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## INTRODUCTION

- 10.1 **Chapter 10: Hydrology, Hydrogeology, Geology and Soils**, of the Environmental Impact Assessment (EIA) Report assesses the potential impacts of the proposed development on soils, geology and the water environment (hydrology and hydrogeology).
- 10.2 This Supplementary Environmental Information (SEI) Chapter supplements **Chapter 10** of the EIA Report. The methodology employed in this SEI Chapter is as set out in EIA Report **Chapter 10** of the EIA Report.
- 10.3 The following key documents should be read in conjunction with this SEI:
- EIA Report Volume 2 - **Chapter 10: Hydrology, Hydrogeology, Geology and Soils**;
  - EIA Report Volume 3d - Chapter 10 Plan Figures; and
  - EIA Report Volume 4b – Chapter 10 Technical Appendices.

## CONSULTEE RESPONSES TO THE 2022 KIRKTON APPLICATION

- 10.4 **Table 10-1** below provides a summary of the Hydrology, Hydrogeology, Geology and Soils related responses to the 2022 Kirkton Energy Park application, received from key consultees. A reply to the consultee responses is also provided in **Table 10-1**.

**Table 10-1: Consultation Responses**

Consultee	Comments	Response
NatureScot 31 July 2023	We identified, during our site visit, that the proposal site includes a variety of habitats of varying condition. There are areas on site which are more sensitive to development than others. Such an area is the access track to turbines 5-11 where it crosses an area of deep peat centred around NC88225947. We advise this area is avoided, with access moved to the north or south of this area. In addition, there is an area between turbine 6 and 7 which is of much deeper peat. While this is mainly avoided in the current design, any site micro-siting should ensure this area continues to be avoided. Avoiding these 2 areas would reduce the impact on carbon-rich soils, peat and peatland habitat within the proposal site.	The proposed track to Turbines No.5 – 11 has been realigned (see <b>SEI Figure 2.13</b> , <b>SEI Figure 2.14</b> and <b>SEI Figure 10.1.5</b> ) in order to address this concern. The track has been rerouted further north in order to avoid, as far as possible (and technically feasible), the largest and deepest areas of peat and the most sensitive peat habitats in this area.

<p>Scottish Environment Protection Agency (SEPA).  02 February 2023</p>	<p>We ask that the application be subject to the issues outlined below being covered by suitable conditions. If any of these issues is not covered by condition, then please consider our position to be one of objection.</p>	<p>Noted.</p>
	<p>To ensure that Groundwater Dependent Terrestrial Ecosystems (GWDTE) are suitably protected:</p> <ul style="list-style-type: none"> <li>• A single condition requiring either (1) a more detailed qualitative and quantitative assessment to be undertaken to demonstrate to the satisfaction of the planning authority in consultation with SEPA that the W4 and M6 habitats on the track to Turbine 1 and Turbine 2 are not groundwater dependant or (2) a scheme of groundwater monitoring is agreed with the planning authority in consultation with SEPA for those habitats to ensure that the works do not result in a statistically significantly change in the groundwater feeding them, all in line with SEPA guidance on Groundwater Dependant Terrestrial Ecosystems (currently LUPS-GU31).</li> </ul> <p>Turbine 7 shall be micro-sited to avoid direct impacts on M6 habitat.</p>	<p>As part of the detailed design stage of the project (post any consent), further assessment of the W4 and W6 habitats near to the track leading to Turbines No.1 and No.2 will be undertaken. It is accepted that a planning condition can be used to secure this, and the CEMP can be used to ensure appropriate mitigation to safeguard this habitat (if it is sustained by surface water) and/or a scheme of groundwater monitoring to the satisfaction of SEPA.</p> <p>A technical note was produced by SLR and issued to SEPA in response to the request for Turbine No.7 to be microsited. This technical note detailed that the M6c Mire in mosaic with U2 habitat, in the area of T7 is unlikely to be groundwater dependent. SEPA accepted the conclusions of the SLR technical note, however as detailed in their subsequent response dated 17 May 2023 (see below) it was still requested that Turbine No.7 be microsited in order to minimise impacts on M6 habitat.</p>
	<p>To minimise negative impacts on peat and carbon loss:</p> <p>All tracks on peat in excess of 1 m shall be of a floating construction unless otherwise agreed with the planning authority in consultation with SEPA.</p> <ul style="list-style-type: none"> <li>• Requirement for a finalised Peat Management Plan which should demonstrate how post consent layout improvements and other measures have been used to further minimise peat disturbance.</li> </ul>	<p>All tracks crossing areas of consistently 1m or greater of peat, along shallow topography (below 5%), have been floated.</p> <p>Noted.</p>

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	<ul style="list-style-type: none"> <li>• Micrositing of up to 50m (or as you see reasonable), but not onto peat deeper than currently shown for the relevant infrastructure on Figure 10.2.3</li> </ul>	Noted.
	<p>To protect and where possible enhance wetland and peatland and to improve carbon sequestration and natural water management:</p> <ul style="list-style-type: none"> <li>• Implementation of the Outline Habitat Management Plan so that it provides the enhancement to at least 87 ha of blanket bog. This will help mitigate for the loss of GWDTE.</li> </ul>	Noted.
	<p>To protect the water environment and avoid increasing flood risk elsewhere:</p> <ul style="list-style-type: none"> <li>• All watercourse crossing outlined in the locations shown in Appendix 10.4 shall be oversized bottomless culverts or traditional style bridges built to accommodate the 1 in 200 year flow plus an allowance for climate change, unless agreed with the planning authority in consultation with SEPA.</li> </ul>	Noted.
	<p>To ensure that construction works are carried out in line with the measures prescribed in the submission:</p> <ul style="list-style-type: none"> <li>• Adherence to the mitigation outlined in the Schedule of Commitments (Table 16.1).</li> <li>• Adherence to the Outline Construction Environmental Management Plan (Appendix 3.1)</li> </ul>	Noted.
	<p>To ensure that reinstatement and decommission works are carried out in a way that is sensitive to the environment:</p> <ul style="list-style-type: none"> <li>• Borrow pit restoration at the end of the construction phase.</li> <li>• Finalised Decommissioning and Restoration Plan with proposals in line with our Guidance on the life extension and decommissioning of onshore wind farms.</li> </ul>	Noted.
<p>Scottish Environment Protection Agency (SEPA). 17 May 2023</p>	<p>Thank you for your email of 26 April which included the letter from SLR Consulting Limited of that date. It provides further information relating to the likely groundwater dependence of habitats in the vicinity of T7.</p> <p>We have considered the additional information provided and are content that the M6c Mire in mosaic with U2 in the area of T7 is unlikely to be</p>	<p>Turbine No.7 (and its associated crane pad) has been relocated approximately 53m north in order to move it out of the M6c Mire in mosaic with U2 habitat, as requested.</p>

	<p>groundwater dependent and as a result are content that the mitigation measures outlined in the EIA-R can be used to minimise the potential impacts. As a result the second bullet point of section 1 of our previous response (our reference 7478) is revised to Turbine 7 needing to be micro-sited to <i>minimise</i> direct impacts on M6 habitat.</p>	
<p>Ironside Farrar (on behalf of the Energy Consents Unit). January 2023</p>	<p>Recommendations requiring response from Developer:</p> <ul style="list-style-type: none"> <li>• Team competencies must be stated, including a Chartered team lead, with a multidisciplinary background.</li> <li>• Haggling appears present but is not mentioned in reporting, comment requested.</li> <li>• Confirmation is requested on why no coring / sampling / lab testing was carried out and how this impacts on the confidence in the assessment .</li> <li>• Section 4.4.1 of ECUBPG notes the most basic requirements for a geomorphological map, the map should be reviewed with reference to this section.</li> <li>• Explanation / clarification of Appendix 01 is required, and if necessary, any errors which impact on the likelihood scoring and consequently risk scoring, corrected.</li> <li>• Confirmation on whether the SSSI, SCA, SPA and Ramsar designated site on the west of the development has been considered as a receptor.</li> </ul>	<p>SLR technical note, responding to Ironside Farrar, was issued on 23 March 2023.</p>
<p>Ironside Farrar (on behalf of the Energy Consents Unit). April 2023</p>	<p>Recommendations requiring response from Developer:</p> <ul style="list-style-type: none"> <li>• Response to point 3) regarding the lack of lab testing</li> <li>• Response to point 5) regarding apparent errors in Appendix 01</li> <li>• Response to point 6) regarding risk score at designated sites</li> </ul>	<p>SLR technical note, responding to Ironside Farrar, was issued on 26 April 2023.</p>
<p>Ironside Farrar (on behalf of the Energy Consents Unit). May 2023</p>	<p>Response to Ironside Farrar PSRA Stage 2 Checking Report and have the following comment.</p> <p>Item 3) Response is accepted, no further action.</p> <p>Item 5) Errors in Appendix 01 spreadsheet have been corrected and Developer confirmed this makes no change to the assessment, no further action.</p> <p>Item 6) Developer states <i>As indicated in PLHRA Section 6.7, only receptors immediately down gradient of the infrastructure could be affected by peat instability.</i> This is not correct, for example as stated in ECUBPG removing support from the toe of upslope material can destabilise it. As per ECUBPG</p>	<p>All noted.</p>

Section 4.2 <i>Typically, the study area will be determined by catchments and topography, sometimes extending downslope and upslope of the application boundary.</i> Therefore, receptors upgradient of infrastructure must be considered in PLHRA. In this instance the Consultant has confirmed the designated sites are at negligible risk and therefore no further action.
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## DESIGN AMENDMENTS

- 10.5 As outlined in **SEI Chapter 3: Description of Development**, the only design amendments from the site layout of the 2022 Kirkton Energy Park application (as detailed in the 2022 EIA Report) are the repositioning of Turbine No.7 (and associated crane pad) approximately 53m north, and the realignment of proposed access track to Turbines No.5 - 11. These relatively minor amendments have been undertaken in order to accommodate requests from the Scottish Environment Protection Agency (SEPA) and NatureScot (see **Table 10-1** above).
- 10.6 The average peat depth at the new Turbine No.7 location is 0.8m and 0.99m for the hardstanding compared with 0.7m for the previous Turbine No.7 and 0.95m for the previous hardstanding location presented in the EIA Report.
- 10.7 The new overall track length is 7.5km of which 2.03km would be upgraded track and 536.97m would be floated. This compares to 7.51km, as presented in the EIA Report, of which 2.03km was upgraded track and 446.95m was to be floated.

## REVISED FIGURES

- 10.8 Figures 10.1, 10.2, 10.3, 10.4, 10.5 and 10.8 of the EIA Report have been updated to outline the design amendments and are therefore superseded by:
- **SEI Figure 10.1: Local Hydrology;**
  - **SEI Figure 10.2: Soil Map of Scotland;**
  - **SEI Figure 10.3: Peatland Classification;**
  - **SEI Figure 10.4: Superficial Geology;**
  - **SEI Figure 10.5: Bedrock Geology;** and
  - **SEI Figure 10.8: Potential GWDTE.**
- 10.9 **Technical Appendix 10.1: Peat Landslide Hazard Risk Assessment, Figures 10.1.2, 10.1.3, 10.1.4, 10.1.5, 10.1.6, 10.1.7, 10.1.8 and 10.1.9** of the EIA Report, have been updated to outline the design amendments and are therefore superseded by:
- **SEI Figure 10.1.2: Site Layout;**

- **SEI Figure 10.1.3: Superficial Geology;**
- **SEI Figure 10.1.4: Bedrock Geology;**
- **SEI Figure 10.1.5: Peat Depth;**
- **SEI Figure 10.1.6: Peat Depth Over 0.5m;**
- **SEI Figure 10.1.7: Slope;**
- **SEI Figure 10.1.8: Peat Slide Risk; and**
- **SEI Figure 10.1.9: Geomorphology.**

10.10 **Technical Appendix 10.2: Peat Management Plan, Figures 10.2.2, 10.2.3 and 10.2.4** of the EIA Report, have been updated to outline the design amendments and are therefore superseded by:

- **SEI Figure 10.2.2 – Site Layout;**
- **SEI Figure 10.2.3 – Peat Depth; and**
- **SEI Figure 10.2.4 – Peat Depth Over 0.5m.**

10.11 **Technical Appendix 10.3: Borrow Pit Appraisal, Figures 10.3.2, 10.3.3 and 10.3.4** of the EIA Report, have been updated to outline the design amendments and are therefore superseded by:

- **SEI Figure 10.3.2: Site Layout;**
- **SEI Figure 10.3.3: Superficial Geology; and**
- **SEI Figure 10.3.4: Bedrock Geology.**

## CUMULATIVE BASELINE UPDATE

10.12 Since the 2022 Kirkton Energy Park application the cumulative wind farm situation in the study area has changed. The relevant changes to the cumulative context since the 2022 Kirkton Energy Park application are as follows:

- Melvich Wind Energy Hub application;
- Armadale Wind Farm application;
- Pentland Offshore Wind Farm consented; and
- West of Orkney Offshore scoping.

10.13 The updated cumulative baseline does not change the cumulative assessment presented in the EIA Report as the cumulative developments are located in different water catchments and the

mitigation measures are presented in the EIA Report that ensure there are no likely effects beyond the EIA Report application boundary.

### ASSESSMENT OF DESIGN AMENDMENT EFFECTS

#### Water Environment

- 10.14 The revised location of Turbine No.7 would not result in any material change to the submitted EIA Report assessment. The turbine is not located within 50m of a watercourse and it has been agreed with SEPA that the habitat at the revised turbine location is not sustained by groundwater. The controls and management measures specified in the EIA Report remain wholly applicable and can be used to mitigate potential adverse effects on erosion and sedimentation, pollution, flood risk and drainage, and dewatering of soils and peat.
- 10.15 The amended access track to Turbine No.5 – 11, passes adjacent to a man-made drain, which it is assumed was established to locally drain soils and improve grazing. Photographs of the drain at approximately its closest point to the proposed realigned track, are shown in **SEI Technical Appendix 10.5: Drainage Photographs**.
- 10.16 It is evident that the drain does not convey a significant quantity of water and is not part of the natural drainage network. It is proposed therefore, as part of the track construction works to remove the drain and restore this area. The restoration works would be supervised by the proposed site Environmental Clerk of Works (ECoW) using site won soils. Removing the drain would locally improve habitat and allow its rewetting and establish a buffer from the track to water features. This is considered a beneficial effect.

#### Peat Landslide Hazard Risk Assessment

- 10.17 There is sufficient peat probe data to assess the revised location of Turbine No.7 and the amended proposed track layout.
- 10.18 Review of the new location of Turbine No.7 and re-aligned track indicates that there has been no change to the level of Peat Stability Risk or the conclusions and recommendations within **Technical Appendix 10.1: Peat Landslide Hazard Risk Assessment (PLHRA)** of the EIA Report. No update of the PLHRA is therefore required and no increase in peat slide risk has been identified.

#### Peat Management Plan

- 10.19 The amended location of Turbine No.7 and the re-aligned track are located in areas of similar peat depth as previously assessed in **Technical Appendix 10.2: Peat Management Plan (PMP)** of the EIA Report. The previous recommendations on excavation and re-use of soils and peat detailed within the existing Stage 1 PMP remain valid. An update to the excavated materials calculator (Appendix 01 of **Technical Appendix 10.2**) is provided as **SEI PMP Appendix 01: Excavated Materials Calculator**.



### SUMMARY OF CHANGES TO THE SIGNIFICANCE OF EFFECTS

- 10.20 As detailed above, the proposed amendments to the site layout do not change the findings of Chapter 10 the EIA Report and that the best practice measures detailed in the EIA Report remain wholly applicable and relevant to the proposed revision.
- 10.21 The significance of likely effects therefore remains as assessed in the EIA Report and no significant effects would result as a result of the proposed revision to the assessed development. Further, no additional site investigation or monitoring is required.

### CONCLUSIONS

- 10.22 The design amendments will not result in any change to the significance of effects as presented in Chapter 10 of the EIA Report.