Chapter 9 Hydrology, Geology and Hydrogeology

Contents

9.1. Executive Summary 1
9.2. Introduction 2
9.3. Legislation, Policy and Guidelines 2
9.4. Consultation 5
9.5. Assessment Methods and Significance Criteria 9
9.6. Baseline Conditions 15
9.7. Receptors Brought Forward for Assessment 25
9.8. Potential Effects 26
9.9. Mitigation 32
9.10. Residual Effects 35
9.11. Cumulative Effects 36
9.12. Summary 37

List of Abbreviations

Abbreviation	Description
CEMP	Construction Environmental Management Plan
DWPA	Drinking Water Protected Area
GCR	Geological Conservation Review
GWDTE	Groundwater Dependent Terrestrial Ecosystems
NVC	National Vegetation Classification
OBEMP	Outline Biodiversity Enhancement Management Plan
PLHRA	Peat Landslide and Hazard Risk Assessment
PMP	Peat Management Plan
PWS	Private Water Supply
SAC	Special Area of Conservation
SPA	Special Protection Areas

SSSI	Site of Special Scientific Interest
WCX	Watercourse Crossing

9. Geology, Peat, Hydrology and Hydrogeology

9.1. Executive Summary

9.1.1. A combination of desk study and field survey work was undertaken to identify and characterise the geological, hydrological and hydrogeological receptors which could be subject to impacts from construction, operation and decommissioning of the Proposed Development.

9.1.2. The site is largely located within the River Tarff catchment and its tributary sub-catchments, and is partly located within the Calder Burn catchment. The watercourses are classified in accordance with the EU Water Framework Directive (WFD) as the River Tarff/Allt Lagan a' Bhainne has an overall status of 'Good' and the Calder Burn has an overall status of 'Moderate'.

9.1.3. The bedrock beneath the site is defined by the Great Glen Fault Zone to the north. Bedrock includes fault gouge rock of Devonian Old Red Sandstone, cataclasites, and metamorphic rocks of the Grampian Group. Superficial deposits comprise areas of peat and till, which are typically low permeability. There are also smaller areas of glacial and glaciofluvial deposits along the River Tarff and its tributaries, and alluvial fan and alluvium deposits along Connachie Burn. The peat is identified as Class 1 and Class 2 priority peatland according to the Scottish Natural Heritage (SNH) (now NatureScot) Carbon and Peatlands Map 2016. Class 3 and Class 5 non-priority peatland is also present on-site.

9.1.4. Extensive peat probing surveys found areas of peat and deep peat (>1 m) on-site, that were found to be highly variable across the site. The surveys suggest the peatland condition category on-site to be either drained (artificial drainage) or modified. Habitat surveys identified the peatland to be in degraded condition, with no specific areas of better quality near-natural peatland identified.

9.1.5. A Peat Landslide and Hazard Risk Assessment (PLHRA) has identified that there is an insignificant risk of a peat landslide at the proposed turbine locations and associated infrastructure.

9.1.6. Potential construction and operational effects include changes to surface water and groundwater flow and quality, excavation of peat, peat slide risk and effects to designated sites.

9.1.7. Embedded and good practice mitigation measures set out in this chapter will be included within a Construction Environmental Management Plan (CEMP) prior to the commencement of construction activities. An outline CEMP is provided as **Appendix 3.1**. These mitigation measures are considered to be robust and implementable and will reduce the potential impacts on peat resources (see draft Peat Management Plan - **Appendix 9.2**), watercourses and groundwater. Additional project specific mitigation is considered to be required for one potentially significant potential effect (impacts on Private Water Supplies (PWS)) and this has been set out within the outline CEMP, reducing the significance of effect to non-significant. The significance of residual effects on geology, peat, hydrology and hydrogeology receptors following the implementation of committed mitigation measures is considered to be none to minor and therefore not significant. In addition, during the operational phase a Biodiversity Enhancement Management Plan (BEMP) (**Appendix 8.6**) will be implemented for habitat enhancement and peatland restoration. The effects of the BEMP could mean a beneficial, long-term effect during the operational phase of the Proposed Development.

9.2. Introduction

9.2.1. This chapter provides an assessment of the potential effects of the Proposed Development on hydrological, hydrogeological, and geological resources. This includes potential impacts on surface waters, groundwater, water abstractions, designated receptors and flood risk within the local area. Potential impacts to peat and geological receptors are also assessed.

9.2.2. This chapter assessment has been undertaken by Joanna Cassidy (BSc (Hons), MCIWEM). Joanna holds a BSc in Geology with 5 years' experience in geological, hydrological and hydrological assessments, including delivery of relevant technical appendices, on a large variety of renewable development EIAs.

9.2.3. Several technical appendix assessment and figures have been undertaken by MacArthur Green and Natural Power.

9.2.4. This chapter is supported by the following Figures and Appendices:

- Figure 9.1: Proposed Development Area and study areas;
- Figure 9.2: Watercourse Crossings (1:25,000);
- Figure 9.3: Watercourse Crossings (Aerial);
- Figure 9.4: Bedrock Geology;
- Figure 9.5: Superficial Geology;
- Figure 9.6: Phase 1 & 2 Peat Depth Sample & Coring Locations;
- Figure 9.7: Phase 1 & 2 Peat Depth Sample Results;
- Figure 9.8: Phase 1 & 2 Interpolated Peat Depth;
- Figure 9.9: Hydrological Catchments;
- Figure 9.10: Watercourse Buffers;
- Figure 9.11: Hydrological Constraints;
- Figure 9.12: Proposed Development Infrastructure and Peat Excavation;
- Figure 9.13: Groundwater Dependent Terrestrial Ecosystems (GWDTE);
- Appendix 9.1: Peat Landslide and Hazard Risk Assessment (PLHRA);
- Appendix 9.2: Draft Peat Management Plan (DPMP);
- Appendix 9.3: Peat Probing and Coring Report;
- Appendix 9.4: Carbon Calculator
- Appendix 9.5: Watercourse Crossing Assessment;
- Appendix 9.6: Private Water Supply Risk Assessment; and
- Appendix 9.7: Borrow Pit Desktop Assessment

9.3. Legislation, Policy and Guidelines

Legislation

9.3.1. Relevant legislation and guidance documents have been reviewed and taken into account as part of this assessment.

9.3.2. The European Union (EU) Water Framework Directive (WFD) has been implemented in Scotland through the Water Environment and Water Services (Scotland) Act 2003. The act introduced a regulatory system with the Scottish Environmental Protection Agency (SEPA) as the lead authority, to establish a framework for co-ordinated controls on activities with the potential to negatively impact the water environment. Water monitoring and classification systems are maintained by SEPA to provide the data to support the aim of the WFD.

9.3.3. The European Parliament and of the Council (EC) Groundwater Directive (GWD) is implemented in Scotland through the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) (as amended).

9.3.4. Other relevant legislation includes:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Water Resources (Scotland) Act 2013;
- The Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017;
- Flood Risk Management (Scotland) Act 2009;
- The Conservation (Natural Habitats, & c.) Regulations (1994, as amended in Scotland);
- Environmental Protection Act 1990;
- Environment Act 1995;
- The Contaminated Land (Scotland) Regulations 2000 (as amended); and
- The Conservation (Natural Habitats, & c.) Regulations (1994, as amended in Scotland).

Planning Policy

9.3.5. This section also considered the relevant aspects of the National Planning Framework (NPF), Highland-wide Local Development Plan (HWLDP), Planning Advice Notes (PAN) and other relevant guidance. Of relevance to the hydrological, hydrogeological, geological and soils assessment presented within this chapter are the following policies and advice notes:

- NPF4 Policy 5 Soils;
- NPF4 Policy 11 Energy
- NPF4 Policy 22 Flood Risk;
- CSLDP Policy 3 Growing Settlements;
- HWLDP Policy 53 Minerals;
- HWLDP Policy 55 Peat and Soils;
- HWLDP Policy 57 Natural, Built and Cultural Heritage;
- HWLDP Policy 60 Other Important Habitats and Article 10 Features;
- HWLDP Policy 62 Geodiversity;
- HWLDP Policy 63 Water Environment;
- HWLDP Policy 64 Flood Risk;
- HWLDP Policy 66 Surface Water Drainage;
- HWLDP Policy 67 Renewable Energy Developments;
- HWLDP Policy 72 Pollution;
- PAN 51: Planning, Environmental Protection and Regulation (Scottish Executive, 2006);
- PAN 79: Water and Drainage (Scottish Executive, 2006);
- Flood Risk: planning advice (Scottish Government, 2015); and

Guidance

Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPS)

9.3.6. Pollution Prevention Guidelines (PPGs) provide guidance on responsibilities and good practice to prevent pollution from a range of development activities. These are currently in the process of being replaced by the Guidance for Pollution Prevention (GPPs) series. SEPA's environmental regulatory guidance applies to Scotland.

- GPP1: Understanding your environmental responsibilities – good environmental practices (2020);
- GPP2: Above ground oil storage tanks (2018);
- GPP4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (2017);
- GPP5: Works and maintenance in or near water (2018);
- PPG6: Working at construction and demolition sites (2012);
- GPP8: Safe storage and disposal of used oils (2017);
- GPP13: Vehicle washing and cleaning (2017);
- GPP21: Pollution incident response planning (2021); and
- GPP22: Dealing with spills (2018).

SEPA Guidance

9.3.7. The following relevant guidance from SEPA has been considered as part of the assessment of geology, peat, hydrology and hydrogeology:

- Land Use Planning System Guidance Note 4 (LUPS GU4) Planning guidance on on-shore windfarm developments (SEPA, 2017);
- Land Use Planning System Guidance Note 31 (LUPS-GU31) Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (SEPA, 2017);
- Supporting Guidance (WAT-SG-75) Sector Specific Guidance: Water Run-Off from Construction Sites (SEPA, 2021);
- Technical Flood Risk Guidance for Stakeholders, Version 12 (SEPA, 2019);
- Developments on Peat and Off-Site Uses of Waste Peat (SEPA, 2017);
- Guidance on Developments on Peatland (Scottish Government, SNH and SEPA, 2017).
- Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Scottish Renewables and SEPA, 2012); and
- Groundwater Protection Policy for Scotland, Version 3 (SEPA, 2009).

Other Relevant Guidance

9.3.8. The following relevant guidance has also been considered:

- CIRIA C532: 'Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors' (CIRIA, 2001);
- CIRIA C741: 'Environmental Good Practice on Site' (CIRIA, 2015);
- Good practice during wind farm construction, 4th edition (NatureScot, 2019);
- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (ECU Scottish Government, 2017);
- The Scottish Soil Framework (Scottish Government, 2009); and
- BS5930:2015 - Code of Practice for Site Investigation (British Standards Institute, 2015).

- Advising on Peatland, Carbon-rich Soils and Priority Peatland Habitats in Development Management (NatureScot, 2023)

9.4. Consultation

9.4.1. **Table 9.1** provides details of consultations undertaken with regulatory bodies, together with action undertaken by the Applicant in response to consultation feedback.

Table 9.1 – List of Consultee Responses

Consultee	Consultation Response	Applicant Action
The Highland Council Pre-Application Consultation Feedback (7 April 2022)	The EIA Report 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 EIA Report should fully describe the likely significant effects of the development on the local geology including aspects such as borrow pits, earthworks, site restoration and the soil generally including direct effects and any indirect. Proposals should demonstrate construction practices that help to minimise the use of raw materials and maximise the use of secondary aggregates and recycled or renewable materials. Where borrow pits are proposed the EIA Report should include information regarding the location, size and nature of these borrow pits including information on the depth of the borrow pit floor and the borrow pit final reinstated profile. The EIA Report 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,	Peat depth surveys were carried out for all areas where development is proposed following relevant guidance and using methodology in agreement with SEPA as detailed in Technical **Appendix 9.3**. Details on excavated peat are included in Technical **Appendix 9.2**: Draft Peat Management Plan (DPMP). Baseline hydrology, hydrogeology, geology and peat conditions at the site are detailed in **Section 9.6**. Assessment of potential effects on these receptors are detailed in **Section 9.7**. Mitigation to protect receptors is detailed in **Section 9.9** and Technical **Appendix 3.1** CEMP. Assessment of any potential direct and indirect impacts and embedded mitigation for Class 1 and Class 2 peatland is included in **Section 9.8**. Mitigation measures are included in 9.9 and Technical **Appendix 9.2** DPMP. Efforts to avoid areas of deep peat have been taken into consideration during the design stage. Impacts on peat are included in Technical **Appendix 9.2** DPMP. Technical **Appendix 3.1** CEMP details mitigation measures to minimise impact on peat. Technical **Appendix 8.6** Outline Biodiversity Enhancement Management Plan (OBEMP) addresses habitat reinstatement as part the Proposed Development. Technical **Appendix 9.5** Watercourse Crossing Assessment details new and existing watercourse crossing locations. Technical **Appendix 9.5** details the likely CAR licence required.

along with monitoring proposals and contingency plans. Assessment will need to recognise periods of high rainfall which will impact on any calculations of run-off, high flow in watercourses and hydrogeological matters. You are strongly advised at an early stage to consult SEPA as the regulatory body responsible for the implementation of the Controlled Activities (Scotland) Regulations 2005 (CAR), to identify if a CAR license is necessary and the extent of the information required by SEPA to assess any license application.

NatureScot states that the Carbon and Peatland map indicates that there is potential for Class 1 and Class 2 peatland to be present within the application site. Classes 1 and 2 are considered to be nationally important carbon-rich soils, deep peat and priority peatland habitat. These areas are afforded significant protection under Scottish Planning Policy. An assessment of any potential direct and indirect impacts of this proposal on this nationally important resource should be made and the EIA Report should contain details of any mitigation measures which have been incorporated to ensure the protection of the carbon rich soils, deep peat and priority peatland habitats. The assessment should consider and if necessary quantify any loss of this resource and any impacts on the functioning of the habitats associated with it.

NatureScot advise that turbines and other large infrastructure should be located to avoid areas of deep peat. The EIA Report should fully explore opportunities to reduce any impacts on deep peat. An outline peat management plan should be included with the EIA Report. NatureScot advise that a CEMP should be produced. Paragraph 205 of SPP states; “Where peat and other carbon rich soils are present, applicants should assess the likely effects of development on carbon dioxide (CO2) emissions. Where peatland is drained or otherwise disturbed, there is liable

Details of PWS and surveys carried out are included in Technical **Appendix 9.6** PWSRA.

	to be a release of CO2 to the atmosphere. Developments should aim to minimise this release". This should be addressed through measures described in the proposed CEMP. 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 EIA Report 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 minimise impact. The table should be accompanied by photography of each watercourse affected and include dimensions of the watercourse. The need for, and information on, abstractions of water supplies for concrete works or other operations should also be identified. The EIA Report should identify whether a public or private source is to be utilised. If a private source is to be utilised, full details on the source and details of abstraction need to be provided. The Council's Environmental Health Team have advised that the applicant will be required to carry out an investigation to identify any private water supplies, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption. Highland Council has some information on known supplies but it is not definitive. An on-site survey will be required.	
NatureScot (28 March 2022)	We advise that EIA Report should provide sufficient information and assessment, based on site-specific surveys to determine if the wind farm infrastructure will affect, directly or indirectly, areas of nationally important carbon-rich soils, deep peat and priority	Assessment of any potential direct and indirect impacts and embedded mitigation for Class 1 and Class 2 peatland is included in **Section 9.8**. Mitigation measures are included in **Section 9.9** and Technical **Appendix 9.2** DPMP.

	peatland habitat. If features nationally important peatland may be affected then our guidance should be followed. Opportunities to mitigate impacts through siting, design and other measures should be fully considered within the EIA Report. This may include options for significant habitat restoration within an Outline Habitat Management Plan (OHMP) to compensate for any loss and damage to this peatland interest. If impacts to Class 1 and Class 2 peatland cannot be avoided then we may object to the proposal. We are pleased to note commitments to prepare a Peat Landslide Hazard and Risk Assessment (PLHRA). We advise that a Peat Management Plan (PMP) should also be prepared as part of the EIA. An OHMP is also likely to be required given the nature of the features on the site and the scale of the Proposed Development. We are aware that the Culachy Estate has been awarded funding from the Peatland Action programme for peatland restoration within the proposed wind farm application site. We therefore advise that the EIA Report should provide an assessment of how the peatland restoration area will be protected for any direct or indirect impacts as a result of the proposed wind farm. Impacts on the Peatland Action funded restoration area, and the terms of grant, will be considered further once we receive the EIA Report. With regards to the SAC and SSSI woodland features, the EIA Report should demonstrate how any potential impacts on these features will be avoided or mitigated.	Technical **Appendix 8.6** OBEMP considers habitat loss as a result of the Proposed Development. Efforts to avoid areas of deep peat have been taken into consideration during the design stage. Impacts on peat are included in Technical **Appendix 9.2** DPMP. Technical **Appendix 9.1** PHLRA has been prepared for the Proposed Development. Potential impacts on hydrologically connected designated sites have been considered in Section 9.7. Culachy Estate has been awarded funding from the Peatland Action programme for peatland restoration within the estate, with the area overlapping slightly with the site boundary; due to the distance from infrastructure, no direct or indirect impacts would be expected in areas covered by the Peatland Action grant and the areas do not overlap with compensation and enhancement proposals for the Proposed Development (as included in **Appendix 8.6**).

Scottish Environmental Protection Agency (4 March 2022)	With relation to flood risk, if, having considered the site and potential for flood risk, it appears that the only apparent issue could relate to design of watercourse crossing, then provided crossings are designed to accommodate the 1 in 200-year event and other infrastructure is located well away from watercourses it is unlikely that there will be a need for detailed information on flood risk. Map and assessment of impacts upon Groundwater Dependent Terrestrial Ecosystems and buffers Map and assessment of impacts upon groundwater abstractions and buffers. Peat depth survey and table detailing re-use proposals. As much of the site is on peat, we expect the application to be supported by a comprehensive site specific Peat Management Plan. Map and site layout of borrow pits. Schedule of mitigation including pollution prevention measures. Borrow Pit Site Management Plan of pollution prevention measures. Map of proposed waste water drainage layout. Map of proposed surface water drainage layout. Map of proposed water abstractions including details of the proposed operating regime. Decommissioning statement.	Crossings will be designed to accommodate the 1 in 200 year event. Watercourse crossings required are outlined in Technical **Appendix 9.5**. NVC surveys were carried out and reported in Technical **Appendix 8.1** NVC Report with potential GWDTE shown on **Figure 8.4**. Assessment of impacts on potential GWDTEs are detailed in **Section 9.6** and **Figure 9.13**. Assessment of impacts on private water abstractions is detailed in Technical **Appendix 9.6** PWSRA. Peat probing surveys were carried out following relevant guidance using methodology as detailed in Technical **Appendix 9.3.** Calculations on peat loss are detailed in Technical **Appendix 9.2**: DPMP. Site layout including associated infrastructure are shown in **Figure 9.4**, including the location of borrow pits. Mitigation measures are detailed in Technical **Appendix 3.1** CEMP. This will include proposed runoff and silt management measures which will be implemented. Detailed design of drainage will be undertaken at detailed design stages of the Proposed Development. No water abstractions are required as part of the Proposed Development.

9.4.2. Further consultation was undertaken with SEPA regarding the further design of the development in relation to peat depth, watercourse crossings, GWDTE and PWS. These meetings were undertaken 11 July and 27 September 2023. Following the first meeting summaries of assessment of these receptors in respect to the design were issued to SEPA on 21 August for review and feedback.

9.4.3. The design iteration process undertaken with input from SEPA is presented in **Appendix 2.1**.

9.5. Assessment Methods and Significance Criteria

Consultation

9.5.1. Identification of potential PWS as per The Highland Council's (THC) Scoping response, led to a review of council data to identify PWS within 2 km of the site. Consultation by letter by MacArthur Green was undertaken. A second consultation letter was issued by ITPEnergised,

and then a follow up site visit was undertaken with residents with registered PWS. Further detail is given in Technical **Appendix 9.5**.

9.5.2. Consultation was also undertaken with SEPA regarding registered water abstractions within the surrounding area. A response to the Freedom of Information (FOI) request was received in August 2022, with a Controlled Activities Regulation (CAR) registration for an abstraction was noted by SEPA to be located within 1 km of the site.

Study Area

9.5.3. The study area for assessment of hydrological and hydrogeological receptors, including designated sites with hydrological reasons for designation, incorporates the area within the site and up to 10 km from the site boundary. Potential effects to PWS are considered within 2 km from the site. The study area for assessment of geological receptors is the site itself. The study areas are shown in **Figure 9.1**.

9.5.4. These study areas are based on professional judgement and experience assessing similar developments, with due consideration of relevant guidance on hydrological and geological assessment. It is considered that in excess of these distances due to attenuation and dilution, the Proposed Development is unlikely to have an effect.

Desk Study

9.5.5. Baseline conditions have been established primarily through desk-based assessment which has included:

- Consultation with relevant bodies and collation of data (refer to the Consultation section above);
- Identification of surface watercourses and waterbodies, including WFD classifications;
- Identification of hydrogeological receptors, including aquifers;
- Identification of underlying bedrock and superficial geology, including assessment of peat depth contours;
- Assessment of topography, land use and climate conditions to inform drainage patterns;
- Identification of any identified PWS;
- Identification of potential GWDTEs, including review of NVC survey data; and
- Assessment of flood risk.

9.5.6. The following information sources have been reviewed to inform the desk study:

- The Ordnance Survey (OS) Mapping (1:50,000 and 1:25,000);
- British Geological Survey (BGS) GeoIndex Online Map Viewer;
- BGS Geological Survey of Scotland 73W Invermoriston 2012 Superficial Map (1:50,000);
- BGS Geological Survey of Scotland 73W Invermoriston 1993 Solid Map (1:50,000);
- National Soils Map of Scotland;
- Scottish Natural Heritage (SNH) (now NatureScot) Carbon and Peatland 2016 Map;
- NVC survey data and report (refer to **Appendix 8.1**);
- SEPA Online Flood Map;
- Scotland's Environment Map;
- National River Flow Archive (NRFA); and
- Meteorological Office Rainfall Data.

Site Visit

Peat Surveys

9.5.7. Stage 1 peat depth probing was undertaken by a team of suitably qualified and experienced surveyors, following relevant guidance, from May 2022. Peat depths were measured on a 100 m grid across the site area, to supplement the existing Stage 1 peat depth surveys from 2014. Where gaps in the existing Stage 1 survey was noted, supplementary probing was undertaken, as outlined in **Appendix 9.3**.

9.5.8. Data obtained from the peat depth surveys has been used to plot the presence and distribution of peat across the site and feed into the detailed design process. Following the design process, a proposed design was agreed that was considered by the project team to represent the optimal turbine and infrastructure layout to maximise electricity yield whilst minimising environmental effects, including effects on geology, peat, hydrology and hydrogeology.

9.5.9. A Stage 2 peat depth survey was undertaken in October and December 2022, and February 2023, to record peat depths along proposed access tracks, turbine and hardstanding locations, ancillary infrastructure locations, in the following probing pattern:

- Probe points were taken at 10 m intervals to the north, east, south and west of proposed turbines, and across a 25 m grid at proposed borrow pits, construction compounds, batching plants and substation.
- Probe points every 50 m along the proposed new access tracks, with offset probes 10 m either side of the track centre line (**Figure 9.6**).

9.5.10. As well as taking peat depth measurements, the team recorded observations of peat condition, erosion, evidence of impacts such as drainage, cutting and fire, any evidence of substrate (e.g., outcropping rock) and other notes considered relevant to the assessment of impacts on, and potential for restoration of, peat and peatland habitat.

9.5.11. The detailed surveying informed the final design and ensured coverage of peat depth measurements extended to the final layout, which is outlined within **Appendix 9.3**: Peat Probing and Coring Report. This data also informed **Appendix 9.1**: Peat Landslide and Hazard Risk Assessment and **Appendix 9.2**: Draft Peat Management Plan.

Hydrological Walkover

9.5.12. A hydrological walkover of the site was undertaken in October 2022, and February and March 2023. Site observations included topography, habitats, ground conditions and features of watercourses and waterbodies. The walkover also allowed ground-truthing of receptors identified during the desk study and identification of further hydrological receptors.

9.5.13. A visit to residents as part of the PWS assessment was undertaken in February 2023, to confirm the locations and supply type.

9.5.14. Habitat survey work, including mapping of NVC communities, was undertaken by MacArthur Green in May 2022 and February 2023. This included the identification of habitats which had the potential to be GWDTE. Further details of this are provided in **Chapter 8: Ecology** and **Appendix 8.1**.

Assessment of Potential Effect Significance

9.5.15. The sensitivity characteristics of geological, peat, hydrological and hydrogeological resources have been guided by the matrix presented in **Table 9.2** below.

Table 9.2 – Sensitivity Criteria for Receptors

Sensitivity	Description
High	Highly sensitive land use including raised or blanket bog, carbon-rich or peat soils (Class 1 or 2 priority peatland). Highly permeable superficial deposits, allowing storage and transport of contaminants. Designated receptor present protected under national or international legislation, including SSSIs, SACs and SPA. A waterbody with a SEPA WFD Overall or Ecological classification of 'High' or 'Good'. An aquifer, classified by BGS as a 'highly productive aquifer' or 'moderately productive aquifer', or that is of regional importance. Extensive areas of 'High Likelihood' or 'Moderate Likelihood' of river, surface water or coastal flooding which acts as an active floodplain. Public Water Supplies or Private Water Supplies that abstract from a hydrological receptor underlying or connected to the site. Potential GWDTE identified through NVC survey classified by SEPA to be 'highly groundwater dependent' with minimal degradation, that are found to have site-specific groundwater dependency and are not ombrotrophic.
Medium	Moderately sensitive land use including carbon-rich or peat soils (Class 3 or 4 priority peatland). Moderately permeable superficial deposits, allowing limited storage and transport of contaminants. Designated Receptors of regional importance, including Regionally Important Geological and Geomorphological Sites (RIGS), or receptors of local importance A waterbody with a SEPA WFD Overall or Ecological classification of 'Moderate'. An aquifer, classified by BGS as a 'low productivity aquifer' that does not support abstractions. Isolated areas of 'High Likelihood' or 'Moderate Likelihood' of surface water flooding or river or coastal flooding that is confined to waterbody extents and is not an active floodplain. Potential GWDTE identified through NVC survey classified by SEPA to be 'highly groundwater dependent' with extensive degradation, that are found to have site specific groundwater dependency and are not ombrotrophic. Potential GWDTE identified through NVC survey classified by SEPA to be 'moderately groundwater dependent', that are found to have site specific groundwater dependency and are not ombrotrophic.
Low	Low sensitive land use that do not include carbon-rich or peat soils (Class 5 or 0). Geological or hydrological features not currently protected and not considered worthy of protection.

	Low permeability superficial deposits likely to inhibit the transport of contaminants. A waterbody with a SEPA WFD Overall or Ecological classification of 'Poor' or 'Bad', or no classification. A non-aquifer, classified by BGS as a 'Rocks with essentially no groundwater'. Areas of 'Low Likelihood' of surface water, river or coastal flooding. Public Water Supplies or Private Water Supplies are not supported by hydrological receptor underlying or connected to the site. Potential GWDTE identified through NVC survey classified by SEPA to be 'highly groundwater dependent' or 'moderately groundwater dependent', that are not found to be groundwater dependent and are instead ombrotrophic.

9.5.16. The criteria for sensitivity have been developed based on a hierarchy of factors, that has been assessed through experience and professional judgement following extensive assessment and work undertaken to date, in line with appropriate guidance, legislation and best practice.

9.5.17. The magnitude of change criteria that will apply to the baseline sensitivities of the identified receptors are set out in **Table 9.3**. Similar to criteria for sensitivity, these have been developed based on professional judgement and appropriate guidance, legislation and best practice.

Table 9.3 – Magnitude of Change Criteria

Magnitude of Change	Guidance Criteria
High	Total loss of, or alteration to key features of the baseline resource such that post development characteristics or quality would be fundamentally and irreversibly changed, for example, extensive excavation of peatland or watercourse realignment.
Medium	Loss of, or alteration to key features of the baseline resource such that post development characteristics or quality would be partially changed, for example, in-stream permanent bridge supports or partial excavation of peatland.
Low	Small changes to the baseline resource, which are detectable, but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions e.g., culverting of very small watercourses/drains.
Negligible	A very slight change from baseline conditions, which is barely distinguishable, and approximates to the 'no change' situation, for example short term compaction from machinery movements.

9.5.18. Using these criteria, potential effects resulting from the Proposed Development have been assessed. Details of embedded mitigation measures and additional mitigation measures are outlined in **Section 9.9**.

9.5.19. The significance of the predicted effects has been assessed in relation to the sensitivities of the baseline resource. A matrix of significance, based on the combination of magnitude of change and sensitivity of the receptor, was developed to provide a consistent framework for evaluation, shown in **Table 9.4** below.

Table 9.4 –Matrix of Significance

		Magnitude of Change			
		High	Medium	Low	Negligible
Sensitivity of Receptor	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

9.5.20. The guideline criteria for the various categories of effect are provided in **Table 9.5** below.

Table 9.5 – Significance Criteria (Hydrology, Geology and Hydrogeology)

Significance	Definition	Guidance Criteria
Major	A fundamental change to the environment	Changes in water quality or quantity affecting widespread catchments or groundwater reserves of strategic significance, or changes resulting in substantial loss of conservation value to geological or aquatic habitats and designations.
Moderate	A large, but non-fundamental change to the environment	Changes in water quality or quantity affecting part of a catchment or groundwaters of moderate vulnerability, or changes resulting in loss of conservation values to geological or aquatic habitats or designated areas.
Minor	A small but detectable change to the environment	Localised changes resulting in minor and/or reversible effects on soils, surface and groundwater quality or habitats.
Negligible	No detectable change to the environment	Essentially no effects on geological resources, drainage patterns, surface and groundwater quality or aquatic habitats.

9.5.21. In the above classification, fundamental changes are those which are permanent, either adverse or beneficial, and would result in widespread change to the baseline environment. For the purposes of this assessment, those effects identified as being major or moderate have been evaluated as significant environmental effects.

9.5.22. These matrices have been used to guide the assessment, though they have been applied with a degree of flexibility, since the evaluation of effects will always be subject to location-specific characteristics which must be taken into account. For this reason, the evaluation of the significance of effects in particular will not always correlate exactly with the cells in the relevant matrix, especially where professional judgement and knowledge of local conditions may result in a slightly different interpretation of the impact concerned.

Requirements for Mitigation

9.5.23. Depending on the potential impact predicted to sensitive receptors, committed embedded and additional mitigation measure are presented within this chapter. Wherever possible, mitigation has been embedded and incorporated into the design. Additional mitigation has been outlined in this chapter and those to be implemented during the construction phase will be included within the CEMP, along with the PMP, and HMP/BEMP which outlines proposed enhancement measures.

Assessment of Residual Effect Significance

9.5.24. An assessment of any predicted significant residual effects on sensitive geological, hydrological or hydrogeological receptors is presented within this chapter (**Section 9.10**). This includes effects from other developments or Proposed Developments in the surrounding area, with potential cumulative effects identified, as shown in **Section 9.11**.

Limitations to Assessment

9.5.25. Other than peat depth survey work, no water quality monitoring or intrusive investigations have been undertaken. This is not considered to represent a significant limitation to the assessment of effects, as detailed intrusive site investigation works and water quality monitoring would be undertaken prior to and during construction to inform detailed engineering design, micro-siting and environmental protection and control measures to be implemented.

9.6. Baseline Conditions

Topography and Land Cover

9.6.1. The site is characterised as an upland rural location, situated approximately 900 m south of Fort Augustus. The site is bound by A82 and the Caledonian Canal to the north, and the River Tarff to the east. Existing access tracks are shown across the site for access to the south. The site is crossed by the existing Beauly-Denny Overhead Line.

9.6.2. The topography of the site rises from 200 m Above Ordnance Datum (m AOD) at the site entrance in the north, to 650 m AOD at in the south. Across the site, the topography is sloping to the east towards the River Tarff, gently sloping in the north of the site and steeply sloping in the south.

9.6.3. Land cover is generally mapped as blanket bog lying in the valley plateaus with areas of heathland. Areas of grassland and woodland are mapped adjacent to the River Tarff. Further detail on habitats is discussed in **Chapter 8: Ecology**.

Climate

9.6.4. The nearest National River Flow Archive (NRFA) monitoring station to the site is the Tarff at Ardachy Bridge (6011) approx. 450 m downstream, north-east of the site. It records an average annual rainfall in the standard period (1961 – 1990) of 1616 mm.

9.6.5. The closest Meteorological Office climate station is Fort Augustus, located approx. 1.7 km north-west of the site. It records an average annual rainfall in the climate period (1991 – 2020) of 1359 mm.

Surface Hydrology

9.6.6. Following the sloping topography to the north, several named and unnamed watercourses traverse the site, draining to the north-east and north-west, as shown in **Figure 9.9** The site lies within wider surface water catchments, the River Tarff catchment and Calder Burn catchment, which both contribute to the Loch Ness.

9.6.7. The majority of the site is located within the River Tarff catchment. The River Tarff rises on slopes to the east of the site, before flowing via and draining from the Loch An-t Sealeach (Glendoe) reservoir located approx. 3.3 km upstream of the site. The River Tarff flows west then north, and within is joined by tributaries Allt Coire na Ceire, Allt Lagan a' Bhainne and Allt Coire Uchdachan from the south. In the centre of the site, the River Tarff confluences with the Black Burn, which rises on the slopes in the west of the site. There are several other unnamed tributaries which drain to the north-east into the River Tarff. This includes the unnamed small waterbody feature in the north of the site along the Connachie Burn which drains to the River

Tarff in the east, via the Culachy Falls. The Allt na Leitire is an upstream tributary of the Connachie Burn that rises in the west of the site. The River Tarff flows into Loch Ness, approx. 2 km north-east of the site at Fort Augustus.

9.6.8. A network of cut drainage channels intersect the site predominantly within the catchments of Connachie Burn and Black Burn. These drain the surrounding area of surface water and near surface flow, and direct into watercourses. Less cut drainage features are observed in the sub-catchments of the Allt Lagan a' Bhainne and Allt Coire Uchdachan.

9.6.9. The western slopes of the site are located within the Calder Burn catchment. Tributaries of the Calder Burn which rise within or to the immediate west of the site include the Allt a' Ghlinne and Allt a' Charnaich. The Calder Burn flows north in Glen Buck before discharging into Loch Oich approx. 1.7 km west of the site. Loch Oich is connected by the River Oich and Caledonian Canal, and inflows to Loch Ness to the north-east.

9.6.10. According to the SEPA Water Classification Hub, which displays waterbody conditions under the WFD Scotland River Basin Management Plans (RBMP), the on-site waterbodies of River Tarff / Allt Lagan a' Bhainne (ID 23915) has an overall status of 'Good'. The Calder Burn (ID 20294) has an overall status of 'Moderate'. Downstream of the site, Loch Oich (100188), River Oich (ID 20253), Caledonian Canal (Loch Oich to Loch Ness) (ID 20249) have an overall status of 'Good', while Loch Ness (ID 100156) has an overall status of 'High'.

Superficial Geology

9.6.11. The BGS GeoIndex Onshore viewer shows the site to be underlain by large areas of diamicton till and peat, with large areas where superficial deposits are absent, indicative of bedrock at or near surface (as shown in **Figure 9.5**). These areas where there are no mapped superficial deposits are largely present on higher topography with steeper slopes. There are also smaller areas of hummocky glacial deposits (diamicton, sand and gravel) and glaciofluvial deposits (gravel, sand and silt) along the River Tarff and its tributaries. Alluvial fan deposits (gravel, sand, silt and clay) are also present along with alluvium deposits (sand, gravel and boulders) along the Connachie Burn.

9.6.12. Landslide deposits are present approx. 1.5 km upstream of the site, along the River Tarff.

Peat

9.6.13. The National Soil Map of Scotland shows the site to primarily be underlain by peat and peaty gleys. They are described to be associated with dystrophic blanket peat with drifts derived from metamorphic rocks, principally of the Moine Series. In the higher topographic areas to the south-east of the site, peaty podzols and montane soils are present. Brown earths with humus-iron podzols are present along the River Tarff. To the north of the site, alluvial soils derived from recent riverine and lacustrine alluvial deposits are present, along with large areas of mineral podzols in the lowlands.

9.6.14. The Carbon and Peatland 2016 Map, shows the peatland in the centre of the site to be Class 1 and Class 2. Class 1 and Class 2 peatland soils are defined as nationally important priority peatland habitat, with potentially high conservation value and restoration potential. An area of Class 3 peatland of predominantly peaty soil is present at an area of topographic high in the west of the site. Class 5 peatland is present in the centre of the site, associated with tributaries of the River Tarff. Class 3 and Class 5 are not considered to be priority peatland and have minimal or no peatland habitat and vegetation present. The north of the site and surrounding the River Tarff are associated with mineral soils.

9.6.15. A Peatland Action feasibility study exists for an area of land that overlaps with the site boundary (Peatland Action, 2023). Peat depth surveys recorded varying depths of less than 0.5 m to up to 4 m. The condition category information for this study suggests that the peatland was largely either Drained (artificial drainage) or Modified, with scattered points recorded as being in Near Natural condition. Within the site boundary, all points were recorded as either Modified or Drained.

9.6.16. Phase 1 and phase 2 peat probing surveys have been undertaken at the site as described in **Appendix 9.3**. The results are shown in **Figure 9.6**, **Figure 9.7** and **Figure 9.8** and show peat deposits across much of the site. The phase 1 and phase 2 (2022 and 2023) surveys recorded depths less than 0.5 m to greater than 4.0 m, with almost 30% of probes on land with depths less than 0.5 m, as outlined in **Appendix 9.3**.

9.6.17. Peat core samples were undertaken on-site, and found the peat to be intermediate to fibrous in nature, and moderately to well decomposed, were analysed to score between H5 and H7 on the Von Post scale. The depth of acrotelm was found to be variable, between 7 cm to 13 cm.

9.6.18. Habitat surveys, detailed within **Appendix 8.1**, identified the peatland across the site to be in degraded condition, with evidence of historical drainage and grazing, and extensive areas of peat hagging and eroding bare peat, as shown in **Photos 1-4**. No specific areas representative of better quality near-natural peatland were identified, and therefore if present would be limited to small and isolated pockets scattered among the degraded peatland.

Photo 1 – Blanket bog with significant peat haggs.

Photo 2 – Further example of peat hagging.

Photo 3 – Disturbed area of bare peat.

Photo 4 – Example of drainage channels across the survey area.

Bedrock Geology

9.6.19. Following review of the BGS GeoIndex Onshore Viewer, the geology surrounding the site is defined by the presence of the Great Glen Fault Zone and resulting brittle deformation in the north of the site. The north of the site is underlain by fault zone rocks, while metamorphic rocks of the Grampian Group underlie the majority of the site, to the centre and south-east.

9.6.20. Several faults are present on-site separating lithologies. There are four faults in the north of the site, including a thrust fault. In the centre of the site, there is another group of connected faults, including another thrust fault.

9.6.21. In the north of the site, within the Great Glen Fault Zone, is fault gouge rock (fine grained incohesive fault rock) of lower and middle Devonian Old Red Sandstone. This fault gouge rock is defined as undifferentiated conglomerate, breccio-conglomerate and sandstone. This is separated by a fault from the cataclastic (fine grained cohesive fault rock) psammitic gneiss and quartzite to the south. Another inferred fault separates this from a cataclasite of unknown protolith to the south.

9.6.22. A fault separates the cataclasite with metamorphic rocks of the Grampian Group (psammite and semipelite) to the south. The Glen Buck Pebbly Psammite Formation consists of 'micaceous psammite with arkosic pebbly beds'. A large thrust fault has sheared the upper boundary of the Glen Buck Pebbly Psammite to the Tarff Banded Formation (semipelite and micaceous psammite). Further south, also of the Grampian Group, are the Auchivarie Psammite Formation and Loch Laggan Psammite Formation.

9.6.23. The site is not located within a Coal Mining Reporting Area, and as such there are no records of mine entries, abandoned mine catalogues or surface coal resources within the site, as would be expected given the nature of the bedrock geology.

Contaminated Land

9.6.24. BGS data and mapping indicate ceased or inactive gravel pits to the north, outwith the site boundary, at the base of the valley. This includes Market Hill Gravel Pit, Muir Pit, Coiltry, Coille Torr Dhuin Pit, and Bridge of Oich.

9.6.25. No artificial ground is noted within the site, according to BGS GeoIndex Onshore. The closest artificial deposits to the site is approx. 1 km north-east, of made ground (undivided) deposits. Artificial made ground (undivided) deposits are also noted to the north of the site, associated with the Caledonian Canal. Two areas of artificial ground are associated with Muir Pit and Market Hill Gravel Pit, and are noted as 'worked ground (undivided) – void'.

Borrow Pit Search Areas

9.6.26. A Borrow Pit Assessment was undertaken by Natural Power, as outlined in **Appendix 9.7**. The walkover survey was undertaken in November 2022 and considered several borrow pit locations. During the walkover rock mass assessments were undertaken, along with inspection and index testing to determine relative rock strength. Two potential locations for borrow pits have been identified, as shown in **Figure 9.4** which are included as part of the Proposed Development as shown in **Figure 1.2** and described in **Chapter 3: Proposed Development Description.** Borrow Pit Area A was chosen due to the significant volume of rock present, there is existing drainage for the previous borrow pit present and the area is located 100 m from the nearest watercourse. Borrow Pit Area B is located over 200 m from the nearest watercourse and has a large indicative rock yield. Both locations are favourable for logistics, due to being nearby proposed infrastructure locations. These will be investigated further with site works including boreholes and trial pits.

Hydrogeology

9.6.27. The overlying superficial deposits of till and peat are mapped within topographical valleys associated with watercourses. Glacial till and saturated peat deposits are largely impermeable promoting overland run-off or shallow interflow within the acrotelm layer of the peat. These largely impermeable deposits will restrict vertical hydraulic connectivity to groundwater, and may result in discrete, isolated perched aquifers within superficial deposits. The presence of peat pipes may increase the potential for subsurface flow, due to greater hydraulic connectivity. Where more permeable gravel, sand and silt deposits are present, there will be greater vertical hydraulic connectivity to groundwater.

9.6.28. The majority of the site is underlain by low productivity Class 2C aquifer, associated with psammite and semipelite bedrock of the Grampian Group. The flow within the bedrock is noted to be 'virtually all through fractures and other discontinuities' with 'small amounts of groundwater in near surface weathered zone and secondary fractures'.

9.6.29. Rocks associated with fault zone cataclasite bedrock, are also noted to have flow mainly through fractures and are noted as 'mylonitic rock and fault breccia yielding small amounts of groundwater'.

9.6.30. The north of the site is underlain by moderate productivity Class 2B aquifers, associated with Devonian ORS fault gouge. While flow is also through fractures and discontinuities, the bedrock is described to be a 'Locally important multi-layered aquifer'.

9.6.31. The underlying groundwater body of the Northern Highlands (ID 150701) has an overall status of 'Good'.

Flooding

9.6.32. Following a review of the SEPA Flood Maps, there is found to be a high likelihood of fluvial flooding (10% annual probability of flooding) along watercourses, including the River Tarff and its main tributaries, Black Burn and Allt Lagan 'Bhainne. The extent of flooding is confined to within the watercourse channel. This is similar to high likelihood of fluvial flooding along the Calder Burn and its tributaries, which is constrained to the watercourse channel.

9.6.33. There are small, isolated areas of pluvial flooding across the site but particularly noted to the north. These areas are largely confined to watercourses or with surface water run-off along forestry rides and existing access tracks.

9.6.34. An FOI request was made to THC, to consult regarding any records of flood risk incidents on site. The response from THC confirmed that there is record of five flooding incidents within 2 km of the site. Of these, four are within Fort Augustus and occurred in 1849, 1966, 1989 and 1990 from the River Oich. The fifth record relates to a flood event on General Wade's Military Road, which was the result of a road culvert becoming obstructed.

9.6.35. The artificial drainage channels within the Connachie Burn and Black Burn sub-catchments, will likely reduce the time to peak flow within these waterbodies. This is due to the drainage channels decreasing rainfall infiltration and directing overland flow to the main watercourses. These are unlikely to significantly increase flood risk within the main catchments, however, due to the relatively small areas within the site that these channels drain.

Public Water Supplies

9.6.36. A data request was issued to SEPA by MacArthur Green to confirm the nature of any CAR authorisations surrounding the site. CAR authorisations regulate activities which may affect Scotland's water environment and are intended to control impacts on the water environment, including mitigating the effects on other water users.

9.6.37. A response received from SEPA confirmed one CAR registration granted in 2013, for Balfour Beatty Utility Solutions Ltd at the Glenmor Site Compound for abstraction for industrial or commercial process water. This is located outwith 250 m from the site.

9.6.38. In the Scoping response, Scottish Water indicated that the site lies within a Drinking Water Protected Area (DWPA), as protected by Article 7 under the Water Framework Directive (WFD), to protect the abstraction of water intended for human consumption as public water supplies. The River Tarff (ID 20292) is a DWPA, which supplies Loch Ness and therefore Invermoriston Water Treatment Works (WTW).

9.6.39. As outlined within their Scoping response, Scottish Water confirmed that due to the large size of the catchment, *'this activity appears to be a sufficient distance from the intake that it is likely to be low risk'*. Scottish Water have produced a list of precautions for a range of activities within the catchment with site specific risks requiring assessment and if required, mitigation.

9.6.40. The groundwater underlying the site is also drinking water protected, in line with the rest of Scotland.

Private Water Supplies

9.6.41. Review of THC records by MacArthur Green identified 27 properties within the 2 km study area that may be affected by the Proposed Development. Full information on the methodology, consultation and site work undertaken is outlined in Technical **Appendix 9.5** PWSRA.

9.6.42. As outlined in **Appendix 9.5**, additional properties were identified through desk study of the surrounding area. These were assessed for potential hydrological connectivity to the Proposed Development and were scoped into further assessment. PWS scoped in to further assessment are included in **Table 9.6**.

Table 9.6 – PWS Scoped In

Source	PWS Supply	Source Type	Hydrologically Connected to the site
PWS Ard Aluinn	Ard Aluinn	Spring	Yes – located on-site
PWS Culachy Estate	Culachy House Glentarff Cottage Lower Culachy Culachy Steading Torrandarroch Gate House	Spring	Yes – located on-site

9.6.43. Following the response from the SEPA FOI request, one SEPA abstraction registration was found to be located within 1 km of the site. The registration for Glenmor Site Compound, A 82 (CAR/R/1111473) was granted in 2013 for Balfour Beatty Utility Solutions Ltd. The primary activity for this abstraction 'Industrial or Commercial: Process Water'. If the abstraction is still active, it is hydrogeologically distant and hydrologically disconnected by topography.

Groundwater Dependent Terrestrial Ecosystems

9.6.44. A detailed National Vegetation Classification (NVC) survey was completed, as outlined in **Chapter 8: Ecology** and reported in **Appendix 8.1**. From the NVC survey data, communities have been identified that have the potential to be groundwater dependent in accordance with Scottish Environment Protection Agency Land Use Planning System Guidance Note 31 (SEPA-LUPS-GU31). The survey methodology for this is outlined in **Chapter 8: Ecology**.

9.6.45. The following potential GWDTE communities were identified, with potential groundwater dependency, based on SEPA-LUPS-GU31, shown in brackets:

9.6.46. A review of the baseline features including topography, underlying geology, surface water features, was undertaken to determine the groundwater dependency. This is shown in **Table 9.7**.

Table 9.7 –Revised Groundwater Dependency

Potential Groundwater Dependency	NVC Communities	Description of Baseline Features	Revised Groundwater Dependency
High (Highly Dominant)	M6a, M6c, M10a, M23b, W4b (High) M15a, M15b U6c (Moderate)	Located either by: ○ Surface watercourses or waterbodies, which it will be primarily fed by. ○ Located on bankside of surface watercourses underlain by impermeable glacial till. There is likely limited connectivity to underlying groundwater, except near-surface which drains to watercourse, or overland surface flow. ○ Underlain by largely impermeable deposits of till or ombrotrophic peatland.	Low: ○ Groundwater is unlikely to be dominant water source as located and fed by surface water. ○ Fed by surface water runoff to watercourses and disconnected from groundwater by largely impermeable superficial deposits. ○ Disconnected from groundwater by impermeable glacial till and peat.
High (Highly Sub-dominant)	M6c, M6d, M10, M10a, M23a, M23b (High) M15a, M15b M25a, M25b Je, U6c (Moderate)		
Moderate (Moderately Dominant)	M15a, M15b, M15c, M15d, M25a, Je U6c (Moderate)		
Moderate (Moderately Sub-dominant)	M15a, M15b, M15c, M25a, Je, U6a, U6c (Moderate)		

9.6.47. There are areas of proposed GWDTE that require further detailed assessment due to not being underlain by largely impermeable superficial soils and not being located beside surface waterbodies.

Table 9.8 – Mosaic Specific Revised Groundwater Dependency

Potential Groundwater Dependency	NVC Communities	Mosaic Polygon Ref	Description of Baseline Features	Revised Groundwater Dependency
Moderate (Moderately Dominant and Moderately Sub-dominant)	M15a, M15b, M25a (Moderate)	M265, M266, M267, M268, M270, M271, M272, M275, M276, M277, M279, M280, M282, M283, M286, M287, M288, M290, M294, M295, M296, M297, M298, M299, M300, M301, M303, M310,	Partly underlain by moderate productivity aquifer and fault line. Largely underlain by low productivity and impermeable fault rocks. No underlying superficial deposits identified. Habitats identified include wet dwarf shrub heath, wet modified bog, dry dwarf shrub heath and acid grassland mosaics. No flush habitats were identified. Habitats are located on steep	Low – while there may be limited input from underlying near-surface groundwater, habitats are likely primarily fed by surface water runoff. Also located by existing tracks so near surface groundwater

Potential Groundwater Dependency	NVC Communities	Mosaic Polygon Ref	Description of Baseline Features	Revised Groundwater Dependency
		M311, M312, M320, M321, M327, M343, M344	slopes likely associated with high volumes and fast surface water runoff. Located downslope of existing tracks and likely associated with surface runoff from tracks.	paths unlikely to be further impacted.
Moderate (Moderately Dominant and Moderately Sub-dominant)	M15a, M15b, M25a (Moderate)	M217, M218, M219, M220, M222, M223, M230, M231, M232, M341, M342	Underlain by low permeability aquifer with no underlying faults or fractures. Partially underlain by superficial deposits of largely impermeable peat and till. Habitats identified include acid dry dwarf shrub heath, wet dwarf shrub heath and scattered broad-leaved tree. No flush habitats were identified. Located on moderately sloping slopes, bound by existing tracks upslope and downslope, which likely would disrupt any near surface groundwater and surface runoff flow paths.	Low – limited connectivity to groundwater, likely primarily fed by surface water runoff from surrounding peatland and existing tracks.
High (Highly Sub-dominant) Moderate (Moderately Dominant and Moderately Sub-dominant)	M6c (High) M15a, M15b, M15c, M25a, Je, U6 (Moderate)	M104, M105, M109, M112, M113, M115, M116, M117, M122, M123, M128, M130, M132, M133, M134, M136, M156, M158, M161, M162, M166, M172, M184, M185, M186, M187, M188, M190, M191, M194	Underlain by low permeability aquifer, only one mosaic underlain by a thrust fault, which itself is overlain by an area of impermeable peatland. Partially underlain by largely impermeable peat and till. Habitats identified include wet dwarf shrub heath, unimproved acid grassland, wet modified bog, marshy grassland. Several mosaics of ombrotrophic blanket bog habitat type. No flush habitats were identified. Located on largely gentle slopes, upslope and downslope of an existing track.	Low – lack of connection to underlying groundwater, likely fed by surface water runoff from existing tracks and surrounding ombrotrophic peatland.
High (Highly Sub-dominant) Moderate (Moderately Dominant and Moderately	M6c, M6d (High) M15a, M15b, M15c, M25a (Moderate)	J048, J056, J089, J102, J104, J108, J109, J112, J113, J114, J150, J151, J161, J164, J`65, J169, J173, J175,	Underlain by low productivity aquifer, no underlying superficial deposits noted, however, surrounded by extensive areas of peatland. No underlying faults or fractures. Habitats identified area wet dwarf shrub heath, wet	Low – unlikely connected to underlying groundwater and likely fed by surface water runoff from slopes, as headwaters of

Potential Groundwater Dependency	NVC Communities	Mosaic Polygon Ref	Description of Baseline Features	Revised Groundwater Dependency
Sub-dominant)		J176, J177, J182, J184, J188, J189, J190, J191, J192, J194, J209, J210, J215, M053	modified bog, unimproved acid grassland, in addition to ombrotrophic blanket bog. No flush habitats were identified. Located on moderate slopes, surrounded by peatland habitat and surface watercourses.	surrounding watercourses, and as runoff from ombrotrophic peatland.
Moderate (Moderately Dominant and Moderately Sub-dominant)	M15a, M15b, M15c, M25a, Je, U6 (Moderate)	J240, J248, M015, M016, M017, M054, M055, M056, M057, M058, M059, M060, M062, M064, M066, M067, M068, M069, M070, M071	Underlain by low productivity aquifer, partially underlain by largely impermeable peatland. No faults or fractures identified. Habitats include wet dwarf shrub heath, unimproved acid grassland, marshy grassland, wet modified bog. There are mosaics of blanket bog present. No flush habitats identified. Located on steep slopes, located upslope of existing tracks. Also located upslope of and are headwaters of surface watercourses.	Low – no evidence of groundwater springs or flushes, or connection to underlying aquifer. Likely fed by surface water runoff, shown by headwaters of surface watercourses.
High (Highly Dominant and Highly Sub-dominant) Moderate (Moderately Dominant and Moderately Sub-dominant)	M6c (High) M15a, M15b, M15c, U6a, U6c (Moderate)	J495, J496, J498, J501, J502, J504, J505, J506, J507, J508, J510, J511, J514, J516, J517, J518, J521, J524, J525, J526, J579, J580, J581, J582, J583, J585, J586, J588, J589, J591, J592, J594, J599	Located on steep slopes to north of outcrop. Underlain by low productivity aquifer with no faults or fractures which may connect to underlying groundwater. Habitats identified include largely unimproved acid grassland and blanket bog, with smaller areas of wet dwarf shrub heath and wet modified bog. Isolated mosaic of acid neutral flush identified. Habitats likely fed by surface runoff which is likely high due to outcropping impermeable bedrock and steep slopes reducing percolation. Area of acid neutral flush is located immediately upslope and is likely source of surface waterbody. Areas of blanket bog and acid grassland likely ombrotrophic and fed by high surface water runoff on high gradient slopes.	Low – no faults or fractures to connect to underlying groundwater, and likely high surface water runoff on slopes.

Designated Sites

9.6.48. Within the wider study area of 10 km from the site, the following designated sites have been identified, as shown in **Table 9.9**.

Table 9.9 –Designated Sites

Designated Site	Distance	Features	Connected to the site?
Glen Tarff (SSSI)	25 m north	Beetle (favourable declining) and upland mixed ash woodland (unfavourable no change).	Yes, located downslope along River Tarff and its tributaries.
Ness Woods (SAC)	25 m north	Otter (unfavourable declining), western acidic oak woodland, and mixed woodland on base-rich soils associated with rocky slopes (unfavourable no change)	Yes, located downslope along River Tarff and its tributaries.
Loch Knockie and nearby Lochs (SPA)	3 km east	Slavonian grebe, breeding (unfavourable no change)	No, located upslope of the site and disconnected by River Tarff.
Glendoe Lochans (SSSI)	3 km east	Common scoter, breeding, and Slavonian grebe, breeding (favourable maintained).	No, located upslope of the site and disconnected by River Tarff.
Easter Ness Forest (SSSI)	3.8 km north-east	Upland mixed ash woodland, and upland oak woodland (unfavourable no change).	No, disconnected by River Tarff and located in a separate catchment to the site.
Parallel Roads of Lochaber (SSSI)	4.3 km south	Fluvial geomorphology of Scotland (favourable maintained), and quaternary of Scotland (partially destroyed).	No, disconnected by topography and located in a separate catchment to the site.
River Spey (SAC)	6.3 km south	Atlantic salmon (unfavourable recovering), freshwater pearl mussel (unfavourable declining), otter, and sea lamprey (favourable maintained).	No, disconnected by topography and located in a separate catchment to the site.
West Inverness-shire Lochs (SPA, SSSI)	6.4 km west	Black-throated diver, breeding (favourable maintained) and Common scoter, breeding (unfavourable declining)	No, disconnected by topography and Loch Oich.
South Laggan Fen (SSSI)	6.8 km south-west	Transition open fen (favourable maintained)	No, disconnected by Calder Burn
River Moriston (SAC)	7.9 km north	Atlantic salmon and freshwater pearl mussel (unfavourable no change)	No, disconnected by Loch Ness
Garry Falls (SSSI)	8.7 km west	Bryophyte assemblage (unfavourable declining) and upland mixed ash woodland (favourable declining)	No, disconnected by topography and Loch Oich.
Creag Meagaidh (SPA, SSSI, SAC)	9.4 km south	Dotterel, breeding (unfavourable declining), upland assemblage (unfavourable recovering), breeding bird assemblage, rocky slopes and upland birch woodland (favourable	No, disconnected by topography and River Spey, located in a separate catchment to the site.

Designated Site	Distance	Features	Connected to the site?
		maintained). Acidic scree and alpine and subalpine heaths (favourable recovered), blanket bog (unfavourable no change) and clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels (favourable maintained).	

9.6.49. The Geological Conservation Review (GCR) sites of Fort Augustus; and Glen Roy and the Parallel Roads of Lochaber, were identified within the study area. As these are geological receptors, however, and are not located within the site, they will not be impacted by the Proposed Development and are therefore scoped out of further assessment.

9.7. Receptors Brought Forward for Assessment

9.7.1. A summary of potential receptor sensitivity is outlined in **Table 9.10**. Those with a high or medium sensitivity have been brought forward for assessment. Those with a low sensitivity will not require further assessment following the application of the standard mitigation unless there is an established potential for impacts of high magnitude.

Table 9.10 – Receptor Sensitivity

Receptor	Description	Sensitivity
Peat	The superficial geology is dominated by peat and peaty gleys. Class 1 and Class 2 peatland is present on-site.	High
Groundwater	Largely underlain by low productivity aquifer, however, area to north underlain by moderate productivity aquifer. Underlying groundwater is of 'Good' classification.	High
Surface Water	WFD watercourse on-site River Tarff has a 'Good' classification.	High
Private Water Supply (PWS)	PWS located on-site.	High
Public Water Supply and Abstractions	Located within a DWPA, however, noted by Scottish Water to be sufficient distance to be low risk.	High
GWDTE	Potential GWDTE identified through NVC survey are ombrotrophic and not groundwater dependent.	Low
Designated Sites	Designated Sites located downslope and hydrologically connected along River Tarff, Glen Tarff (SSSI) and Ness Woods (SAC).	High

9.7.2. The following receptors have been scoped out for further assessment:

- RIGS or GCRs are not present on-site, therefore there will be no direct or indirect impacts to protected bedrock geology receptors.
- Superficial geology, excepting peat was found to be of low sensitivity and scoped out as it is largely low permeability and likely to inhibit the flow of contaminants.
- Due to areas of high or medium risk of flooding not being present on-site, apart from fluvial flooding within watercourse channels and highly localised pluvial flooding, the risk of significant impacts from flooding is considered very unlikely. It is therefore considered that a separate Flood Risk Assessment is not required, and flood risk is scoped out of further assessment. Best practice measures to prevent increase of flood risk are included within the Mitigation.
- GWDTEs identified during the NVC surveys through further assessment were found to not be groundwater dependent and are instead ombrotrophic. This was assessed by identifying surface water sources or characteristics that disconnected the habitats from groundwater.

9.8. Potential Effects

Construction

Impact on Surface Water Quality

9.8.1. Surface water runoff containing silt and other sediments, particularly during and after rainfall events, has the potential to enter the watercourses and field drains on and adjacent to the site. Silt and sediment laden surface water runoff is predicted to arise from excavations, exposed ground and any temporary stockpiles. This has the potential to temporarily impact on the water quality and hydrological and ecological function of the receiving watercourse at and downstream of the works in the absence of any mitigation. Additionally, pollutants such as oils, fuel and cement may be mobilised through mechanical leaks or spillage and carried in surface drainage.

9.8.2. As noted previously, a minimum buffer of 50 m around all watercourses will be maintained in siting all infrastructure except where watercourses crossings are required, with hydrological receptors shown in **Figure 9.11**. Due to the steep sloping banks either side of watercourses, these buffers have been extended in areas to ensure there is appropriate set back of infrastructure from watercourses, as shown in **Figure 9.10**. Furthermore, good construction practice measures will be set out in a CEMP and fully implemented to minimise the risk of pollution to surface watercourses.

9.8.3. The magnitude of impact prior to any additional mitigation, is considered to be negligible, on a high sensitivity receptor. Therefore, there is potential for a direct, temporary, short-term effect of **minor significance**, this is considered to be **not significant**.

Impact on Surface Water Flow

9.8.4. The access tracks and turbine hardstandings could result in an increased rate of surface water runoff from the site. This could potentially increase sedimentation and erosion in watercourses and risk of flooding downstream. It can also result in the diversion of surface water flows.

9.8.5. Runoff from infrastructure will be controlled through suitable construction drainage provision, the outline principles of which are noted above and in the CEMP, and the detailed design of which will be developed and agreed with SEPA and THC. Hydrological connectivity and maintenance of existing drainage pathways will be undertaken through installation of trackside and cross drainage (as shown in **Figure 9.2** and **Figure 9.3**).

9.8.6. As outlined in **Appendix 9.5** Watercourse Crossing Inventory, there are several watercourse crossings required across the site, the outline solutions for which range from pipe culverts and bottomless arch culverts to existing and new bridges. Measures outlined within the Watercourse Crossing Inventory and the CEMP (see outline in **Appendix 3.1**), will prevent constricting and increase in flow. Prior to construction there will be further detailed design of the watercourse crossings, including the new single span bridge. Where CAR licences are applicable, all necessary licences would be sought prior to commencement of operations on site.

9.8.7. The magnitude of impact prior to any additional mitigation, is therefore negligible, on a high sensitivity receptor. Therefore, there is potential for a direct, temporary, short-term effect of **minor significance**, this is considered to be **not significant**.

Impact on Groundwater Flow

9.8.8. The installation of turbine foundations and permanent access tracks can result in the diversion of groundwater flows within underlying geology by creating a barrier. If dewatering occurs at turbine foundations during construction, this could locally reduce groundwater quantity.

9.8.9. The superficial geology underlying the Proposed Development is characterised by typically low permeability peat and till. Deeper, catotelmic peat deposits typically exhibit very low permeability, with extremely slow transmission of groundwater. The underlying bedrock is described to be largely low productivity with small amounts of groundwater in the near surface weathered zone and secondary fractures. While there is moderately productive bedrock present to the north of the site, its flow is primarily through fractures and discontinuities. Infrastructure present overlying this moderately productive bedrock includes new access tracks and associated earthworks, and construction compound. No turbines, substations or borrow pits are located within this area.

9.8.10. The spatial impacts of drawdown from dewatering will be a localised area at each turbine foundation. It is also considered to be a short-term impact with localised groundwater levels anticipated to restore when completed. Embedded mitigation measures will be implemented to prevent impacts to groundwater, which, as noted above, will include completing excavation and dewatering as quickly as practicable.

9.8.11. Diversion of groundwater flows by hardstanding and permanent access tracks is a potential impact. Drainage will be utilised to maintain hydrologically connectivity upslope and downslope of access tracks. On areas of permanent tracks this will be maintained though cross-track drainage.

9.8.12. Impact on groundwater flow is assessed to be of negligible magnitude on a high sensitivity receptor. This is assessed to be a direct, temporary, short-term effect of **minor significance**, which is considered to be **not significant**.

Impact on Groundwater Quality

9.8.13. As outlined above, the geology underlying the site is characterised by typically low permeability peat and till, and largely low productivity bedrock aquifers. As summarised previously, there is likely to be minimal connectivity between the bedrock aquifers and superficial deposits.

9.8.14. The installation of the turbine foundations has the potential to impact groundwater quality as a result of alkaline leachate from concrete foundations. Due to the characteristics of the underlying geology, the spatial impact of any alkaline leachate is therefore likely to be limited to the localised area at the turbine foundation. Other forms of chemical pollution that may occur include spills of fuels and chemicals stored on-site or from vehicle and plant spills.

9.8.15. Embedded mitigation measures include sufficient and continued dewatering at the turbine foundation excavation until the concrete is cured, to prevent leaching. To prevent pollution to groundwater, other standard mitigation includes appropriate management measures for transfer of concrete and minimising the duration of concrete pouring, appropriate storage of fuels and chemicals, refuelling of plant and vehicles at designated locations, and distributing spill kits throughout the site and within all plant and vehicles.

9.8.16. Impact on groundwater quality is assessed to be of negligible magnitude on a high sensitivity receptor. This is assessed to be a direct, temporary, short-term effect of **minor significance** and is considered to be **not significant**.

Removal of and Impact on Peat

9.8.17. The proposed turbines, associated hardstandings and other infrastructure would be constructed by excavating peat within their footprints to allow construction on a suitable founding stratum (i.e. bedrock). As outlined in embedded mitigation measures, proposed turbines and infrastructure have been sited to minimise the excavation of peat as far as practicable, taking account of other constraints (as shown in **Figure 9.12**).

9.8.18. Peatland across the site is in a degraded condition, with prolonged effects of historical drainage and grazing leading to extensive peat hagging and bare peat. Any areas of better-quality bog would be small and isolated with no notable areas of near-natural peatland being identified during habitat surveys.

9.8.19. Detail on the estimated volume of peat to be excavated, and the management of excavated peat, is given in the DPMP presented in **Appendix 9.2**. While 24.65 ha of blanket bog (including wet modified bog) are assessed to be impacted (as detailed within **Chapter 8: Ecology**), within the OBEMP (**Appendix 8.6**) there is an area of 424.6ha proposed for peatland enhancement. Embedded mitigation measures outlined will be implemented by the Principal Contractor, to reduce the potential effects on peat during construction. This includes measures to prevent drying out of peat in stockpiles, to enable the peat to be successfully restored, where practicable, as outlined in the DPMP.

9.8.20. Following implementation of embedded and good practice mitigation as outlined in **Chapter 8: Ecology**, and OBEMP (**Appendix 8.6**), and considering the peatland condition and quality on site, the removal of and impact on peat is assessed to be a negligible magnitude on a high sensitivity receptor. This will result in a direct, temporary, long-term effect of **minor significance** and is considered to be **not significant**.

9.8.21. Carbon can be lost through the removal of peat during the construction of the Proposed Development. The Scottish Governments online ‘carbon calculator’ has been carried out and is detailed in **Appendix 9.4**. The online carbon calculator tool calculates carbon losses and savings over the lifetime of an onshore wind farm sited on peatland. The calculation compares an estimate of the carbon emissions from the construction, operation, and decommissioning of the Proposed Development to those emissions estimated from other electricity generation sources.

Peat Landslide Impact on Watercourses

9.8.22. Construction on peat soils can result in destabilisation of peat deposits on slopes and lead to slope failure. This can result in peat and debris reaching watercourses, potentially resulting in sedimentation and changes to flow and fluvial geomorphology.

9.8.23. A detailed assessment of peat landslide risk has been undertaken as presented in **Appendix 9.1**. This has identified the risk of peat landslides at the proposed turbines, hardstandings and other infrastructure, to downslope receptors.

9.8.24. Based on the findings of **Appendix 9.1**, the potential magnitude of impact from peat landslides is assessed, that with implementation of appropriate mitigation measures, to be negligible on a high sensitivity receptor, resulting in a **minor effect** that is indirect, temporary and short-term. This is considered to be **not significant**.

Compaction of Soils

9.8.25. As part of the Proposed Development there will be a requirement for construction of permanent access tracks and hardstanding. During construction there will also be movement of vehicles and plant. There is therefore potential for this to result in soil compaction, leading to reduced permeability, increasing the potential for surface water runoff. Reduced permeability could also reduce the flood storage capacity within the site and could potentially lead to localised flooding incidents.

9.8.26. As discussed previously, the site is largely underlain by peat and till which are inferred to be of low or variable permeability. There is therefore unlikely to be a significant reduction in flood storage capacity between low permeability superficial deposits to low permeability hardstanding. In addition, the area of hardstanding of the Proposed Development has been minimised and the existing access track will be utilised as far as practicable, as part of the embedded design measures.

9.8.27. Following the implementation of these embedded measures, the potential effect on a receptor of high sensitivity, is considered to be of negligible magnitude. This will result in an indirect, short-term **negligible effect** and is considered to be **not significant**.

Impacts to Designated Sites

9.8.28. Following a review of the Proposed Development design, it is found that Glen Tarff (SSSI) and Ness Woods (SAC) are located 25 m north, downslope of the site, along River Tarff and its tributaries. These are both located approximately 240 m from proposed new infrastructure. These designated sites therefore have the potential to be affected by changes in quality or quantity of surface water or near surface groundwater.

9.8.29. The Glen Tarff (SSSI) is protected based on its woodland habitat and beetle assemblage; Ness Woods (SAC) is protected based on its woodland habitat and otter assemblage. Both of these designated areas may be affected by changes to water quality from polluted surface water run-off. The habitats are located on-site along the River Tarff, which is fed by several tributaries including the sub-catchment of Allt Lagan a Bhainne (as shown in **Figure 9.9**). The infrastructure within these catchments includes all proposed new infrastructure, including access track, wind turbines, borrow pits and construction compounds. During construction, silt management measures will be included within the CEMP to follow best practice to minimise risk of pollution to surface watercourses and downstream designated sites. Additional measures would include surface water monitoring during construction, regular visual checks by the ECoW and an emergency procedure plan in the event of a chemical spill within these catchments.

9.8.30. Furthermore, all infrastructure, except watercourse crossings where required, has been sited 50 m from surface watercourses, and good construction practice measures will be set out in a CEMP and fully implemented to minimise the risk of pollution to surface watercourses.

9.8.31. As there will be no construction works within more than 50 m of the designated sites, in addition to measures set out within the CEMP, the potential effect on receptors of high sensitivity, is considered to be of negligible magnitude. This will result in an indirect, temporary, short-term **minor effect** and is considered **not significant**.

Impacts to Public Water Supplies

9.8.32. The public water supply of the River Tarff Drinking Water Protected Area has been scoped into further assessment.

9.8.33. As part of embedded mitigation, a minimum buffer of 50 m has been maintained around watercourses, excepting where required for watercourse crossings. Best practice construction measures and mitigation will be implemented as outlined within the CEMP to minimise risk of chemical pollution or sedimentation to surface watercourses within or connected to the DWPA.

9.8.34. As noted previously Scottish Water stated in the consultation response, *'this activity appears to be a sufficient distance from the intake that it is likely to be low risk'*.

9.8.35. The magnitude of impact prior to any additional mitigation, is considered to be negligible, on a high sensitivity receptor. Therefore, there is potential for a direct, temporary, short-term effect of **minor significance**, this is considered to be **not significant**.

Impacts to Private Water Supplies

9.8.36. The PWS receptors scoped in to further assessment include PWS Ard Aluinn and PWS Culachy Estate.

9.8.37. Both PWS receptors have the same supply infrastructure, which includes wells located on springs in the headwaters or immediately beside small unnamed watercourses. They are therefore considered to be fed by near surface groundwater and surface water infiltration in superficial deposits and weathered bedrock.

9.8.38. In accordance with SEPA-LUPS-GU31, impacts to groundwater abstractions can occur within the following buffer distances:

- Within 100 m of radius of all excavations less than 1 m in depth; and
- Within 250 m of all excavations deeper than 1 m.

9.8.39. As shown in **Figure 5 in Appendix 9.6**, the identified receptors are shown whether they are within 100 m or 250 m of anticipated excavation depths at permanent and temporary infrastructure. Details of the assessment of PWS are outlined within **Appendix 9.6**.

9.8.40. Following SEPA guidance, as PWS Culachy Estate is located outwith these 100 m or 250 m buffers from permanent or temporary infrastructure, and its source catchment is also separated from the infrastructure by a topographic high, the potential effect on receptors of high sensitivity, is considered to be of negligible magnitude. This will result in an indirect, temporary short-term **minor effect** and is considered **not significant**.

9.8.41. Following the implementation of these embedded measures, the potential effect on PWS Culachy Estate receptor of high sensitivity, is considered to be of negligible magnitude. This will result in an indirect, short-term **negligible effect** and is considered to be **not significant**.

9.8.42. As shown in **Figure 5 of Appendix 9.6** PWS Ard Aluinn is located within 250 m of permanent infrastructure. As outlined in **Appendix 9.6**, however, the underlying groundwater source is considered to be heavily influenced and subdivided by surface water catchments. The majority of infrastructure has been separated from the PWS by the sub-catchment of an unnamed tributary of the River Tarff. Upslope within the source catchments, which have been modelled in ArcGIS, there is a section of new track, which has been upgraded from an existing track. While the track has been kept as far from PWS as practicable, it is located 310 m upslope from the nearest well due to utilising an existing track and slope constraints To prevent impacts, best practice mitigation measures will be followed which will be outlined within the CEMP, including no fuel or chemical storage within the catchment and implementation of cross drainage to maintain hydrological connectivity.

9.8.43. Following the implementation of these embedded measures, the potential effect on PWS Ard Aluinn; a receptor of high sensitivity, is considered to be of low magnitude. This will result in an indirect, short-term **moderate effect** and is considered to be **significant**.

Operation

Impacts on Surface Water Flow

9.8.44. The access tracks and turbine hardstanding could result in an increased rate of surface water runoff from the site. This could potentially increase sedimentation and erosion in watercourses and risk of flooding downstream. Permanent hardstanding can also alter natural drainage pathways.

9.8.45. There will be a reduction in exposed ground and hardstanding areas during the operational phase as compared to the construction phase. Any changes to drainage of surface water will be altered from the construction phase and continue during the operational phase.

9.8.46. Prior to construction, a detailed Drainage Strategy will be developed and agreed with SEPA and THC to ensure runoff from infrastructure is controlled, and will be included as part of the CEMP. Embedded measures which will be included within the Drainage Strategy, such as the presence of trackside drainage, check dams and where appropriate sumps, is outlined in **Section 9.9**.

9.8.47. The magnitude of change, prior to any additional mitigation, is therefore negligible, on a high sensitivity receptor. Therefore, there is potential for a direct, temporary, long-term effect of **minor significance** (**not significant**).

Impacts on Fluvial Geomorphology

9.8.48. If new watercourse crossings are not designed properly to ensure continuous flows, this could potentially adversely affect the geomorphology of watercourses by reducing heterogeneity. While the Proposed Development does cross watercourses, several of these are existing crossings, some of which are to be upgraded or replaced, and most are recommended to be bottomless pipe culverts. This is excepting WCX4 which is an existing single span bridge which will be utilised, and WCX23 which will require a new single span bridge, as shown in Annex A of **Appendix 9.5**.

9.8.49. The Watercourse Crossing Schedule (**Appendix 9.5**) details the new watercourse crossings required and suggested crossing types to ensure maintenance of suitable flow and therefore heterogeneity. Following detailed design of these watercourse crossings, any necessary CAR authorisations would be sought prior to construction on-site, if required.

9.8.50. It is expected that WCX23 will require CAR authorisation and licence prior to construction. The bridge has been designed to be single span to prevent impacts to the watercourse, with abutments back from the watercourse to prevent increased risk of flooding. Due to the low gradient sloping topography either side, culverts may be required as part of the earthworks to prevent restriction in flow. There will be further assessments of flow and further design of the watercourse crossings prior to construction regulated by CAR and agreed with SEPA and THC.

9.8.51. The magnitude of impact on a high sensitivity receptor is assessed to be negligible. This is considered to be an indirect, permanent effect of **minor significance** and is considered to be **not significant**.

Impacts on Groundwater Flow and Drying Out of Peat

9.8.52. The presence of turbine foundations, hardstandings and other infrastructure elements have the potential to interrupt groundwater flow by acting as barriers to flow. This could result in drying out of surrounding peat deposits. As outlined previously, there is considered to be limited

connectivity to the underlying bedrock aquifer, due to the typically low permeability of the overlying peat and till.

9.8.53. There may be impacts to peat immediately surrounding areas excavated during construction for hardstanding and foundations, however, as it is considered that these are likely to be localised to the immediate areas around excavations, they are unlikely to produce long term effects and water levels are likely to rebound during the operational phase.

9.8.54. Taking account of embedded mitigation measures, the magnitude of impact is assessed as negligible, on high sensitivity receptors. There is therefore potential for an indirect, temporary, short-term effect of **minor significance**, which is considered to be **not significant**.

Impacts on Surface Water and Groundwater Quality from Chemical Pollution and Sedimentation

9.8.55. As outlined in the Construction section above, surface water and groundwater quality can be impacted by polluted runoff from the site. Following the construction phase, there will be reduced disturbance to sediments during the operational phase. Many of the activities that may have resulted in chemical pollution, including refuelling and cement pouring, will not occur during the operational phase. Embedded measures to mitigate potential chemical pollution, including spill kits to be present within each vehicle, will continue within the operational phase.

9.8.56. A battery storage facility is planned as part of the Proposed Development. In the event of a battery fire at the site, polluted waters can be produced where water is introduced to the system to cool the batteries. This will therefore only become a risk during the operational phase when the battery storage is connected. Mitigation measures to prevent the release of polluted waters to the hydrological receptors will be included within an Operational Environmental Management Plan (OEMP). These will include an emergency plan in the event of a fire, consultation with local fire services and appropriate treatment and disposal of the polluted waters.

9.8.57. Impact on surface water quality is assessed to be of negligible magnitude of impact on a high sensitivity receptor. This is assessed to be a direct, temporary, short-term effect of **minor significance** and considered to be **not significant**.

9.8.58. Impact on groundwater quality within superficial peat and bedrock is assessed to be of negligible magnitude on high sensitivity receptors. This is assessed to be a direct, temporary, short-term effect of **minor significance** and considered to be **not significant**.

Decommissioning

9.8.59. The potential effects of the decommissioning phase will be similar to during construction. Due to reduced site activity, impacts are predicted to be of the same or lesser magnitude, with resultant effects being the same or lesser significance to construction phase effects.

9.9. Mitigation

Embedded Mitigation

9.9.1. The following considerations have been taken into account in the iterative design of the Proposed Development, considered as embedded mitigation:

- A 50 m buffer has been maintained around all surface watercourses identified in OS 1:25k mapping, except where tracks need to cross watercourses. These watercourse buffers have been modified to increase from 50 m in steeply sloping areas. The need for watercourse crossings has been minimised as far as practicable while taking account of other technical and environmental constraints.
- Avoiding deeper peatland (>1 m), blanket bog and wet modified bog for the location of turbines and other infrastructure as far as practicable. Despite the presence of deep peat

within the site, due to several design iterations, the Proposed Development infrastructure is largely outwith areas of deep peat, however, this has been limited by the highly variable peat depths noted on-site.

- No areas on-site were identified as high risk within the PLHRA, and most Infrastructure has been sited outwith minimal areas of medium risk.
- As there are no GWDTEs assessed to be present on-site, no infrastructure is located within areas of GWDTEs.

Good Practice Measures

9.9.2. In undertaking the assessment of potential effects from the Proposed Development, good practice measures are assumed to be embedded mitigation. As appropriate, these mitigation measures would be outlined within the CEMP in **Appendix 3.1.**

Pre-Construction

9.9.3. Prior to construction being undertaken, relevant detailed site investigations would be conducted. This will include investigations of underlying deposits, in particular where proposed infrastructure is sited, to inform detailed design and suitable micro-siting of the turbines and associated infrastructure.

9.9.4. If it is assessed that there will be potential effects to surface watercourses or groundwater, baseline water quality monitoring will be undertaken as required. This may also include groundwater level and flow monitoring. A Water Quality Management Plan (WQMP) will be prepared and agreed with THC, in consultation with SEPA, prior to commencement of construction. It is anticipated that this will include a programme of pre-construction monitoring, over a period to be set out in the plan. An outline plan is included within the CEMP in **Appendix 3.1**.

Construction

9.9.5. Following review of best practice outlined in relevant guidance and legislation, including SEPA guidance 'Prevention of Pollution from Civil Engineering Contracts: Special Requirements' (SEPA, 2006), a CEMP will be compiled (an outline of which is provided in **Appendix 3.1**). The Principal Contractor will implement measures outlined within the CEMP, as agreed with relevant consultees, including SEPA, NatureScot and THC. This will also include a construction method statement, which will account for:

- Pollution Risk Assessment;
- Identification of Controlled Waters and temporary discharge points to these watercourses;
- Planning and design of dewatering activities to minimise the local drawdown;
- Planning and design of pollution control measures, in particular during earthworks;
- Storage of fuel and chemicals in a designated area in accordance with best practice procedures, outwith 50 m buffers of watercourses and water bodies;
- Borrow pit management measures;
- Designated area for concrete batching;
- Pollution control system management, including dewatering of excavations;
- Contingency planning and emergency procedures; and
- On-going monitoring of construction procedures.

9.9.6. Embedded measures within the CEMP to prevent sedimentation pollution and erosion include:

- All earthworks would be carried out in accordance with BSI Code of Practice for Earth Works BS6031:2009;

- Stockpiles will be placed at least 50 m from watercourses. The height and maximum slope angle will be in accordance with BSI guidance. Where there are stockpiles of peat, re-wetting will occur to prevent peat drying out. Sediment pollution mitigation measures, including drains will be implemented at the base of stockpiles.
- Sediment pollution mitigation measures will be emplaced across the Proposed Development, this may include: drainage; silt fencing; settlement lagoons; and check dams.
- Plant movements will be minimised through management measures. Measures to prevent sediment on public roads may include wheel washing or road sweeping at the site entrance.
- Any CAR licences required for site discharges will be applied to from SEPA prior to construction.
- A 'wet weather policy' will be in place, given that there are likely to be periods of significant rainfall at the site. The policy will include that site management checks local weather forecast daily, regularly checks and maintains pollution control system and suspends work during adverse conditions.
- Where topography dictates that working platforms are needed, these will be formed to ensure that surface water drains away from watercourses.
- To avoid unnecessary compaction and disturbance to site soils, working areas and corridors will be established and demarcated, with construction operatives appropriately inducted and trained to avoid work outside the designated work areas.

9.9.7. Embedded measures within the CEMP to prevent chemical pollution include:

- Dewatering at the turbines will be minimised through careful management and reducing the time the excavation is open, including concrete pouring.
- A method statement to address the transport, transfer, handling and pouring of liquid concrete at foundations will be produced and implemented by the Principal Contractor.
- Cement, grout and unset concrete will not be allowed to enter the water environment. No operations involving concrete transfer will take place within 50 m of watercourses.
- There will be no washing out of vehicles used for concrete delivery or washing of vehicles within 50 m of watercourses.
- Fuel and chemicals will be stored in impermeable bunded containers at least 110% of the volume stored. All fuelling on-site will occur in a designated location, at least 50 m from watercourses.
- Spill kits will be stored across the site and within all vehicles and plant. On-site toolbox talks with construction staff will set out the requirement to report all on-site spills and the correct implementation of spill kits.
- All vehicles and plant will be checked regularly with regular maintenance undertaken as required.

9.9.8. Embedded measures within the CEMP to enable surface water drainage management include:

- A suitable surface water drainage strategy with detailed drainage design will be prepared and agreed prior to construction, but the following outline measures will be included.
- Identified watercourse crossings in **Appendix 9.5** will be designed to convey flows of 0.5%AEP (1:200yr) plus climate change, to prevent exacerbating downstream flood risk.
- Trackside drainage ditches will be designed to ensure separation of clean water drainage from potentially contaminated drainage.
- Check dams will be employed to slow down the flow of water and decrease erosion within drainage ditches.
- Sumps and settlement lagoons will be used to treat and slow down the flow of water during periods of high rainfall. This will be employed at drainage outlets prior to reaching watercourses.
- Areas of excavation and earthworks will have drainage designed to drain to a sump to prevent pollution and increase surface water run-off.

- Hydrological connectivity between upslope and downslope will be maintained through cross-drainage and culverts.

Additional Mitigation and Enhancement

9.9.9. It was identified that following implementation of embedded and good practice mitigation there may be a significant effect to the PWS Ard Aluinn. Due to this additional mitigation will include water quality monitoring of the PWS at its source and supply, following consent by the resident. The following monitoring schedule is proposed and outlined within **Appendix 9.6** and within **Appendix 3.1** CEMP.

- Monthly for 12 months prior to construction, following this a baseline monitoring report will be produced and maximum and minimum thresholds for parameters will be agreed with THC in consultation with SEPA;
- Monthly throughout the construction phase; and
- Monthly for 12 months following construction.

9.9.10. The residents will be provided with emergency contact details in the event of impacts to their water supply. If there is considered to be potential impact, the on-site ECoW will organise testing of the supply as soon as is practicable.

9.9.11. As outlined with the OBEMP, enhancement will be undertaken on an area of 424.6 ha within Management Unit A. This peatland enhancement, with the effects assessed also in **Chapter 8: Ecology**, will include measures such as drain blocking, protection and revegetation of bare peat, hagg and gully reprofiling and grazing management. Additionally, a detailed drain and erosion feature survey will be undertaken to understand where these measures should be implemented for increased effectiveness. As noted within the DPMP, opportunities will be identified to reuse excavated peat where practicable.

9.10. Residual Effects

Construction

9.10.1. As noted above, **no significant** potential construction-phase environmental effects were identified, taking account of embedded and good practice mitigation, excepting impacts to PWS. The level of potential effect assessed for all impacts other than impacts to PWS negligible to minor.

Impact on PWS

9.10.2. Implementation of best practice mitigation measures, and additional measures, including water quality monitoring, are considered to result in a **residual minor effect** which is **not significant**.

Operation

9.10.3. As noted above, no significant potential operational-phase environmental effects were identified, taking account of embedded and good practice mitigation. The level of potential effect assessed for all operational phase impacts is minor. No additional mitigation measures are considered to be necessary, therefore the residual effect significance for most impacts is unchanged, remaining as **minor, and not significant**.

9.10.4. The implementation of the proposed OBEMP (**Appendix 8.6**), involving restoration and enhancement of 424.63 ha of peatland habitat, is expected to reduce the potential for long-term impacts on groundwater flow and drying out of peat, in fact providing a beneficial impact across the OBEMP Unit A management area. Taking account of the proposed Unit A management area and associated monitoring programme, the impact on groundwater flow and drying out of peat at the site is considered to be low (beneficial), on high sensitivity receptors, resulting in an indirect, long-term effect of **moderate beneficial significance** (significant in EIA terms).

Decommissioning

9.10.5. The residual effects of the decommissioning phase will be similar to or lesser than the construction phase effects. There will be no anticipated effect resulting from excavation and removal of peat, as no excavation of peat is anticipated to be required for decommissioning.

9.11. Cumulative Effects

9.11.1. Cumulative developments have been considered where they are located within the study area of 10 km from the site. These developments are listed below in **Table 9.11**.

9.11.2. Operational developments are scoped out of consideration from cumulative effects. This is due to impacts to receptors being of greatest magnitude during the construction phase. There is little potential for substantial construction works to be planned on operational developments, and therefore **no significant cumulative effects** are likely to arise.

9.11.3. Operational developments scoped out include:

- Millennium Group (9.9 km); and
- Stronelairg (10 km).

Table 9.11 – Cumulative Developments Considered in the Assessment

Development	Phase	Distance from Proposed Development turbine (km)	Surface Water Catchment
Cloiche	Application	7.2	River Tarff, River Killin and Allt Breineag

9.11.4. As identified in **Table 9.11**, Cloiche Wind Farm is the cumulative development within 10 km that is also within the same catchments as the Proposed Development, the River Tarff.

9.11.5. Within the Cloiche Wind Farm submitted EIA Report, the hydrology and hydrogeology chapter considered impacts to receptors to be not significant following implementation of mitigation measures. The application documentation for Cloiche Wind Farm has included a CEMP and schedule of mitigation which details the implementation of the following measures:

- Implementation of a 50 m watercourse buffer, excepting C11, where the hardstanding encroaches, and the batching plant, which is in a location previously used by Stronelairg Wind Farm.
- Methods for water control and drainage from areas of hardstanding, with drainage to remain in place during the operational phase.
- Good practice construction techniques to include Sustainable Drainage Systems (SuDS) where applicable, to help attenuate and treat runoff.
- Implementation of silt traps and settlement lagoons, and a maintenance schedule for all SuDS and drainage assets installed.
- A detailed Borrow Pit Assessment include details of proposed drainage.
- Implementation of water quality monitoring at watercourses downstream of the Proposed Development.

9.11.6. It is considered that the cumulative effects on identified receptors will be no greater than **minor (not significant)** and no additional mitigation measures are therefore required.

9.12. Summary

9.12.1. The site is located within the catchments of the River Tarff and Calder Burn. There are several minor unnamed and named tributaries of the River Tarff located within the site. The River Tarff/Allt Lagan a' Bhainne catchment is classified as 'good' while Calder Burn is classified as 'moderate'.

9.12.2. The bedrock beneath the site consists of sedimentary and metamorphic rocks which have been significantly faulted by the Great Glen Fault. Superficial deposits where present comprise peat and till, which are typically low permeability, with localised granular glacial, glaciofluvial and alluvium deposits beside watercourses. The peat is identified as Class 1 and Class 2 priority peatland according to the SNH Carbon and Peatlands Map 2016.

9.12.3. Extensive peat probing surveys found peat deposits across the site, which have been largely avoided through design iterations.

9.12.4. A Peat Landslide and Hazard Risk Assessment has identified that while there are minimal areas of medium risk, most of these have been avoided. The eight remaining areas were assessed and with mitigation are considered an insignificant risk.

9.12.5. Two private water supplies were identified on site, with PWS Ard Aluin located within 250 m of the Proposed Development access track.

9.12.6. Potential construction and operational effects include changes to surface water and groundwater flow and quality, excavation of peat, peat slide risk and effects to water abstraction, designated sites or GWDTE.

9.12.7. The mitigation measures set out in this chapter will be included within the CEMP and OBEMP prior to commencement of construction activities. These mitigation measures are considered to be robust and implementable and will reduce the potential impacts on peat resources, watercourses and groundwater. Additional measures to reduce impact to PWS Ard Aluinn will include water quality monitoring prior to and for the duration of construction.

9.12.8. The significance of residual effects on geology, peat, hydrology and hydrogeology receptors following the implementation of these mitigation measures are considered to be **Minor** to **Negligible** and therefore **not significant**. Potential effects, mitigation measures and residual effects are summarised in **Table 9.12**.

Table 9.12 – Summary of Effects

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/Adverse		Significance	Beneficial/Adverse
Construction					
Impact on Surface Water Quality	Minor / Not Significant	Adverse	Embedded design and good practice mitigation: ○ Minimum 50 m buffer from watercourses. ○ Use of existing infrastructure as far as practicable. ○ Siting infrastructure to minimise peat excavation requirements. ○ Implementation of mitigation measures in CEMP. ○ Drainage Strategy to be implemented. ○ Final design of watercourse crossings to be implemented. ○ Dewatering undertaken for as short a time as practicable. ○ Pre-construction ground investigation works. ○ Water quality monitoring and management plan to be agreed and implemented.	Minor / Not Significant	Adverse
Impact on Surface Water Flow	Minor / Not Significant	Adverse		Minor / Not Significant	Adverse
Impact on Groundwater Quality	Minor / Not Significant	Adverse		Minor / Not Significant	Adverse
Impact on Groundwater Flow	Minor / Not Significant	Adverse		Minor / Not Significant	Adverse
Compaction of Soils	Negligible / Not Significant	Adverse		Negligible / Not Significant	Adverse
Impacts to Designated Sites (Glen Tarff SSSI and Ness Woods SAC)	Minor / Not Significant	Adverse		Minor / Not Significant	Adverse
Impacts to Public Water Supplies (River Tarff DWPA)	Minor / Not Significant	Adverse		Minor / Not Significant	Adverse
Impacts to Private Water Supplies (PWS Culachy Estate)	Minor / Not Significant	Adverse		Minor / Not Significant	Adverse
Impacts to Private Water Supplies (PWS Ard Aluinn)	**Moderate / Significant**	Adverse		Minor / Not Significant	Adverse
Removal and Impact on Peat	Minor / Not Significant	Adverse	Embedded design and good practice mitigation, including peat	Minor / Not Significant	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/Adverse		Significance	Beneficial/Adverse
			management, storage and restoration in line with the DPMP.		
Peat Landslide Impact on Watercourses	Minor / Not Significant	Adverse	Embedded and good practice mitigation, including measures noted above and avoidance of potential peat landslide risk areas in design. Management, storage and restoration in line with the DPMP.	Minor / Not Significant	Adverse
Operation					
Impacts on Surface Water Flow	Minor / Not Significant	Adverse	Embedded design and good practice mitigation. Implementation of a Drainage Strategy, to include trackside and cross drainage.	Minor / Not Significant	Adverse
Impacts on Fluvial Geomorphology	Minor / Not Significant	Adverse	Embedded design and good practice mitigation. Regulation of watercourse crossings by CAR, to include maintenance and removing any blockages.	Minor / Not Significant	Adverse
Impacts on Groundwater Flow and Drying out of Peat	Minor / Not Significant	Adverse	Embedded design and good practice mitigation. Implementation of a Drainage Strategy, to include trackside and cross drainage. Enhancement via delivery of OBEMP to restore 424.63ha habitat.	Minor / Not Significant	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/Adverse		Significance	Beneficial/Adverse
Impacts on Surface Water and Groundwater quality from Chemical Pollution and Sedimentation	Minor / Not Significant	Adverse	Embedded design and good practice mitigation. Implement best practice and correct storage of fuels and management plans in the event of spills.	Minor	Adverse
Decommissioning					
All decommissioning effects are assessed as being the same as, or lesser than, construction phase effects.					

References

BGS (2020) Online GeoIndex Map Viewer. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html Accessed on: 14 August 2023.

British Standards Institute (2015). BS5930:2015 Code of Practice for Site Investigation.

CIRIA. (2001). C532 Control of water pollution from construction sites: guidance for consultants and contractors. CIRIA, London.

CIRIA. (2015). C741 Environmental Good Practise on site guide. 4th Edition. CIRIA, London.

NatureScot. (2019). Good practice during wind farm construction, 4th edition. Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction Accessed on: 14 August 2023.

NatureScot (2022) SiteLink Map Search. Available at: https://sitelink.nature.scot/map Accessed on: 14 August 2023.

Peatland Action (2023). Peat depth survey results. Available at: https://www.nature.scot/climate-change/nature-based-solutions/peatland-action-project/peatland-action-data-research-and-monitoring/peatland-action-open-data Accessed on: 17 July 2023.

Scottish Environment Protection Agency (2022) Scotland's Environment Map. Available at: https://www.environment.gov.scot/maps/scotlands-environment-map/ Accessed on: 14 August 2023.

Scotland's Soils (2022) Carbon and Peatland Map 2016. Available at: https://map.environment.gov.scot/Soil_maps/?layer=1# Accessed on: 14 August 2023.

Scotland's Soils (2022) National Soil Map of Scotland. Available at: https://map.environment.gov.scot/Soil_maps/?layer=1# Accessed on: 14 August 2023.

Scottish Government (2006). The Private Water Supplies (Scotland) Regulations 2006. Available at: https://www.legislation.gov.uk/ssi/2006/209/contents/made

Scottish Government (2009). Flood Risk Management (Scotland) Act 2009. Available at: https://www.legislation.gov.uk/asp/2009/6/contents Accessed on: 14 August 2023.

Scottish Government (2009). The Contaminated Land (Scotland) Regulations 2000 (as amended). Available at: https://www.legislation.gov.uk/ssi/2000/178/contents/made Accessed on: 14 August 2023.

Scottish Government (2009). The Scottish Soil Framework. Available at: https://www.gov.scot/publications/scottish-soil-framework/ Accessed on: 14 August 2023.

Scottish Government (2011). The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Available at: https://www.legislation.gov.uk/ssi/2011/209/contents/made Accessed on: 14 August 2023.

Scottish Government (2011). Water Environment and Water Services (Scotland) Act 2003. Available at: https://www.legislation.gov.uk/asp/2003/3/contents Accessed on: 14 August 2023.

Scottish Government (2013). The Water Resources (Scotland) Act 2013. Available at: https://www.legislation.gov.uk/asp/2013/5/enacted Accessed on: 14 August 2023.

Scottish Government (2017). The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made Accessed on: 14 August 2023.

Scottish Government, SNH, SEPA (2017). Guidance on Developments on Peatland. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-

2017/govscot%3Adocument/Guidance%2Bon%2Bdevelopments%2Bon%2Bpeatland%2B-%2Bpeatland%2Bsurvey%2B-%2B2017.pdf Accessed on: 14 August 2023.

Scottish Government (2017). Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Available at: https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/documents/ Accessed on: 14 August 2023.

Scottish Government (2017). The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Available at: https://www.legislation.gov.uk/ssi/2017/282/contents/made Accessed on: 14 August 2023.

Scottish Government (2020). Scottish Planning Policy. 2020. Available at: https://www.gov.scot/publications/scottish-planning-policy/ Accessed on: 14 August 2023.

Scottish Government. (2022). Planning Advice Notes. Available at: https://www.gov.scot/collections/planning-advice-notes-pans/ Accessed on: 14 August 2023.

Scottish Government (2022) National Planning Framework 4: revised draft. Available at: https://www.gov.scot/publications/national-planning-framework-4-revised-draft/pages/3/Scottish Renewables, SEPA (2012). Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste. Available at: https://www.gov.scot/publications/assessment-of-peat-volumes-reuse-of-excavated-peat-and-minimisation-of-waste-guidance/ Accessed on: 14 August 2023.

SEPA. (2009). Groundwater Protection Policy for Scotland, Version 3 Environmental Policy Number 19. Available at: https://www.sepa.org.uk/media/34371/groundwater-protection-policy-for-scotland-v3-november-2009.pdf Accessed on: 14 August 2023.

SEPA (2017) Developments on Peat and Off-Site Uses of Waste Peat. Available at: https://www.sepa.org.uk/media/287064/wst-g-052-developments-on-peat-and-off-site-uses-of-waste-peat.pdf Accessed on: Accessed on: 14 August 2023.

SEPA. (2017). Land Use Planning System SEPA Guidance Note 31 Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf Accessed on: Accessed on: 14 August 2023.

SEPA. (2017). Land Use Planning System SEPA Guidance Note 4. Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf Accessed on: 14 August 2023.

SEPA (2019) Technical Flood Risk Guidance for Stakeholders. Available at: https://www.sepa.org.uk/media/162602/ss-nfr-p-002-technical-flood-risk-guidance-for-stakeholders.pdf Accessed on: 14 August 2023.

SEPA. (2020). Online Water Environment Hub and Classification Hub. Available at: https://www.sepa.org.uk/data-visualisation/water-environment-hub/ Accessed on: 14 August 2023.

SEPA. (2021). Supporting Guidance (WAT-SG-75) – Sector Specific Guidance: Construction Sites. Available at: https://www.sepa.org.uk/media/340359/wat-sg-75.pdf Accessed on: 14 August 2023.

SEPA (2022) Flood Maps. Available at: https://map.sepa.org.uk/floodmaps Accessed on: 14 August 2023.

SEPA (2022). Guidance for Pollution Prevention. Available at: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/guidance-for-pollution-prevention-gpps-full-list/ Accessed on: 14 August 2023.

SEPA. (2022). The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) A Practical Guide, Version 9.1. Available at https://www.sepa.org.uk/regulations/water/ Accessed on: 14 August 2023.

The Highland Council (2012) Highland-wide Local Development Plan. Available at: https://www.highland.gov.uk/info/178/development_plans/199/highland-wide_local_development_plan Accessed on: 14 August 2023.

The Highland Council (2018) Caithness and Sutherland Local Development Plan Available at: https://www.highland.gov.uk/downloads/file/19712/casplan_adopted Accessed on: 14 August 2023.

UK Government (1990). Environmental Protection Act 1990. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents Accessed on: 14 August 2023.

UK Government (1994). The Conservation (Natural Habitats, & c.) Regulations (1994, as amended Scotland). Available at: https://www.legislation.gov.uk/uksi/1994/2716/contents/made Accessed on: 14 August 2023.

UK Government (1995). Environment Act 1995. Available at: https://www.legislation.gov.uk/ukpga/1995/25/contents Accessed on: 14 August 2023.