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### NOTICE

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## **Executive Summary**

This updated Cable Plan (CaP) has been prepared to discharge Condition 3.2.2.4 of Nova Innovation's Marine Licence Number 06642/18/0 for the Shetland Tidal Array (as extended). An earlier Cable Plan for the project was published in August 2015, as required by previous project licences. This Cable Plan replaces that version.

The purpose of the CaP is to ensure all environmental and navigational issues are considered for the location and construction of the subsea cables for the Development.

The CaP establishes the policies and measures required to manage the environmental and navigational issues of the Development prior to construction, through construction and operation of the Development.

The CaP presented within this document is considered sufficient to satisfy Condition 3.2.2.4 and enable the construction and operation of the Development to progress, subject to the CaP being implemented.

The CaP will be presented to Marine Scotland for distribution to the relevant stakeholders.

## 1 Introduction

The Nova Innovation Shetland Tidal Array (“the Development”) received a Marine Licence (06642/18/0) from Scottish Ministers (“the Licence”) in April 2018. This replaces a previous licence (04859/15/0) granted in 2014 and covers the extension of the Shetland Tidal Array as part of the EnFAIT project (see Section 1.1)

This CaP is prepared to enable Condition 3.2.2.4 of the Licence (“the Condition”) to be discharged. The Condition states:

*The Licensee must, within three months of the issue date of this licence, submit a Cable Plan (CaP) (to include Cable Protection Risk Assessment) in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with SNH and any other such advisors or organisations as may be required at the discretion of the Licensing Authority. The CaP must be in accordance with the Environmental Assessment Report.*

*Any consent cable protection works must ensure existing and future safe navigation is not compromised. The Licensing Authority will accept a maximum of 5% reduction in surrounding depth referenced to Chart Datum.*

This document sets out Nova Innovation’s intended approach to satisfy this Condition. Where relevant, it cross-references other documents.

### 1.1 EnFAIT project background

The Shetland Tidal Array project incorporates activity from the Enabling Future Arrays in Tidal (EnFAIT) project, which is briefly introduced below.

Nova Innovation was awarded a major new European tidal energy project, heading a consortium of nine leading industrial, academic and research organisations from across Europe.

The EnFAIT project builds on Nova’s existing operational tidal power station in Bluemull Sound off the Shetland Islands in Scotland, which was the world’s first grid connected offshore array of tidal energy turbines.

The project, which begins in July 2017 and will run until June 2022, has been won as a competitive contract awarded by the European Union’s Horizon 2020 research and innovation programme to develop marine energy sources and demonstrate technologies in European waters. The project is a flagship initiative for the EU and marine energy and aims to increase the commercial viability of tidal power.

It will extend the Bluemull Sound array to six turbines and demonstrate that high array reliability and availability can be achieved using best practice maintenance regimes. The layout of the turbines will be adjusted to enable array interactions and optimisation to be studied for the very first time at an operational tidal energy site.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement No 745862.

## 2 Scope of Cable Plan

The CaP applies to the Development which incorporates associated cables. The CaP may also cross reference other existing plans as required under the Licence, including the Construction Method Statement (CMS).

Where relevant the CaP makes reference to industry best practice guidance notes such as:

- Subsea Cables UK (2012) The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters; and
- ICPC (2009) Fishing and submarine cables: working together.

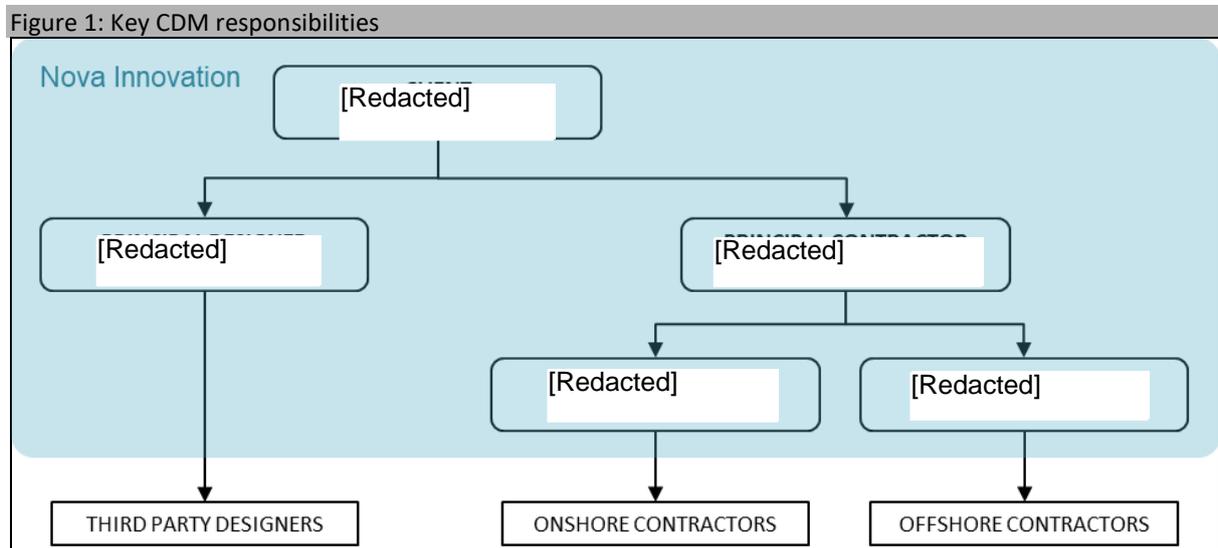
It is intended that the CaP will be regularly reviewed, and revisions approved by the Scottish Ministers in accordance with the Condition. The Development will, at all times, be constructed and operated in accordance with the approved CaP (as updated and amended from time to time by Nova Innovation Ltd). Any updates or amendments made to the CaP by Nova Innovation Ltd will be submitted, in writing, by Nova Innovation Ltd to the Scottish Ministers for their written approval.

## 3 Communications plan

### 3.1 Responsibilities and Ownership

The CaP has been prepared by Nova Innovation Ltd with input from the company's suppliers and contractors.

Nova Innovation has primary responsibility for implementing the CaP and, in line with the UK Construction (Design and Management) Regulations 2015, is acting as client, principal designer and principal contractor for the Development. To ensure accountability, named individuals within Nova Innovation are appointed to these different roles (Figure 1).



Source: Nova Innovation 2018

### 3.2 Organisational Chart for Cable Operations

Figure 3.2 shows the responsibilities of the different organisations involved with the planned cable operations.

Figure 3.2 Organisational chart



Source: Copyright © Nova Innovation 2018

Nova Innovation is responsible for all onshore works and will supply all materials to the Offshore Contractor. As such, the only interface with direct relevance to the CaP is between Nova Innovation and the Offshore Contractor. Nova Innovation and the Offshore Contractor will be the only parties on-site as construction associated with the CaP progresses. Nova Innovation is responsible for communicating the CaP to the Offshore Contractor and for reporting progress to Marine Scotland.

### 3.3 Reporting

Marine Scotland will be informed in advance and on completion of any project work associated with the CaP. Where relevant, additional updates on construction activity will be reported to Marine Scotland. Marine Scotland will be responsible for coordinating dissemination to wider stakeholders (e.g. Joint Nature Conservation Committee (JNCC), Scottish Natural Heritage (SNH), and the Maritime and Coastguard Agency (MCA)).

## 4 Consultation

### 4.1 Consultation on the CaP

Following submission of this Cable Plan, under the requirements of Condition 3.2.2.4 of Marine Licence 06642/18/0, Marine Scotland will consult with SNH and any such other advisors or organisations as may be required at their discretion. Nova envisage that consultation with the following bodies may be beneficial:

- Shetland Islands Council
- Shetland Ports and Harbours
- Maritime and Coastguard Agency
- Northern Lighthouse Board
- Scottish Natural Heritage
- Shetland Fishermen's Association
- Lerwick Boating Club
- Shetland Shellfish Management Organisation (SSMO)
- Scottish and Southern Energy
- British Telecom

## 4.2 Ongoing CaP Consultation

Any changes to the CaP will be communicated to the parties above by email and telephone.

# 5 Environmental and Navigational Sensitivities

This section sets out the main environmental and navigational sensitivities associated with the Development. Detailed information regarding the sensitivities of the receptors to the Development are provided in the Project Environmental Management Plan (PEMP) and the Navigational Risk Assessment (NRA).

## 5.1 Environmental sensitivities

As detailed in the PEMP, a video survey of the site and cable route will be conducted prior to installation using a subsea camera lowered from a survey vessel. The survey will identify the location and extent of any benthic habitat or species on the recommended Marine Priority Features list. The survey will be used to inform the precise location for device and cable deployment.

## 5.2 Navigational sensitivities

Cable routes have been selected to avoid anchorage areas and to minimise any risk to shipping in the area.

During construction, all vessels involved in the cable works will comply with all aspects of the International Regulations for Preventing Collisions at Sea (COLREGS). The vessels used will carry all equipment as required under the vessels' registration, e.g. the Code of practice for the safety of small workboats and pilot boats. Notice to Mariners will be circulated to an agreed list of stakeholders and information will be provided to SEAFISH for the publication of Kingfisher maritime safety bulletins. Temporary buoys will comply with the relevant aspects of COLREGS (e.g. vessel mooring buoys) or NLB/IALA requirements (e.g. marker buoys) as appropriate.

A video survey will be conducted of each cable in order to confirm the cable has been deployed correctly and to determine the precise cable coordinates for communication to UKHO.

# 6 Nova Innovation Commitments

This section provides an overview of the commitments made in the PEMP and NRA of relevance to the Cable Plan. This will be updated to reflect any changes made to these documents, as approved by Marine Scotland.

## 6.1 Project Environmental Monitoring Plan (PEMP)

Nova are in the process of finalising the PEMP for the Shetland Tidal Array (as extended), through discussion with Marine Scotland, Shetland Islands Council and their advisors. Once in place, the PEMP will set out all measures Nova will take to comply with the environmental requirements of the licences for the project, including environmental monitoring. Whilst the PEMP has yet to be finalised, those measures detailed within the existing Environmental Monitoring and Mitigation Plan relating to the Cable Plan will transfer across to the PEMP. These are detailed in Table 6.1 (over).

Table 6.1 Commitments relevant to the CaP to be made in the PEMP

Commitment	Description	Implementation in the CaP
Pre-deployment benthic survey	A video survey of the site and cable route will be conducted using a subsea camera lowered from a survey vessel. The survey will identify the location and extent of any benthic habitat or species on the recommended Marine Priority Features list. The survey will be used to inform the precise location for cable deployment.	Section 5.1
Post-deployment benthic survey	A video survey will be conducted of the cables after deployment, to confirm the cable has been deployed correctly and to determine the cable coordinates for communication to UKHO.	Section 5.2 Section 11
Reporting	Reports will be submitted to Marine Scotland at a frequency and according to a format to be agreed within the PEMP. An update on the cable status will be included in these reports, as appropriate.	Section 3.3

Source: Copyright © Nova Innovation 2018

## 6.2 Navigational Risk Assessment

Table 6.2 Commitments relevant to the CaP made in the NRA

Commitment	Description	Implementation in the CaP
Notice of works	Promulgation of Navigational Warnings will take place ahead of all phases of the project including planning, construction, operation and decommissioning. Notice of works will be promulgated through Notices to Mariners and direct contact with Marine Scotland and other bodies such as the UKHO where appropriate.	Section 5.2
Vessel compliance	All vessels involved in the installation, maintenance and decommissioning of the device will comply with all aspects of the International Regulations for Preventing Collisions at Sea (COLREGS). All vessels used will carry all equipment as required under the vessels' registration, e.g. the Code of practice for the safety of small workboats and pilot boats.	Section 5.2
Marker buoys	Any temporary buoys used during operations will comply with COLREGS (e.g. for vessel mooring buoys) or NLB/IALA requirements (e.g. for marker buoys) as appropriate.	Section 5.2
Updating navigational charts	A video survey will be conducted of the cables after deployment, to confirm the cable has been deployed correctly and to determine the precise cable coordinates for communication to UKHO.	Section 5.2 Section 11
Emergency response	Before installation commences, Nova Innovation will consult with the project's Offshore Energy Liaison Officer from the MCA Coastguard Operations Centre (CGOC) to develop an Emergency Response Cooperation Plan (ERCoP) for the project. This plan will include a familiarisation programme to train project staff on	Section 12

Source: Copyright © Nova Innovation 2018

### 6.3 Consent Conditions

Table 6.3 Commitments relevant to the CaP from Marine Licence 06642/18/0 for the Shetland Tidal Array.

Commitment	Description	Implementation in the CaP
Notice of vessels	The vessels, vehicles, agents, contractors or sub-contractors appointed to engage in the Works must be notified to the Licensing Authority under prior to their engagement in the Works.	Section 7.1
Reporting	Submit reports to the licensing authority at a frequency determined by the PEMP.	Section 3.3
Environmental protection	All reasonable, appropriate and practicable steps are taken at all times to avoid or minimise any damage to the Scottish marine area caused as a result of the undertaking of the licensed activities. Works are to be conducted in strict accordance with the PEMP.	Section 5.1
Updating navigational charts	UKHO will be notified of both commencement and progress of the Works, and on completion of the Works supply 'as built plans', in order that all necessary amendments to nautical publications are made.	Section 5.2 Section 11
Notice of works	Promulgation of Navigational Warnings, via Notices to Mariners ahead of all phases of the project including planning, construction, operation and decommissioning.	Section 5.2
Post consent plans	Works shall be conducted in accordance with an agreed Navigational Risk Assessment, Cable Plan (to include cable protection risk assessment) and ERCoP.	This CaP and Cable Protection Risk Assessment

Source: Copyright © Nova Innovation 2018

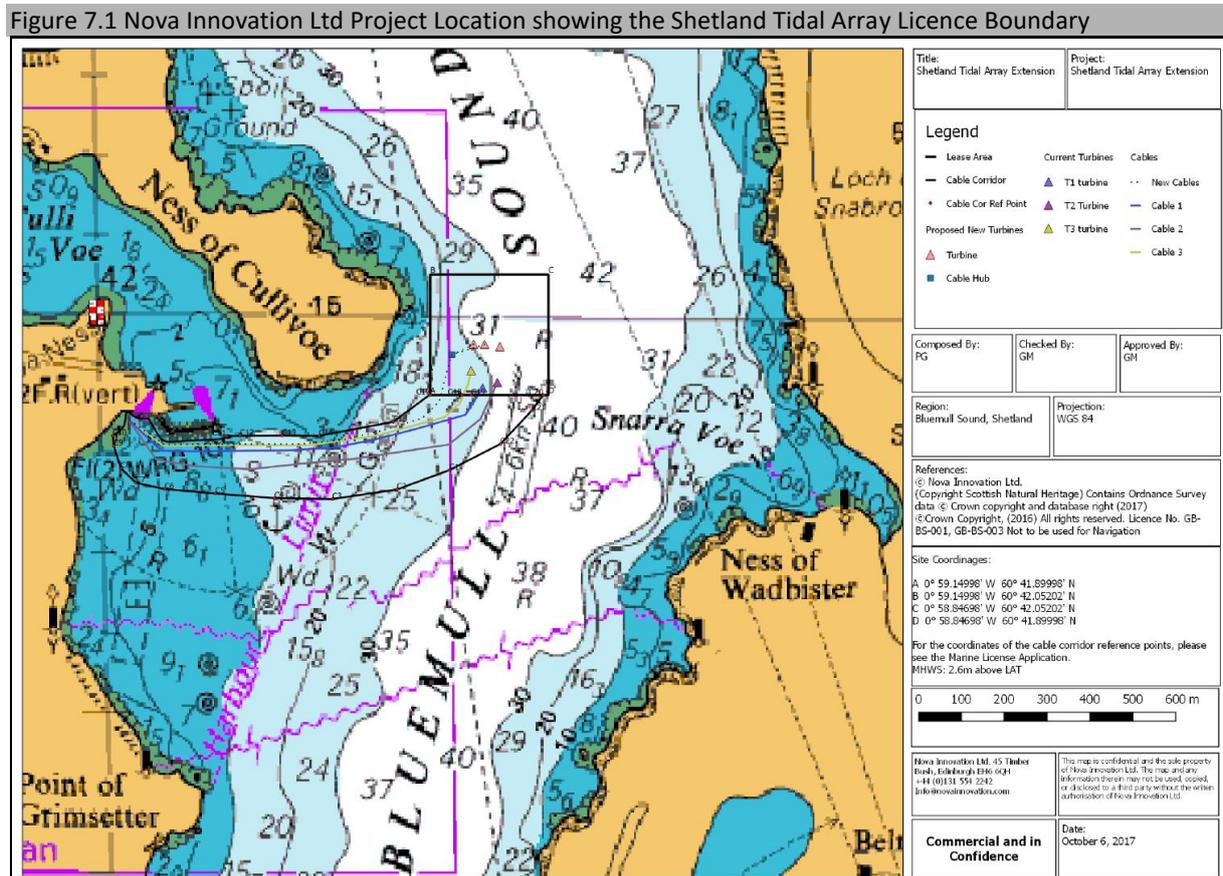
Nova is establishing a register of consent conditions, setting out each of the requirements, the corresponding action required. The register will be updated to maintain an audit trail of progress against each of the conditions. This register will be shared with Marine Scotland at regular intervals.

## 7 Cable Laying & Burial Techniques

This section provides overarching information regarding the proposed approach to installation of the array cables.

### 7.1 Proposed Locations of Cables

Figure 7.1 shows Nova Innovation’s licensed site area and cable corridor.



Source: Copyright © Nova Innovation 2018

In the current operations phase there are three cables led out from shore to the turbines T1, T2 and T3.

The following changes to the current cable layout are planned:

- A fourth cable for the T4 turbine will be installed along with the T4 turbine in Q2/Q3 2019
- A subsea hub and jumper cables for turbines T4-T6 will be installed along with turbines T5 and T6 in 2020

Note: design work to confirm exact turbine positions and cable lay coordinates is ongoing; this information will be communicated to the relevant parties in due course.

## 7.2 Transportation and Installation Vessels

The cables will be transported to site by road. A Multicat vessel similar to that shown in Figure 7.2 will be used to install the cables.

Figure 7.2 Representative cable installation vessel



Source: Delta Marine

The actual vessel to be used has yet to be finalised but will be notified to the licensing authorities in advance of any work taking place.

## 7.3 Proposed Cable Laying Techniques

The cable will be laid from the stern of the Multicat as a single length from the turbine location to the pier at Cullivoe (or from shore to offshore if required for operational reasons). A marker buoy connected to cable will temporarily mark the location of the cable turbine end. The cable is not buried or fixed to the seabed but incorporates double wire armouring and has been proven to be stable under its own weight on the seabed. The cable planned for use for the T4-6 turbines will be the same type that has been used successfully over the previous 3 years of operations on the Shetland Tidal Array.

## 8 Results of Survey Work

A number of site surveys have been undertaken over the previous years of operations on the Shetland Tidal Array and no significant impacts from the cables have been recorded. Underwater cameras will again be used to establish that the seabed in the area is free from hazards and to identify the nature of the seabed.

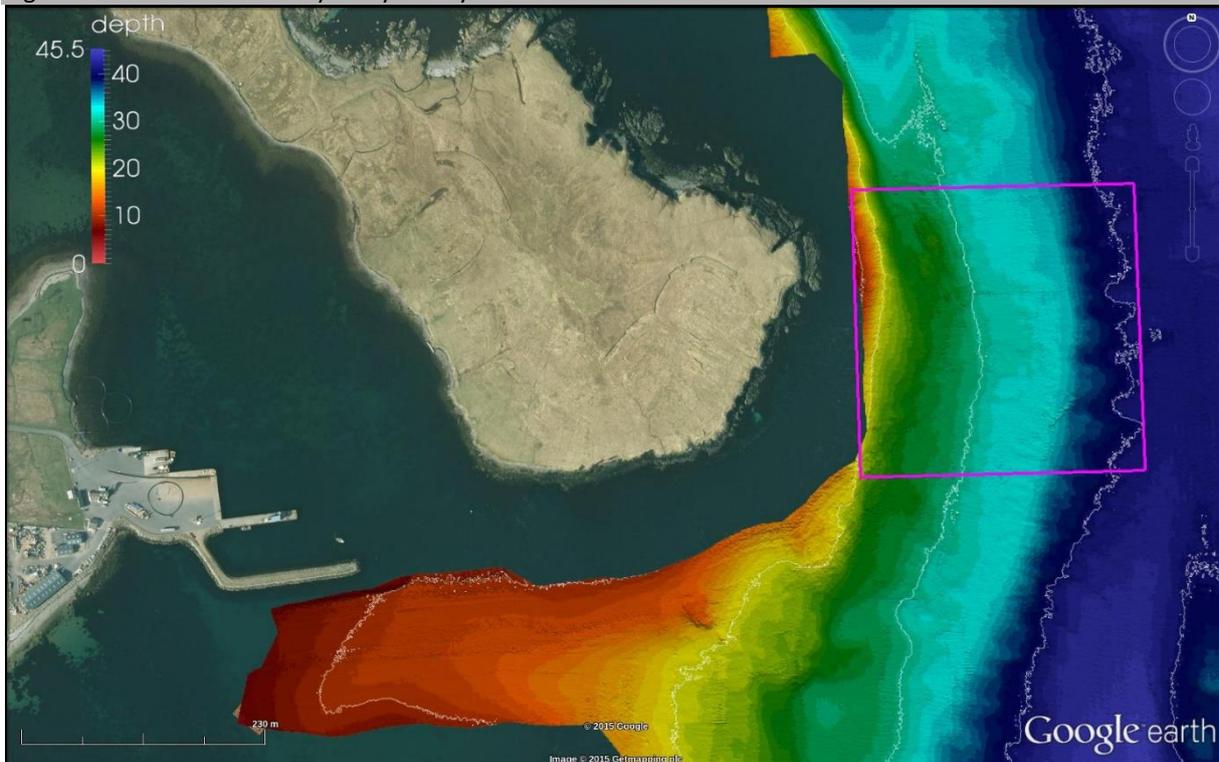
The sea bottom at the site consists of relatively flat shattered rock and small boulders that forms a stable seabed. An additional detailed survey of the sea bed in the designated area will be carried before any works begin.

Figure 8.1 Still picture from ROV footage on the array site



Source: Nova Innovation 2018 ©

Figure 8.2 Result of site bathymetry survey

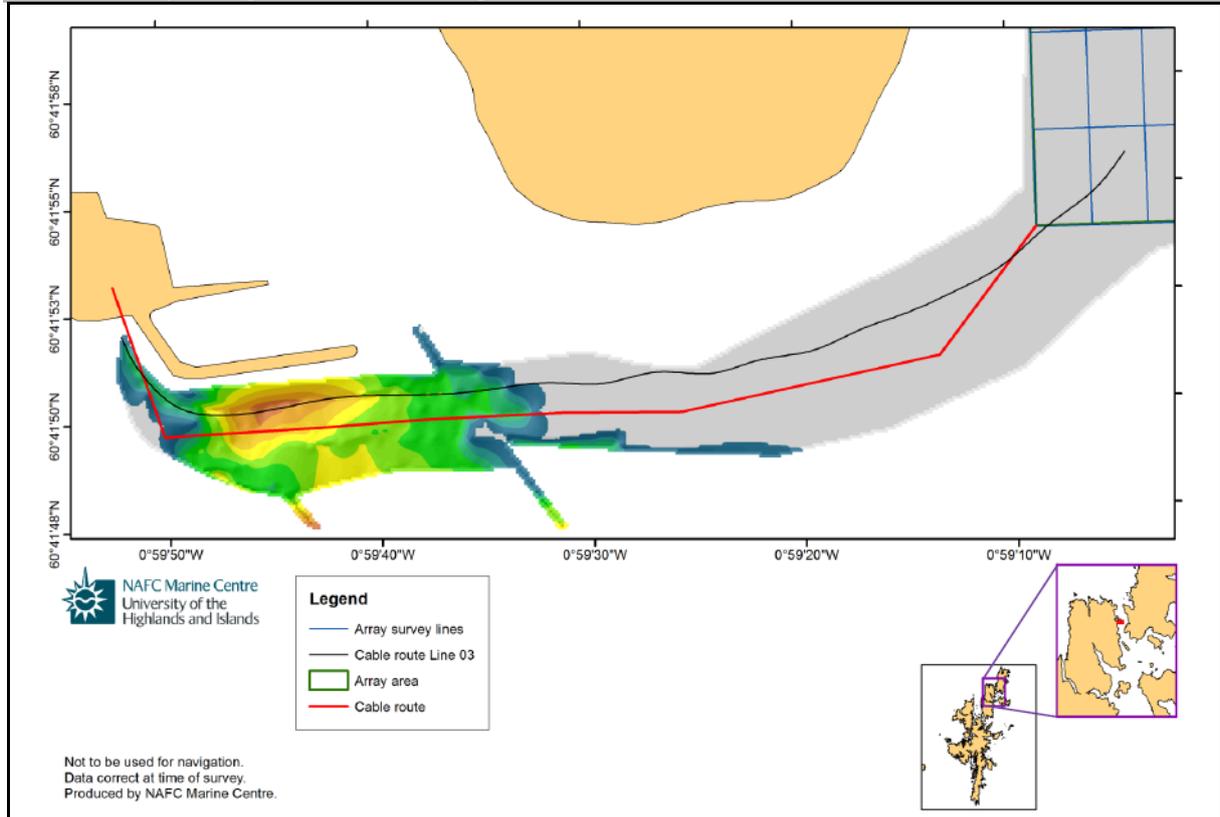


Source: Nova Innovation 2018 ©, Google earth

Figure 8.2 shows the results of the bathymetry survey, which indicates that the depth in the array area varies relatively smoothly from 10m depth at the west of the site to 40m depth at the east. The bathymetry survey was conducted to IHO Standard 1a.

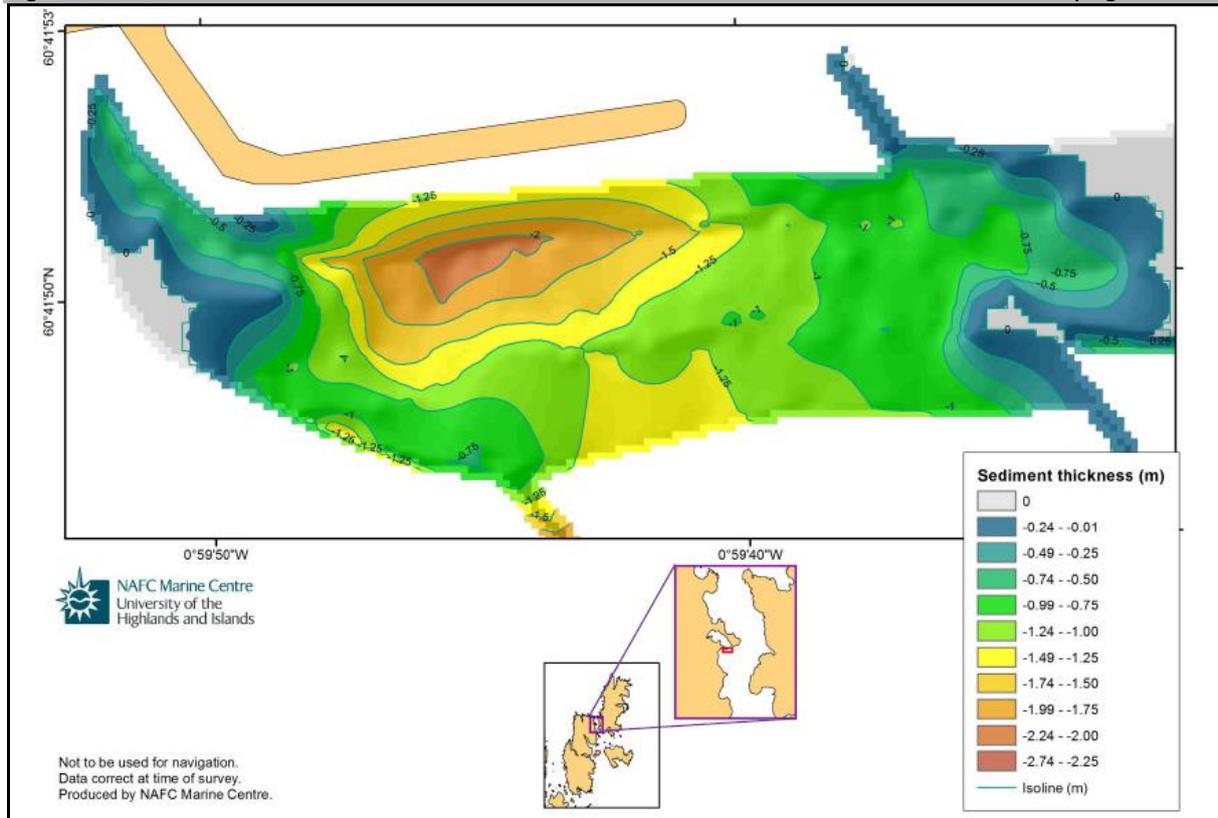
A sub-bottom survey was conducted in March 2014; the results are shown in Figure 8.3 with further detail in Figure 8.4.

Figure 8.3 Result of sub-bottom survey. Vessel track (black line); approximate cable route (red line) running from inside the array area (green box) and through soft sediment to shore.



Source: NAFC Marine Centre. Copyright © Nova Innovation 2018

Figure 8.4 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

The results show that no soft sediment was found 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 2.2 m thick and located to the south of the breakwater.

## 9 Technical Specification

The length of each cable is in the range 800 to 1200 m, depending on the location of the device within the array. Each cable will include two armour layers and a hard outer HDPE shell, bringing extra stability, robustness and electromagnetic shielding compared to alternative cable designs. The outer diameter of the cable will be 48 mm.

The primary EMF emitted directly from the cables will be shielded by the steel wire protection enclosing the cable, which acts like a Faraday cage – effectively stopping any electric fields. The magnetic fields and resultant induced EMF in the sea around the cable will be negligible. As a comparator any residual field will be much smaller than for the two single-armoured 33 kV cables linking Yell to Unst further south of Cullivoe.

## 10 Cable Protection Risk Assessment

A risk assessment of different cable protection options is described in a separate document provided under the previous licence: *Cable protection risk assessment 29072015.pdf*. The conclusion of the risk assessment is that hazards to the cables and to other users of the sea along the proposed route are as low as reasonably practicable.

The existing Nova Innovation cables have been installed on the site for three years without incident, demonstrating the validity of this approach.

## 11 Proposals for Cable Monitoring and Over Trawl Surveys

The final as-laid positions of any new cables will be surveyed after installation using video and GPS, and their location communicated to UKHO for recording on Admiralty charts.

During operation, cables will be surveyed approximately once per year or as required – e.g. should a snagging or other event occur. Significant changes to cable locations will be communicated to UKHO for recording on Admiralty charts. Updates on the status of the cable will also be included, as appropriate in monitoring reports to be submitted to Marine Scotland as per the requirements set out in the PEMP.

## 12 Emergency Measures and Contacts

The cables are designed not to be buried, so cable exposure is not a concern. Should an emergency occur relating to the cables (e.g. snagging) during construction, operation or decommissioning then the procedures outlined in the relevant Emergency Response Co-operation Plan (ERCoP) will be followed, as agreed with the MCA.

The first point of contact for emergency response will be the Offshore Manager, who will be on-call for the duration of construction phase operations. In the event that the Offshore Manager cannot be reached then the next point of contact is the Onshore Manager. Either the Offshore or Onshore Manager will be present in Cullivoe for the duration of the construction phase operations.

Emergency contact details are provided in the ERCoP agreed with and held by the MCA.

## 13 References

Subsea Cables UK (2012) The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters. Subsea Cables UK Guideline No 6, Version 4. Available online at: <https://knowledge.energyinst.org/search/record?id=87353> [accessed 11/07/2018]

ICPC (2009) Fishing and submarine cables: working together. International Cable Protection Committee. Available online at:

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