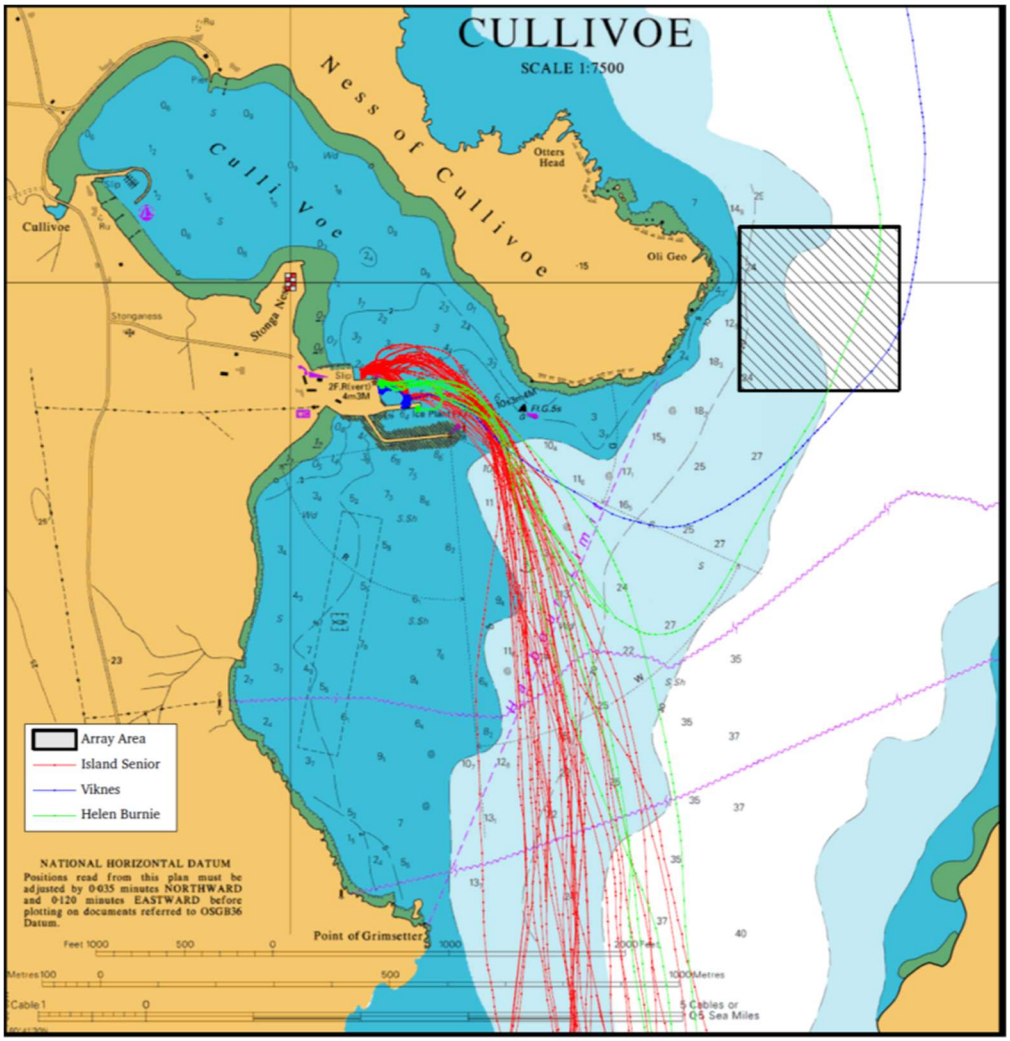
To the South of Bluemull Sound, approximately 2 km from the array site, ferries run between Gutcher, Belmont, and Hamars Ness. The ferry occasionally berths at Cullivoe Pier in poor weather or to refuel.

3.4.4 AIS Traffic Survey

AIS data was collected in Bluemull Sound over two 2-week periods, one in Summer (2nd to 15th of July 2014) and one in Winter (1st to 14th of February 2015). The results are shown in Figure 3-2 and Figure 3-3.

[2] Merchant shipping note MSN 1837 (M), Categorisation of Waters

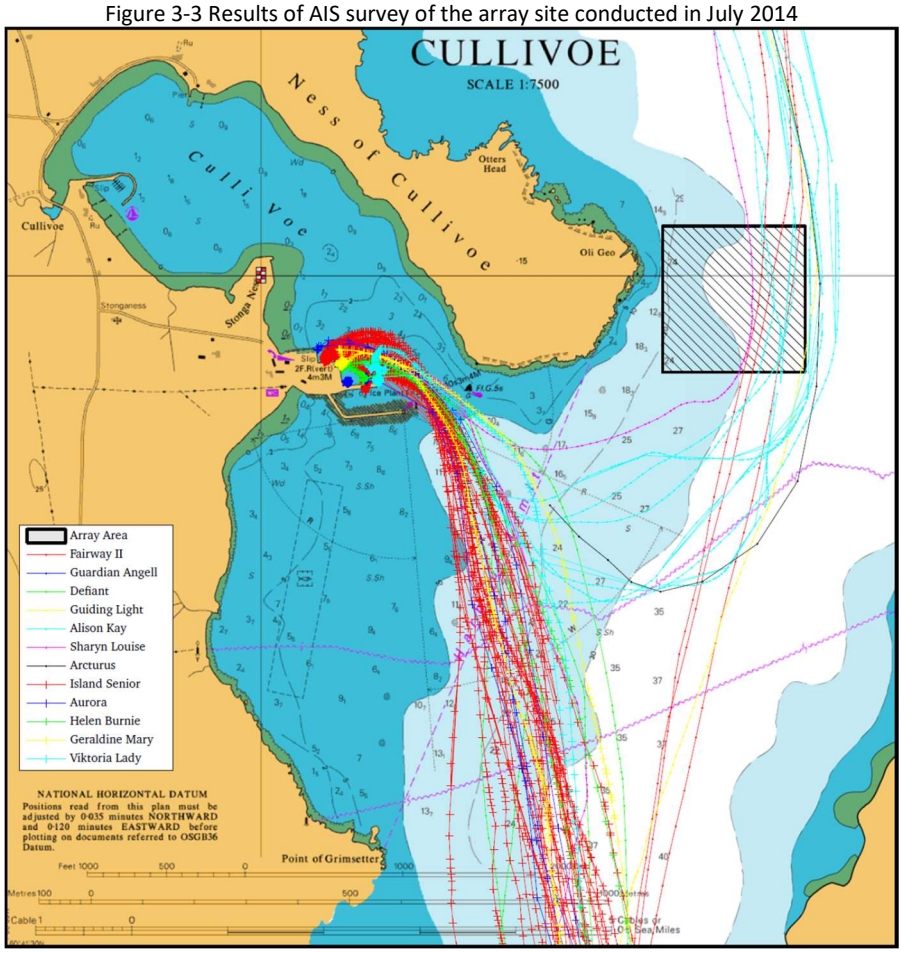
Figure 3-2 Results of AIS survey of the array site conducted in February 2015



Source: Copyright Nova Innovation 2018 ©

During the winter AIS survey only two vessels were observed passing over the array site (one traverse per week). Both vessels were travelling to or from Cullivoe Pier and crossed the deep water (30 m+) area to the East of the array site.

Figure 3-3 Results of AIS survey of the array site conducted in July 2014



Source: Copyright Nova Innovation 2018 ©

During the Summer AIS monitoring there was an increase in traffic compared to the winter survey: the site was traversed eight times by four different vessels during the survey period (approximately one traverse every two days): four times by vessels travelling to/from Cullivoe Pier; four times by vessels passing through the Sound. The observed seasonal variation in activity was confirmed in consultation with local seafarers, and through observation during operations undertaken by Nova at the site.

3.4.5 Non AIS Traffic

Much of the traffic using Bluemull Sound consists of smaller vessels which will not necessarily be fitted with AIS (mandatory for ships over 300 gross tonnes). This will include fishing vessels, service boats and leisure boats. Many of these vessels use Bluemull Sound as a transit route. The local harbour at Cullivoe also attracts vessels to the area along with a small marina for leisure boats.

To better understand the local traffic and site-specific issues, the position and size of the Shetland Tidal Array deployment area was discussed and agreed in consultation with Shetland Ports and Harbours, the Shetland Fishermen's Association and Shetland Shellfish Management Organisation. The position of the turbines was selected to avoid any area used for safe anchorage and to minimise any risk to shipping in the area. It was agreed that 15 metres would be adequate draft clearance for the deployment area selected. It was also agreed that the site would not be permanently marked by a buoy (or similar device) as this could create a hazard to shipping.

3.4.6 Fishing activity

Consultation with local professional fishing and recreational angling bodies confirmed that that the array site is not used for commercial or recreational fishing activities.

3.5 Nature Designations

3.5.1 Habitats Regulation Appraisal

The Shetland Tidal Array is located near multiple "Natura sites". These include Special Areas of Conservation (SACs), designated under the European Habitats Directive[3] for the protection of certain habitats and species and Special Protection Areas (SPAs), designated under the EU Birds Directive[4] for the protection of certain bird species.

The EU Habitats and Birds Directives are transposed into domestic law in Scotland by The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 (previously The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)). These are commonly referred to as the 'Habitats Regulations'.[5]

The Habitats Regulations require Marine Scotland to undertake a Habitats Regulations Appraisal (HRA) of activities with the potential to affect Natura sites prior to issuing licences or consents for those activities. A Habitats Regulations Appraisal (HRA) allows Marine Scotland to:

- Determine whether the proposal is directly connected with or necessary to site management for conservation; and, if not,
- Determine whether the proposal is likely to have a significant effect on the site either individually or in combination with other plans or projects; and, if so, then
- Make an Appropriate Assessment of the implications (of the proposal) for the site in view of that site's conservation objectives.

Nova carried out an Environmental Assessment to support its application for a Marine Licence for the Shetland Tidal Array. This assessment provided information required by Marine Scotland to enable it to carry out its own HRA for the project. Nova's Environmental Assessment and Marine Scotland's HRA are available on Marine Scotland's website[6]. The HRA concluded that the construction and operation of the Shetland Tidal Array does not have with the potential to affect Natura sites.

An 'Environmental and Protected Species Risk Assessment' will be carried out to inform Nova's application for a marine licence for the decommissioning activity planned under EnFAIT. This will include an assessment of the potential effects on Natura sites, to inform Marine Scotland's HRA of the decommissioning activity. It will be informed by the original Environmental Assessment for the Shetland

[3] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992L0043 Accessed 08/06/2023.

[4] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, available at: http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32009L0147 Accessed on 14/08/2017

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992L0043 Accessed on 14/08/2017

[5] The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019

[6] https://marine.gov.scot/ml/shetland-tidal-array

Tidal Array but will be updated to take account of any new sites, and changes in legislation, policy or good practice at the time it is carried out.

3.5.2 Natura Sites

Consultation with Marine Scotland and SNH (now NatureScot) allowed Nova to identify Natura sites and their protected features that could potentially be affected by the Shetland Tidal Array, including decommissioning. At the time of writing, this is largely based on an assessment of the potential effects of project construction, as the environmental effects of decommissioning (which is largely construction in reverse) are likely to be very similar. An updated comprehensive environmental assessment will be undertaken in support of Nova's application for a Marine Licence for decommissioning, based on best available evidence at the time.

The Natura sites and features that could potentially be affected by decommissioning are detailed in the table below. On a precautionary basis these include sites located some distance from Bluemull Sound, taking account of foraging ranges of breeding seabirds[7] and marine mammals, as well as data from bird and mammal surveys that Nova has been conducting in Bluemull Sound since 2010[8]. Sites are listed in descending order of proximity.

Table 3.1 Natura sites and features that could potentially be affected by decommissioning of the Shetland Tidal Array

Natura Site	Qualifying Features
Bluemull & Colgrave Sounds SPA	• Red-throated diver (Gavia stellata), breeding
Yell Sound Coast SAC	• Harbour seal (Phoca vitulina) • Otter (Lutra lutra)
Hermaness, Saxa Vord & Valla Field SPA	• Fulmar (Fulmarus glacialis), breeding • Gannet (Morus bassana), breeding • Great skua (Catharacta skua), breeding • Guillemot (Uria aalge), breeding • Kittiwake (Rissa tridactyla), breeding • Puffin (Fratercula arctica), breeding • Red-throated diver (Gavia stellata), breeding • Shag (Phalacrocorax aristotelis), breeding
Yell Sound Coast SAC	• Otter (Lutra lutra)
Fetlar SPA	• Arctic skua (Stercorarius parasiticus), breeding • Arctic tern (Sterna paradisaea), breeding • Dunlin (Calidris alpina schinzii), breeding • Fulmar (Fulmarus glacialis), breeding • Great skua (Stercorarius skua), breeding • Red-necked phalarope (Phalaropus lobatus), breeding • Seabird assemblage, breeding • Whimbrel (Numenius phaeopus), breeding
Foula SPA	• Puffin (Fratercula arctica), breeding • Red-throated diver (Gavia stellata), breeding • Arctic tern (Sterna paradisaea), breeding
Mousa SPA	• Arctic tern (Sterna paradisaea), breeding
Noss SPA	• Gannet (Morus bassanus), breeding • Puffin (Fratercula arctica), breeding

[7] Thaxter C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W. & Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas, Biological Conservation. DOI: 10.1016/j.biocon.2011.12.009

[8] For further details see https://marine.gov.scot/ml/shetland-tidal-array

Of the Natura sites listed above, the features of Bluemull & Colgrave Sounds SPA, Yell Sound Coast SAC, and Hermaness, Saxa Vord and Valla Field SPA are most likely to be affected by decommissioning activity during EnFAIT due to their proximity to the Shetland Tidal Array.

3.5.3 European Protected Species and Basking Sharks

The Habitats Regulations further provide strict protection to certain species listed under Annex IV of the Habitats Directive "European Protected Species" (EPS). Activities that have the potential to disturb EPS require a licence from Marine Scotland.

Possible disturbance to basking shark, also strictly protected, under Schedule 5 of the Wildlife & Countryside Act 1981[9], as amended by the Nature Conservation (Scotland) Act 2004[10] must also be licensed by Marine Scotland. The need for licences to disturb EPS or basking shark will be discussed and agreed with Marine Scotland prior to decommissioning commencing.

3.5.4 Potential Impacts of the Decommissioning Process

The potential environmental impacts of decommissioning will be very similar to those during construction of the Shetland Tidal Array, as decommissioning is effectively the construction process in reverse. The potential impacts of the decommissioning process are detailed in the following tables, based on information in the Environmental Assessment carried out by Nova to support a Marine licence application for construction of the Shetland Tidal Array. An updated comprehensive environmental assessment will be undertaken in support of Nova's application for a Marine Licence for decommissioning, based on best available evidence at the time.

Table 3.2 Potential Impact of the Decommissioning Process for Marine Mammals and Basking Sharks

Potential impact	Potential for impacts
Barrier to Movement	The decommissioning is unlikely to have a significant impact on marine mammals and basking sharks, or significant effects on any SACs with marine mammal features. This is due to: • The temporary and extremely short duration of the decommissioning activities. • The lack of any particularly noisy marine works. • The use of multicat vessels which are common in the area.
Displacement of Essential Activities	
Underwater Noise and Vibration	
Surface Noise	

Table 3.3 Potential Impacts of the Decommissioning Process for Birds

Potential impact	Potential for impacts
Displacement of Essential Activities	The decommissioning is unlikely to have a significant impact on birds, or significant effects on any SPAs. This is due to: • The temporary and extremely short duration of the decommissioning activities. • The lack of any particularly noisy marine works. • The use of multicat vessels which are common in the area.
Underwater Noise and Vibration	
Surface Noise	

[9] Wildlife and Countryside Act 1981, available at: http://www.legislation.gov.uk/ukpga/1981/69

[10] Nature Conservation (Scotland) Act 2004, Available at: http://www.legislation.gov.uk/asp/2004/6/contents

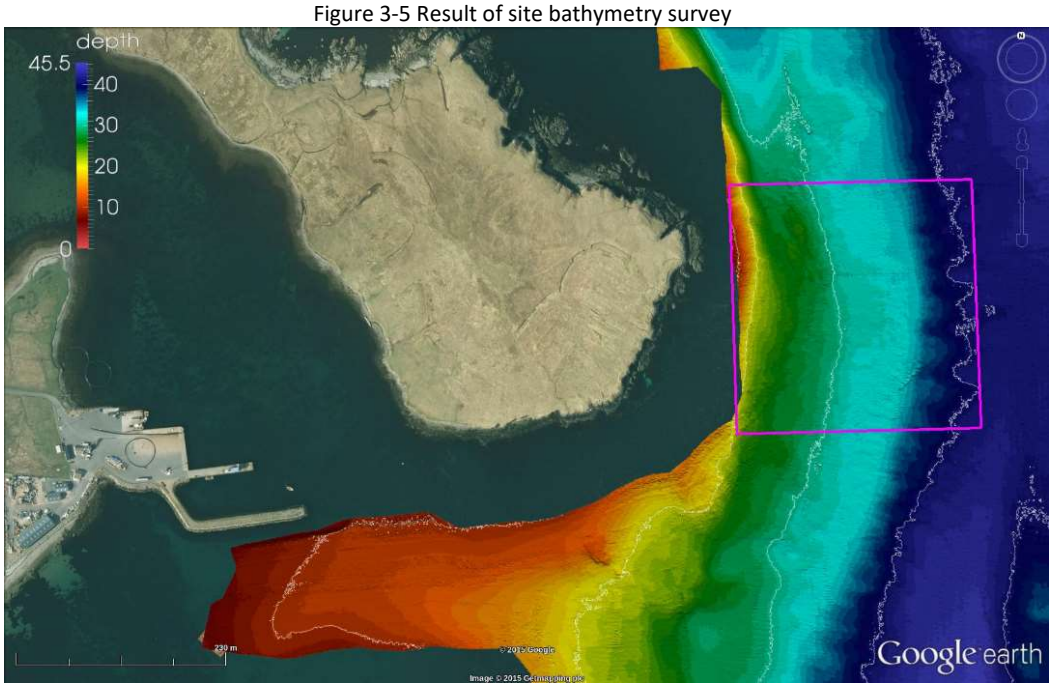
3.6 Seabed and Physical Conditions

Site surveys have been undertaken using drop down underwater cameras to establish the nature of the seabed. The sea bottom at the site consists of relatively flat shattered rock and small boulders that form a stable seabed.

Figure 3-4 Still picture from ROV footage on the array site

Source: Copyright Nova Innovation 2018 ©

Figure 3-5 Result of site bathymetry survey

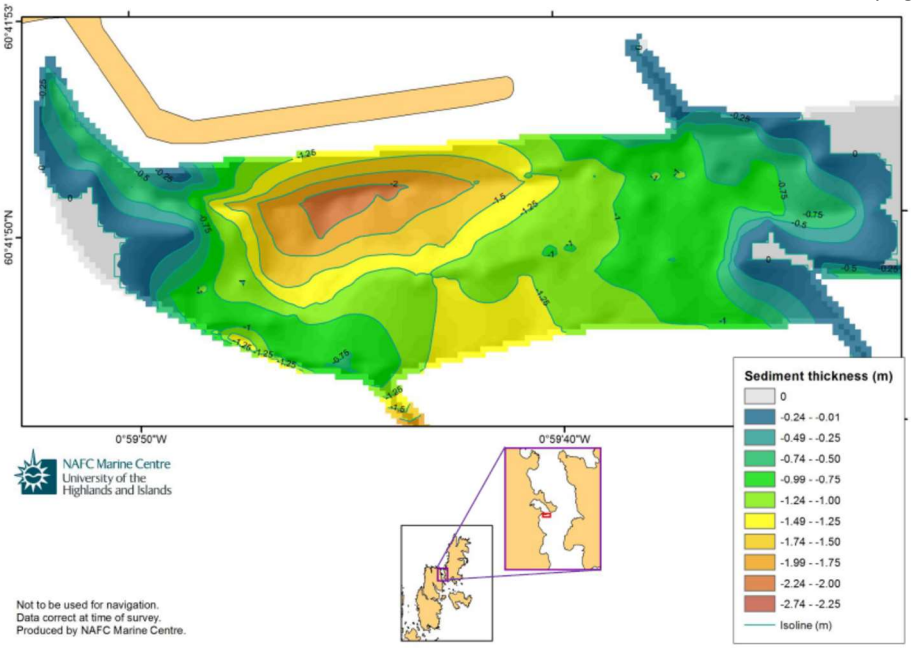


Source: Copyright Nova Innovation 2018 ©, Google earth

Figure 3-5 shows the results of the bathymetry survey, which indicates that the depth in the array area varies relatively smoothly from 10 m depth at the west of the site to 40 m depth at the east.

A sub-bottom survey has been conducted, with the results shown in Figure 3-6. The survey found no soft sediment in the array area or along the majority of the cable route. Soft sediment was located along the cable route from the entrance to the harbour and along the south side of the harbour breakwater. The deepest sediment was found to be 2.2m thick and located to the south of the breakwater.

Figure 3-6 A zoomed in view of the total sediment thickness drawn at 250 cm intervals with overlaying isolines

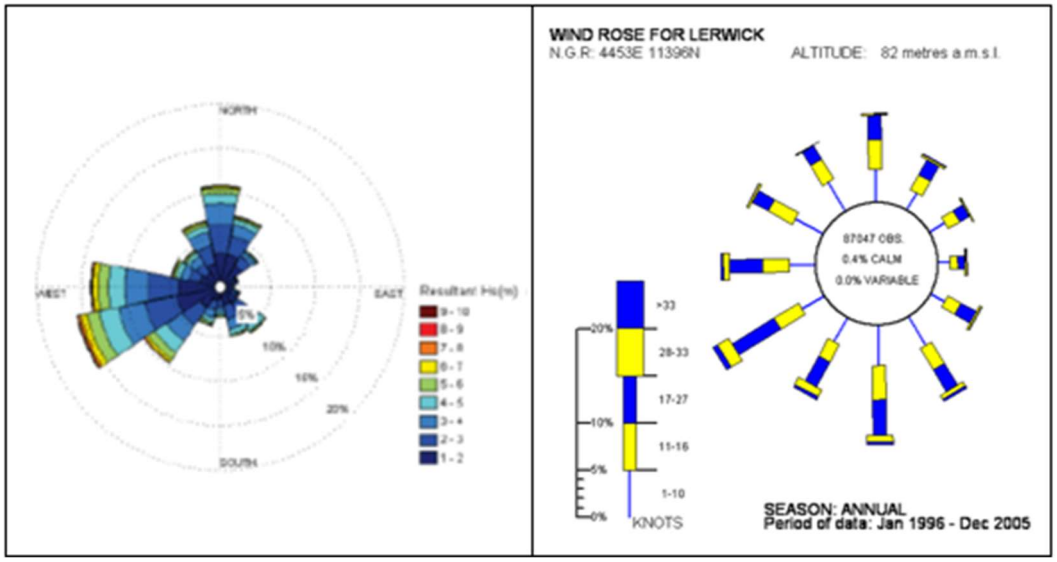


Source: NAFC Marine Centre. Copyright © Nova Innovation 2018

3.7 Metocean Conditions and Weather Conditions

Wave and wind data for Shetland are shown in Figure 3-7.

Figure 3-7 Left: wave rose, west of Shetland (offshore); Right: wind rose for Lerwick



Source: Shetland Island Council, Shetland Marine Resource Study 2011, Met Office

Sea state at the turbine location was estimated with reference to the Shetland Tidal Resource Study[11]. This found that the wave regime to the west of Shetland was relatively stable throughout the year, with waves incident predominantly from the West, a mean wave height 2-4 m, a period of 7-8 seconds, and an extreme annual significant wave height[12] of 8 m.

In contrast, because the Bluemull Sound is a narrow channel sheltered from the prevailing winds, the mean wave height in the Sound was found to be less than 0.6 m. Assuming the ratio of maximum to mean wave height is the same in the Sound as offshore, the maximum significant wave height experienced in one year would be less than 2 m. This is consistent with the classification of the Bluemull Sound by the MCA[13] as Category D, meaning "Tidal rivers and estuaries where the significant wave height could not be expected to exceed 2.0 metres at any time". This assessment is also consistent with sea conditions observed during offshore operations conducted by Nova at the site since 2014.

4 Description of Items to be Decommissioned

4.1 Layout of the Facilities and Site Location

The proposed layout of the facilities is provided in Section 3.1.

4.2 Development Elements

The development consists of the following elements:

- Nova M100 turbine nacelles, including rotor modules
- Power cables connecting turbines to shore
- Nova M100 gravity foundations, incl. steel substructure and concrete ballast

4.3 Nova M100 turbine Description (T1-T3)

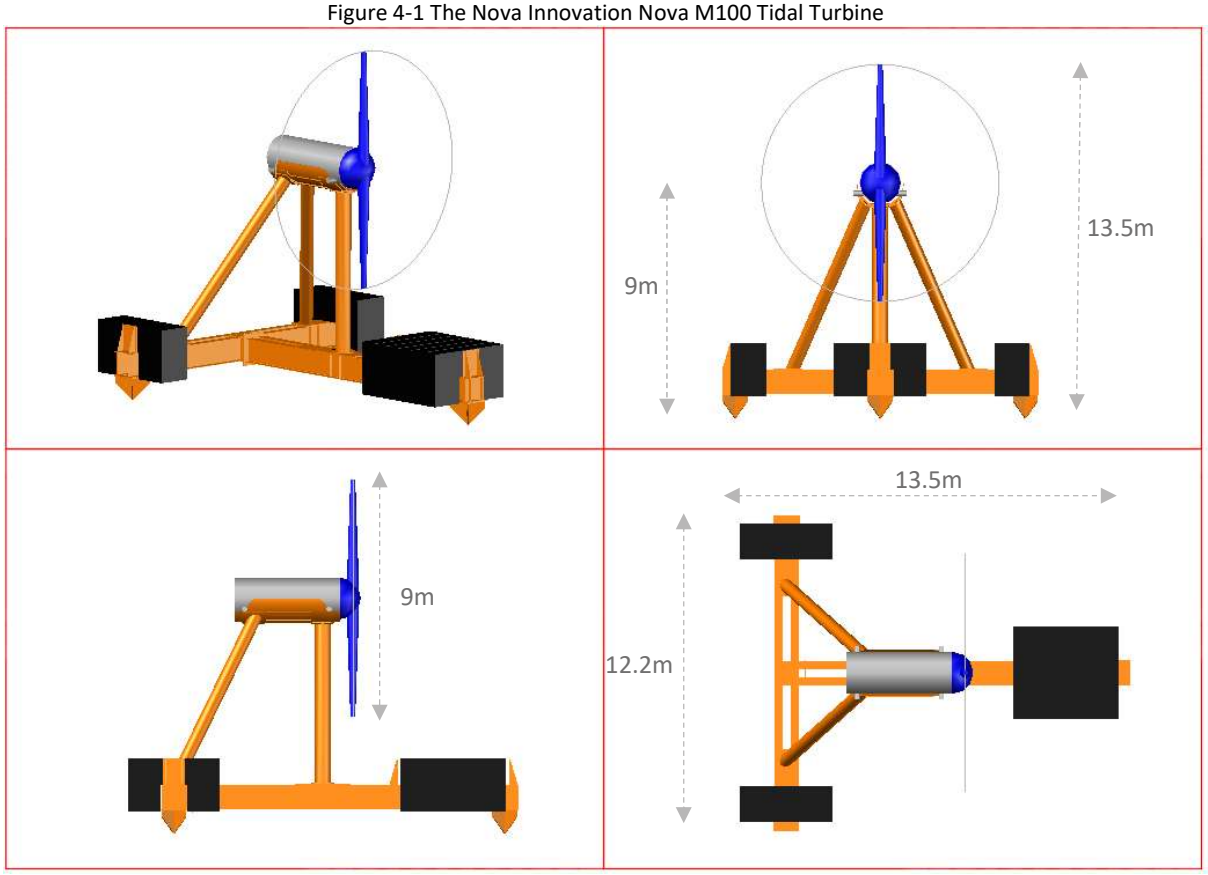
A representative image of the Nova Innovation 100 kW (Nova M100) device is shown in Figure 4-1. Each tidal turbine assembly comprises a cylindrical nacelle unit, rotor and gravity base foundation (made up of a steel frame and concrete ballast) to secure it to the seabed. No seabed drilling, cutting or additional site works are required for removal. The negatively buoyant nacelle is connected to the foundation by means of secure mating system.

[11] Shetland Islands Wave and Tidal Resource, Shetland Island Council 2011.

[12] Significant wave height is defined as the mean height (trough to crest) of the highest third of waves.

[13] Merchant shipping note MSN 1837 (M), Categorisation of Waters

Figure 4-1 The Nova Innovation Nova M100 Tidal Turbine



Source: Copyright Nova Innovation 2018 ©

For the devices to be decommissioned (T1- T3), the turbine has a rotor diameter of 9 m, and a hub height of 9 m, making the maximum height 13.5 m from the bottom of the feet to the tip of the blades. In the Shetland Tidal Array the devices will be installed in water depths greater than 30 m, so clearance will be more than 15 m below mean tide. The footprint of the device is 13.5 x 12.2 m, and the weight in air of the entire structure (steel foundation, concrete ballast, nacelle and turbine) is 145 tonnes.

The three M100-D turbines (T4-T6) have a similar but slightly modified turbine design, covered in detail in the DP associated with these turbines.

4.4 Foundation Description

The foundation consists of a solid, painted steel structure, as shown in yellow in Figure 4-1. The foundation sits on three feet consisting of triangular steel plates. Ballast consisting of x14 reinforced concrete blocks sits on top of the three feet (the grey blocks in Figure 4-1). This ballast comprises:

- x6 ballast blocks over the forward foot
- x4 ballast blocks over each of the two aft feet

4.5 Cable Connections at Turbines

The cables are connected via subsea electrical connectors. For removal, the turbine nacelle is lifted to the surface and secured to the recovery vessel; the cable can then be disconnected manually on the vessel.

4.6 Sub-Sea Cables (T1-T3)

Three sub-sea cables run from the site to the shore, making landfall at the South of the breakwater at Cullivoe Pier. The length of each cable is in the range 800 to 1200 m, depending on the location within the array. The cables include two armour layers and a hard, HDPE outer shell, bringing extra stability and robustness compared to alternative cable designs.

5 Decommissioning Process

This section outlines the decommissioning processes for the array. Processes have been updated as the project progresses to reflect changes in (for example) industry best practice, national and local regulations, port facilities, vessel technology, lessons learned from the decommissioning of the Nova 30 turbine in 2016 (detailed in EnFAIT-EU-0028 – D7.1) and lessons learned from marine operations at the Shetland Tidal Array throughout the EnFAIT project. A detailed Decommissioning Method Statement will be produced in support of an application to Marine Scotland for a Marine Licence for the decommissioning process.

5.1 Overview of Decommissioning Process

Decommissioning involves removing the turbines, foundations, cables, and associated equipment to shore for recycling or disposal and surveying the site to confirm all equipment has been removed. Decommissioning is to be completed using one vessel mobilisation and incorporates the following stages:

1. Each turbine nacelle is physically unlatched, electrically isolated, and lifted by the vessel from the turbine foundation to the surface. The cable is disconnected at the surface and any additional cable protection is removed. The cable is spooled onto a drum on the vessel and recovered to shore.

2. The shore end of the cable is cut and pulled through the intertidal zone via the cable spooler on the vessel.

3. A lifting beam is lowered from the vessel and attached to the base, which is lifted by the vessel and removed to a shallow location out with the tidal flow.

4. A ballast recovery tool is lowered from the vessel forward crane onto the ballast blocks, which is to secure the blocks individually and recover to surface.

5. The bare foundation is lifted to Belmont quayside and is recovered with the shore crane.

6. Once onshore, all components will be recycled or disposed of in accordance with relevant recycling and waste disposal procedures.

7. The offshore site is surveyed to ensure all equipment has been removed.

5.2 Port Options for Decommissioning

During the decommissioning process, the ports of Cullivoe (1km from the array site) and Belmont (3km from the site) on the Bluemull Sound will be used. Recycling facilities at the Port of Lerwick (~80km distant) can also be used, with transport options available via vessel or road.

6 Vessels, Equipment and Facilities

The vessel used during the decommissioning process of the M100 devices (T1-T3) will be the Multicat shown in Figure 6-1. This was the same vessel used to initially deploy turbines T2 and T3. To complete the cable recoveries a cable reeler will be required on the vessel. A mobile crane and flat-bed trucks will be required for onshore decommissioning. Appropriate, certified lifting gear will be required for all lifts.

6.1 Vessels Used in Decommissioning

All offshore elements of the array will be removed using a Multicat vessel, like the one shown in Figure 6-1. Because of the small size of the turbine, relatively small vessels can be utilised: at time of writing there are approximately 25 vessels of similar specification operating in UK waters.

Figure 6-1 Representative array decommissioning vessel

Source: Leask Marine

7 Environmental Impact Assessment

A Marine Licence will be required from Marine Scotland, on behalf of Scottish Ministers, prior to decommissioning. A formal Environmental Impact Assessment[14] will not be required for this activity. However, Nova always operates in a manner that demonstrates exemplary environmental practice and stewardship, so the application for this marine licence will be supported by a detailed Environmental and Protected Species Risk Assessment.

This Environmental and Protected Species Risk Assessment will provide an assessment of the potential environmental effects the decommissioning, including any effects on Marine Protected Areas (MPAs) and Priority Marine Features (PMF). The document will also assess the potential effects on "Natura" sites, including Special Areas of Conservation (SAC) and Special Protection Areas (SPA) and the potential for the activity to disturb marine species that are subject to strict protection ("European Protected Species" – EPS), as described in Annex IV to Council Directive 92/43/EEC. This assessment will build on the information provided in section 3, based on the requirements of legislation and guidance, and best available evidence at the time.

8 Consultation with Interested Parties

Prior to decommissioning, the following parties will be consulted with as a matter of good practice and as part of the process of securing the Marine Licence for decommissioning:

- Marine Scotland
- Maritime and Coastguard Agency
- Shetland Ports and Harbours
- NatureScot
- Northern Lighthouse Board
- Shetland Fishermen's Association
- Shetland Shellfish Management Organisation
- Shetland Coastguard Operations Centre
- UK Hydrographic Office
- Shetland Islands Council
- Recreational Boating Associations
- Recreational Angling Associations
- Crown Estate Scotland
- Scottish Environment Protection Agency (SEPA)

Consultations will be conducted via telephone, face to face or email.

9 Waste Management

Any material that can be reused (e.g. mechanical or electrical components) will be transported from the site and stored by Nova Innovation for re-use. Material that can be recycled (such as steel and cables) will be recycled using facilities in Shetland.

[14] Under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 201700 (as amended) or the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended).

The following are estimates of the maximum amount of material requiring recycling:

- Steel/iron, 300 tonnes
- Plastic/synthetic/mixed, 180 m^2
- Concrete, 300 m^3
- Cable, 6.6 km

10 Restoration and Seabed clearance

All the components from the M100 devices (T1-T3) will be removed from the water. Clearance of the site will be verified through underwater video survey at the end of the decommissioning operation.

11 References

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