

## Humphries S (Sophie)

---

**From:** Nick Salter <Nick.Salter@mcga.gov.uk>  
**Sent:** 12 August 2016 11:29  
**To:** Dinsdale R (Rosanne); MS Renewables  
**Cc:** Aires C (Catarina); Bain N (Nicola) (MARLAB); Drew J (Jessica)  
**Subject:** RE: Marine Licence (Offshore Transmission Works) - Cable Plan (Offshore Transmission Works)

Dear Rosanne,

Thanks for the reminder. I have been through the document and I have no comments to make. All content.

Best regards,

Nick

Nick Salter  
Offshore Renewables Advisor  
Navigation Safety Branch | Maritime and Coastguard Agency  
Spring Place | 105 Commercial Road | Southampton | SO15 1EG  
Tel: 020 3817 2433 | Mob: [REDACTED] | Email: [nick.salter@mcga.gov.uk](mailto:nick.salter@mcga.gov.uk)



Maritime &  
Coastguard  
Agency

Safer Lives, Safer Ships, Cleaner Seas

---

**From:** Rosanne.Dinsdale@gov.scot [mailto:Rosanne.Dinsdale@gov.scot]  
**Sent:** 11 August 2016 10:03  
**To:** jnccadvice@jncc.gov.uk; marineenergy@snh.gov.uk; Nick Salter <Nick.Salter@mcga.gov.uk>; navigationsafety<navigationsafety@mcga.gov.uk>; renewables@sff.co.uk; Sarah.Pirie@edpr.com; Catarina.Rei@edpr.com; peter.moore@edpr.com; Paul.Stainer@gov.scot; MS\_Renewables@gov.scot  
**Cc:** Catarina.Aires@gov.scot; Nicola.Bain@gov.scot; Jessica.Drew@gov.scot  
**Subject:** FW: Marine Licence (Offshore Transmission Works) - Cable Plan (Offshore Transmission Works)

Dear Sir/Madam,

This is a gentle reminder that the consultation detailed below will close on the 16<sup>th</sup> August 2016.

Kind regards,

Rosanne

Rosanne Dinsdale  
Marine Renewables Casework Officer  
**Marine Scotland** - Marine Planning & Policy

Scottish Government | Marine Laboratory | 375 Victoria Road | Aberdeen | AB11 9DB

Direct Dial: +44 (0)1224 295 331  
Fax: +44 (0)1224 295 524  
Email: [rosanne.dinsdale@gov.scot](mailto:rosanne.dinsdale@gov.scot)  
Website: <http://www.gov.scot/Topics/marine/Licensing/marine>

FAO Jessica Drew  
Marine Scotland Licensing Operations Team  
Marine Laboratory  
375 Victoria Road, Aberdeen  
PO Box 101  
AB11 9DB

**BY EMAIL**

16 August 2016

Dear Ms Drew

**Moray Offshore Renewables Limited (MORL)**  
**Beatrice Offshore Windfarm Limited (BOWL)**  
**BOWL Marine Licence (Offshore Transmission Works) - Cable Plan (Offshore Transmission Works)**

I refer to your email of 19 July in respect of the above. As you are aware MORL requested to be consulted on this plan. During the consultation on the original BOWL marine licence application MORL objected due to the potential conflicts which could arise between the development of the BOWL export cable and any wind farm in the MORL Zone where the cable crosses the MORL Zone.

Together with MORL's ongoing commitment to developing out the consented sites within the Eastern Development Area we are further investing in the development of the MORL Zone by developing proposals for the Western Development Area (WDA). Maximising the development of the MORL Zone is supported by Scotland's National Marine Plan which recognises the potential of the MORL Zone to deliver offshore wind development which will also support both UK and the Scottish Governments in meeting their climate change commitments. On 27 May MORL issued its Scoping Report for an offshore wind farm in the WDA. The scoping was undertaken for the whole of the unconsented area of the MORL Zone for a maximum of 90 wind turbine generators. BOWL was consulted as part of scoping for the WDA.

MORL has reviewed the BOWL export cable plan and we would make the following comments:

1. Precise routing of the cable is not provided and, whilst micro-siting is proposed, the extent of this is not stated. Clearly MORL requires the specific detail of the routing of the BOWL cable route within the MORL Zone to ensure that the development proposals for the WDA are developed to minimise the potential for conflict.
2. We note that a Cable Burial Risk Assessment (CBRA) has been completed, but that it is not included in the Cable Plan itself. We understand from the Cable Plan that it recommends depth of lowering (burial depth) of 0.6 m within the WDA and that BOWL have committed to achieving 0.6 m across the length of the route. MORL would request that MSLOT ensures that the cable burial depth is achieved across the MORL Zone in accordance with the CBRA to



ensure safety within the MORL Zone and minimise the risk of damage to either MORL or BOWL assets.

3. We note that the Cable Plan confirms that the method of cable protection is "most likely" to be rock placement (paragraph 9.6.2 and table A1). Again, MORL requires to understand the nature, volume and location of the deposits BOWL intends to make within the MORL Zone to ensure the WDA proposals can be developed efficiently. We are not clear whether there are any parts of the WDA where the burial depth of 0.6m may not be achieved and the extent to which cable protection may be required. MORL will require to understand the level of cable protection used on the BOWL cable route for future cumulative impact studies for the WDA.
4. The Cable Plan also states (in section 9.2.2) that boulders will be placed on the seabed away from the cable routes. Clearly MORL would be concerned if this was carried out in an uncontrolled way within the MORL Zone where we have already carried out geophysical surveys. Accordingly, we request that MS-LOT requires BOWL to remove boulders from the MORL Zone should relocation be required to avoid unnecessary impacts on the potential WDA turbine and inter-array cabling locations. Failing which BOWL should agree with MORL the relocation site and provide exact GPS co-ordinates of these obstacles should be notified to MORL immediately after completion of works in the MORL Zone.
5. We note that the Cable Plan states in paragraph 10.1.5 that:  
*"Where additional cable protection measures are applied in an area of known fishing activity, BOWL propose to conduct further discussions with Marine Scotland with regard to the need for over trawl surveys, taking account of:*
  - *The extent and location of the cable protection material*
  - *The design of the cable protection material (noting that these can be designed to minimise effects on fishing gear), and*
  - *The amount and type of fishing activity observed along the export cable corridor."*

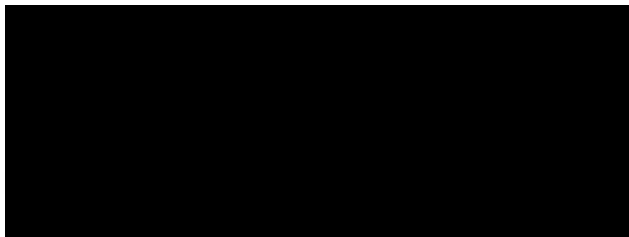
MORL wishes to understand in what circumstances such over trawl surveys will or will not be undertaken within the WDA. We have been unable to determine this from the Cable Plan. MORL submits that MSLOT should ensure that over trawl surveys should be undertaken within the MORL Zone in the event that there is a potential for impact on commercial fishing activities to mitigate such impacts. MORL wishes to avoid a situation where an unacceptable cumulative impact to commercial fishing is caused within the MORL Zone but which is outwith its control.

6. Although the Cable Plan states in section 10.2 that burial/protection of cables will be monitored no timescales are given, either as to when these will first be monitored or how often. Clearly MORL is keen to understand that the BOWL export cable will be adequately monitored within the MORL Zone to minimise risks to any MORL assets through the exposure of the BOWL export cable. In general MORL would anticipate that MORL and BOWL would co-operate during the lifetime of the export cable and the development and operation of the WDA offshore wind farm to ensure that programmed activities, potential cable crossings, maintenance activities and inspections avoid conflicts. MORL would be happy to meet to discuss with BOWL how the developments in the Moray Firth can coordinate with each other.



I would be grateful if MSLOT would consider the above comments in relation to the BOWL Cable Plan to ensure that the BOWL export cable does not unnecessarily hinder the delivery of offshore wind development within the WDA.

Yours sincerely



**Head of Development**

cc Jonathan Wilson, Beatrice Offshore Windfarm Limited



Jessica Drew  
Licensing Operations Team  
Marine Scotland  
375 Victoria Road  
Aberdeen  
AB11 9DB

### **003-0W-BOWL-8 - BEATRICE OFFSHORE WINDFARM LTD: CONSENT PLAN - CABLE PLAN – REQUEST FOR MSS COMMENTS**

Marine Scotland Science has reviewed the submitted cable plan and has provided the following comments.

#### **marine mammals**

MSS have no comments to make regarding marine mammals.

#### **ornithology**

MSS have no comments to make regarding ornithology.

#### **marine fish ecology**

MSS have no comments to make regarding marine fish ecology.

#### **commercial fisheries**

MSS has reviewed the provided document with respects to commercial fisheries. The focus of the review included the location of the cables (sections 5 & 6), cable laying techniques (Section 9), burial risk assessment (section 8) and measures to address exposure of cable sections (section 9.6). Comments and clarifications include

Section 6.3.1 suggests that the final location and layout of the export cables are subject to minor route refinements. There should be an explicit reference to the maximum refinement expected.

Section 8.1.3 – As part of the Cable Burial Risk Assessment, applicants considered the depth of penetration of identified fishing gear. There is no reference to the source of this information. It is stated that public data indicate that fishing gears used in the Moray Firth do not normally penetrate into the seabed beyond 0.3 m where the seabed is composed of very soft clays. Have other sources been used for the other type of sediments along the corridor?

Section 10.1.5 states that “where additional cable protection measures are applied in an area of known fishing activity, BOWL has proposed to conduct further discussion with Marine Scotland”. This shall be supported by consultation with fisheries stakeholders as part of the Moray Firth Offshore Wind Developers Group - Commercial Fisheries Working Group.

#### **benthic ecology**

MSS have no comments to make regarding benthic ecology

**diadromous fish**

MSS has already made comments in relation to the cables in its response on the Post-consent Construction Method Statement for the Offshore Transmission Works. In these, MSS noted that:

The cables will be buried where practicable and it advised that that the minimum target burial depth, now set at 0.6m, would be acceptable in relation to diadromous fish. But please now see the further information request and comment added below. MSS also noted that where burial was not possible, rock placement was anticipated to be used for protection.

Although the landfall is close to the mouth of the River Spey, which is an important salmon and sea trout river, all work at sea would be in the open sea and that MSS did not expect salmon or sea trout to be visible even if they are present. MSS therefore considered that it would not therefore be possible to take prior action to avoid disturbing or injuring any salmon or sea trout which might happen to be present during activities like rock placement, and put forward no requests in respect of this.

The content of the cable plan has prompted MSS to make the following additional information request and comment.

The minimum target burial depth has been set by Bowl mainly to prevent the cable being snagged by commercial fishing gear. However, cable burial also provides additional security in relation to reducing EMF field strengths and the cable plan in Section 7.3 provides modelled EMF field strengths for buried cables. However, these assume that the cables will be buried to 1 to 2 m and the modelled EMF field strengths are for cables buried to these depths. Modelled field strengths should be provided for cables buried to the now proposed target burial depth of 0.6 m and these updated modelled EMF field strengths should be used to inform full consideration by the developer of whether a burial depth of 0.6m is sufficient.

**aquaculture**

MSS aquaculture planning has no specific comments to make on the Beatrice Offshore Wind Farm Limited (BOWL): Consent Plan – Cable Plan. There are no further comments to add to those made in March 2016 in response to the Post Consent Vessel Management Plan.

Hopefully these comments are helpful to you. If you wish to discuss any matters further contact the MSS Renewables in-box [MS\\_Renewables@gov.scot](mailto:MS_Renewables@gov.scot).

Yours sincerely



**Paul Stainer**

Marine Scotland Science

17 August 2016



Our Ref: MM/fl: 16-076

Your Ref:

17<sup>th</sup> August 2016

Scottish Fishermen's Federation  
24 Rubislaw Terrace  
Aberdeen, AB10 1XE  
Scotland UK

T: +44 (0) 1224 646944  
F: +44 (0) 1224 647058  
E: [sff@sff.co.uk](mailto:sff@sff.co.uk)

[www.sff.co.uk](http://www.sff.co.uk)

by email to: [Jessica.drew@gov.scot](mailto:Jessica.drew@gov.scot); [Rosanne.dinsdale@gov.scot](mailto:Rosanne.dinsdale@gov.scot); [ms.marinerenewables@gov.scot](mailto:ms.marinerenewables@gov.scot)

Dear Sir/Madam

#### **BOWL LF 000005-PLN-214OfTW Cable Plan**

The Scottish Fishermen's Federation (SFF) is pleased to respond on behalf of the 550 fishing businesses in membership of its ten constituent associations, the Anglo-Scottish Fishermen's Association, the Clyde Fishermen's Association, the Fife Fishermen's Association, the Fishing Vessel Agents & Owners Association (Scotland) Limited, the Mallaig and North-West Fishermen's Association Ltd, the Orkney Fishermen's Association, Scallop Association, the Scottish Pelagic Fishermen's Association Ltd, the Scottish Whitefish Producers' Association Ltd and the Shetland Fishermen's Association.

In p5.3.5 there is reference to areas of ground in the south consisting of Diamicton and Clay where the SFF would expect that any cable activity in this area is very carefully monitored to avoid creating impassable berms, which in fishing grounds will necessitate remedial overtrawlability.

The SFF would expect that BOWL through their FLO would take cognisance of any disruption to the fishing fleet, especially any static gear on the run in to the coast.

Referring to 5.4.1 on the possible removal of boulders, the SFF would expect that any such occurrence would be undertaken in such a manner that no additional danger would be created, and the boulder positions are carefully plotted and disseminated via the usual channels.

Considering paras 9.5 and 9.6.3, the SFF would consider it essential that any cable left exposed on the sea-bed be protected by Guard Vessel until burial.

In the case of any rock-dumping being required, the minimum target DOL of 0.6m, as in 9.6.8, should not be randomly exceeded, but carefully engineered to avoid large deposits of un-necessary rock. Wherever scallop fishing exists, consideration to other methods of protection is necessary, and on other grounds profiling and gradients should be such that mobile gear should not snag on said protection.

#### **Members:**

Anglo Scottish Fishermen's Association • Clyde Fishermen's Association • Fife Fishermen's Association • Fishing Vessel Agents & Owners Association (Scotland) Ltd • Mallaig & North-West Fishermen's Association Ltd • Orkney Fisheries Association • Scallop Association • Scottish Pelagic Fishermen's Association Ltd • The Scottish White Fish Producers' Association Ltd • Shetland Fishermen's Association

VAT Reg. No: 605 096 748



Regarding Chapter 10, the SFF, if presented with adequate proof of burial, with no change to seabed surface material is prepared to discuss the need for overtrawl trials. However in areas of fishing activity, where the seabed surface may have been altered the SFF would not accept p10.1.5 as being sufficient protection for fishing and would expect to be included in any negotiations, as described in the para, to define the need for overtrawl trials.

Yours faithfully



Bertie Armstrong  
**Chief Executive**  
**Scottish Fishermen's Federation**



**Scottish Natural Heritage**  
**Dualchas Nàdair na h-Alba**

All of nature for all of Scotland  
Nàdar air fad airson Alba air fad



Marine Scotland  
Licensing Operations Team  
PO Box 101  
375 Victoria Road  
Aberdeen  
AB11 9DB

CNS REN OSWF Beatrice

For the attention of: Jessica Drew

16 August 2016

## **BEATRICE OFFSHORE WIND FARM**

### **SNH & JNCC COMMENTS ON CABLE PLAN**

Thank you for consulting us over the cable plan for Beatrice offshore wind farm. This plan relates to design, layout and construction methods for the export cable (and link cable) between the Beatrice offshore substation platforms and the cable landfall point in Spey Bay, 1.5km west of Port Gordon (and just west of the Tennachy Burn / Burn of Tynet).

SNH has met twice with BOWL to discuss the offshore cable works, 11 November 2015 and 31 May 2016. These meetings have been very helpful to understand the proposed work, including details of the installation methods and information from geophysical and geotechnical surveys. While JNCC were not involved in these discussions, this current response includes their comments and is provided on behalf of both statutory nature conservation bodies.

### **Background**

The cable plan is being submitted to discharge condition 3.2.2.10 of the marine licence for the transmission works, however, it also includes information which can be used to discharge the specification and layout plan for these works (condition 3.2.2.6) and the construction method statement (condition 3.2.2.4). Condition 3.2.3.8 on horizontal directional drill (HDD) or direct pipe is also highly relevant:

The Licensee must ensure the seaward exit point of the HDD will be located as far offshore as practicable towards the depth of closure; the landward exit point of the HDD will be located onshore of the high-water mark, which may move landward due to coastal retreat; and the cables will be suitably buried between the seaward exit of the HDD and the depth of closure (the depth of water beyond which annually significant wave events will cease to contribute to beach sediment supply and morphological processes).

This has been a key focus of the current discussion between SNH and BOWL, where we've reached agreement on "depth of closure" and are in the process of addressing cable burial.

## **SNH advice at previous meetings**

At the meeting of 11 November 2011, we agreed that “depth of closure” in Spey Bay (the point at which waves cease to exert an influence) is achieved in water depths of ~6m. Ideally, the cable “pop out” (its emergence following HDD or direct pipe) would be in these deeper waters beyond the reach of any wave action. However, as discussed with BOWL, it’s not always possible to achieve this due to the practicalities of HDD (or direct pipe). Much depends on the nature of the sediment, how difficult it is to bore through, the risk of hitting boulders and the risk of tunnel collapse.

So it is possible that the Beatrice cable may need to pop out closer to shore in areas still subject to wave action. This being the case, it is important to consider the feasibility of cable burial and the risk of any re-exposure over time. In our advice of 18 November 2011, we indicated that pop out in water depths of ~4m would not, if sufficiently evidenced, present us with major concerns. However, we noted the risk of popping out in water shallower than this – please see **Appendix A** for further detail.

## **Information in the cable plan**

Unfortunately, the submitted plan does not clearly state the design envelope for the Beatrice export cable nor confirm the anticipated water depth at pop out. Our reading of the plan indicates that pop out could be as close to shore as 250m, and perhaps in water depths of only 1-2m (paragraphs 5.2.4, 5.3.4 and 9.3.2). This is considerably shallower than what we’d been discussing previously.

We therefore request that BOWL defines the “worst case” for assessment, with clear statements on the minimum distance the cable might pop out from shore and the minimum water depth at this point. As previously advised, it will also be necessary for BOWL to provide an adequate risk assessment considering the cable burial and risk of re-exposure:

We would be looking for confirmation not only that the cable can be buried to sufficient depth following pop out, but also that this burial can be maintained over the lifespan of the project, factoring in storm events and any longer-term seabed profile changes (such as those associated with ongoing erosion and sea-level rise).

As it stands, chapter 8 of the cable plan does not provide this information. In the high energy environment of Spey Bay, we believe that a 0.5m burial depth might not be sufficient, particularly (but not solely) if pop out is close to shore in the shallower water. We also note that the material infilling the cable trench may be less consolidated than the surrounding sediment and therefore more readily quarried by waves.

## **Further information**

There will need to be further discussion around the relevant conditions (particularly 3.2.3.8) to establish if these can be discharged on the basis of the submitted plan. In **Appendix B**, we indicate the information we need to understand the “worst case” for the HDD (or direct pipe) and outline the issues that need to be addressed in the cable burial risk assessment. We also include information on coastal erosion in Spey Bay, illustrated in **Appendix C**.

In **Appendix B** we discuss the risk of impacts to Atlantic salmon, a qualifying interest of the River Spey Special Area of Conservation (SAC), and where we advise mitigation will be needed if pop out is going to take place close to shore.

Finally, if you have any queries or comments in relation to this advice, please don't hesitate to get in touch.

Yours sincerely,

**Catriona Gall**

Marine Renewables Casework Adviser (Offshore Wind)  
SNH Policy & Advice

cc. Sarah Canning, JNCC

## **APPENDIX A**

### **SNH ADVICE ON CABLE WORKS, 18 November 2015**

**From:** Catriona Gall

**Sent:** 18 November 2015 17:05

**To:** Royle, Lis [REDACTED]; Wilson, Jonathan [REDACTED]

**Cc:** Nick Everett; Erica Knott

**Subject:** SNH comments on BOWL export cable works

Dear Lis and Johnny,

Thank you for arranging a very useful meeting last week to discuss proposals for the BOWL export cable and associated HDD works.

We agreed to provide you with some key comments from SNH on this work, in relation to Spey Bay SSSI, in order to inform your upcoming discussions with the cable contractors.

In this regard, our main area of interest is around the cable HDD – the confirmed water depth for HDD ‘pop out’ and the confidence you have in the cable burial from this ‘pop out’ point offshore.

Your ES modelling indicated that the ‘safest’ option for HDD pop out in Spey Bay is at a water depth of ~6m, well beyond any wave-base action. At the meeting we discussed pop out closer to shore at ~4m water depth where cable burial should still be possible.

SNH’s key requirement will be to see your risk assessment of the HDD works and associated cable burial – we’d be happy to receive this as part of the cable plan, but equally if it needs discussion beforehand then please don’t hesitate to get back in touch. We would be looking for confirmation not only that the cable can be buried to sufficient depth following pop out, but also that this burial can be maintained over the lifespan of the project, factoring in storm events and any longer-term seabed profile changes (such as those associated with ongoing erosion and sea-level rise).

Following the discussion at last week’s meeting, we think it should be possible to evidence this for pop out in water depths of ~4m, but the risks will start to increase in shallower waters. Both yourselves and ourselves wish to avoid the need for cable protection: from an environmental perspective this would impact on the geomorphological interests of Spey Bay SSSI.

We’d be interested in hearing the outcomes of your meeting with the cable contractor. Please don’t hesitate to contact us if there are any issues you wish to discuss in relation to this work or the drafting of your cable plan.

Yours sincerely,

**Catriona Gall**

Marine Renewables Casework Adviser - Offshore Wind



## **APPENDIX B**

### **SNH & JNCC ADVICE on the BEATRICE EXPORT CABLE**

This appendix sets out the information we need on the Beatrice cable works, in order to establish the “worst case” scenario and determine whether there could be any risk of impacts on Spey Bay SSSI or on Atlantic salmon from the River Spey SAC.

Further to discussion at the meeting of 31 May 2016, we also provide some supporting advice on the rates of coastal erosion in Spey Bay. This information is important to consider in relation to the placement of onshore infrastructure, noting that the location of such infrastructure (particularly the transition pits for directional drill / direct pipe) may have a bearing on what can be achieved in terms of cable pop out.

#### **Establishing the worst case**

Spey Bay is a high energy environment so the shallower the water in which the cable pops out, the stronger the wave action it will be subject to, and the more difficult it may prove to maintain cable burial in the longer term. In this regard we seek the following information to establish the “worst case” for assessment:

- Confirmed location of onshore infrastructure.
- Minimum distance offshore for cable pop out, with the distance to be measured from mean high water springs (MHWS), clearly stating the source and date of the MHWS information.
- Minimum water depth for cable pop out.

#### **Spey Bay SSSI – cable burial risk assessment**

Chapter 8 of the Beatrice cable plan does not currently provide the information we were looking for on cable burial, as noted in our advice of 18 November 2011 (see Appendix A).

In this regard we seek the following:

- Submission of a risk assessment for cable burial that takes account of potential re-exposure and possible coastal retreat over the 25 year project lifespan.
- Explanation of the term “burial to 0.5m below the mud line” and whether this means a depth of lowering of 0.5m.
- Confirmation on whether jointed metal casing will be used for cable protection from pop out to the depth of closure.
- Confirmation of the maximum diameter of the export cable + thickness of the jointed metal casing. (*NB. Likely to be ~30cm diameter as indicated in a phone call with BOWL.*)
- Contingency options if the proposed jointed metal casing does not last the full 25 years.

Depending on the information thus supplied, further work may be needed if there's any risk that the BOWL export cable could impact on coastal processes in Spey Bay SSSI.

#### **Advice on risks to Atlantic salmon from the River Spey SAC**

In our response to the marine licence application (letter dated 8 July 2013), we advised that:

...potential impacts arising from installation of the export cable have not been thoroughly evaluated, particularly where it draws close to shore in proximity to the River Spey SAC. The original ES indicated that installation of this section of the cable

could just take a matter of days, so that mitigation, or avoidance, of impacts could be possible by timing the work to avoid peak smolt runs...

In this regard, the further offshore the directional drill / direct pipe can go the increasing likelihood that this in itself will be the only necessary mitigation. However, if cable pop out is needed in the shallower water depths (<4m) closer to shore, there is a risk that the work could impact on Atlantic salmon and give rise to likely significant effects. In this case, we would advise mitigation to time the work in order to avoid peak smolt runs from the SAC.

### **Advice on benthic interests**

We note the records of ocean quahog which we think derive from the survey work undertaken by APEM in 2015 (see Table 5.1 in the cable plan). We confirm that the design, route and installation of the BOWL export cable will not significantly impact on this species nor on any other benthic interests. We would, however, welcome a copy of the APEM survey report.

### **Advice on coastal erosion in Spey Bay SSSI**

Further to discussion at the meeting of 31 May 2016, and subsequent emails, we are able to provide the following advice on coastal erosion in Spey Bay SSSI. Please see **Appendix C** for a map illustrating the line of MHWS recorded at different points over time. This information is taken from the ongoing National Coastal Change Assessment: <http://www.dynamiccoast.com/>

The map indicates different rates of erosion – between 0.43 and 1.52 m per year – relating to the three points in time at which the position of the coastline has been measured. The data is sparse and it doesn't suggest any long-term trend (e.g. stable, accelerating or slowing); the associated error margins are also large (e.g. rates could be halved or doubled). So while it is difficult to define a "representative" rate of erosion, the available information does indicate that this has generally been over 0.5m per year and that for significant periods of time it has exceeded 1m per year, occasionally coming close to 2m per year.

The following issues are relevant to consider when extrapolating from past rates into the future:

- There is an absence of any source of 'new' gravels to feed the beach at this east end. This makes persistent erosion more likely, contrasting with other areas of Spey Bay where there may be cyclic variation between periods of erosion and periods of stability or growth.
- Changes to gravel landforms around the mouth of the Spey are less likely to influence this end of the beach as the longshore movement is dominantly to the north-west.
- Any unsteadiness in erosion resulting from periodic growth of gravels across the Tennachy Burn is likely to be very minor especially in comparison to storm-driven variations.
- Erosion over the past century has been eating into the old, vegetated gravel ridges located in this area, and this is likely to continue despite the rising slope of land.

Taken together, these considerations give no reason to think that long-term erosion rates will significantly reduce in future. Infrastructure should therefore be planned to allow for an eroding coastline.

## APPENDIX C

### National Coastal Change Assessment: Interim result for cable landfall on Spey Bay (Moray).

