CONTENTS

INTRODUCTION

10.1 This Chapter assesses the potential impacts of the Proposed Development on soils, geology and the water environment (hydrology and hydrogeology). The assessment of potential impacts has been made on the basis of the Proposed Development layout as fully described in **Chapter 3: Description of the Development** and shown on **Figure 3.1a-b**. It outlines the embedded good practice methods which have been incorporated into the design and would be used during the construction and operation of the Proposed Development to prevent or reduce identified effects and risks. As part of the Proposed Development, it is proposed to restore areas of existing and degraded peatland. The benefits of this, and how it meets the Policy aims of National Planning Framework 4 is discussed in **Chapter 8: Ecology** and the **Planning Statement**.

10.2 The wind farm design has undergone many design iterations to take account the findings of multiple field survey and investigation programmes. As a consequence, considerable mitigation is afforded by the design of the wind farm. Where required, further mitigation methods to address any potential effects are proposed, where appropriate, in this Chapter and residual effects assessed.

10.3 In addition, the assessment uses information and findings presented in **Chapter 8: Ecology** to inform the assessment of potential effects on possible areas of Groundwater Dependent Terrestrial Ecosystems (GWDTE) which are presented in this Chapter.

10.4 This Chapter presents summary information from the following supporting Technical Appendices (TA):

- **Technical Appendix 10.1: Peat Landslide Hazard and Risk Assessment (PLHRA);**
- **Technical Appendix 10.2: Soil and Peat Management Plan (PMP); and**
- **Confidential Technical Appendix 10.3: Private Water Supply Risk Assessment.**

10.5 Planning policies of relevance to this assessment are provided in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**.

10.6 This Chapter has been prepared by SLR Consulting Ltd (SLR), who has also undertaken the assessment.

SCOPE AND CONSULTATION

10.7 The scope of the study and assessment has been determined through a combination of professional judgement, reference to relevant guidance documents and consultation with stakeholders.

Consultation

10.8 Consultation for the Proposed Development was undertaken with statutory and non-statutory bodies during 2022 as set out in **Chapter 6: Scoping and Consultation**. The outcome of the relevant consultations with regard to soils, geology and the water environment are summarised in **Table 10-1.**

Table 10-1: Consultation Responses

Consultee	Summary of Key Issues	Where Addressed in Chapter
NatureScot	Areas with active peat forming habitats should be avoided and the layout should generally be designed to minimise the extent of development on peat and peaty soils.	See **Technical Appendix 10.1: PLHRA** and **10.2: PMP**
Scottish Environmental Protection Agency (SEPA)	We now expect developments on peat and near-natural wetlands to be avoided in the first instance and impacts on carbon minimised through sensitive design. Proposals for any re-use of excavated peat will need to demonstrate how catotelmic peat will be reinstated into a functional peatland system. Excavated catotelmic peat should be re-used within a functional peatland system, meaning that it should be locked underground, below the water table and covered with reinstated turves (acrotelmic peat). The proposals should investigate opportunities to re-use excavated peat within historic peat cuttings, which may be present on site, which allows existing turves to be utilised and reduces double handling of catotelmic peat. All tracks should be kept a minimum 50m away from any waterbody, with the exception of watercourse crossings and connecting tracks should minimise watercourse crossings. We would encourage the Applicant to share the location of the borrow pit, battery storage, site compounds and temporary laydowns against the NVC and peat depth surveys, as these too should avoid near-natural habitats and areas of deep peat.	See **Technical Appendix 10.1: PLHRA** and **10.2: PMP** See **Figure 10.1** See **Figure 10.8** and **Technical Appendix 10.2 PMP**
Scottish Water	Scottish Water has no objection to this planning application; however, the Applicant should be aware that this does not confirm that the Proposed Development can currently be serviced. Scottish Water will also not accept any surface water connections into their combined sewer systems.	Noted
The Highland Council (THC)	The EIAR needs to address the nature of the hydrology and hydrogeology of the site, and of the potential impacts on water courses, water supplies including private supplies, water quality, water quantity and on aquatic flora and fauna. Impacts on watercourses, lochs, groundwater, other water features and sensitive receptors, such as water supplies, need to be assessed. Measures to prevent erosion, sedimentation or discolouration will be required, along with monitoring proposals and contingency plans. If culverting should be proposed, either in relation to new or upgraded tracks, then it should be noted that SEPA has a general presumption against modification, diversion or culverting of watercourses. Schemes should be designed to avoid crossing watercourses, and to bridge watercourses where this cannot be avoided. The EIAR will be expected to identify all water crossings and include a systematic table of watercourse crossings or channelising, with detailed justification for any such elements and design to	See Baseline Conditions and Assessment of Effects (Embedded Measures) section of this Chapter The site design has avoided the need for new watercourse crossings.

Consultee	Summary of Key Issues	Where Addressed in Chapter
	minimise impact. The Council's Flood Risk Management Team had no comments to make at this stage. However, there are a number of watercourses and waterbodies on the site therefore the following applies: ▪ Minimum 50m buffer is maintained between the water environment and the Proposed Development; ▪ Access tracks not acting as preferential pathways for runoff and efforts being made to retain existing natural drainage where possible; ▪ Natural flood management techniques should be applied to reduce the rate of runoff where possible; use of SuDS to achieve pre-development runoff rates and to minimise erosion on existing watercourses; ▪ The EIAR should be informed by the Council's Flood Risk and Drainage Impact Assessment SG. The EIAR should include a full assessment on the impact of the development on peat. The assessment of the impact on peat must include peat probing for all areas where development is proposed. The Council are of the view this should include probing not just at the point of infrastructure as proposed by the scheme but also covering the areas of ground which would be subject to micro-siting limits. The EIAR must consider the risks of engineering instability relating to presence to peat on the site. Assessment should also address pollution risk and environmental sensitivities of the water environment. It should include a detailed map of peat depth and evidence that the scheme minimises impact on areas of deep peat. The Council's Environmental Health Team requires an onsite survey and investigation to identify any private water supplies, including pipework, which may be adversely affected by the development and to submit details of measures proposed to prevent contamination or physical disruption.	Noted. A 50m buffer to watercourses has been applied and measures to control and manage runoff have been proposed (see Assessment of Effects (Embedded Measures) section of this Chapter See **Technical Appendix 10.1: PLHRA** and **10.2: PMP** See Baseline Conditions and **Confidential Technical Appendix 10.3** (Private Water Supply Risk Assessment)

Effects Scoped Out

10.9 On the basis of the desk based and survey work undertaken, policy, guidance and standards, the professional judgement of the EIA team, feedback from consultees and experience from other relevant projects, the following topic areas have been 'scoped out':

- Detailed Flood Risk and Drainage Impact Assessment. Published mapping confirms that most of the site is not located in an area identified as being at flood risk. A simple screening of potential flooding sources (fluvial, coastal, groundwater, infrastructure etc.) is presented in the EIA Report and measures that would be used to control the rate and quality of runoff have been specified and would be included in the Construction and Environmental Management Plan (CEMP) at the detailed design stage of the project;

- Drainage Impact Assessment: Principles for the design of any watercourse crossings and for the control of drainage shed from the development have been specified in the EIA Report. It is expected that these would be developed as part of the detailed Site design, should the Site be

granted planning permission, and a site-specific drainage plan would be a pre-development planning condition;

- Water quality monitoring: As the assessment is informed by classification data available from SEPA and there are no known sources of potential water pollution, no additional water quality monitoring is considered necessary to complete the assessment. Note water quality monitoring is proposed prior to, during and post construction if the Proposed Development were to be granted consent. Details of monitoring suites, locations, frequencies, and reporting would be specified in the CEMP; and

- Potential significant decommissioning effects would be the same as potential construction effects. Decommissioning the wind farm and its associated infrastructure would be subject to a decommissioning plan which would include the same safeguards as those identified during the construction stage of the project. Potential decommissioning effects are therefore scoped out of this assessment.

APPROACH AND METHODS

10.10 The potential effects associated with the Proposed Development on soils, geology and the water environment have been assessed by completing an initial desk study followed by an impact assessment. Characterisation of baseline conditions and the impact assessment have been informed by a detailed programme of site investigation.

Study Area

10.11 The study area includes all of the proposed site infrastructure and illustrated on **Figure 10.1**. In addition, details of local water use and quality within a buffer of 1km from the Proposed Development has been considered. Beyond this 1km any effect is considered to be so diminished as to be undetectable and therefore not significant.

10.12 The study area for potential cumulative effects uses the catchments within the study area, with a maximum downstream distance of 5km from the Proposed Development.

Information and Data Sources

10.13 An initial desk study has been undertaken to determine and confirm the baseline characteristics by reviewing available information on soils, geology, hydrology and hydrogeology. In addition to the policy, legislation and guidance set out in **Technical Appendix 4.1** the following sources of information have been consulted in order to characterise baseline conditions:

- OS 1:50,000 and 1:10,000 scale mapping data;
- Flood Estimation Handbook (FEH) web service (available online at https://fehweb.ceh.ac.uk/);
- British Geological Survey (BGS) Onshore Geoindex (available online at http://mapapps2.bgs.ac.uk/geoindex/home.html);
- BGS Hydrogeological Maps of Scotland (1:100,000 scale) (available online at https://www.bgs.ac.uk/datasets/hydrogeological-maps-of-scotland/);

- Scotland's Soils, National soil map of Scotland (1:250,000) (available online at http://soils.environment.gov.scot/maps/);
- SEPA flood maps (available online at https://www.sepa.org.uk/environment/water/flooding/flood-maps/ and http://map.sepa.org.uk/reservoirsfloodmap/Map.htm);
- SEPA Environmental Data (available online at https://www.sepa.org.uk/environment/environmental-data/);
- NatureScot Sitelink (available online at https://sitelink.nature.scot/home);
- Natural England Magic Map (available online at http://magic.defra.gov.uk/MagicMap.aspx);
- Data requests with SEPA regarding details of registered/licensed abstractions and discharges (December 2022); and
- Data requests with THC environmental health department regarding details of historic flooding records and private water abstractions (December 2022).

Field Survey

10.14 The project hydrologists, geologists and ecologists have worked closely on this assessment to ensure that appropriate information is gathered to allow a comprehensive impact assessment to be completed.

10.15 Detailed site visits and walkover surveys have been undertaken by SLR on the following dates:

- October 2020 to conduct an initial peat / soil depth probing exercise;
- November 2022 to conduct additional peat / soil depth probing exercise and undertake a hydrological site walkover and private water supply survey; and
- February 2023 to conduct additional peat / soil depth probing exercise.

10.16 The field work has been undertaken in order to:

- verify the information collected during the desk and baseline study;
- undertake a visual assessment of the main surface waters and identify and verify private water supplies;
- identify drainage patterns, areas vulnerable to erosion or sediment deposition, and any pollution risks;
- visit any identified potential GWDTE (in consultation with the project ecologist);
- visit any potential watercourse crossings and prepare a schedule of potential watercourse crossings if required;
- inspect rock exposures and establish by probing, an estimate of overburden thicknesses, peat depth and stability;
- confirm underlying substrate, based on the type of refusal of a peat probe and by coring; and
- allow appreciation of the site, determine gradients, potential borrow pit locations, access

routes, ground conditions, etc., and to assess the relative location of all the components of the Proposed Development.

10.17 The desk study and field surveys have been used to identify potential development constraints and have been used as part of the iterative design process.

10.18 The data obtained as part of the desk study and collected as part of the field work has been processed and interpreted to complete the impact assessment and recommend mitigation measures where appropriate.

Assessment Methods

10.19 The significance of potential effects of the Proposed Development has been assessed by considering two factors: the sensitivity of the receiving environment and the potential magnitude of impact, should that effect occur.

10.20 The assessment methodology has also been informed by experience of carrying out such assessments for a range of wind farm and other developments, knowledge of soils, geology and the water environment characteristics in Scotland and cognisance of good practice.

10.21 This approach provides a mechanism for identifying the areas where mitigation measures are required and for identifying mitigation measures appropriate to the significance of potential effects presented by the Proposed Development.

10.22 Criteria for determining the significance of effect are provided in Error! Reference source not f ound.**,** Error! Reference source not found. **and** Error! Reference source not found.**.**

Sensitivity of Receptor

10.23 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria which is set out in **Table** Error! Reference source not found.Error! Reference source not found.. Receptors in the re ceiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

Table 10-2: Sensitivity of Receptor Criteria

Sensitivity	Definition
High	▪ SEPA Water Framework Directive Water Body Classification: High-Good or is close to the boundary of a classification: Moderate to Good or Good to High; ▪ Receptor is of high ecological importance or National or International value (e.g. Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), habitat for protected species) which may be dependent upon the hydrology of the Development Area; ▪ Receptor is at high risk from flooding above 0.5% Annual Exceedance Probability (AEP) and/or water body acts as an active floodplain or flood defence; ▪ Receptor is used for public and/or private water supply (including Drinking Water Protected Areas; ▪ Groundwater vulnerability is classified as high; ▪ If a Groundwater Dependent Terrestrial Ecosystem is present and identified as being of high

Sensitivity	Definition
	sensitivity; and ▪ Soil type and associated land use is highly sensitive (e.g. unmodified blanket bog peatland).
Moderate	▪ SEPA Water Framework Directive Water Body Classification: Moderate or is close to the boundary of a classification: Low to Moderate; ▪ Receptor is at moderate risk from flooding (0.1% AEP to 0.5% AEP) but does not act as an active floodplain or flood defence; and ▪ Moderate classification of groundwater aquifer vulnerability; and ▪ Soil type and associated land use moderately sensitive (e.g. arable, commercial forestry).
Low	▪ SEPA Water Framework Directive Water Body Classification: Poor or Bad; ▪ Receptor is at low risk from flooding (less than 0.1% AEP); ▪ Receptor not used for water supplies (public or private); and soil type and associated land use not sensitive to change in hydrological regime and associated land use (e.g. intensive grazing of sheep and cattle).
Not Sensitive	▪ Receptor would not be affected by the Proposed Development e.g. lies within a different and unconnected hydrological / hydrogeological catchments.

Magnitude of Impact

10.24 The potential magnitude of impact would depend upon whether the potential effect would cause a fundamental, material or detectable change. In addition, the timing, scale, size and duration of the potential effect resulting from the Proposed Development are also determining factors. The criteria that have been used to assess the magnitude of impact are defined in Error! Reference s ource not found.**Error! Reference source not found.**.

Table 10-3: Magnitude of Impact

Magnitude	Criteria	Definition
Major	Results in loss of attribute	Fundamental (long term or permanent) changes to the baseline geology, hydrology, hydrogeology and water quality such as: ▪ permanent degradation and total loss of the soils habitat; ▪ loss of important geological structure/features; ▪ wholesale changes to watercourse channel, route, hydrology or hydrodynamics; ▪ changes to the site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns; ▪ major changes to the water chemistry; and ▪ major changes to groundwater levels, flow regime and risk of groundwater flooding.
Medium	Results in impact on integrity of	Material but non-fundamental and short to medium term changes to baseline geology, hydrology, hydrogeology and water quality, such as: ▪ loss of extensive areas of soils habitat, damage to important

Magnitude	Criteria	Definition
	attribute or loss of part of attribute	geological structures/features; ▪ some fundamental changes to watercourses, hydrology or hydrodynamics. – changes to site resulting in an increase in runoff within system capacity; ▪ moderate changes to erosion and sedimentation patterns; ▪ moderate changes to the water chemistry of surface runoff and groundwater; and ▪ moderate changes to groundwater levels, flow regime and risk of groundwater flooding.
Low	Results in minor impact on attribute	Detectable but non-material and transitory changes to the baseline geology, hydrology, hydrogeology and water quality, such as: ▪ minor or slight loss of soils or slight damage to geological structures/feature; ▪ minor or slight changes to the watercourse, hydrology or hydrodynamics; ▪ changes to site resulting in slight increase in runoff well within the drainage system capacity; ▪ minor changes to erosion and sedimentation patterns; ▪ minor changes to the water chemistry of surface runoff and groundwater; and ▪ minor changes to groundwater levels, flow regime and risk of groundwater flooding.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	No perceptible changes to the baseline soils, geology, hydrology, hydrogeology and water quality such as: ▪ no impact or alteration to existing important geological environs; ▪ no alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns; ▪ no pollution or change in water chemistry to either groundwater or surface water; and ▪ no alteration to groundwater recharge or flow mechanisms.

Potential Effects

10.25 The following potential impacts have been assessed in full in relation to the Proposed Development:

- pollution risk, including potential impact on surface water and groundwater quality and public and private water supplies during construction and operation;
- erosion and sedimentation which could give rise to potential impact on surface water and groundwater quality, and private water supplies during construction and operation;
- fluvial flood risk resulting from changes to runoff volumes and rates and modifications to natural and man-made drainage patterns during operation;
- potential impact upon the linkage between groundwater and surface water during construction and operation;
- potential impact on areas of peat during construction and operation;

- potential impact on areas of GWDTE during construction and operation; and
- potential cumulative impact during construction and operation.

Significance of Effects

10.26 The sensitivity of the receiving environment together with the magnitude of the impact determines the significance of the effect, which can be categorised into level of significance as identified in **Table 10-4**. This also considers good practice measures implemented and embedded as part of the design and construction of the Proposed Development and use of professional judgement where appropriate.

10.27 The table provides a guide to assist in decision making. However, it should not be considered as a substitute for professional judgment and interpretation. In some cases, the potential sensitivity of the receiving environment or the magnitude of potential impact cannot be quantified with certainty and therefore professional judgement remains the most robust method for identifying the predicted significance of a potential effect.

Table 10-4: Significance of Effect

Magnitude of Impact	Sensitivity			
	High	Moderate	Low	Not Sensitive
Major	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Cumulative Effects

10.28 The assessment also considers potential cumulative effects associated with other developments within the same surface water catchments as the Proposed Development.

10.29 A cumulative effect is considered to be the effect on a geological, hydrological or hydrogeological receptor arising from the Proposed Development in combination with other Proposed Developments which are likely to affect soils or geology, surface water and groundwater.

10.30 Proposed Developments within the same catchment as the site and within a distance of 5km from the Proposed Development have been considered, including:

- Edinbane Wind Farm lies within the Abhainn Choishleader and River Ose catchments; and
- Ben Aketil Wind Farm which is located in the Red Burn catchment.

10.31 Ben Sca Wind Farm and its Extension, which is consented, but yet to be constructed, will lie to the north of the Proposed Development and in the Red Burn catchment. The proposed overhead power line associated with the Skye Reinforcement Project would be located to the south west of the Proposed Development area and within the Abhainn Bhaile Mheadhonaich, River Ose and

Caroy River surface water catchments.

10.32 Cumulative effects are considered using the same methodology as for effects of the Proposed Development in isolation.

Mitigation

10.33 Any potential effects of the Proposed Development on soils, geology and the water environment identified by the assessment have been addressed and mitigated by the conceptual site design and the application of good practice guidance implemented as standard during construction and operation to prevent, reduce or offset effects where possible. As such, a number of measures would form an integral part of the design/construction process, and these have been considered prior to assessing the likely effects of the Proposed Development. Where appropriate, further tailored mitigation measures have been identified prior to determining the likely significance of residual effects.

10.34 Good practice measures would be applied in relation to pollution risk, sediment management, peat management and management of surface runoff rates and volumes. This would form part of the CEMP to be implemented for the Proposed Development which would be secured by a planning condition and would be prepared prior to construction commencing. An outline CEMP is provided in **Technical Appendix 3.1**.

10.35 The final CEMP would include details and responsibilities for environmental management onsite for site environmental aspects and would outline the necessary measures for surface water management, oil and chemical delivery and storage requirements, waste management, traffic and transport management. It would also specify monitoring requirements for wastewater, water supply including an Environmental Incident Response Plan (EIRP) and all appropriate method statements and risk assessments for the construction of the Proposed Development.

Residual Effects

10.36 A statement of residual effects, following consideration of any further specific mitigation measures where identified, is then given where required.

Statement of Significance

10.37 The hydrology, hydrogeology and soils assessment provides a statement of significance associated with the Proposed Development. Effects of 'major' and 'moderate' significance, as outlined in Error! Reference source not found., are considered to be 'significant' in terms of the EIA R egulations.

Assumptions, Limitations and Confidence

10.38 The assessment uses site investigation and survey data and publicly available data sources, including but not limited to SEPA, Met Office, THC and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.

10.39 As a consequence, it is considered that the data and information used to complete this assessment is robust and that there are no significant data gaps or limitations.

BASELINE CONDITIONS

Current Baseline

10.40 This section presents information gathered regarding the existing geological, hydrogeological and hydrological conditions at the site and its immediate surrounding.

Site Setting

10.41 The site, centred on NGR 133900, 846750 is located in the north west of the Isle of Skye, on the Bracadale Estate, on the Balmeanach and Caroy Common Grazings, and partly on the Coishletter Estate. The site, which measures approximately 680ha, is located on moorland approximately 3km to the south of the settlement of Edinbane, approximately 8km to the east of Dunvegan and approximately 7km to the north of Struan on the Isle of Skye (**Figure 1.1**). Access to the site would be via the existing Ben Aketil Wind Farm access track from the A850, and then south east via the consented Ben Sca Wind Farm Site access track onto the hillside.

10.42 For the main development area of the site, topography slopes to the south east from 283m AOD at the summit of Ben Sca down to the lower slopes at approximately 160m AOD.

10.43 SEPA has provided precipitation data for the nearest rain gauge (Allt Dearg House located at NGR 147791, 829371). In 2022, a precipitation total of 4,733mm was recorded. Average annual rainfall data provided by FEH for the River Ose catchment records a much lower annual precipitation total of 2,084mm.

10.44 An extract of OS mapping for the site, which shows its setting, is presented on **Figure 10.1**.

Statutory Designated Sites

10.45 Review of **Figure 2.1** confirms that the application boundary does not contain statutory designated sites.

10.46 The locations of nearby statutory designated sites are shown on **Figure 10.1.** An Cleireach Site of Special Scientific Interest (SSSI) and An Cleireach Geological Conservation Review (GCR) site are both located to the south of the site and are designated for the sequence of tertiary igneous rocks at this location. No negative pressures have been identified for these protected areas and they were assessed to be favourable maintained in 2002. No development is proposed near to this SSSI and GCR and the qualifying interest of the designated site is not water dependent. It is not considered further in this assessment.

10.47 Loch Caroy to the south of the site forms part of the Inner Hebrides and the Minches Special Area of Conservation (SAC) and is a Shellfish Waters Protected Area (ID: SWPA31). The loch and the SAC lie beyond the study area and whilst much of the site drains to Loch Caroy it will afford significant dilution such that any potential effects would not be discernible. It is not, therefore, considered further in this assessment.

Geology

Soils and Superficial Deposits

10.48 An extract of the 1:250,000 Scotland's Soils mapping is presented as **Figure 10.2**. The principal soil types recorded at site are peaty gleys and blanket peat.

10.49 An extract of the peatland classification dataset published by Scottish Natural Heritage (now NatureScot) is shown on **Figure 10.3**. This shows that the majority of the site lies within Class 1 peatland with small areas of Class 5 towards the south east. Class 1 peatland is considered nationally important carbon-rich soils, deep peat and priority peatland habitat. These areas are likely to be areas of high conservation value. Class 5 peatland is not considered nationally important; however, the soils remain carbon rich and contain deep peat with the potential to include areas of bare soil.

10.50 BGS mapping, shown on **Figure 10.4**, indicates that the majority of the site is underlain by peat, with small areas of glacial till within the northern extent of the site. Superficial deposits are shown to be absent on the hill tops locally, particularly near Ben Sca and Ben Aketil.

10.51 As part of the baseline assessment, a comprehensive scheme involving three phases of peat probing has been conducted and informs the PLHRA and PMP (**Technical Appendix 10.1 and 10.2**). In summary:

- the geomorphology of the peat areas varies between large, flat expanses of apparently thick peat with high moisture content and smaller areas of thinner drier deposits of blanket peat on the moderate undulating slopes;
- peat thickness varies from zero to 2.7m with an average depth of 0.3m;
- peat coring confirmed most of the shallow peat would be classified as predominantly fibrous between H2 and H3 in the von Post classification, showing slight decomposition with some limited amorphous material;
- evidence of areas of peat erosional features were present as peat hags at the location of the proposed substation and the proposed construction compound in the north western section of the main site down slope of Ben Sca summit. Deeply eroded peat, and large hags are present near to the plateau between Ben Aketil and Ben Sca; and
- no signs of peat instability were identified during the field works.

Bedrock Geology and Linear Features

10.52 An extract of the regional BGS bedrock geological mapping is presented on **Figure 10.5** which shows that the site is underlain by three units of the Skye Lava Group:

- Skye Lava Group comprising of basalt and microgabbro, an extrusive igneous rock that underlies part of the northern and south eastern extent of the site;
- Skye Lava Group comprising hawaiite and mugearite, an extrusive igneous rock that underlies the centre of the site; and
- Skye Lava Group comprising trachyte, an extrusive igneous rock that underlies part of the south

eastern boundary.

10.53 A small area of North Britain Palaeogene Dyke Suite, which comprises mafic igneous rocks of troctolite and bytownite, is also noted towards the south of the site.

10.54 Several inferred faults are noted across the site as shown on **Figure 10.5**.

Hydrogeology

Aquifer Characteristics and Groundwater Vulnerability

10.55 Extracts of the BGS groundwater vulnerability and regional hydrogeological mapping (see **Figures 10.6 and 10.7**) confirm that the superficial deposits, where present, and the bedrock beneath the site are unlikely to contain significant quantities of groundwater. The BGS classify the bedrock as a low productivity aquifer, whereby small amounts of groundwater may be present within the near surface weathered zone or secondary fractures. Further details are given in **Table 10-5**.

Table 10-5: Hydrogeological Characterisation

Period	Geological Unit	Hydrogeological Characterisation	Hydrogeological Classification
Pleistocene to Recent	Peat	Where not degraded or eroded, characteristically wet underfoot and dominated by Sphagnum. Typically peat consists of two layers: the upper very thin (up to 30cm) acrotelm layer contains upright stems of Sphagnum mosses and allows relatively free water movement and the lower catotelm layer comprising the thicker bulk of peat where individual plant stems have collapsed. Water movement in the catotelm layer is very slow and normally the water table in a peat never drops below the acrotelm layer.	Not a significant aquifer
	Glacial Till	Sand and gravel horizons within this unit can store groundwater, although their lateral and vertical extent realises a variable and often small groundwater yield. Clay within this unit acts as an aquitard to the more permeable sand and gravel lenses and will hinder/prevent large scale groundwater movement. Regionally, groundwater flow will be limited by the variability of these deposits and consequently any groundwater yields are normally low.	Not a significant aquifer
Paleocene	Skye Lava Group	Generally without groundwater except at shallow depths. Hard rocks with limited groundwater in near surface weathered zone and secondary fractures or rare springs.	Low Productivity Aquifer Fracture flow where groundwater movement does occur

10.56 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure 10.6** shows that the potential groundwater

vulnerability in the uppermost aquifer beneath the Proposed Development has a vulnerability of Class 4 and 5. This reflect the potential shallow depth to groundwater and the shallow superficial cover.

Groundwater Levels and Quality

10.57 Groundwater recharge at and surrounding the site is limited by the following factors:

- steeper topographic gradients will result in rainfall forming surface water runoff;
- the peat and glacial till deposits inhibit infiltration owing to their generally low bulk permeability; and
- the underlying bedrock displays a low permeability that inhibits groundwater recharge.

10.58 SEPA has confirmed it does not maintain any groundwater level monitoring locations within 1km of the site. In the absence of published information or data held by SEPA, it is anticipated that limited groundwater will be present as perched groundwater within the more permeable horizons of the glacial till deposits and within weathered zone, fractures or faults within the bedrock deposits.

10.59 All of Scotland's groundwater bodies have been designated as Drinking Water Protected Areas under the Water Environment (Drinking Water Protected Area) (Scotland) Order 2013 and require protection for their current use or future potential as drinking water resources.

10.60 The current status of groundwater bodies in Scotland has been classified by SEPA (SEPA, 2020) in accordance with the requirements of the Water Framework Directive (WFD). SEPA have identified that the site is underlain by the Skye North groundwater body (SEPA ID: 150688) which was classified in 2020 (the last reporting cycle) with an Overall Status of Good with no pressures identified.

Groundwater Dependant Terrestrial Ecosystems

10.61 A national vegetation classification (NVC) habitat mapping exercise was conducted in 2021 and 2022 as part of the ecology baseline assessment to identify potential GWDTE within the application boundary. The results of the NVC habitat mapping exercise are discussed in detail within **Chapter 8: Ecology** and areas of potential GWDTE are shown on **Figure 10.8**. An assessment of the GWDTE, and in particular a discussion of whether the habitats are sustained by ground or surface water, is summarised in **Table 10-6**.

Table 10-6: Groundwater Dependent Terrestrial Ecosystems

NVC Community	GWDTE Potential	Location	Discussion
M6	High	M6 are noted in small linear sections within the central and eastern parts of the site.	M6 where recorded follows watercourse corridors, it is therefore considered that M6 is likely not to be groundwater dependent and instead is sustained by surface water and the waterlogging of soils adjacent to watercourses.
M23	High	M23 are recorded in linear sections most commonly	Since M23 habitat is located in watercourse corridors, it is likely not to be groundwater

NVC Community	GWDTE Potential	Location	Discussion
		noted to the south and east of the site. M23 habitat also is located in watercourse corridors.	dependent and instead is sustained by surface water and waterlogging of soils adjacent to watercourses.
M15	Moderate	Large areas of M15 are noted to the north and south west of the site. Smaller areas of M15 have been noted within the centre of the site and to the south.	The M15 habitat noted to the north of the site lies immediately east of the peak Ben Sca, due to the steepness of the topography in this area it is unlikely that the potential GWDTE is supported by groundwater and is likely to be supported by rainfall and surface water runoff. The other M15 areas are clearly connected to unnamed burns and are likely to be sustained by local water logging of soils.
U6	Moderate	A small area of U6 has been noted to the west of the site, immediately south of Ben Aketil peak.	The U6 habitat is recorded at the beginning of an unnamed stream and is supported by runoff from the southern flank of Ben Aketil.

10.62 It is concluded that the areas mapped as potential high and moderate GWDTE are not sustained by groundwater but rather are sustained by incident rainfall and surface water runoff. Accordingly, the buffers to potential GWDTE specified in SEPA guidance need not apply. Safeguards would be required, however, to sustain existing surface water flow paths so that incident rainfall can continue to sustain these habitats (see Assessment of Impacts and Embedded Mitigation).

Hydrology

Local Hydrology

10.63 Elements of the Proposed Development are located within three main surface water catchment areas (see **Figure 10.1**):

- The River Ose to the south east of the site which flows south west discharging into Loch Bracadale;
- The Red Burn to the north west of the site generally flowing northwards before discharging into Loch Greshornish; and
- The Abhainn Coishleader to the north east of the site also generally flowing northwards towards Coishletter before discharging into Loch Greshornish.

10.64 Part of the western extent of the site is located within the Caroy River surface water catchment which flows southwards before discharging into Loch Caroy.

10.65 There is one Drinking Water Protected Area (DWPA) within the study area, it is located to the south of the site to the east of Loch Caroy, near Balmeanach (ID: DWPA13_112). This DWPA lies within the Abhainn Bhaile Mheadhonaich catchment which is not hydraulically connected to the Proposed

Development site. The DWPA is therefore not at risk from the Proposed Development and is not considered further in the assessment.

Surface Water Flow

10.66 **Table 10-7** summarises the surface water catchment characteristics of the three main watercourses that drain the site.

Table 10-7: Surface Water Catchment Descriptors

Watercourse	Downstream Point (NGR)	Area (km^2)	SAAR (mm)	ALTBAR (mASL)	DPSBAR (m/km)	LDP (km)	BFIHOST (dim)
Red Burn	131450, 849100	3.53	1,956	186	88.20	3.67	0.2850
Abhainn Choishleadar	134350, 850250	9.09	2,015	158	95.30	4.68	0.2840
River Ose	134050, 842400	19.92	2,084	145	86.2	9.16	0.319

Note: Grid reference of downstream point is either the Proposed Development application boundary or confluence with another watercourse; SAAR – surface average annual rainfall between 1961 and 1990; ALTBAR – mean catchment altitude (metres above sea level); DPSBAR – index of catchment steepness; and LDP – longest drainage path; BFIHOST - base flow index is a measure of catchment responsiveness to precipitation.

Surface Water Quality

10.67 Water quality in the River Ose, Red Burn and Abhainn Choishleadar is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table 10-8** summarises classifications reported in 2017 (the last reporting cycle). Smaller watercourses within the Proposed Development are not monitored nor classified by SEPA.

Table 10-8: Surface Water Classification Data

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology
Red Burn (20729)	Good	Good	Good	High
Abhainn Choishleadar (20730)	Good	Good	Good	High
River Ose (20725)	Good	Good	Good	High

10.68 All three watercourses are recorded to have a Good overall status and no pressures are identified by SEPA.

Fisheries

10.69 Fisheries for watercourses that are downstream of the Proposed Development are managed by the Skye and Wester Ross Fisheries Trust (SWRFT) in partnership with Skye District Salmon Fishery Board (SDSFB). Fishery interests are discussed and assessed within **Chapter 8: Ecology**.

Flood Risk

10.70 SEPA has developed national flood maps that present modelled flood extents for river, coastal, surface water and groundwater flooding. The river, coastal, surface water and groundwater maps were developed using a consistent methodology to produce outputs for the whole of Scotland, supplemented with more detailed, local assessments where available and suitable for use. Flood extents are presented in three likelihoods:

- High likelihood: A flood event is likely to occur in the defined area on average more than once in every ten years (1:10), or a 10% chance of happening in any one year;
- Medium likelihood: A flood event is likely to occur in the defined area on average more than once in every two hundred years (1:200), or a 0.5% chance of happening in any one year; and
- Low likelihood: A flood event is likely to occur in the defined area on average more than once in every thousand years (1:1000), or a 0.1% chance of happening in any one year.

10.71 The flood risk from each of these potential sources is discussed in **Table 10-9**.

Table 10-9: Potential Flood Risk

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	The site lies on elevated ground and SEPA flood maps confirms no risk of tidal flooding within the application boundary, therefore, the site is not at risk of tidal flooding.
River flooding	No	SEPA flood maps confirm flood extents are small and, where present, close to watercourses. No river or fluvial flooding is recorded within the application boundary, and therefore, fluvial flooding is not considered further.
Surface water flooding	No	SEPA flood maps indicate no risk of surface water flooding within the application boundary. The site is not at risk of surface water flooding.
Groundwater flooding	No	Review of the SEPA groundwater flood map confirms that the site is not at risk from groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant groundwater at the site.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no artificial drainage systems are recorded.
Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of the SEPA mapping highlights that there is no risk of reservoir inundation within the Proposed Development site. Flooding from this source is not considered further.

Historical Flooding Records

10.72 Consultation with THC has highlighted that there has been one historical flooding event within 5km of the Proposed Development. This flooding event was also confirmed by SEPA and relates to pluvial flooding which occurred downstream of the Proposed Development in 2009 on the A850 near Edinbane (see **Figure 10.1**) and it is understood to be caused by a blocked culvert which allowed water to flood the road. The recorded instance of flooding does not lie within a catchment which drains from the site.

10.73 SEPA noted one other historical flooding event once again caused by a blocked culvert on the A863 to the south west of the site in 2001. The flooding does not lie within a catchment draining from the site.

Private Water Supplies and Licenced Sites

10.74 As part of this assessment, a data request was made to THC for details of Private Water Supplies (PWS) sources within the study area. Review of this data confirms that there are no PWS located within the study area.

10.75 Following consultation, a programme of site investigation has been undertaken to confirm the location of PWS sources. The risk the Proposed Development poses to confirmed PWS sources has been considered as part of this assessment and is presented as **Confidential Technical Appendix 10.3: Private Water Supply Risk Assessment**. The assessment confirms there are no PWS sources that at risk from the Proposed Development.

10.76 SEPA has provided records of Controlled Activity Regulation (CAR) authorisations within the study area. Two are recorded which are shown on **Figure 10.1** and are for engineering works (bridge/ bridging culverts / pipelines / sediment removal) over watercourses.

10.77 No licenced water abstractions were noted within the study area.

Summary of Sensitive Receptors

10.78 **Table 10-10** outlines the receptors identified as part of the baseline study, and their sensitivity based upon the criteria contained in Table 10-2. These receptors form the basis of the assessment, and as per the previously introduced methodology, are used in conjunction with an estimate of the magnitude of an effect to determine significance.

10.79 **Table 10-10** outlines the receptors identified as part of the baseline study, together with a description of their sensitivity to potential impacts associated with wind farm development.

Table 10-10: Summary of Identified Receptors

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	Not Sensitive	Whilst Loch Caroy Shellfish Protection Area and Inner Hebrides and the Minches SAC is located downstream of the site it is located outside of the study area significant dilution is afforded by the loch such that no effects on the loch and SAC would be discernible.
Geology	High	Areas of peat and carbon rich soils have been recorded with the site and are

Receptor	Sensitivity	Reason for Sensitivity
		assessed further. With the exception of peat the superficial and bedrock geology is not rare and is not considered sensitive (and are not considered further as they are not sensitive).
Groundwater	High	Groundwater beneath the site has been classified as Good and vulnerability is classified as High. All of Scotland's groundwater bodies have been designated as DWPAs.
Surface water	High	Surface watercourses that drain the site have been classified by SEPA as Good.
Flooding	Moderate	Little flood risk has been identified onsite, but the development has potential, without appropriate design, to alter surface water flow paths and could increase flood risk downstream of the site.
Private Water Supplies	Not Sensitive	No private water supplies are considered at risk from the Proposed Development.
Drinking Water Protected Area	Not Sensitive	The DWPA lies within the Abhainn Bhaile Mheadhonaich catchment is not hydraulically connected to the site.
Licenced sites	Not Sensitive	No licensed water abstractions are recorded within the study area
GWDTE	High	Areas of potential GWDTE have been identified by NVC mapping. It has been shown that the habitats are not sustained by groundwater but by rainfall and surface water flow paths. Surface water flow paths to these habitats will need to be safeguarded to ensure these habitats are sustained.

Cumulative Situation

10.80 This section considers the potential cumulative effect of the Proposed Development taking into consideration other developments within 5km upstream/downstream of the Proposed Development. Any developments which are out with this study area are not considered as their potential effects are unlikely to be discernible.

Operational Period Baseline Changes Considered (Future Baseline)

10.81 Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside higher average temperatures. This suggests that there may be greater pressures on water supplies and lower water levels in summer months in the future. In addition, summer storms are predicted to be of greater intensity. Peak fluvial flows associated with extreme storm events may also increase in volume and velocity, and sea level rise is anticipated. These potential changes are considered in the assessment of effects.

ASSESSMENT OF EFFECTS

Embedded Measures

10.82 As noted in **Chapter 2: Site Selection and Design Evolution**, the Proposed Development has undergone extensive design iterations and evolution in response to the constraints identified as part of the baseline studies and field studies so as to avoid and/or minimise potential effects on receptors where possible. This has included areas of peat and carbon rich soils, geological, hydrological and hydrogeological constraints which include slope stability, watercourse locations, areas of potential flooding, and groundwater dependent terrestrial ecosystems. Details of the embedded mitigation are given below.

Peat

10.83 The potential presence of peat within the site formed a key consideration in the design of the Proposed Development. Informed by the extensive programme of peat probing undertaken across the site, the design has avoided areas of deeper peat (typically greater than 2.0-2.5m) and limited development to areas of peat less than 1m where possible or where peat is absent.

10.84 As shown in **Technical Appendix 10.1 (PLHRA) and 10.2 (PMP)** measures have been proposed to ensure the stability of peat and carbon rich soils and that peat and soils that would be disturbed by the Proposed Development can be safeguarded and beneficially re-used on site. The Policy aims of NPF4, regarding soils and peat, are therefore met; further details are provided below.

Peat Management

10.85 A detailed review of the distribution and depth of peat at the site is contained in **Technical Appendix 10.2 (PMP)**. As the site design has followed the mitigation hierarchy outlined in Policy 5 of NPF4 and avoided the majority of areas of deep peat, only limited areas of deep peat would be encountered by the Proposed Development which can be readily managed and accommodated within the site layout without significant environmental impact. No surplus peat would be generated and the limited volumes of peat generated from the proposed excavations would be used to reinstate track verges, turbine bases, cane hardstandings and restoration of onsite borrow pits.

Peat Landslide Hazard

10.86 A Design and Geotechnical Risk Register would be compiled to include risks relating to peat instability, as this would be beneficial to both the developer and the Contractor in identifying potential risks that may be involved during construction.

10.87 Good construction practice and methodologies to prevent peat instability within areas that contain peat deposits are detailed in **Technical Appendix 10.1 (PLHRA)**. These include:

- measures to ensure a well-maintained drainage system, to include the identification and demarcation of zones of sensitive drainage or hydrology in areas of construction;
- minimisation of ‘undercutting’ of peat slopes, but where this is necessary, a more detailed assessment of the area of concern would be required;

- careful micrositing of turbine bases, crane hardstandings and access track alignments to minimise effects on the prevailing surface and sub-surface hydrology;
- raising peat stability awareness for construction staff by incorporating the issue into the site induction (e.g. peat instability indicators and good practice);
- introducing a 'Peat Hazard Emergency Plan' to provide instructions for site staff in the event of a peat slide or discovery of peat instability indicators;
- developing methodologies to ensure that degradation and erosion of exposed peat deposits does not occur as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. minimisation of off-track plant movements within areas of peat);
- developing robust drainage systems that would require minimal maintenance; and
- developing drainage systems that would not create areas of concentrated flow or cause over/under-saturation of peat habitats.

10.88 Notwithstanding any of the above good construction practices and methodologies, detailed design and construction practices would need to consider the particular ground conditions and the specific works at each location throughout the construction period. An experienced and qualified engineering geologist/geotechnical engineer would be appointed as a supervisor, to provide advice during the setting out, micrositing and construction phases of the Proposed Development.

Buffer to Watercourses

10.89 As part of the Proposed Development design, a buffer of at least 50m has been applied to all known watercourses. There are no lochs and ponds within the site.

10.90 The possibility for watercourse crossings was examined on site through the development of the infrastructure design. However, the layout of the access tracks was carefully considered and as a result no new watercourse crossings are proposed.

10.91 It is noted that on the 1:10k scale mapping a small watercourse is noted near to the access track to proposed turbine 1, as shown on Figure 3.1b. The Proposed Development is shown on this scale mapping to be adjacent to the beginning of this watercourse, however, no evidence of the watercourse was found during the site visit nor is it shown on either 1:25k or 1:50k scale mapping.

Groundwater Dependent Habitats

10.92 SEPA's wind farm planning guidance (SEPA, 2017a) states a NVC survey should be undertaken to identify wetland areas that might be dependent on groundwater. If potential GWDTE are identified within (a) 100m of roads, tracks and trenches, or (b) within 250m of borrow pits and foundations, then it is necessary to assess how the potential GWDTE may be affected by the Proposed Development.

10.93 This guidance has been used to inform the site design and the proposed turbines and associated infrastructure have been located so as to minimise potential effects on areas of possible GWDTE. A summary of the habitat surveys completed at site is provided in **Chapter 8: Ecology** along with a detailed NVC habitat plan (**Figure 8.1.3**). **Figure 10.8** shows areas of potential GWDTE and the Proposed Development. However, an assessment of GWDTE is presented in this Chapter in **Table**

10-6 and as discussed, it has been concluded that all areas identified as potential for being moderately or highly GWDTE habitat are in fact likely to be sustained by incident rainfall and local surface water runoff rather than by groundwater.

10.94 Measures have been proposed to safeguard existing water flow paths and maintain existing water quality. It is considered therefore that the water dependent habitats identified by the NVC mapping can be sustained. This would be confirmed, in accordance with good practice, by the Environmental Clerk of Works (EnvCoW) at the time of the construction of the Proposed Development.

Good Practice Measures

10.95 Good practice measures would be applied in relation to pollution risk, sediment management and management of surface runoff rates and volumes. These would form part of the final CEMP.

10.96 Key good practice measures are stated below, and the assessment incorporates these measures.

Construction Site Licence

10.97 In accordance with Controlled Activity Regulations (CAR) prior to any construction at site a Construction Site Licence application would be made to SEPA. The Licence, which is regulated by SEPA, is used to ensure that runoff from a construction site does not cause pollution of the water environment. The Construction Site Licence requires the development of a Pollution Prevention Plan, which once agreed with SEPA is adhered to on site. The principles which would be adopted in the Plan are discussed in the good practice measures below.

General Measures

10.98 As a principle, preventing the release of any pollution/sediment is preferable to dealing with the consequences of any release. There are several general measures which cover all effects assessed within this Chapter, details are given below.

10.99 Prior to construction, site-specific drainage plans would be produced. These would consider any existing local drainage which may not be mapped and incorporate any site-specific mitigation measures identified during the assessment.

10.100 Measures would be included in the final CEMP for dealing with pollution/sedimentation/flood risk incidents and would be developed prior to construction. This would be adhered to should any incident occur, reducing the effect as far as practicable.

10.101 The final CEMP would contain details on the location of spill kits, would identify 'hotspots' where pollution may be more likely to originate from; provide details to site personnel on how to identify the source of any spill and state procedures to be adopted in the case of a spill event. As identified in the outline CEMP (**Technical Appendix 3.1**), a specialist spill response contractor would be identified to deal with any major environment incidents.

10.102 A wet weather protocol would be developed. This would detail the procedures to be adopted by all staff during periods of heavy rainfall. Tool box talks would be given to engineering /construction /supervising personnel. Roles would be assigned to site staff and the inspection and maintenance regimes of sediment and runoff control measures would be adopted during these periods. In extreme cases, this protocol would dictate that work onsite may have to be temporarily suspended

until weather/ground conditions allow.

Water Quality Monitoring

10.103 Water quality monitoring before and during the construction phase would be undertaken for the surface water catchments that drain from the site to ensure that none of the tributaries of the main channels are carrying pollutants or suspended solids. Monitoring would be carried out at a specified frequency (depending upon the construction phase) on these catchments.

10.104 Monitoring would continue throughout the construction phase and immediately post construction. Monitoring would be used to allow a rapid response to any pollution incident as well as assess the impact of good practice or remedial measures. Monitoring frequency would increase during the construction phase if remedial measures to improve water quality were implemented. Water quality monitoring plans would be developed during detailed design (SEPA, THC, SWRFT and SDSFB would be consulted on the plan) and would be contained within the final CEMP.

10.105 The performance of the good practice measures would be kept under constant review by the water monitoring schedule, based on a comparison of data taken during construction with a baseline data set, sampled prior to the construction period.

Pollution Risk

10.106 Good practice measures in relation to pollution prevention would include the following:

- refuelling would take place at least 50m from watercourses and where possible it would not occur when there is risk that oil from a spill could directly enter the water environment;
- foul water generated onsite would be managed in accordance with best practice and be drained to a sealed tank and routinely removed from site;
- a vehicle management plan and speed limit would be strictly enforced onsite to minimise the potential for accidents to occur;
- drip trays would be placed under stationary vehicles which could potentially leak fuel/oils;
- as a consequence of the site design and the minimum 50m buffer applied to watercourses, areas which would be designated for washout of vehicles are a minimum distance of 50m from a watercourse;
- washout water would also be stored in the washout area before being treated and disposed of;
- if any water is contaminated with silt or chemicals, runoff would not enter a watercourse directly or indirectly prior to treatment;
- water would be prevented as far as possible, from entering excavations;
- procedures would be adhered to for storage of fuels and other potentially contaminative materials in line with the CAR, to minimise the potential for accidental spillage; and
- a plan for dealing with spillage incidents would be designed prior to construction, and this would be adhered to should any incident occur, reducing the effect as far as practicable. This would be included in the final CEMP.

Erosion and Sedimentation

10.107 Good practice measures for the management or erosion and sedimentation would include the following:

- all stockpiled materials would be located out with a 50m buffer from watercourses, including on up gradient sides of tracks and battered to limit instability and erosion;
- where possible, stockpiled material would either be seeded or appropriately covered, minimising the area of exposed bare ground;
- monitoring of stockpiles/excavation areas during extreme rainfall events;
- water would be prevented as far as possible, from entering excavations through the use of appropriate cut-off drainage;
- where the above is not possible, water that enters excavations would pass through silt/sediment traps to remove silt prior to discharge into the surrounding drainage system. Detailed assessment of ground conditions would be required to identify locations where settlement lagoons would be feasible;
- clean and dirty water onsite would be separated and dirty water would be filtered before entering the water environment;
- if the material is stockpiled on a slope, silt fences would be located at the toe of the slope to reduce sediment transport;
- the amount of ground exposed, and time period during which it is exposed, would be kept to a minimum and appropriate drainage would be in place to prevent surface water entering deep excavations, specifically borrow pit excavations;
- a design of drainage systems and associated measures to minimise sedimentation into natural watercourses would be developed - this may include silt traps, check dams and/or diffuse drainage;
- silt/sediment traps, single size aggregate, geotextiles or straw bales would be used to filter any coarse material and prevent increased levels of sediment. Further to this, activities involving the movement or use of fine sediment would avoid periods of heavy rainfall where possible; and
- construction personnel and the Principal Contractor would carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas.

Fluvial Flood Risk

10.108 It is proposed to adopt Sustainable Drainage Systems (SuDS) as part of the Proposed Development. SuDS techniques aim to mimic pre-development runoff conditions and balance or throttle flows to the rate of runoff that might have been experienced at site prior to development. Good practice in relation to the management of surface water runoff rates and volumes and potential for localised fluvial flood risk would include the following:

- drainage systems would be designed to ensure that any sediment, pollutants or foreign materials which may cause blockages are removed before water is discharged into a watercourse;

- onsite drainage would be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the original drainage design causing localised flooding;
- appropriate drainage would attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk;
- where necessary, check dams would be used within cable trenches in order to prevent trenches developing into preferential flow pathways and trenches shall be backfilled with retained excavated material; and
- as per good practice for pollution and sediment management, prior to construction, site-specific drainage plans would be developed and construction personnel made familiar with the implementation of these.

10.109 Further information on ground conditions and drainage designs would be provided in the final CEMP.

Water Abstractions

10.110 If water abstraction for construction activities is required a potential source will be identified at the detailed design stage of the project and following site investigation. An application for a CAR Licence would then be made to SEPA and managed through the regulation of the CAR Licence. Should a suitable source not be identified, a water bowser would be used. Good practice that would be followed in addition to the CAR Licence regulations includes:

- water use would be planned so as to minimise abstraction volumes;
- water would be re-used where possible;
- abstraction volumes would be recorded; and
- abstraction rates would be controlled to prevent significant water depletion in a source.

Watercourse Crossings

10.111 The site design requires no new watercourse crossings.

Potential Construction Effects

Pollution Risk

10.112 During the construction phase, there is the potential for a pollution event to affect surface waterbodies impacting on their quality. This would have a negative impact on the receptor, potentially resulting in degradation of the water quality which would impact on any aquatic life and private and public water supplies abstracting from the watercourses.

10.113 Pollution may occur from excavated and stockpiled materials during site preparation and excavation of borrow pits. Contamination of surface water runoff from machinery, leakage and spills of chemicals from vehicle use and the construction of hardstanding also have the potential to affect surface water bodies. Potential pollutants include sediment, oil, fuels and cement.

10.114 The risk of a pollution incident occurring would be managed using industry standard good practice

measures. Many of these practices are concerned with undertaking construction activities away from watercourses, sensitive peat and vegetation habitats and identifying safe areas for stockpiling or storage of potential pollutants that could otherwise lead to the pollution.

10.115 The magnitude of a pollution event on peat, surface water dependent habitat, groundwater and surface water receptors is considered negligible following adherence to good practice measures. The potential effect of a negligible magnitude event on these receptors of high sensitivity would be negligible and therefore not significant. No further mitigation measures are required.

Erosion and Sedimentation

10.116 Site traffic during the construction phase has the potential to cause erosion and increase sedimentation loading during earthworks, and due to increased areas of hardstanding and such features as stockpiles, tracks and excavations etc., which could be washed by rainfall or inappropriate site practices into surface water features. This has the potential to reduce surface water quality, increase turbidity levels, reduce light and oxygen levels and affect ecology including fish populations.

10.117 Excavation of borrow pits, construction of hardstanding, diversion of drainage channels and the construction of water crossings associated with the Proposed Development are the key sources of erosion and sediment generation. Adherence to good practice measures would ensure that any material generated is not transported into nearby watercourses, to groundwater, or onto areas of peat.

10.118 Location specific good practice measures will form part of the final CEMP and would be used to minimise the potential for erosion and sedimentation.

10.119 After consideration of good practice measures, the magnitude of impact associated with erosion and sedimentation is assessed as negligible. Peat, surface water dependent habitat, groundwater and surface water are considered high sensitivity receptors. The level of effect is therefore assessed as negligible and not significant and no further mitigation measures are required.

Fluvial Flood Risk

10.120 Construction of hardstanding including the substation compound, construction compound and turbine bases would create impermeable surface areas which could increase runoff rates and volumes.

10.121 Adherence with good practice measures including appropriate drainage design and compliance with the final CEMP would limit potential impacts to being local and short duration and so of negligible magnitude.

10.122 It is proposed that any rainwater and limited groundwater ingress which collects in the turbine excavations during construction would be stored and attenuated prior to controlled discharge to ground or surface water network adjacent to the excavation.

10.123 Attenuation of runoff generated within the proposed turbine excavations would allow settlement of suspended solids within the runoff prior to discharge in accordance with 'Site control' component of the SuDS 'management train'.

10.124 The potential level of effect on flood risk, which is considered to have a moderate sensitivity, is therefore assessed as being negligible and not significant. No further mitigation is therefore required.

10.125 The magnitude of the increase in impermeable area is not sufficient to have a measurable effect on groundwater levels, as the extent of the impermeable area is insignificant compared to the extent of the underlying geology and groundwater.

Infrastructure and Man-made Drainage

10.126 Excavations associated with construction works (e.g. cut tracks, turbine bases foundations, cable trenches, borrow pits etc.) can result in local lowering of the water table. This is an important consideration in areas of peat deposits, where the water table is characteristically near the ground surface.

10.127 Dewatering associated with construction of turbine foundations is temporary and would not be required post construction. Cable laying, without appropriate mitigation measures, can also lower high groundwater levels and provide a preferential drainage route for groundwater movement that can lead to local and permanent drying of soils, superficial deposits and/or water supplies.

10.128 The design of the Proposed Development has avoided areas of high ecological or habitat interest, including GWDTE, wherever possible. Furthermore, the superficial and bedrock deposits have little groundwater and therefore limited or little dewatering is likely to be required. There remains potential however, for local dewatering of soils near cable trenches, turbine bases and borrow pits, without incorporation of mitigation measures.

10.129 Location specific good practice measures will form part of the final CEMP and would be used to minimise the potential for drainage and dewatering effects.

10.130 The sensitivity of the receptor (groundwater and habitat that may be dependent on groundwater) has been assessed as being High. Without further mitigation the magnitude of impact is assessed as negligible and therefore the potential significance of effect of changing groundwater levels and flow due to dewatering is considered negligible, not significance and requires no further mitigation.

Proposed Mitigation

10.131 As there are no predicated significant effects under the terms of the EIA Regulations, other than the good practice measures that the developer would implement as standard (and as described above), no specific mitigation during construction is required.

Residual Effects

10.132 No significant residual effects on soils and peat, geology, surface water or groundwater receptors are predicted during the construction period of the Proposed Development.

Potential Operational Effects

10.133 During the operational phase of the Proposed Development, it is anticipated that routine maintenance of infrastructure and tracks would be required across the site. This may include work such as maintaining access tracks and drainage and carrying out maintenance of turbines.

10.134 Should any maintenance be required onsite during the operational life of the project which would involve construction type activities; mitigation measures would be adhered to along with the measures in the final CEMP to avoid potential effects.

Pollution Risk

10.135 The possibility of a pollution event occurring during operation is very unlikely. There would be a limited number of vehicles required onsite for routine maintenance and for the operation of the Proposed Development. Storage of fuels/oils onsite would be limited to the hydraulic oil required in turbine gearboxes and this would be bunded to prevent fluid escaping.

10.136 Based upon this, the potential risk associated with frequency, duration and likelihood of a pollution event is low. It is therefore anticipated that the magnitude of a pollution event during the operational phase of the Proposed Development would be negligible, as no detectable change would likely occur. Therefore, the significance of effect for a pollution event during the operational phase of the development is predicted to be negligible for all receptors and not significant. No mitigation is therefore required.

Erosion and Sedimentation

10.137 During the operation of the Proposed Development, it is not anticipated that there would be any significant excavation or stockpiled material beyond the clearing of SuDS features to maintain their efficiency, reducing the potential for erosion and sedimentation effects.

10.138 Immediately post-construction, newly excavated drains and track dressings may be prone to erosion as any vegetation would not have matured. Appropriate design of the drainage system, incorporating sediment traps, would reduce the potential for the increased delivery of sediment to natural watercourses. Potential effects from sedimentation or erosion during the operational phase are considered to come from linear features on steeper slopes, where velocities in drainage channels are higher. Immediately post-construction, flow attenuation measures would remain and be maintained to slow runoff velocities and prevent erosion until vegetation becomes established.

10.139 The likelihood, magnitude and duration of a potential erosion and sedimentation event occurring within the surface water catchments would be negligible following adherence to good practice measures. Therefore, the potential significance of effect on these high sensitivity receptors is of negligible significance. No mitigation is therefore required.

10.140 Should any non-routine maintenance be required at the sections of track crossing wet areas (defined visually onsite by a contractor or operational personnel) there would be potential for erosion and sedimentation effects to occur due to the existence of disturbed material. Should this type of activity be required, then the good practice measures as detailed for the construction phase would be required on a case by case basis. Extensive work at water crossings/adjacent to the water environment may require approval from SEPA under the CAR (depending upon the nature of the activity).

Fluvial Flood Risk

10.141 The risk of an effect on fluvial flood risk arises as a result of a potential restriction of flow at a permanent water crossing following intense rainfall. In accordance with good practice routine inspection and clearing of the culverts or bridges at site would be undertaken, reducing the

likelihood of a blockage occurring. In the unlikely event of a blockage any flooding would be localised and the magnitude of impact is assessed as negligible, and thus the significance of effect is assessed as negligible, and no further mitigation is required.

Infrastructure and Man-made Drainage

10.142 Operation of the Proposed Development would require limited activities relative to the construction phase.

10.143 The magnitude of a potential effect on groundwater and sub-surface flows as a result of permanent hardstanding and associated drainage would be negligible on the overall groundwater body due to the dispersed nature of the proposed hardstanding. The significance of effect is negligible and not significant. No further mitigation is required.

Proposed Mitigation

10.144 As there are no predicated significant effects under the terms of the EIA Regulations, other than the good practice measures that the Applicant would implement as standard, no specific mitigation during operation is required.

Residual Effects

10.145 No significant residual effects on soils, peat, geology, surface water or groundwater receptors are predicted during the operational period of the Proposed Development.

Cumulative Effects

10.146 There are two operational wind farms that are in the same water catchments as the Proposed Development:

- Edinbane Wind Farm lies within the Abhainn Choishleader and River Ose catchments; and
- Ben Aketil Wind Farm which is located in the Red Burn catchment.

10.147 Ben Sca Wind Farm and its Extension, which is consented, but yet to be constructed, will lie to the north of the Proposed Development and in the Red Burn catchment. The proposed overhead power line associated with the Skye Reinforcement Project is located to the southwest of the Proposed Development area and within the same surface water catchments as the site.

10.148 These developments have been designed, and in the case of Ben Aketil and Edinbane, have developed and are managed in accordance with best practice, industry standards and relevant legislation, planning policy and guidance regulated by statutory consultees. These standards ensure, with respect to the soils, geology and water environment, potential impacts are mitigated and controlled at source.

10.149 The magnitude of impact from potential cumulative effects is therefore considered negligible following adherence to the good practice measures. The potential effect of negligible magnitude event on the receptors of high sensitivity would be negligible, not significant and therefore no further mitigation measures would be required.

STATEMENT OF SIGNIFICANCE

10.150 An assessment of the potential effects of the Proposed Development on soils, geology, hydrology, hydrogeology within a defined study area (comprising land within 1km of the site boundary) has been undertaken and no significant impacts in terms of the EIA Regulations have been identified.

10.151 The assessment has considered the construction and operational phases of the Proposed Development.

FURTHER SURVEY REQUIREMENTS AND MONITORING

10.152 This Chapter has demonstrated that the Proposed Development is not likely to have any significant effects on the study area's soils, geology, hydrological or hydrogeological receptors. The lack of significant effects relates primarily to the proposed 'Good Practice Measures' and the iterative design process (**Chapter 2**), which effectively act as 'designed-in' mitigation. No other further surveys or monitoring is considered necessary to complete this assessment.

10.153 It has been recognised in this assessment that a programme of water monitoring would be required prior to any construction activity and during construction of the Proposed Development. The monitoring programme would be agreed with THC, SEPA and SWRFT and it is expected to include monitoring watercourses identified as potentially at risk without incorporation of best practice construction and mitigation techniques.

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