



Scottish Hydro Electric Power Distribution

Pre-application Consultation Report

Mainland-Jura Emergency Repair



	Name	Title	Signature
Applicant	Scottish Hydro Electric Power Distribution	Mainland-Jura	
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1 Introduction

- 1.1 Scottish Hydro Electric Power Distribution plc (SHEPD) holds a licence under the Electricity Act 1989 for the distribution of electricity in the north of Scotland including the Islands. It has a statutory duty to provide an economic and efficient system for the distribution of electricity and to ensure that its assets are maintained so as to ensure a safe, secure and reliable supply to customers.
 - 1.2 The islands of Jura and Islay are normally fed by a 33kV circuit from Lochgilphead. This circuit is comprised of overhead line, underground cable and submarine cable sections. Further dependant on the 33kV circuit is the island of Colonsay which is supplied by the 11kV network from Islay. In total 3,070 customers are supplied on Jura, Islay and Colonsay. Electricity is now considered to be an essential service for communities. This cable distributes electricity to domestic and business customers; providing a long term economic and social benefit to the communities.
 - 1.3 On 20 November 2019, the existing submarine cable between Mainland and Jura faulted in service. During the time of fault, Bowmore Power Station was operational and maintaining supplies to customers on Islay and Colonsay whilst 33kV overhead line refurbishment works were being carried out on Jura. Therefore 199 customer electricity supplies on Jura were impacted by the fault. Bowmore Power Station is now maintaining customer supplies to the islands of Jura, Islay and Colonsay.
 - 1.4 This Pre-application Consultation report provides details as required by Marine (Scotland) Act 2010: Section 24. SHEPD are applying for authorisation to carry out an emergency inspection, survey, repair and possible replacement of this cable under The Marine Licensing (Exempted Activities) (Scottish Inshore Region) Order 2011 – Article 32 Cables and Pipelines.
 - 1.5 As part of the marine licencing process, we have undertaken engagement with key stakeholders in order to notify them of our intended operations. We state within this report how their views have been considered and influenced our approach to cable design, installation and protection.
 - 1.6 We balance stakeholder's views through our cost benefit analysis model to demonstrate (to ourselves, our customers, our regulators and all users of the sea environment that the method(s) that we propose to deploy for laying and protecting cables around the coast of Scotland justifies the expenditure and provides best value. We will use the output from this model as supporting evidence within marine licence application – this is appended to this report.
- 1.1. This document should be read in conjunction with the following documents:
- Marine Licence Application Form
 - Project Description
 - Marine Environmental Appraisal
 - Fishing Liaison Mitigation Action Plan (covering all legitimate sea users)
 - Construction Environment Management Plan
 - Operation, Inspection, Maintenance and Decommissioning Strategy
 - European Protected Species Licence Application Form

2 Proposed licensable marine activity

- 2.1 The licensable marine activity at the crossing of the existing submarine electricity cable connecting Jura (landing at Lussa Point on east Jura) to the Mainland (landing in Carsaig Bay near Tayvallich) in Argyll.
- 2.2 The activity consists of the end to end installation of a submarine electricity cable between the Mainland and Jura which is critical for a safe and reliable supply of electricity to our customers on the islands of Jura, Islay and Colonsay.
- 2.3 A detailed project description can be found in the Marine Licence Application.

3 Applicant details

- 3.1 Mr John Buchan
Head of Submarine Cables
Scottish Hydro Electric Power Distribution plc
Inveralmond House
200 Dunkeld Road
Perth
PH1 3AQ

Tel: 01738 516987
Mob: 07767 852194
Email: submarinecables@sse.com
- 3.2 Scottish Hydro Electric Power Distribution plc is registered in Scotland No SC213460.

4 Proposed licensee details

- 4.1 As per applicant details.

5 Pre-application Consultation

- 5.1 As this is an emergency licence application, the scope to carry out a comprehensive consultation has been limited. This has meant that consultation has primarily been with statutory stakeholders and those marine users who may be affected by our operations.
- 5.2 Once initial testing has been complete, an outline project description was produced detailing the situation and how we intended to resolve the fault. This is attached in *Appendix 1 – Draft Project Description*
- 5.3 This draft Project Description, as well as an initial Risk Assessment was sent to a number of key stakeholders to give background and invite comments. These consultees are listed in Table 1 below.

Table 1 – List of Consultees

Organisation	Project Description sent
Marine Scotland	29/11/19
Maritime and Coastguard Agency	29/11/19
Northern Lighthouse Board	29/11/19
Scottish Natural Heritage	29/11/19
Scottish Environmental Protection Agency	29/11/19
The Crown Estate	29/11/19
Bidwells	29/11/19
Scottish Fishermen's Federation	29/11/19
Clyde Fishermen's Association	29/11/19
West Coast Regional Inshore Fisheries Group	29/11/19

6 Information provided by the prospective applicant during pre-application stage

- 6.1 Prior to submission of this Marine Licence Application, a draft project description and risk assessment was provided to key stakeholders. (see Appendix 1)
- 6.2 This gave information on the faulted cable including its location, how we would identify the fault and the possible options were for repair or replacement of the cable.

7 Information received by the prospective applicant at the pre-application stage

- 7.1 Further to the draft Project Description being circulated a number of consultees acknowledged the situation as follows:
 - Scottish Fishermen's Association – no issues and asked to be kept informed via Notice to Mariners
 - West Coast Regional Inshore Fisheries Group - no issues and asked to be kept informed via Notice to Mariners

- SEPA – acknowledged receipt and no comments to make
- Northern Lighthouse Board – acknowledged and no objection with two suggestions
 - **Scottish Hydro Electric Power Distribution plc** should issue marine safety information clearly stating the nature and duration of the works.
 - On completion of the installation, a copy of the 'as laid' plans should be submitted to the UK Hydrographic Office (sdr@ukho.gov.uk) in order that the associated chart can be revised accordingly.
- Clyde Fishermen's Association acknowledged information and requested clarification on programme duration, burial methods of new cable and use of guard vessels during operations.

8 Comments or changes made following comments received during pre application stage

- 8.1 With regards to timescales, we are currently finalising the programme but will probably be required to carry out some ROV survey work w/c 16 December 2019. Weather permitting these should last a few days and an NtM will be issued beforehand.
- 8.2 Licence permitting, a full end to end replacement looks likely in the late January and we would hope that, given the right weather window, we could replace the cable within a couple of weeks.
- 8.3 Due to seabed conditions and depths, full burial is not possible, although the last survey of the area did show that over 70% of the current cable had self-buried.
- 8.4 The new cable will be surveyed post lay to give an accurate seabed position for sea charts. We did protect the cable from shore end to 50m previously as this was a condition from Marine Scotland in light of fishing intensity in the area.
- 8.5 SSEN would be willing to use a guard vessel during installation and will check availability of appropriate vessels.

9 Certification

Mr John Buchan
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Scottish Hydro Electric Power Distribution plc
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200 Dunkeld Road
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Tel: 01738 516987

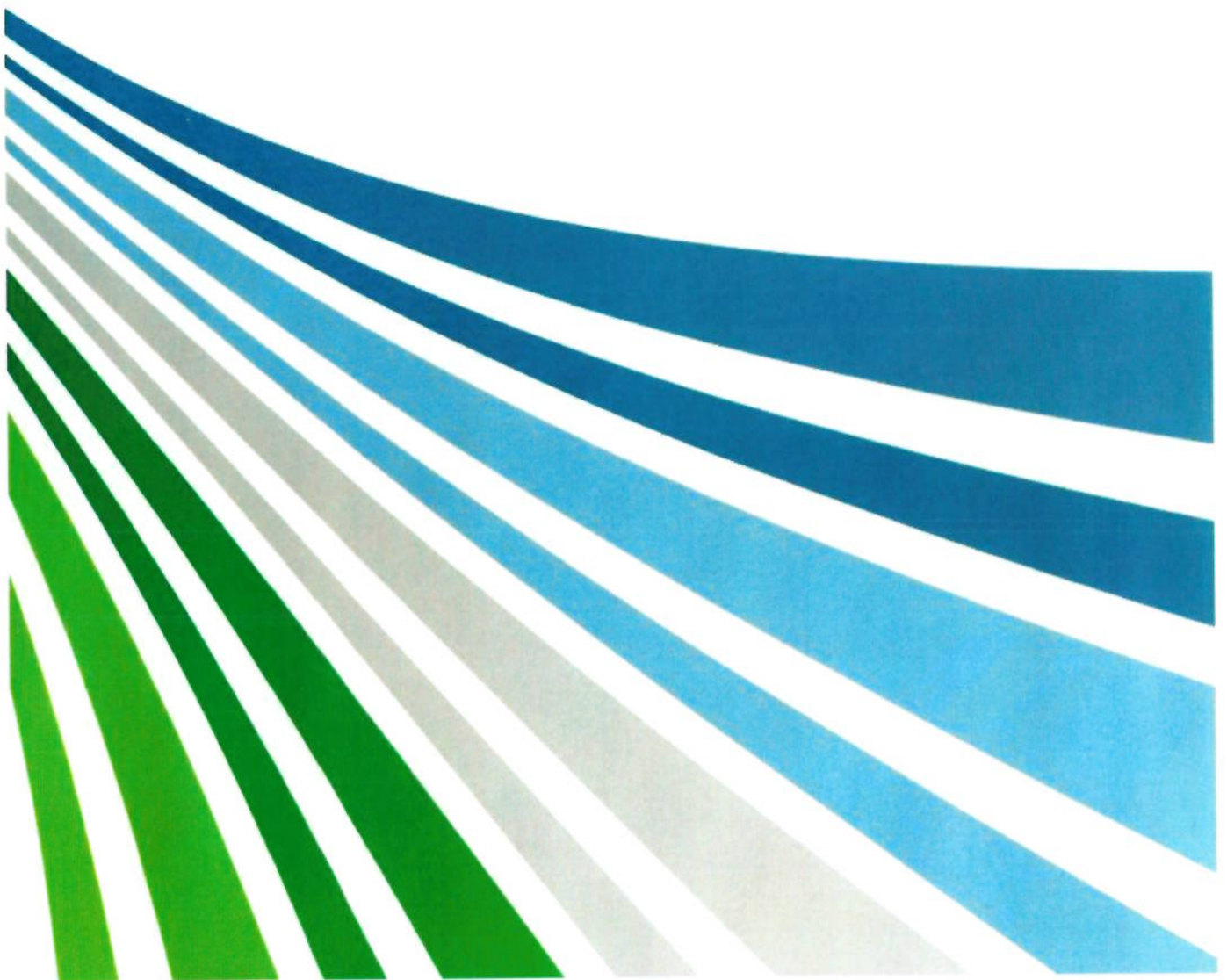
I certify that I have complied with the legislative requirements relating to pre-application consultation and that the pre-application consultation has been undertaken in accordance with statutory requirements.

Signature [Redacted]

Date 12 December 2019

Appendix 1

Scottish Hydro Electric Power Distribution Project Description Mainland-Jura Emergency Repair



2. Introduction

- 2.1. Scottish Hydro Electric Power Distribution plc (SHEPD) holds a licence under the Electricity Act 1989 for the distribution of electricity in the north of Scotland including the Islands. It has a statutory duty to provide an economic and efficient system for the distribution of electricity and to ensure that its assets are maintained to ensure a safe, secure and reliable supply to customers.
- 2.2. The islands of Jura and Islay are normally fed by a 33kV circuit from Lochgilphead. This 33kV circuit is comprised of overhead line, underground cable and submarine cable sections. Further dependant on the 33kV circuit is the island of Colonsay which is supplied by the 11kV network from Islay. In total 3,070 customers are supplied on Jura, Islay and Colonsay. Electricity is now considered to be an essential service for communities. This cable distributes electricity to domestic and business customers; providing a long term economic and social benefit to the communities.
- 2.3. On 20 November 2019 at 07:26, the existing submarine cable between Mainland and Jura faulted in service. During the time of fault, Bowmore Power Station was operational and maintaining supplies to customers on Islay and Colonsay whilst 33kV overhead line refurbishment works were being carried out on Jura. Therefore 199 customer electricity supplies on Jura were impacted by the fault. Bowmore Power Station is now maintaining customer supplies to the islands of Jura, Islay and Colonsay.
- 2.4. This now means that there is an increased reliance upon fossil fuels to maintain electricity supplies to the islands through the use of the embedded power station at Kirkwall. This places electricity supplies at significant risk if any further faults occur on the SHEPD electricity network infrastructure.
- 2.5. Network testing has confirmed that there is a submarine cable fault located 4.670km from the Mainland end and 3.338km from the Jura end. Attempting a piece-in repair is possible however there is significant concern with the water depth at this location (approximately 80m). At this cable location, the water depth reaches a maximum of 200m at its deepest point.
- 2.6. SHEPD are applying for authorisation to carry out an emergency inspection, survey, repair and possible replacement of this cable under The Marine Licensing (Exempted Activities) (Scottish Inshore Region) Order 2011 – Article 32 Cables and Pipelines.

Details of Fault Location

- 2.7. The location of the existing cable route is shown in Figure 1. A list of co-ordinates and the area in which the work activities will take place is provided in Figure 2.

Figure 1 Chart of emergency inspection, repair and possible replacement work area

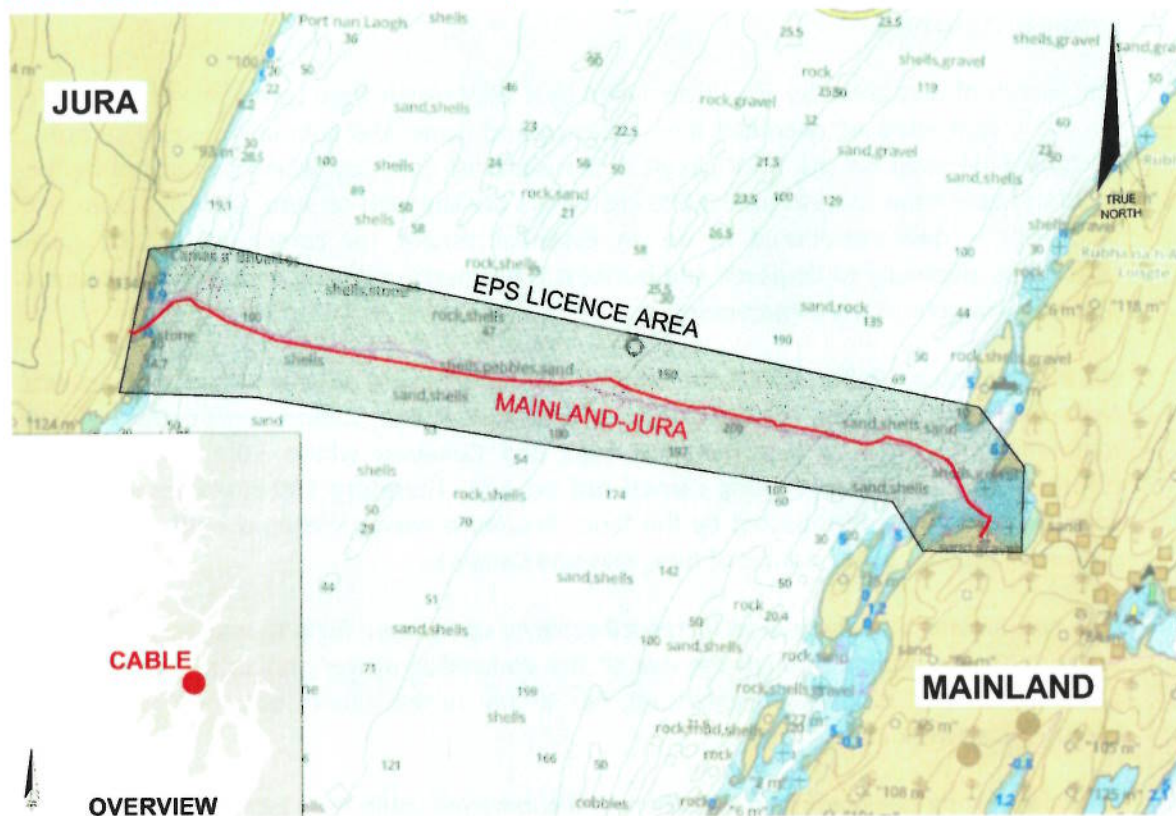


Figure 2 List of corridor co-ordinates for the emergency inspection, repair and possible replacement work area

Cable	Indicative length (km)	Longitude DD	Latitude DD	Co-ordinates for works (WGS84) the DMS are not negative due to these being westerlies (i.e. west of Greenwich meantime)			
				Longitude DDM W	Latitude DDM N	Longitude DMS W	Latitude DMS N
Mainland - Jura	7.8	-5.64419	56.03816	5° 38.651' W	56° 2.290' N	5° 38' 39.08" W	56° 2' 17.38" N
		-5.63804	56.03394	5° 38.282' W	56° 2.036' N	5° 38' 16.94" W	56° 2' 2.18" N
		-5.63793	56.02763	5° 38.276' W	56° 1.658' N	5° 38' 16.55" W	56° 1' 39.47" N
		-5.651	56.02746	5° 39.060' W	56° 1.648' N	5° 39' 3.60" W	56° 1' 38.86" N
		-5.6552	56.03102	5° 39.312' W	56° 1.861' N	5° 39' 18.72" W	56° 1' 51.67" N
		-5.74058	56.03708	5° 44.435' W	56° 2.225' N	5° 44' 26.09" W	56° 2' 13.49" N
		-5.7589	56.0371	5° 45.534' W	56° 2.226' N	5° 45' 32.04" W	56° 2' 13.56" N
		-5.75557	56.04768	5° 45.334' W	56° 2.861' N	5° 45' 20.05" W	56° 2' 51.65" N
		-5.74802	56.04829	5° 44.881' W	56° 2.897' N	5° 44' 52.87" W	56° 2' 53.84" N
		-5.64419	56.03816	5° 38.651' W	56° 2.290' N	5° 38' 39.08" W	56° 2' 17.38" N

3. Identifying the fault location, cable condition and environment

- 3.1. Initial fault finding has determined the location of the fault within the submarine cable section. The fault location has been correlated from both sides at a distance of 4.67km from the Mainland end and 3.338km from the Jura end.
- 3.2. We are looking to carry out emergency inspection and survey to assess fault position and cable condition; as well as the seabed environment around the cable. These results will be used to inform the repair or replacement option to restore the circuit.
- 3.3. The accompanying European Protected Species (EPS) Risk and Protected Sites and Species Assessment for Distribution Cable Surveys (A-302244-S00-REPT003) provides a description of activities and the risks to EPS, protected species and sites assessment when carrying out the works proposed for identifying the fault location, cable condition and environment. All works will be carried out in compliance with the species protection measures stated in section 6 to avoid and reduce potential impacts on species which may be present in the vicinity during the works.
- 3.4. We would like to begin these works as soon as possible.

4. Repair Options Considered

At this point, it is important to further identify the cause of the fault and cable condition, therefore, we describe the options which have been considered.

- **Option 1: Onshore, intertidal piece-in repair:** If the fault location is identified as being located within the intertidal zone, inshore of the mean low water tidal limit, this solution will be dependent on the tidal windows for access. This means that this activity has to be programmed to maximise the tidal working window. A tracked machine will be utilised to expose the cable, creating a working area for the repair. The repair itself will see the existing cable being stripped and cut to remove the faulty section. The cable will need to be protected and capped as the tides turn and work is forced to halt. A new section of cable will be jointed at the next available tide, and dependent on progress, the cable again will be left in a temporary state as the tides dictate the works. On the next available tidal window, the cable repair area will be further worked upon to complete the repair works inclusive of the addition of split pipe to the cable and burial up to two metres. At the repair location, the cable could require physical protection in the form of split pipe shells fitted to the cable where burial can't be achieved. This final activity may be delayed by the tides and continue over additional days. For this reason, until we know when we can access the site, we are unable to predict the exact time periods required for the works.

This option has been discounted as the fault has been identified offshore.

- **Option 2: Offshore piece-in repair (close to shore):** The repair itself will involve recovery of the faulted cable from the seabed. The faulted cable will be cut, cable recovered and

testing on-board the vessel is needed to confirm the faulted area has been removed from the system. A new section of cable will then be jointed onto the existing cable. The jointing activity will be carried out on the deck of the vessel. Typically the jointing activity will take around 3 days to complete however an appropriate weather window will be needed to allow this. The new section of cable would then be laid out towards the beach using various methods of pulling and floating the cable. Sufficient cable would be pulled to allow the installation of a shore joint to tie into the onshore electricity network. At the repair joint location, the cables could require physical protection in the form of split pipe, concrete mattresses or rock filter bags directly onto the cable to provide protection and stabilisation of the cable and joint. Burial of the cable may also be possible dependant on the seabed geology and information obtained during the survey works. Indicatively, the repair works will be carried out over a 14 days period and followed by onshore jointing.

This option has been discounted as the fault has been identified offshore.

- **Option 3 Offshore piece-in repair (mid section):** As the cable is over 8km long; the fault may be a significant distance from the shore. Therefore, an offshore mid section repair would be preferred dependant on cable condition and water depth. The cable would be cut on the seabed either side of the fault location, with a new piece of cable pieced in to the gap and jointed at either end on the deck of the repair vessel. The new cable section will be laid on the seabed in a bight orientation. Typically, this repair option would be completed within 20 days subject to appropriate weather windows.

This option has been discounted because historical submarine cable repairs have been limited to diver operated water depths around a maximum 20m water depth. Cable recovery and jointing results in significant mechanical stresses and fatigue within the cable. These repairs have had limited success predominantly dependent on the condition of the existing cable being repaired. With the water depth at the fault location being approximately 80m, this is out with the safe working depths of divers and therefore remotely operated vehicles will be required to cut the cable and rig the cable for recovery to vessel for subsequent testing.

- **Option 4: End to end cable replacement:** This cable was installed in 2014 and inspected in 2018. The water depth at the point of fault is known to be approximately 80m from the previous route survey completed to inform the installed route. This water depth exceeds the limitations of diver operated works and at this significant water depth the mechanical and tensile stress on the existing cable and marine repair joint is likely to exceed the safe working limits of the cable and joint. Typically, this repair option would be completed within 28 days subject to appropriate weather windows.

Therefore based on the fault location and water depth, an end-to-end replacement is assessed to be the only feasible engineering option.

The replacement cable would be on a like-for-like basis, initially surface laid within the surveyed corridor at an offset from the faulted cable. Micro-routing will be required based on the rocky and steeply graded seabed. With the tidal conditions at this location, a cable on bottom stability will be completed to identify whether cable mobility may be an issue. The installation of rock filter bags may be required to stabilise the cable. At this stage it is expected that the cable will be buried between Mean High Water Springs and Mean Low

Water Springs where possible. If burial at the shore ends is not possible, it is proposed that the cable be protected with split pipe protection fitted directly around the cable.

The results from the survey activities and joint suitability at the fault location will determine whether an offshore repair is feasible or whether an end to end cable replacement should be progressed. However, at this time an end to end replacement looks to be the only feasible option and we request permission to proceed on this basis.

