13. Geology, Hydrology, Hydrogeology and Peat

13.1 Introduction

13.1.1 This chapter of the EIAR details the findings of an assessment of the likely significant effects of the Proposed Development, as described in **Chapter 4: Project Description**, on geology, hydrology and hydrogeology and peat.

13.1.2 Consideration of potential effects is made in the context of the existing Development Site conditions (baseline), the construction phase, the operational phase (once the Proposed Development is complete), and the decommissioning of the Proposed Development.

13.1.3 The assessment sets out baseline information, discusses appropriate mitigation measures, and assesses the significance of residual and cumulative effects. Potential impacts on the geology, hydrology, hydrogeology and peat will predominantly be associated with the construction phase of the Proposed Development. The methodology and criteria used to undertake the assessment is also set out in this chapter, see Section 13.4.

13.1.4 This chapter should be read in conjunction with **Chapter 2: Approach to EIA**, **Chapter 4 Project Description**, **Chapter 8: Ecology** and **Volume 3: Appendices**.

13.1.5 This chapter is supported by the following figures:

- Figure 13.1: Bedrock Geology;
- Figure 13.2: Superficial Geology;
- Figure 13.3: National Soil Map of Scotland;
- Figure 13.4: Site Visit Features;
- Figure 13.5: Peat Probe Survey Results (All Phases);
- Figure 13.6: Peat Depth Interpolation;
- Figure 13.7: Hydrology;
- Figure 13.8: National Vegetation Classification (NVC) Habitat Map – Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE); and
- Figure 13.9: Flood Risk.

13.1.6 This chapter is supported by the following Appendices and associated figures:

- Appendix 13.1: Watercourse Crossing Strategy;
  - Figure 13.1.1: Watercourse Crossings
- Appendix 13.2: Peat Landslide Hazard and Risk Assessment (PLHRA);

  - Figure 13.2.1: Location Plan;
  - Figure 13.2.2: Site Plan;
  - Figure 13.2.3: Site Visit Features;
  - Figure 13.2.4: Topography;
  - Figure 13.2.5: Bedrock Geology;
  - Figure 13.2.6: Superficial Geology;
  - Figure 13.2.7: Peat Probe Locations and Depths;
  - Figure 13.2.8: Peta Depth Interpolation;
  - Figure 13.2.9: Peat Slide Assessed Hazard;
  - Figure 13.2.10: Access Track Groupings and Borrow Pits;
- Appendix 13.3: Carbon Balance Assessment;
- Appendix 13.4: Outline Peat Management Plan (oPMP);
  - Figure 13.4.1: Peat Excavation
- Appendix 13.5: GWDTE Assessment; and
  - Figure 13.5.1: NVC Habitat Map and Potential GWDTE
- Appendix 13.6: PWS Assessment.
  - Figure 13.6.1: Private Water Supplies

13.2 Legislation, Planning Policy, and Guidance

13.2.1 This section outlines the legislative framework, planning policies, and best-practice guidance relevant to the assessment of geology, hydrology, hydrogeology and peat, as well as the mitigation proposed to determine the residual effects. These requirements, together with professional judgement and previous experience, have informed the evaluation of receptor importance (Table 13.4), impact magnitude (Table 13.5), and overall significance of effects (Table 13.6).

Legislative Background

13.2.2 Protection of the water environment in Scotland is enforced by local authorities and the Scottish Environment Protection Agency (SEPA), much of which is derived from European Directives.

13.2.3 The European Union (EU) Water Framework Directive (WFD) was transposed into Scottish Law by the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act), which gave Scottish Ministers powers to introduce regulatory controls over activities in order to protect and improve Scotland's water environment.

13.2.4 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), more commonly known as the Controlled Activities or CAR, provide for the regulatory controls enabled by the WEWS Act. CAR serves to protect surface waters against the discharge of poisonous, noxious, or polluting substances. Under CAR it is an offence to make a discharge to any wetlands, surface water or groundwater without prior authorisation.

13.2.5 Key legislation relevant to this assessment is described in Table 13.1.

Table 13.1 Relevant Legislation

Legislation	Description
European Legislation	
Water Framework Directive (WFD) (2000/60/EC)	Provides a framework for protecting inland surface waters, transitional waters, coastal waters, and groundwater, with the overarching goal to achieve “good status” for all EU water bodies (European Commission, 2000).
Groundwater Daughter Directive (2006/118/EC)	A supplement to the WFD, which establishes specific measures in order to prevent and control groundwater pollution (European Commission, 2006).
Urban Wastewater Treatment Directive (UWWTD) (Directive (EU) 2024/3019)	Protects the environment from potentially adverse effects of urban and industrial wastewater discharges in the EU. An update of the 1991 directive, which includes tighter treatment standards for nitrogen, phosphorus, and micropollutants and holds certain industries accountable to contribute to the cost of advanced treatment processes (European Commission, 2024).
Scottish Legislation	
Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR)	Regulates activities that might affect Scotland’s water environment, including dischargers, abstractions, and engineering works. Provides licensing and requires adherence to requirements to protect water quality (Scottish Government, 2011).
The Water Environment (Miscellaneous) (Scotland) Regulations 2017	A technical set of amendments providing an update from previous water legislation to ensure consistency with the broader WFD approach (Scottish Government, 2017a).
Water Environment and Water Services (Scotland) Act 2003 (WEWS) Act 2003	Implements the WFD in Scotland, covering sustainable water use, pollution control, and the development of River Basin Management Plans (RBMP) led by SEPA (Scottish Government, 2003).
Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013	Outlines how environmental objectives are set for water bodies and how improvement measures are planned and implemented under the river basin management system (Scottish Government, 2013).
Flood Risk Management (Scotland) Act 2009	Provides a framework for managing flood risk in a coordinated, sustainable way. It requires public bodies to collaborate on flood planning and mitigation and to assess risk systematically (Scottish Government, 2009a).

Legislation	Description
Water Intended for Human Consumption (Private Water Supplies) (Scotland) Regulations 2017	Relevant to Private Water Supplies (PWS). Defines "wholesomeness" for drinking water from PWS and sets water quality standards that must be complied with through risk assessments and testing (Scottish Government, 2017b).
Environmental Liability (Scotland) Regulations 2009	Implements the EU Environmental Liability Directive including rules on preventing and resolving environmental damage, based on the "polluter pays" principle (Scottish Government, 2009b).
Pollution Prevention and Control (Scotland) Regulations 2012 (PPC)	Regulates emissions to air, water, and land from industrial activities. It implements a permitting system, providing an integrated approach to environmental protection (Scottish Government, 2012).
Climate Change (Scotland) Act 2009	Provides legally binding targets to reduce greenhouse gas emissions, including a net-zero goal by 2045 and introduces methods for climate change adaption and carbon budgeting (Scottish Government, 2009c).
Water Environment (Register of Protected Areas) (Scotland) Regulations 2004	Safeguards Scotland's water environment, which is important for wildlife conservation, human consumption, and economic activities.
Private Water Supplies (Scotland) Regulations 2006	The regulations apply to water supplies that are not provided by Scottish Water and are used for human consumption, including cooking, drinking, and washing.
Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013	Legislation that identifies and protects specific bodies of surface water and groundwater in Scotland used as sources for public drinking water supplies

Planning Policy Context

13.2.6 This assessment has been made with consideration of the polices and guidance set out in national, regional, and local policy. This section summarises the guidance and policies in relation to the geological, hydrological, and hydrogeological environment.

National Planning Framework 4 (2023)

13.2.7 National Planning Framework 4 (NPF4) sets out the Scottish Government's "spatial principles, regional priorities, national development and national planning policy". Policy 5 (Soils) and Policy 22 (Flood Risk and Water Management) of NPF4 are relevant to the Proposed Development and are summarised as follows.

13.2.8 Policy 5 of NPF4 states:

c) Development proposals on peatland, carbon rich soils and priority peatland habitat will only be supported for:

i) Essential infrastructure and there is a specific locational need and no other suitable site;

ii) The generation of energy from renewable sources that optimises the contribution of the area to greenhouse gas emissions reductions targets;

v) Restoration of peatland habitats.

d) Where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required to identify:

i) the baseline depth, habitat condition, quality and stability of carbon rich soils;

ii) the likely effect of the development on peatland, including on soil disturbance; and

iii) the likely net effect of the development on climate emissions and loss of carbon."

13.2.9 Policy 22 of NPF4 states:

a) Development proposals at risk of flooding or in a flood risk area will only be supported if they are for:

i. essential infrastructure where the location is required for operational reasons;

ii. water compatible uses;

iii. redevelopment of an existing building or site for an equal or less vulnerable use; or.

iv. redevelopment of previously used sites in built up areas where the LDP has identified a need to bring these into positive use and where proposals demonstrate that long term safety and resilience can be secured in accordance with relevant SEPA advice.

c) Development proposals will:

i. not increase the risk of surface water flooding to others, or itself be at risk.

ii. manage all rain and surface water through sustainable urban drainage systems (SUDS), which should form part of and integrate with proposed and existing bluegreen infrastructure. All proposals should presume no surface water connection to the combined sewer;

iii. seek to minimise the area of impermeable surface.

Highland-wide Local Development Plan (2012)

13.2.10 The Local Planning Authority (Highland Council (THC)) is currently in the process of preparing a new Highland Local Development Plan (HLDP). Until the adoption of the new HLDP, the existing Highland-wide Local Development Plan (HwLDP) adopted in 2012 and updated in 2016, remains the primary policy framework guiding development decisions.

13.2.11 Relevant existing local policies to the Proposed Development include:

- HwLDP Policy 28 – Sustainable Design

- HwLDP Policy 55 – Peat and Soils
- HwLDP Policy 63 – Water Environment
- HwLDP Policy 64 – Flood Risk
- HwLDP Policy 67 – Renewable Energy Developments

SEPA Environmental Policy

- Environmental Policy 19 – Groundwater protection policy for Scotland
- Environmental Policy 41 – Development at Risk of Flooding: Advice and Consultation
- Environmental Policy 61 – Control of priority and dangerous substances and specific pollutants in the water environment

Best Practice Guidance

13.2.12 In addition to specific legislative and planning requirements, a range of guidance documents have been published in order to provide information on legal responsibilities and good environmental practices. Specific documents are available for wind farm developments and developments on peatland, as well as general good construction practices.

13.2.13 Guidance documents relevant to the Proposed Development and the geological, hydrological and hydrogeological environment include, but are not limited to, those shown in Table 13.2.

Table 13.2 Best Practice Guidance

Guidance Documents
SEPA guidance:
SEPA, 2008. Engineering in the Water Environment Good Practice Guide – Bank Protection (SEPA, 2008); SEPA, 2010a. Engineering in the Water Environment Good Practice Guide - River Crossings (SEPA, 2010a); SEPA, 2010b. Engineering in the Water Environment Good Practice Guide – Sediment Management (SEPA, 2010b); SEPA, 2010c Regulatory Position Statement – Developments on Peat (SEPA, 2010c) SEPA, 2015. Position Statement 06 – Culverting of Watercourses (SEPA, 2015); SEPA, 2014. Land Use Planning System Guidance Note 4 – Planning Guidance on Onshore Windfarm Developments (SEPA, 2014); and SEPA, 2017. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (LUPS-GU 31) (SEPA, 2017).
Construction Industry Research and Information Association (CIRIA) guidance:
CIRIA, 2015. Environmental Good Practice on Site Guide (C741) (CIRIA, 2015); and CIRIA, 2001. Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (C532) (CIRIA, 2001)
The Scottish Government and Agency Guidance (SEPA, NatureScot etc.):

Guidance Documents

HHG001 - Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste, Scottish Renewables and SEPA, January 2012

HHG002 - Carbon calculator for wind farms on Scottish peatlands - factsheet, Scottish Government, 2018

HHG003 - Guidance Developments on Peatland - Site Surveys, SEPA, 2011

HHG007 - Scotland's peatland - definitions and information resources (SNH Commissioned Report No. 701), Bruneau PMC and Johnson SM, 2014

HHG011 - Calculating potential carbon losses & savings from wind farms on Scottish peatlands - technical guidance, Scot Govt, Technical Note V2.10.0

HHG012 - Peat Landslide Hazard & Risk Assessments - Best Practice Guide for Proposed Energy Generation Developments. 2nd Edition, Scot Govt, 2017

HHG013 - The Peatland Code, Version1.1, ICUN, March 2017

HHG014 - Scotland's Aquifers and Groundwater Bodies, British Geological Society, 2015

HHG015 – Assessing Impacts of Dev Proposals on Groundwater Abstractions & Groundwater Dependent Terrestrial Ecosystems, Guidance No. 31, SEPA, 2017

HHG016 - Baseline Groundwater Chemistry in Scotland's Aquifers, British Geological Society, 2017

HHG017 - Advising on carbon-rich soils deep peat and priority peatland habitat in development management, NatureScot, November 2023

HHG018 - Constructed tracks in the Scottish Uplands, SNH (NatureScot), 2015

HHG019 - Floating-Roads on Peat report, SNH (NatureScot) & Forestry Commission Scotland, 2010

HHG020 - Advising on peatland, carbon-rich soils, and priority peatland habitats in development management, NatureScot, November 2023

GPP documents (NetRegs, 2024):

GPP 1 (2020) – Understanding your environmental responsibilities – good environmental practices;

GPP 2 (2018) – Above ground oil storage tanks;

GPP 3 (2022) – Use and design of oil separators in surface water drainage systems;

GPP 4 (2017) – Treatment and disposal of wastewater where there is no connection to the public foul sewer;

GPP 5 (2018) – Works and maintenance in or near water;

GPP 8 (2017) – Safe storage and disposal of used oils;

GPP 13 (2017) – Vehicle washing and cleaning;

GPP 19 (2017) – Vehicles: Service and Repair;

GPP 20 (2018) – Dewatering underground ducts and chambers;

GPP 21 (2021) – Pollution incidence response planning;

GPP 22 (2018) – Dealing with spills;

GPP 26 (2019) – Safe storage – drums and intermediate bulk containers (February 2019); and

GPP 27 (2022) – Installation, decommissioning and removal of underground storage tanks.

Local Authority Guidance:

Highland Renewable Energy Strategy and Planning Guidelines (The Highland Council, 2016)

The Onshore Wind Energy Supplementary Guidance – provides replacement information for sections of the Highland Renewable Energy Strategy document

British Standards:

Guidance Documents

BSI, 2010. BS5930:1999+A2:2010 Code of practice for site investigations. (British Standards Institution, 2010)

BSI, 2017. BS 10175:2011 Investigation of potentially contaminated sites. Code of practice. (British Standards Institution, 2017)

Other Relevant Guidance:

Forestry Commission (2017). *Forestsand Water: UK Forestry Standard Guidelines* (Forestry Commission, 2017);

Scottish Government (2017). Peat Slide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017);

NatureScot & Forestry Commission Scotland (2010). *Floating Roads on Peat* (NatureScot and Forestry Commission Scotland, 2010);

Scottish Renewables, NatureScot, SEPA & Forestry Commission Scotland (2019). *Good Practice during Wind Farm Construction*) (Scottish Renewables et al., 2019);

NatureScot, SEPA, Scottish Government & The James Hutton Institute (2017). *Developments on Peatland: Peatland Surveys* (NatureScot et al., 2017)

Scottish Renewables & SEPA (2012). Developments on Peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste (Scottish Renewables et al., 2012);

Scottish Government (2015). *Online Planning Advice on Flood Risk* (Scottish Government, 2015).

Highland Renewable Energy Strategy and Planning Guidelines (2006) (The Highland Council, 2006)

13.3 Consultation

13.3.1 Table 13.3 summarises the consultation undertaken throughout the EIAR process, including scoping and further pre-application consultation which is relevant to geology and soils.

Table 13.3 Summary of Consultation Responses in Relation to Geology, Hydrology Hydrogeology and Peat

Consultee	Key Issue	Summary of Response and Action Taken
THC - Scoping		
	An estimate, by type and quantity, of expected residues and emissions (water, soil, pollution) resulting from the operation of the development.	The operational phase of a wind farm is characterised by very low levels of residues and emissions compared to construction, as such it is expected that there is little to no pollution impacts during operation. Nonetheless, this has been considered and assessed in Section 13.7.
	The estimated cumulative impact of the project with other consented or operational developments.	Cumulative impacts of the project with other consented or operational developments have been considered in Section 13.10.
	A full assessment of the impact of the development on peat, including peat probing for all areas where development is proposed. The point of infrastructure and areas of ground which would be subjected to micrositing limits must be probed.	Peat is assessed across this Chapter. Peat probing is covered in Section 13.6 and the results of all peat probing can be seen in Figure 13.5 and Figure 13.6. An oPMP has been undertaken and can be viewed in **Appendix 13.4**.
	Carbon balance calculations should be undertaken with a summary of the results provided focussing on the carbon payback period for the wind farm.	A carbon balance has been undertaken and can be viewed in **Appendix 13.3**.
	Fully describe the likely significant effects of the development on the local geology including borrow pits, earthworks, site restoration and the soil generally, including direct and indirect effects.	This EIAR has assessed effects on geology, soils and peat. A Preliminary PLHRA (**Appendix 13.2)** and an oPMP (**Appendix 13.4**) have been prepared to guide peat stability and management.
	Address the nature of the hydrology and hydrogeology of the site and assess the potential impacts on water courses (including lochs & groundwater), water supplies including private supplies, water quality and on aquatic flora and fauna.	Hydrology and hydrogeology have been assessed through baseline surveys and a Watercourse Crossing Strategy (**Appendix 13.1**), a GWDTE Assessment (**Appendix 13.5**) and a PWS Assessment (**Appendix 13.6**) have all been

Consultee	Key Issue	Summary of Response and Action Taken
	Measures to prevent erosion, sedimentation or discolouration will be required, along with monitoring proposals and contingency plans. Assessments will need to recognise periods of high rainfall which will impact on any calculations of run-off, high flow in watercourses and hydrogeological matters. Carry out an investigation to identify any PWS, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption. THC has some information on known supplies but it is not definitive. An on-site survey will be required.	prepared to support this assessment. Pollution prevention, erosion control, and contingency measures are embedded in the oCEMP (**Appendix 4.2**) with monitoring proposals included.
	Strongly advised to contact SEPA to identify if a CAR license is necessary and the extent of the information required by SEPA to assess any license application.	SEPA have been contacted regarding existing CAR licenses for water crossings associated with the Development Site.
	Noted that SEPA has a general presumption against modification, diversion or culverting of watercourses. EIAR to identify all water crossings and produce a systematic table of watercourse crossings and channelising. Table to be accompanied by photographs and dimensions of all watercourse affected.	A watercourse crossing strategy has been produced and can be seen in **Appendix 13.1**.
	Information on abstractions of water supplies for concrete works or other operations should be identified. The EIAR 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	An oCEMP has been produced, which can be seen in **Appendix 4.2** and covers the topic. The final CEMP will be adopted by the contractor and adhere to all measures stated.

Consultee	Key Issue	Summary of Response and Action Taken
	details of abstraction need to be provided.	
	A minimum of a 50m buffer of all watercourses / bodies and turbines / cranes hard-standings, which should be shown on a suitably scaled drawing; All tracks should be kept a minimum 10m away from any waterbody except water crossings;	The design of the wind farm has considered SEPA's 10 m and 50 m watercourse buffers i.e. this is embedded into the design.
	Access tracks not acting as preferential pathways for runoff and efforts being made to retain existing natural drainage wherever possible. Natural flood management techniques should be applied to reduce the rate of runoff where possible; use of SuDS to achieve pre-development runoff rates and to minimise erosion on existing watercourses;	An oCEMP (**Appendix 4.2**) has been produced as part of this EIAR. Prior to construction, the oCEMP will be finalised by the Contractor. Access tracks across the Proposed Development have been designed considering runoff, as such this is embedded into the design. Suitable drainage solutions will be confirmed at detailed design stage.
	Water crossings in the form of culverts or bridges, or upgrades to existing crossings must be designed to accommodate to 1 in 200 year flood event, plus climate change;	A watercourse crossing strategy has been produced and can be seen in **Appendix 13.1**. New watercourse crossings will be in the form of bottomless culverts or clear span bridges and will be designed to accommodate 1 in 200 year flood events, plus climate change. Where existing crossings are upgraded, they will be designed to the same requirements.
	Land rising within any floodplain to be avoided; if ultimately required, compensatory storage must be provided;	Floodplains have been avoided through the design and included as embedded mitigation for the Proposed Development
	The EIAR should be informed by the Council's Flood Risk and Drainage Impact Assessment Supplementary Guidance.	The Proposed Development adheres to THC's HwLDP Policy 64 Flood Risk.

Consultee	Key Issue	Summary of Response and Action Taken
SEPA - Scoping	Require comprehensive Peat Management Plan setting out the avoidance of better quality peatland.	An oPMP has been produced and can be seen in **Appendix 13.4**. The design of the wind farm aims to avoid deeper pockets of peatland and quality peatlands and is embedded into the design.
	Confirm any impacts on PWS.	A PWS assessment has been produced and can be seen in **Appendix 13.6**.
	No detailed information of flood risk required unless land raising associated with the Black Water crossing is proposed.	No land raising associated with the Black Water proposed.
SEPA – Peat Probing Phase II Survey	Content with the proposal to probe shallower track areas at a lower frequency than deeper areas and for; platform-type infrastructure to be surveyed on at least a 25 x 25m basis. In areas of deeper peat or transmission areas, take a dynamic approach to probing, including some surrounding probes to ensure that the 'net' of probing information collected can inform final layout. Additional probing may be required.	The Phase II Peat Probing plan was amended following consultation with SEPA and a dynamic approach was taken, as set out in Paragraph 13.3.31 – 13.3.32. Additional peat probing undertaken following completion of Phase II to inform the final layout.
NatureScot - Scoping	Ceislein Wind Farm should be included in cumulative assessment.	Cumulative effects with Ceislein Wind Farm included in Section 13.10.
	Outline Peat Management Plan should be prepared to inform peat assessment and mitigation.	An oPMP has been produced and can be seen in **Appendix 13.4**.
	Assessment of decommissioning impacts should be carried out.	Decommissioning impacts on Geology, Hydrology and Hydrogeology have been highlighted in Sections 13.7 – 13.11.
NatureScot – Gate Check 1 Response	EIAR to demonstrate how impacts to the hydrological connectivity with the Cromarty Firth and Dornoch Firth would be avoided (including protected areas – Dornoch Firth and	Table 13.9 details the mitigation measures taken to avoid contamination of the watercourses during the construction and operational stages.

Consultee	Key Issue	Summary of Response and Action Taken
	Morrich More SAC, Dornoch Firth and Loch Fleet SPA and Cromarty Firth SPA).	
	Demonstrate how the Battery Energy Storage System (BESS) unit would comply with the National Fire Chiefs Council (NFCC) guidance, as it would be sited within the River Alness catchment, leading to the Cromarty Firth. Include details of measures to ensure any contaminated firewater is contained within the Development Site or otherwise prevented from reaching the protected area.	The BESS units will be fitted with an automated fire suppression system, which comprises a non-water based suppression system as the preferential method for managing thermal runaway. This system will eliminate the need for storage of water on Site for firefighting activities and the potential of contaminated fire suppressant water entering the drainage network and local water environment. This has been assessed in Sections 13.5 – 13.7.
Gate Check 2 Meeting	The Scottish Government Windfarm Carbon Assessment Tool is "currently not in use". Offline Version 2.14.1 provided by ECU.	The Carbon Assessment (**Appendix 13.3**) has been produced using offline version 2.14.1 of the Scottish Government Windfarm Carbon Assessment Tool.

13.4 Approach and Methodology

Study Area

13.4.1 The study area is inclusive of the entire Development Site boundary and extends up to 1 km buffer from it for any effects on the geology, hydrology, and hydrogeology.

13.4.2 As set out in **Chapter 4**, the Development Site includes three main areas: the land within which the turbines will be sited, referred to as the Main Development Area (MDA); areas of land without infrastructure; and the Existing Forestry Access Track area (within which some development is also required).

13.4.3 An assessment of the likely potential geological, hydrological, and hydrogeological impacts is considered necessary due to the presence of peat and watercourses across the MDA and Existing Forestry Access Track area. The areas of land without infrastructure are scoped out of this assessment, unless otherwise stated.

13.4.4 The assessment has been undertaken based on consultation set out in Table 13.3, the collection and interpretation of a wide range of data and published material including publicly available information as well as field surveys, as discussed across this document.

13.4.5 The general approach to the assessment of effects within an EIAR is established in **Chapter 2**, including detail on the specific assessment structure, which has been applied to the geology, hydrology, hydrogeology and peat assessment reported within this chapter.

Methodology

13.4.6 A qualitative assessment has been undertaken to determine the baseline conditions using a combination of legislative standards and other statutory policy and guidance, a desk-based review, site surveys and professional judgement. The assessment involved:

- Analysis of current policy and guidance in relation to wind energy and the likely effects of the Proposed Development on the geological, hydrological, and hydrogeological environment;
- Desk study based on available information;
- Scoping study to establish the existing baseline geological, hydrological, and hydrogeological conditions at the Development Site;
- Two phases of peat probing, cumulating in four site visits, to assess the depth of peat across the Development Site, allowing the preliminary assessment of peat landslide risk, and informing the infrastructure layout design of the Proposed Development; and
- Identification of the potential impacts of the Proposed Development on the geological, hydrological, and hydrogeological environment and evaluation of the significance of effects.

13.4.7 The desk-based research undertaken as part of the EIAR included a review of data from the following sources:

- Centre for Ecology and Hydrology (CEH), National River Flow Archive (NRFA) for flows and rainfall;
- SEPA for RBMP, groundwater classification, groundwater vulnerability, water quality and hydrogeology;
- British Geological Survey (BGS) for geology and hydrogeology;
- Scotland's Soils for soil coverage;
- Aerial photography; and
- Ordnance Survey maps and Digital Terrain Model (DTM) for topography.

Summary of Surveys

13.4.8 The following surveys were undertaken at the Development Site to inform this EIAR:

- Phase I peat probing was conducted in August 2024;
- Phase II peat probing was conducted February 2025;
- Phase II – Additional Peat Probing I was conducted in April 2025;
- Phase II – Additional Peat Probing II was conducted in July 2025; and
- A site walkover was conducted simultaneously to the peat probing surveys in February and April 2025.

13.4.9 Data obtained from the peat depth surveys and site walkover were used across this assessment, notably to plot the presence and distribution of peat across the Development Site, which has informed the PLHRA, Carbon Balance and the oPMP in **Appendix 13.2**, **Appendix 13.3** and **Appendix 13.4** respectively. Details of the peat depth surveys are set out further in Paragraphs 13.5.15 – 13.5.26.

Assumptions, Criteria and Limitations

13.4.10 The overall significance of potential effects with respect to the geology, hydrology and hydrogeology of the Development Site has been defined by combining the sensitivity and magnitude criteria defined in Table 13.4 and Table 13.5 respectively. The sensitivity and magnitude of the potential effect has been combined to produce significance scores for the potential effects at different levels ranging from Major to Negligible, as shown in Table 13.6.

Sensitivity

13.4.11 The sensitivity / importance of different individual effects on the receiving environment has been defined in Table 13.4.

Table 13.4 Importance of Receptors

Receptor Sensitivity	Capacity	Receptor	Description
Very high	The receptor has little or no capacity to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.	Geology / Soils	• The area occupied by the development is protected by International or EU legislation (World Heritage Sites, Geopark, Site of Special Scientific Interest (SSSI) etc.).
		Hydrology / Hydrogeology	• Watercourse having a WFD classification as shown in a RBMP and Q95 ≥ 1.0 metres cubed per second (m^3/s) • Feature of international importance, for example a Special Area of Conservation (SAC).

Receptor Sensitivity	Capacity	Receptor	Description
			• Alternatively, groundwater is critical to designated sites of nature conservation. • Water abstraction: >1000 m^3/day. • Receptors to flood risk: essential infrastructure or highly vulnerable development.
High	The receptor has low capacity to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.	Geology / Soils	• Feature of national importance, for example a Site of Special Scientific Interest (SSSI). • Peat ≥2m depth.
		Hydrology / Hydrogeology	• Watercourse having a WFD classification as shown in a RBMP, and Q95 < 1.0 m^3/s; • Sensitive habitats of national importance. • Groundwater is a locally valuable resource because of its moderate quality and/or yield or is known to be locally exploited for water supply. • GWDTE with high dependency on groundwater. • Water abstraction: 1000 - 500 m^3/day. Receptors to flood risk: more vulnerable development.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.	Geology / Soils	• Site of local geological importance (Local Geological Site – previously Regionally Important Geological Site). • Peat ≥ 1m depth and < 2m depth.
		Hydrology / Hydrogeology	• Watercourse detailed in the Digital River Network but not having a WFD classification as shown in a RBMP • Groundwater of limited value because its quality does not allow potable or other quality sensitive uses. • Exploitation of local groundwater is not extensive and/or local areas of nature conservation known to be

Receptor Sensitivity	Capacity	Receptor	Description
			sensitive to groundwater impacts. • Sensitive habitats of regional importance. • GWDTEs with moderate dependency on groundwater. • Water abstraction: 50 - 499 m^3/day. • Receptors to flood risk: less vulnerable development.
Low	The receptor is tolerant of change without detriment to its present character, is low environmental value, or of local importance.	Geology / Soils	• Sites with local geology / soils interest.
		Hydrology / Hydrogeology	• Surface water sewer, agricultural drainage ditch; non-aquifer. • Unproductive Strata - rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. • Changes to groundwater not expected to impact on local ecology. • Limited economic or social uses. • GWDTE with minimal dependency on groundwater i.e. fed by rain and natural surface drainage. • Water abstraction: <50 m^3/day. • Receptors to flood risk water compatible development.

*Note: Q95 is the flow equalled or exceeded 95% of the time.

Magnitude

13.4.12 The magnitude of impact considers the scale of the predicted change with respect to baseline conditions and considers both duration of an effect, namely temporary or permanent, and whether the effect is direct or indirect. The magnitude of an impact is independent of the sensitivity / importance of a receptor. Definitions are described in Table 13.5.

Table 13.5 Magnitude of Impact

Magnitude	Geology	Hydrology	Hydrogeology
High	Permanent or large-scale loss of important geological features. Major alteration of soil structure or stability affecting landform integrity.	Major change to natural drainage patterns or catchment hydrology. Significant alteration to flow regime of watercourses. High risk of flooding or severe erosion. Long-term deterioration in water quality.	Major reduction in aquifer recharge or storage. Long-term significant changes to groundwater levels affecting water supply or dependent habitats. Contamination of aquifer with non-reversible effects.
Medium	Partial loss or alteration of regionally important geological features. Moderate disturbance of peat or superficial deposits.	Moderate changes to drainage patterns. Short to medium-term alteration of water quality within compliance limits. Moderate increase in flood risk or sediment load.	Moderate changes in groundwater levels or flow paths with potential for partial recovery. Limited but measurable deterioration in groundwater quality.
Low	Minor disturbance to local geological features of low sensitivity. Small-scale disturbance to peat or superficial deposits.	Small, temporary changes to surface water quality or flow, with no breach of regulatory standards; minor, short-term increases in sedimentation.	Small, temporary changes in groundwater levels or quality with rapid natural recovery.
Negligible	No measurable change to geological features, soils or peatlands.	No measurable change in watercourse flow, quality, or hydrological regime.	No measurable change to groundwater flow, levels, or quality.
Positive	Enhancement of geological feature such as peatland restoration.	Improvement in hydrological regime or water quality	Improved groundwater recharge or quality through mitigation or restoration works.

Significance of Effect

13.4.13 The significance of the effect is determined using the matrix presented in Table **13.6**. The significance of a given effect is based on a combination of the sensitivity / importance of the receptor and the magnitude of a given potential impact. These can be adverse or beneficial and their significance Major, Moderate, Minor or Negligible.

13.4.14 When professional judgement is considered, some receptors may experience a significance of effect that is different to that arising from the matrix in Table 13.6. In these instances, an explanation will be provided in the impact section.

Table 13.6 Significance of Effects

Magnitude	Sensitivity			
	Very High	High	Medium	Low
High	Major	Major	Moderate	Moderate
Medium	Major	Moderate	Moderate	Minor
Low	Moderate	Moderate	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible

Note: Grey shaded boxes indicate a significant effect in terms of EIA

13.5 Baseline Conditions

Topography

13.5.1 The MDA is located in undulating terrain, ranging from approximately 340 m Above Ordnance Datum (AOD) to 666 m AOD at Creachan an Fhiodha in the south eastern portion of the MDA.

13.5.2 The MDA is characterised by a ridgeline of five main summits, from the southeast to the northwest of the MDA. These are Bad a' Bhàhaich (517 m AOD), Carn Cas nan Gabhar (605 m AOD), Clah nam Ban (552 m AOD), Creachan an Fhiodha (666 m AOD) and Carn an Lochan (646 m AOD). The summits follow the western extent of the MDA with Carn an Lochan located to the northwestern extent of the MDA.

13.5.3 From Carn an Lochan, the topography slopes down towards Allt Lochan a' Chairn (a tributary of Abhainn Glac an t-Seilich) which has a high point of 409 m AOD in the north corner of the MDA.

13.5.4 The area where the MDA and the Existing Forestry Access Track meet has been recently felled and is earmarked for peatland restoration by Forestry and Land Scotland (FLS).

13.5.5 The Existing Forestry Access Track starts at Inchlumpie Wood off the B9176 and terminates adjacent to Abhainn Glac an t-Seillich near the MDA. The existing track is approximately 11.7 km in length and has elevations ranging from 150 m AOD to 400 m AOD

Geology and Soils

Bedrock Geology

13.5.6 A review of the BGS online GeoIndex Onshore viewer (BGS, 2024) indicates that the majority of the MDA lies within an area of bedrock dominated by igneous and metamorphic rock. The MDA is largely underlain by the Carn Chuinneag and Inchbae Augen Gneiss formation with areas of Diebidale Pelite Formation and Crom Psammite Formation.

13.5.7 The Existing Forestry Access Track is dominated by igneous and metamorphic rock, with some presence of sandstone and argillaceous rock. The track is largely underlain by the Crom

Psammite Formation, with areas of the Ben Wyvis Pelite Formation, Tarvie Psammite Formation and Braemore Mudstone Formation.

13.5.8 Figure 13.1 shows the recorded location of these rock formations in relation to the MDA and Existing Forestry Access Track.

Superficial Deposits

13.5.9 A review of the BGS online GeoIndex Onshore viewer (BGS, 2024) indicates that the majority of the MDA is overlain with peat, with isolated areas where it is assumed that rock is at surface level.

13.5.10 The Existing Forestry Access Track is largely overlain with glacial till, with areas of peat identified to the south of the existing track, within the commercial forestry.

13.5.11 An additional review of the National Soil Map of Scotland (Scotland's Environment, 2024) is consistent with the BGS findings, indicating that peaty gleys with dystrophic blanket peat characteristic is present across both the MDA and Existing Forestry Access Track.

13.5.12 The Carbon and Peatland 2016 map shows that the peat across the MDA is largely classified as Class 1 peatland, which is described as *Areas of peat soil and peatland habitats*. Areas of Class 5 peatlands are also present, which is described as *Area of peat soil but not peatland habitat recorded.*

13.5.13 The extent and location of these superficial deposits across the Development Site can be seen in Figure 13.2 and Figure 13.3.

Additional Geological Information

13.5.14 A review of the BGS online GeoIndex Onshore (BGS, 2024) shows no recorded borehole data or faults within the Development Site. However, there is a fault at Rockhead that runs west to east within 1 km of the south side of the MDA, as shown on Figure 13.1.

Peat Probing

13.5.15 Peat was identified across the Development Site and as part of the requirements set out in NPF4, peat depth surveys were undertaken across the Development Site, mainly within the MDA and along the Existing Forestry Access Track, over four separate days. Details of the peat probing surveys and area targeted are as follows.

Phase I – August 2024

13.5.16 The Phase I peat depth survey was undertaken in August 2024 with the majority of probes taken within the MDA. The scope of the Phase I survey was as follows:

- 100m x 100m grid

13.5.17 1,015 No. peat probes were taken during the Phase I survey, with a depth range of 0 – 3.6 m recorded.

Phase II – February 2025

13.5.18 The Phase II survey was undertaken along the Existing Forestry Access Track and the crane pad and laydown areas within the MDA in February 2025. The scope of the Phase II survey was as follows:

- Existing Forestry Access Track: Probes at 50 m intervals at 10 m perpendicular offset from the track centreline
- Crane pad and laydown areas: 7 x 12 grid of points at 20 m spacing for areas of peat >1 m
- Crane pad and laydown areas: 5 x 10 grid of points at 25 m spacing for areas of peat <1 m

13.5.19 2,104 No. peat probes were taken during the Phase II survey, with a depth range of 0 – 3.7 m recorded.

Phase II – Additional Peat Probing I - April 2025

13.5.20 The Phase II – Additional Peat Probing I was undertaken in April 2025 following consultation with SEPA to inform the layout of the Proposed Development. Details of the consultation is set out in Table 13.3.

13.5.21 During the consultation with SEPA, it was agreed that no further peat probing was required in areas of peat with recorded depth < 1.0m or outside of the proposed 100m micrositing boundary for infrastructure. As such, the scope of the additional peat probing was agreed as follows:

- MDA Access Tracks (peat > 1.0m): 50 m centres and at 10 m offsets from the track centreline
- Large Hardstands and Borrow Pits: 50 m x 50 m grid
- New Turbine Locations: 1 No. probe at the centre with 100 m offsets N, S, E and W
- Turbine Hardstands: 1 No. probe at the centre and edges

13.5.22 488 No. peat probes were taken during the Phase II survey, with a depth range of 0 – 2.5 m recorded.

Phase II – Additional Peat Probing II – July 2025

13.5.23 The Phase II – Additional Peat Probing II was undertaken in July 2025 along the Existing Forestry Access Track and infrastructure within the MDA. The additional probing was focused on the borrow pit locations, met mast location and MDA Access Track. The scope of the survey was as follows:

- Met Mast: 25 m grid
- 2 No. Borrow Pit: 25 m grid

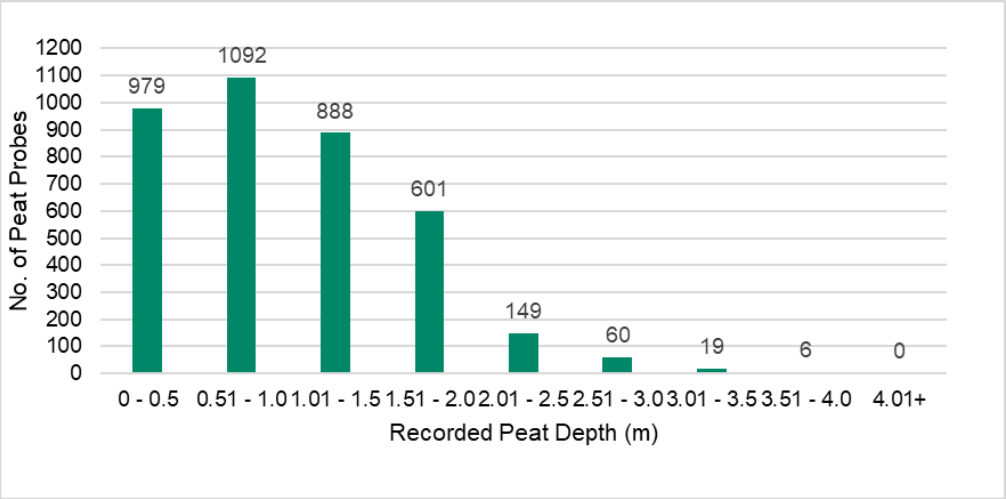
- Borrow Pit Existing Access: 100 m intervals at 10 m perpendicular offsets from the track centreline
- MDA Access Tracks: 50 m centres and 10 m offsets from the track centreline

13.5.24 187 No. peat probes were taken during the Phase II survey, with a depth range of 0 – 2.9 m recorded.

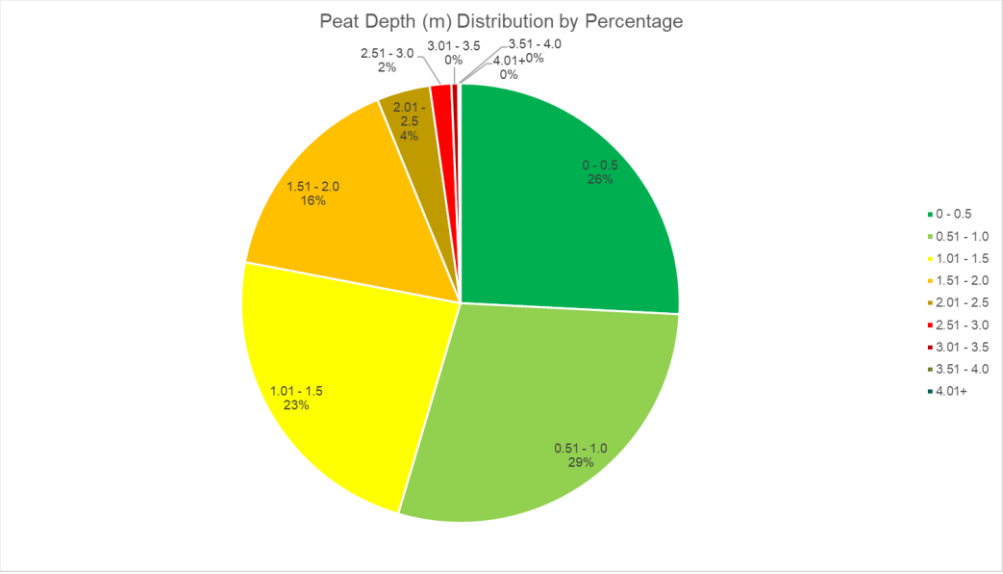
Peat Probing Summary

13.5.25 In total, 3,794 peat probes were undertaken across the four peat probing surveys. A summary of the peat depths recorded is shown in Insert 1 and Insert 2.

Insert 1. Peat Depth Distribution



Insert 2. Peat Depth (m) Distribution by Percentage



13.5.26 The majority of the probes taken recorded peat depth < 1.0 m – 2,071 No. (55%). The remainder of the probes largely recorded a depth between 1 m and 2 m – 1,489 No. (39%), with only 234 No. (6%) with depth > 2.0 m. The deeper peat (> 2 m) is present in localised pockets within the MDA. The full results of the peat probing surveys can be seen in Figure 13.5 and Figure 13.6.

Walkover Survey / Watercourse Crossing Assessment

13.5.27 Site walkovers were included as part of the peat probing surveys undertaken in February and April 2025. The purpose of the site walkovers was to inform the EIAR, and qualify assumptions made during the desk-based assessments.

13.5.28 Additionally, the site walkovers were used to inform **Appendix 13.1**, whereby photographs, measurements and observations were recorded at each proposed watercourse crossing.

13.5.29 The findings of this are shown in Figure 13.4 and summarised below:

- The ground comprises very wet and boggy areas within the MDA, specifically to the south of and north of the MDA;
- Presence of felled woodland between the end of the Existing Forestry Access Track and the MDA;
- Presence of eroded and rutted peatlands along the southern boundary of the MDA, which was drained at the time of survey;
- Along the Existing Forestry Access Track there was evidence of a large borrow pit (proposed Borrow Pit 2) previously used by FLS. The borrow pit was not active at the time of survey; and
- Areas where the ground comprises of firmer soil conditions and rock at surface level.

Mining

13.5.30 No mining features were identified within the Development Site during the review of both BGS data (BGS, 2024) and Mining Remediation Authority Map Viewer (Coal Authority, 2024).

13.5.31 The Mining Remediation Authority interactive map viewer (Coal Authority, 2024) indicates that the Development Site is not located in a “Development High Risk Area”. Furthermore, no mine entries are recorded underlying or in close vicinity to the Proposed Development and the rock type underlying is not recorded to be coal bearing.

Hydrogeology

13.5.32 A review of the hydrogeology 1:625,000 scale map on BGS online GeoIndex Onshore viewer (BGS, 2024) identified the Development Site to be underlain by four different types of Neoproterozoic rock groups / intrusions. These are all characterised as aquifers with low productivity. A low productivity aquifer is expected to have “small amounts of groundwater in near surface weathered zone and secondary fractures.” The northern section of the Development Site sits across an unnamed igneous intrusion and the morar group. The southern section of the Development Site and the access tracks is situated on the Glenfinnan group and Loch Eil group.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

13.5.33 A National Vegetation Classification (NVC) Survey reported in **Chapter 8** identifies areas, which are classified as potentially groundwater dependent, following SEPA guidance for assessing the impacts of developments on GWDTEs (SEPA, 2024).

13.5.34 Four NVC communities were identified as potentially dependent on groundwater within the MDA, these include: Acid Neutral Flush, Wet Dwarf Shrub Heath, Blanket Bog and Wet Modified Bog. Following hydrogeological conceptualisation, the GWDTE Assessment concluded there is one habitat which is potentially a GWDTE (Acid Neutral Flush), please refer to **Appendix 13.5**. Ten localised areas of Acid Neutral Flush habitats were identified within 250m of the proposed infrastructure.

Groundwater Vulnerability

13.5.35 As mentioned in Paragraph 13.5.32, the Development Site is identified to be situated across four different Neoproterozoic rock groups / intrusions, all of which are classed as low productivity aquifers. A low productivity aquifer provides the greatest protection to groundwater from pollution, typically due to the low-leaching soils and / or overlying layers of low-permeability superficial deposits (BGS, 2024).

13.5.36 A review of the groundwater classification layer of the online Scotland's environment map (Scottish Government, 2025) indicates the Development Site lies within the Northern Highlands waterbody with an overall classification of good.

13.5.37 The BGS Groundwater Vulnerability (Scotland) dataset Version 2 (BGS, 2015) indicates the Development Site generally lies within a vulnerability class of 4, defined as 'vulnerable to those pollutants not readily absorbed or transformed' and due to the presence of rock at or near to ground surface within the Proposed Development, vulnerability class 5 – 'vulnerable to most pollutants with rapid impact in many scenarios'.

Surface Hydrology

13.5.38 The hydrology of the Development Site is illustrated in Figure 13.7.

13.5.39 The Development Site drains into two catchment areas, the north lies within the Sgodachail catchment that drains to the River Carron (RiverLevels.uk, no date), and the south falls within the Alness catchment that drains to the Averon River (RiverLevels.uk, no date).

13.5.40 A review of the NRFA Gauging Stations on these catchments have both recorded data since 1973 and show peaks in river flow between January and March, and troughs in the summer months between June and August.

13.5.41 The south of the Development Site predominantly drains into the Abhainn Glac an t-Seilich, which feeds into the River Averon via the Black Water. In the southwest of the Development Site there is an additional tributary which flows into the River Averon via the Abhainn na Glasa (Microsoft Bing Maps, 2025).

13.5.42 The northern end of the Development Site drains into Salachie Burn through two bodies of water, Loch Chuinneag located within the Development Site (NH 49442 84769) and Lochan a'Chairn, approximately 0.5 km east of the Development Site. The Salachie Burn is a tributary of the River Carron (Microsoft Bing Maps, 2025).

Rainfall

13.5.43 A review of the NRFA (UK Centre for Ecology & Hydrology, 2024) shows the Alness catchment had an average rainfall of 1,500 mm between 1991 – 2020, and the Sgodachail catchment area had an average rainfall of 1,832 mm for the same period.

13.5.44 A further review of the NRFA rainfall data across the Development Site, sees the area to the southeast averaging rainfall between 1200 mm to 1400 mm increasing to 1600 mm to 2000 mm towards the northwest edge of the Development Area, with the bulk of the Development Area falling within the 1400 mm to 1600 mm of rainfall between 1991 and 2020.

Water Quality

13.5.45 SEPA's current Water Classification Hub data and classifications for the catchments and water bodies associated with the Development Site are detailed in Table 13.7. All identified water bodies have an overall status of "Good."

Table 13.7 SEPA Water Classification Hub Data

Water Body	Overall	Water Quality	Water Flows and level	Physical Condition	Access for Fish Migration	Freedom From Invasive Species
Black Water	Good	Good	High	Good	High	High
Salachie Burn	Good	Good	High	High	High	High
Northern Highlands (Groundwater)	Good	Good	Good	N/A	N/A	N/A

Controlled Activities Regulation (CAR) Licence

13.5.46 There is one CAR Registration within the Development Site, which is held by Forestry and Land Scotland (FLS) and granted in November 2016 for a bridging culvert.

13.5.47 Any upgrade works to existing culverts will be undertaken in line with General Binding Rules (GBR) set out in the CAR Regulations. As such, it is not expected that the existing CAR licenses held by FLS will be altered and this has therefore not been assessed further.

13.5.48 **Appendix 13.1** covers existing CAR licences for watercourse crossings within the Development Site and identifies the future steps required for detailed design.

Flooding

13.5.49 A review of SEPA Flood Maps (SEPA, 2024) shows the Development Site is subject to river and surface water flooding, due to the presence of watercourse across the Development Site, as illustrated in Figure 13.9. There is a noted “high likelihood” of “river flooding” as follows:

- Abhainn Glac an t-Seilich: Within the northeastern extent of the MDA Boundary, and adjacent to the Existing Forestry Access Track Boundary. The northeastern most corner of proposed BP02 is 36m from the high-likelihood flooding, with the remainder of BP02 located > 50m away;
- Allt Loch Bad a’ Bhàthaich: Crosses the Existing Forestry Access Track near Loch Bad a’ Bhàthaich;
- Black Water: North and adjacent to the Existing Forestry Access Track Boundary. The Black Water crosses the Existing Forestry Access Track near Inchlumpie, where it meets the River Averon; and
- River Averon: South of the Existing Forestry Access Track Boundary. Enters the boundary and meets the Black Water near Inchlumpie.

13.5.50 There is also a “high likelihood” of “surface water and small watercourses flooding” across the MDA.

13.5.51 However, the flood risk appears to be localised to the rivers noted in Paragraph 13.5.49 and the watercourses on the MDA.

13.5.52 The SEPA Flood Maps do not indicate any changes to the baseline flood risk in the future.

Private Water Supplies

13.5.53 Under The Private Water Supplies (Scotland) Regulations (2006), councils have a duty to hold data on PWS in their area and monitor the quality of the supplies. SEPA Land Use Planning System Guidance Note 31 (SEPA, 2014) suggests buffer zones for groundwater abstractions. A total of 29 PWS have been identified within 5 km of the Development Site from THC, Spatial Hub Scotland, and questionnaire responses, as follows:

- THC / Spatial Hub Scotland identified a total of 23 PWS located within 5 km of the Development Site; and
- Questionnaires were sent out to 219 properties located within 5 km of the Development Site on 13 Nov. 2025. Of the 219 questionnaires sent, six responses were received, resulting in identification of a further six PWS.

13.5.54 All PWS within 250 m of the Proposed Development and within 100 m of the access tracks have been screened into the assessment.

13.5.55 The PWS Assessment is detailed in **Appendix 13.6**, where Table 13.6.3 summaries the PWS recorded within 5 km of the Development Site from all three data sources. The locations of the PWS are shown in Figure 13.6.1 **(Appendix 13.6)**.

Designated Sites

13.5.56 The south of the Development Site (along the Existing Forestry Access Track) is identified as a Drinking Water Protected Area (Surface Water) by SEPA (Scottish Government, 2024).

13.5.57 No other designated sites are located within the Development Site. Designated sites that are adjacent to the Proposed Development are listed in **Chapter 4**.

13.5.58 Although these designated sites lie beyond the defined study area, the River Alness is hydrologically connected to the Cromarty Firth Special Protection Area (SPA) and the River Carron is hydrologically connected to the Dornoch Firth and Loch Fleet SPA and Dornoch Firth and Morrich More SAC. Consequently, the Proposed Development lies within the wider hydrological network that influences these protected areas.

Quarrying

13.5.59 A review of the BGS online GeoIndex Onshore viewer (BGS, 2024) did not identify any active quarries located within the Development Site.

13.5.60 However, the dataset showed the presence of a number of disused quarries in the local area, including the Rulevard Quarry, Coir' an Locha Quarry and Inchlumpie Wood Pit. In addition to the information provided by the BGS Onshore Viewer, a large quarry (proposed Borrow Pit (BP) 01) has been identified along the Existing Forestry Road at Cnoc an Ruigh'-Choinnich along with small borrow pits previously operated by FLS.

Landslide

Historical Landslide

13.5.61 A review of the BGS online GeoIndex Onshore viewer (BGS, 2024) and historical maps has not identified any historical landslides within the Development Site.

13.5.62 Due to the presence of peat and steep slopes across the Development Site, a preliminary PLHRA has been drafted (**Appendix 13.2**) and is considered further below, The preliminary PLHRA considers multiple baseline conditions which may influence / indicate the risk of a peat slide occurring either naturally or as a consequence of construction works being undertaken.

Potentially Sensitive Receptors

13.5.63 The importance of potential receptors is based on the definitions provided in Table 13.4. Important or sensitive receptors that may be directly or indirectly affected by the Proposed Development and the value of each receptor are summarised in Table 13.8.

Table 13.8 Potentially Sensitive Receptors

Receptor	Distance from Site	Value	Reason for Sensitivity
Geology and Soils			
Peat	On Development Site	High	Peat depth ≥ 2.0 m across the Development Site. High sensitivity per criteria for peat ≥ 2.0 m (national importance, low capacity to absorb change).
Hydrology			
PWS ID: HLD/33827 PWS Inchlumpie Wood Segama House, Strathrusdale, Alness, IV17 0YQ	17 m NE of the Existing Forestry Access Track	Medium	Domestic private water supply; water abstraction estimated between 50 – 499 m³/day. Locally exploited groundwater resource of limited value.
PWS ID: HLD/30560 PWS Lower Inchlumpie, Strathrusdale, Alness, IV17 0YQ	70 m S of the Existing Forestry Access Track	Medium	Domestic private water supply; water abstraction estimated between 50 – 499 m³/day. Locally exploited groundwater resource of limited value.
Black Water	On Development Site	High	Watercourse with WFD classification and “Good” status; Q95 likely < 1.0 m³/s (regional/national importance).
Salachie Burn	On Development Site	Medium	Smaller watercourse, likely no WFD classification; appears in Digital River Network; regional importance.
Cromarty Firth SPA	7.5 km S of the Existing Forestry Access Track	High	Special Protection Area (national importance).
Dornoch Firth and Loch Fleet SPA	19.9 km E of the MDA	High	Special Protection Area (national importance).

Receptor	Distance from Site	Value	Reason for Sensitivity
Dornoch Firth and Morrich More SAC	11.8 km NE of the MDA	Very High	Special Area of Conservation (international importance).
Hydrogeology			
North Highland Ground Water	On Development Site	High	Groundwater of good quality; locally valuable resource.
GWDTE Habitats	Across Development Site	High	Groundwater-dependent terrestrial ecosystems with high dependency on groundwater.

"Value" cross referenced with "Receptor Sensitivity" in Table 13.4.

13.6 Embedded Mitigation

13.6.1 Mitigation measures are proposed to ensure that no significant environment effects arise. The majority of mitigation for potential effects on geology, hydrology and hydrogeology have been embedded into the design of the wind farm. Mitigation measures taken into consideration during the design process, construction, operation and decommissioning.

Design Stage

13.6.2 The existing constraints within the Development Site were intrinsically linked to the evolution of the design of the wind farm. Numerous measures have been considered during the design of the Proposed Development to mitigate impacts on geology, hydrology and hydrogeology. These include the following:

- The design of the wind farm has aimed to avoid peat with depth > 2.0 m. Where this was not possible, alternative construction methods such as floating roads and piled foundations are considered to reduce impact of peat;
- 100 m micrositing has been prescribed for all infrastructure for post consent refinement;
- 50 m watercourse buffers adhered to in the siting of infrastructure;
- SEPA PWS buffer zones adhered to where possible (access > 100 m from PWS and other infrastructure sited >250 m from PWS). Assessment undertaken for locations that are within these zones;

- The Proposed Development has been designed to avoid infrastructure in areas of 'Probable' peat slide hazard and avoid areas of 'Likely' hazard as far as reasonably practicable.
- Use of Existing Forestry Access Track and borrow pits where possible to reduce the requirement to construct new access tracks, water crossings and borrow pits, respectively;
- Avoidance of GWDTE, where possible. Assessment undertaken for locations that are within GWDTE zones (see **Appendix 13.5**);
- A detailed drainage strategy will be developed, following ground investigation and the preparation of a detailed conceptual site model (CSM), which will ensure the implementation of measures to maintain water movement within the peat. Relief drains across access tracks will be installed at regular intervals to maintain existing low paths.
- Avoidance of PWS, where possible. Assessment undertaken for locations that are within PWS buffer zones (see **Appendix 13.6)**
- Preventing access tracks from becoming preferential pathways for runoff with efforts being made to retain existing natural drainage wherever possible;
- Water crossings in the form of bottomless culverts and bridges, or upgrades to existing crossings will be designed to accommodate to 1 in 200 year flood event, plus climate change; and
- Land rising within any floodplain to be avoided; if ultimately required, compensatory storage will be provided at detailed design. .

Construction

13.6.3 An oCEMP has been produced in **Appendix 4.2**. The oCEMP sets out the management measures, method statements and referenced good practice guidance and legislation which will form the basis of the detailed design. Prior to construction, the oCEMP will be revised and a final CEMP will be developed by the construction Contractor and agreed with the planning authority.

13.6.4 A Construction Method Statement (CMS) will be developed and adhered to ahead of the construction of the Proposed Development, as standard construction practice. In line with Construction (Design and Management) Regulations 2015 (CDM 2015), the CMS will describe how the contractor will safely and effectively carry out the construction works. The implementation of the CMS will ensure that construction activities are carried out in a manner that minimizes environmental impact, mitigates potential risks.

13.6.5 In line with the PLHRA best-practice guidance, further investigation and design will be undertaken at a detailed design stage to refine the assessment and mitigate the peat landslide

risk for the areas having 'Low' Hazard Ranking[1] , which will be covered in the final PLHRA. In addition, based on the guidance, location specific mitigation has been identified for areas of Moderate peat landslide Hazard Ranking, largely in the form of micrositing of infrastructure, locational micrositing restrictions and the production of location specific blasting strategy.

13.6.6 An oPMP has been prepared to guide the handling, storage and reuse of peat during construction of the Proposed Development. The oPMP sets out measures to minimise peat disturbance, prevent unnecessary excavation and reduce carbon release in accordance with SEPA guidance and best-practice. Prior to construction, the oPMP will be revised and a final PMP will be developed and agreed with the planning authority. The oPMP can be seen in **Appendix 13.4**.

Operation

13.6.7 Access tracks will be designed such that they do not become a conduit for water flow. A crossfall or camber will shed water to swales on either one or both sides of the access tracks. Cross drains will be installed at low points and as otherwise required to remove surface water from the access tracks. Intermittent maintenance will be carried out during the operational phase.

13.6.8 The BESS units comprise of enclosed impermeable containers in order to contain all potential runoff and pollutants to soil and water. The BESS units will be fitted with an automated gas-based fire suppression system, as discussed in Table 13.3. Additionally, the BESS units will be located on bunded hardstands.

13.6.9 Maintenance of the Proposed Development will be undertaken by experienced operatives. Routine inspections will be undertaken at areas of a higher risk of oil and chemical spills. Spill kits will be readily available, and all operatives trained in their use.

Decommissioning

13.6.10 Mitigation proposed during the decommissioning stage will be very similar to the construction stage. A Decommissioning and Restoration Strategy would be prepared ahead of the decommissioning phase and agreed with the planning authority. The plan will adhere to best practice guidance and legislation in place at that time.

Micrositing

13.6.11 Micrositing has been embedded into the design of the Proposed Development via the inclusion of a micrositing tolerance of 100 m in the Section 36 Application. This allows for the optimisation of the Proposed Development considering environmental impact, prior to construction.

[1] Hazard Ranking = Hazard x Exposure; The terms Hazard is defined in this case as "the likelihood of the peat landslide event occurring." The term Exposure is defined in this case as "the impact and consequences that the event may have" or its "adverse consequences." (Scottish Government, 2017)

13.7 Potential Significant Effects

13.7.1 This section considers the likely significant effects of the Proposed Development on soils, geology, hydrology, and hydrogeology receptors during the construction, operation, and decommissioning phases of the Proposed Development, following the implementation of the embedded mitigation set out in Section 13.7.

13.7.2 The following sections should be read in conjunction with assessment methodology set out in Section 13.4. Details of the importance of receptors and magnitude of impacts is set out in Table 13.4 and Table 13.5, respectively, with the overall significance of effect is based on the significance of effects matric shown in Table 13.6.

13.7.3 The significance of effect is considered post-embedded mitigation, and should additional mitigation be required, this is set out in Table 13.8.

Construction

Peat

13.7.4 Peat is present across the Development Site and, depending on peat depth, will be excavated and permanently displaced in areas required for infrastructure associated with the Proposed Development. The design has sought to avoid areas of peat greater than 1.0 m in depth wherever practicable; however, due to the widespread presence of peat and site constraints, this was not possible throughout. Limited infrastructure remains in areas of peat depth >1.0 m, with very localized areas exceeding 2.0 m in depth. Where deeper deposits occur, measures such as floating MDA Access Tracks and micrositing will be applied during the detailed design to minimise disturbance.

13.7.5 In addition to the above, an oPMP has been prepared, which sets out procedures for peat excavation, storage, and reuse in accordance with SEPA guidance, ensuring that peat is managed responsibly and demonstrating that no peat will need to be disposed of offsite. This proactive approach significantly reduces the scale of peat disturbance. As a result of these embedded measures, including avoidance of deep peat where practicable, micrositing, floating tracks, and the oPMP, the residual effects are reduced in magnitude. While some permanent loss of peat and associated habitats will still occur, the impact is now considered low to medium in extent, localised, and partially reversible through reinstatement.

13.7.6 Accordingly, the sensitivity of the receptor is **High**, and the magnitude of impact is **Low**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.7 The design of the Proposed Development has been developed to minimise infrastructure in areas of peat greater than 1 m in depth, and where this was not possible, areas exceeding 2 m. As demonstrated in **Appendix 13.3**, the carbon losses associated with peat disturbance during construction will be offset by the generation of low-carbon electricity over the operational life of the Proposed Development, resulting in a significant net reduction in greenhouse gas emissions. Accordingly, while the sensitivity of peatland remains High, the

magnitude of effect is considered **High (Beneficial)**, leading to an overall **Major Beneficial** effect (Significant Beneficial in EIA terms).

Peat Landslide

13.7.8 Peat is present across the Proposed Development at depths greater than 0.5 m and on slopes typically exceeding 2°, triggering the requirement for a PLHRA to be undertaken. Accordingly, a preliminary PLHRA has been prepared (**Appendix 13.2**) to identify potential hazards and inform the design of the Proposed Development.

13.7.9 The assessment indicates that peat slide hazard is generally 'Unlikely' across most of the Development Site, with some areas classified as 'Likely' and occasional localized areas as 'Probable'. The design has sought to avoid higher-risk areas, with most infrastructure located in zones of 'Unlikely' hazard. Where this was not possible, some infrastructure has been located within 'Likely' peat slide hazard zones.

13.7.10 The preliminary PLHRA represents a worst-case scenario, assuming no engineering mitigation. It assessed hazard and exposure for each infrastructure element within its footprint, micrositing buffer (100 m), and impact zone (50 m for all infrastructure apart from borrow pits, which are subject to 100 m impact zone on account of blasting). Most infrastructure has a 'Low' hazard ranking, with some elements initially assessed as 'Moderate'. In line with PLHRA guidance, location-specific mitigation is required for areas of 'Moderate' hazard ranking, such as micrositing restrictions, floating tracks, and blasting strategies. These measures, considered embedded in the design, reduce hazard rankings from moderate to low.

13.7.11 Taking account of embedded mitigation and the commitment to a final PLHRA at detailed design stage post consent, residual effects are predicted to be short-term and localised. Accordingly, the sensitivity of the receptor is **High**, and the magnitude of impact (residual peat slide risk) is **Low**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

PWS

13.7.12 The construction of the Proposed Development has the potential to lead to the pollution of PWS from accidental spillages. Potential pollutants including oils, hydrocarbons, inorganics, sulphates, sulphides, cement, concrete, waste, and wastewater associated with construction works, are likely to be present on the site.

13.7.13 The embedded mitigation ensures that infrastructure is sited away from identified sources of PWS, in line with SEPA requirements. Additionally, the construction of infrastructure will be subject to the CMS and CEMP, which will set out methodologies and controls for construction particularly close to sensitive receptors. A PWS Assessment has been undertaken (**Appendix 13.6**), which identifies two existing PWS are located within the buffer zones. Both of these PWS are close to the Existing Forestry Access Track which will be upgraded during construction works which will include (but not be limited to) grading / resurfacing, widening and culvert replacement.

13.7.14 PWS HLD/33827 is situated 20 m upgradient from the Existing Forestry Access Track, meaning contaminants from construction works could potentially migrate downgradient toward the supply. Embedded mitigation measures, including best-practice controls within the CMS and CEMP, will ensure strict management of fuel storage, spill prevention, and surface water runoff. Accordingly, the sensitivity of the receptor is **Medium,** and the magnitude of impact is **Low**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.15 PWS HLD/30560 is situated 70 m downgradient from the Existing Forestry Access Track, where contaminants could infiltrate and migrate toward the supply. Embedded mitigation measures, including best-practice controls within the CMS and CEMP, will ensure strict management of fuel storage, spill prevention, and surface water runoff. Accordingly, the sensitivity of the receptor is **Medium,** and the magnitude of impact is **Low**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.16 The installation of wind turbine foundations could lead to temporary ground dewatering during construction. Embedded mitigation ensures that all infrastructure is sited away from identified PWS in accordance with SEPA buffer requirements. In addition, best-practice measures set out in the CMS and CEMP will control excavation, drainage, and water management in sensitive areas. While **Appendix 13.6** identifies two PWS within the wider buffer zones, these are located outside the MDA and turbine locations. These measures substantially reduce the risk of contamination, making any residual effects short-term, localized, and reversible. Accordingly, the sensitivity of the receptors is **Medium** and the magnitude of impact is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.17 The construction of turbine foundations could also lead to groundwater pollution from leaching of concrete residue. Embedded mitigation ensures that infrastructure is positioned away from identified PWS in line with SEPA buffers, and best-practice controls within the CMS and CEMP will manage concrete works and prevent accidental contamination. Although two PWS are present within the wider buffer zones **(Appendix 13.6**), they are outside the MDA and turbine locations. These measures mean any residual effects would be short-term and reversible. Given the **High** sensitivity of receptors but Negligible magnitude of residual impact, the overall significance is assessed as **Minor Adverse** (Not Significant in EIA terms)

Watercourses

13.7.18 The excavation for MDA Access Tracks, cable trenches and borrow pits has the potential to increase surface water runoff on exposed ground, which could lead to pollution of nearby watercourses. Embedded mitigation, including maintaining a minimum 50 m offset from watercourses and implementing best-practice controls though the CMS and CEMP, substantially reduce these risks. These measures limit direct disturbance, reduce sediment transport and prevent accidental contamination. As a result, any impacts would be short-term, highly localised and reversible. Accordingly, the sensitivity of the receptor is **High** and the magnitude of impact is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.19 The construction of the wind turbine foundations could lead to temporary ground dewatering and leaching of concrete during construction. Embedded mitigation, including maintaining a minimum 50 m offset from watercourses and implementing best-practice controls though the CMS and CEMP, substantially reduce these risks. These measures prevent direct disturbance and accidental contamination, ensuring any residual effects are short-term and localised. Accordingly, the sensitivity of the receptor is **High** and the magnitude of impact is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.20 The construction of the Proposed Development could lead to increases in river, surface water and small watercourse flooding due to the construction of impermeable surfaces. Embedded mitigation, including maintaining a minimum 50 m offsets from watercourses, designing crossings to accommodate a 1:200-year flood event plus climate change, and applying micrositing buffers of up to 100 m post-consent, reduce this risk. Additional best-practice controls will be implemented through the CMS and CEMP, ensuring activities in sensitive areas are carefully managed. These measures mean that any residual effect would be short-term and localised. Accordingly, the sensitivity of the receptor is **High** and the magnitude of impact is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.21 The construction of new watercourse crossings could result in pollution from construction materials entering watercourses or disrupting the natural flow regime, potentially causing bank erosion or affecting aquatic species migration. Embedded mitigation includes reducing the number of new crossings required, construction of crossings that will not affect the riverbanks (bottomless culverts / clear span bridges) and implementing best-practice controls through the CMS and CEMP. These measures ensure works are carefully managed to prevent contamination and maintain flow. Accordingly, the sensitivity of the receptor is **High** and the magnitude of impact is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

Designated Sites

13.7.22 As noted in Paragraph 13.5.58, the Cromarty Firth SPA, Dornoch Firth and Loch Fleet SPA and Dornoch Firth and Morrich More SAC are hydrologically connected to the Proposed Development Site. Potential impacts are comparable to those identified for watercourses, with embedded mitigation, including maintaining a minimum 50 m offset from watercourses and implementing best-practice controls though the CMS and CEMP, substantially reducing these risks. As such, Paragraphs 13.7.23 - 13.7.25 set out the sensitivity of effects on the designated sites considering the information set out above.

13.7.23 The Cromarty Firth SPA is hydrologically linked to the Proposed Development Site via the River Alness. The sensitivity of receptor is **High** and the magnitude of effect is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

13.7.24 Dornoch Firth and Loch Fleet SPA is hydrologically linked to the Proposed Development Site via the River Carron. The sensitivity of receptor is **High** and the magnitude of effects is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms)..

13.7.25 Dornoch Firth and Morrich More SAC is hydrologically linked to the Proposed Development Site via the River Carron. The sensitivity of receptor is **Very High** and the magnitude of effects is **Negligible**, resulting in an overall **Minor Adverse** effect (Not Significant in EIA terms).

GWDTEs

13.7.26 The construction of wind turbine foundations could create barriers to groundwater flow and alter natural drainage patterns during construction. A GWDTE Assessment has been undertaken (**Appendix 13.5**), which indicates that only three out of the ten areas of Acid Neutral Flush habitats identified within 250 m of the proposed infrastructure have the potential to experience slight impacts, primarily due to access tracks crossing the habitat and the potential disruption to natural drainage and groundwater flow within peat. Embedded mitigation focuses primarily on avoidance of GWDTEs by ensures that infrastructure is sited away from identified GWDTEs in accordance with SEPA buffer requirements and prioritises avoidance of GWDTEs wherever possible (see **Appendix 13.5**). A detailed drainage strategy will also be developed following ground investigation and preparation of a CSM. This strategy will include measures to maintain water movement within peat, such as installing relief drains across access tracks at regular intervals to preserve existing flow paths. These embedded measures substantially reduce the risk of hydrological change, making any residual impacts short-term, localised, and reversible. Accordingly, the sensitivity of the receptor is **High** and the magnitude of effect is **Negligible,** resulting in an overall **Minor Adverse** effect **(**Not Significant in EIA terms)**.**

13.7.27 The construction of the Proposed Development could lead to accidental spillages, causing pollution to GWDTE habitats. Embedded mitigation measures are incorporated into the design and construction approach to minimise this risk. Infrastructure has been sited away from identified GWDTEs in accordance with SEPA buffer requirements, and best-practice controls will be implemented through the CMS and CEMP. These include bunded storage for pollutants, spill kits in all vehicles and strict protocols for handling hazardous materials. These measures substantially reduce the risk of contamination, ensuring any residual effects would be short-term and localised. Accordingly, the sensitivity of the receptor is **High** and the magnitude of effect is **Negligible,** resulting in an overall **Minor Adverse** effect **(**Not Significant in EIA terms)**.**

13.7.28 The construction of wind turbine foundations could lead to groundwater pollution from leaching of concrete residue. Embedded mitigation ensures that infrastructure is sited away from identified GWDTE habitats in accordance with SEPA buffer requirements. In addition, best-practice measures will be implemented through the CMS and CEMP, including suitable drainage strategies to prevent contamination and maintain natural flow paths. These embedded measures substantially reduce the likelihood of concrete leachate reaching sensitive habitats, making any residual effects short-term and localised. Accordingly, the

sensitivity of the receptor is **High** and the magnitude of effect is **Negligible,** resulting in an overall **Minor Adverse** effect **(**Not Significant in EIA terms)**.**

Operation and Maintenance

13.7.29 There could be is a continued risk of accidental spills from general operation and maintenance of the Proposed Development, impacting GWDTEs, Watercourses and PWS. The embedded mitigation will ensure that maintenance works are managed in line with the CMS (e.g. maintenance vehicles to have spill kits, operatives to be suitably qualified, pollutants to be stored in bunded areas etc.). The sensitivity of the receptor is **High** and the magnitude of impact is **Negligible**, resulting in an overall **Minor Adverse** effect **(**Not Significant in EIA terms)**.**

13.7.30 There is a risk of pollutants leaching from the BESS units to water and soils nearby. The embedded mitigation ensures that the BESS units will comprise of enclosed impermeable containers and will be located on bunded hardstands. Therefore, the sensitivity of the receptor is **High**, the magnitude of residual impact is **Negligible**, and the effect is assessed as **Minor Adverse (**Not Significant in EIA terms).

13.7.31 The BESS facility contains batteries that carry a potential risk of fire, which if extinguished with water could cause pollution to GWDTEs, Watercourses and PWS. To manage this, each BESS unit, housed within an enclosed container, will include an automated gas-based fire suppression system, removing the need to store firewater on site. This design feature eliminates the risk of firewater runoff and associated pollution. Accordingly, the sensitivity of the receptor is **High** and the magnitude of residual impact is **Negligible**, and the effect is assessed as **Minor Adverse (**Not Significant in EIA terms).

Decommissioning

13.7.32 The potential effects during the decommissioning stage are expected to be similar to those identified during the construction phase. However, the impacts will be limited as far as possible through the design of the decommissioning works. For example, large excavations will be avoided during decommissioning, with only surface infrastructure being affected. Accordingly, the impacts on decommissioning are not considered further in this assessment.

13.8 Additional Mitigation Measures

Construction

Private Water Supply Investigation

13.8.1 The precise locations of PWS HLD/33827 and PWS HLD/30560 were not verified by a site visit during this assessment. Consequently, the current location data and descriptions are based solely on online sources and end-user feedback obtained through online and letter-drop questionnaires.

13.8.2 As such further PWS Investigation will be carried post-consent. It will include a site visit to confirm the exact positions of PWS HLD/33827 and PWS HLD/30560. This visit would gather information on installation conditions, borehole depths, current use of the PWS, the number of properties to PWS serves, age of the PWS and information on any other PWS within the area that would be relevant to the project.

13.8.3 Following this site visit, the PWS will be assessed against detailed design information to determine whether any site-specific mitigation measures are required.

13.8.4 Water quality monitoring would be carried out during pre-construction, construction and post-construction phases to evaluate the effectiveness of embedded, standard and any site-specific mitigation on PWS. The site visit outlined above would also help to inform the PWS water quality monitoring plan.

13.8.5 A PWS emergency response plan is outlined within **Appendix 13.6**.

13.9 Residual Effects

13.9.1 In accordance with the methodology described in Section 13.7, potential effects have been assessed with embedded mitigation included. Where the residual effect was adverse, additional mitigation is required. As can be seen in **Table 13.9**, once additional mitigation is identified, no significant residual effects are anticipated to remain after the implementation of the proposed mitigation measures.

13.9.2 Prior to additional mitigation, there is an identified **Moderate Adverse** impact on PWS' on account of pollution from construction activities. With the additional mitigation included, the magnitude of change will reduce from **Moderate** to **Negligible** resulting in a **Minor Adverse** significance (Not Significant in EIA terms).

13.10 Cumulative Effects

13.10.1 All operational wind farms and wind farm developments in various stages of the planning process within 20 km of the Proposed Development have been identified, and are detailed in **Chapter 2** of the EIAR. Several of these wind farms are located within the same catchment as the Proposed Development (Carron and Alness catchment) and are considered to potentially result in cumulative effects to the hydrology, together with the Proposed Development. These include:

- **Coire Na Cloiche** – Operational wind farm located approximately 4 km east of the Development Site and drains to the south into Black Water (Alness Catchment). The infrastructure for the Proposed Development drains into Black Water, therefore the two sites are hydrologically linked. However, Coire Na Cloiche is fully operational and no further construction is planned, meaning there will be no overlap in construction activities. As such no cumulative effects are anticipated.

- **The Novar, Novar II and Novar Repower Wind Farms** – Operational wind farm located approximately 9 km south of the Development Site and drain to the south into River Glass and to the North into River Averon (River Alness). Black Water is a tributary to the River Averon; therefore, the two sites are hydrologically linked. Novar and Novar II are already operational, and their drainage systems are established and stable. While Novar is scheduled for decommissioning and repowering, these activities are expected to be phased and managed under separate CEMPs, reducing the likelihood of overlapping works or significant cumulative impacts.
- **Ceislein Wind Farm** – A wind farm in the pre-planning phase, located approximately 12 km south-east of the Development Site and drains into Allt Leacach and Caochan Gobhlach, which are tributaries to the River Averon. As Ceislein is not yet consented, there is uncertainty regarding the timing of construction works. If consented, any cumulative effects would be mitigated through adherence to best practice and regulatory requirements, including CEMPs. Therefore, at this stage, no significant cumulative effects are anticipated.

13.10.2 Within the Alness River catchment, potential cumulative hydrological effects may arise from the decommissioning and possible repowering of Novar Wind Farm. Additionally, if Ceislein Wind Farm is granted consent, overlapping construction periods could occur. These effects are anticipated to be minor adverse (Not Significant in EIA terms). However, it is expected that all developments will have a suitable CEMP in place ahead of construction and follow best practice during construction. Consequently, the cumulative hydrological effect in practice is likely to be negligible **(**Not Significant in EIA terms).

13.10.3 All other wind farms are located outside the catchments affected by the Proposed Development and therefore are not hydrologically linked.

13.10.4 Where cumulative impacts on geology and hydrogeology are concerned, there is no estimated cumulative effect. As such, the cumulative geological and hydrogeology effect is likely to be negligible (Not significant in EIA terms).

13.10.5 During operation, there are no anticipated cumulative risks associated with geology, hydrology and hydrogeology, provided all developments maintain drainage systems and follow best practice.

13.11 Summary and Conclusion

13.11.1 This chapter describes the baseline conditions of the Proposed Development and its surroundings and highlights the potential effects and their significance on geology, hydrology, and hydrogeology.

13.11.2 The Development Site is underlain by four different types of Neoproterozoic rock groups / intrusions. Peat is present extensively across the Development Site, with particularly deeper areas of peat located in the south of the MDA.

13.11.3 The Development Site is located within the North Highland Ground Water Body. This is classified by SEPA as having good groundwater quality and quantity.

13.11.4 Two main watercourses drain the Development Site: Albhainn Glac an t-Seilich and Abhainn na Glasa, which feed into the River Averon via the Black Water and the River Averon, respectively. Various other minor watercourses are present. All identified watercourses have an overall water quality status of good.

13.11.5 A total of 29 PWS were identified within 5 km of the Development Site from THC, Spatial Hub Scotland, and a questionnaire which was issued to local properties. Two PWS were identified to be within the 100 m buffer zone of the Existing Forestry Access Track on the Development Site: HLD/33827 and HLD/30560. Water quality monitoring will be enforced pre-construction, during construction and post construction to ensure the PWS are not subject to adverse effects from the Proposed Development. The response plan detailed in **Appendix 13.6** will be adhered to following any identified changes in the water quality at the PWS.

13.11.6 The location of GWDTEs, namely wet dwarf shrub heath and blanket bogs, will require mitigation measures highlighted in **Appendix 4.2** to reduce potential impacts to Negligible.

13.11.7 Potential effects on the water environment and ground conditions are interrelated and include:

- Pollutions incidents,
- Erosion and sedimentation,
- Compaction of soils,
- Increase in runoff and increased localised flood risk,
- Modification of surface water drainage patterns and flows,
- Modifications of groundwater flows and levels, and
- Modifications to peatlands, including positive and negative impacts on the condition and stability.

13.11.8 Through the adoption of good working practices, development of an appropriately designed drainage system and reinstatement, and water quality monitoring of relevant PWS, potential effects on the water environment and ground conditions will be mitigated. Effects on surface and groundwater and the underlying geology of the Development Site are predicted to be Negligible or Minor adverse **(**Not Significant in EIA terms).

13.11.9 In addition, the Proposed Development will deliver significant beneficial effects for the environment. The Proposed Development has the capacity to provide upwards of 38 years of low-carbon electricity to the grid, resulting in a substantial net reduction in greenhouse gas emissions. This contributes positively to national and international climate change targets. The overall effect of the Proposed Development is considered **Major Beneficial** where impacts on carbon is concerned (Significant Beneficial in EIA terms).

13.11.10 A summary of the assessment of effects is provided in **Table 13.9.**

Table 13.9 Summary of Assessment

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
Peat					
Construction and Decommissioning	Loss of peatlands due to excavation for construction of the Proposed Development.	Design of the Proposed Development avoids peat > 2.0m where practicable. 100 m micrositing prescribed for all infrastructure for post-consent refinement. Alternative construction methodologies proposed where impacts on peat cannot be avoided. oPMP prepared as part of the EIAR along with commitment to the production of a final PMP prior to construction. Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
Peat (Carbon)					
Construction and Decommissioning	Carbon release from peat disturbance.	Carbon Assessment shows offset by renewable energy generation	Major (Beneficial)	N/A	Major (Beneficial)
Peat Landslide					

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
Construction and Decommissioning	Risk of peat slide during construction.	Design avoids high-risk zones of peat landslide risk. Preliminary PLHRA prepared as part of the EIAR, setting out site specific mitigation for areas of heightened assessed hazard, including micrositing restrictions and blasting strategies. Commitment to a final PLHRA post-consent.	Minor Adverse	N/A	Minor Adverse (no change)
PWS HLD/33827					
Construction and Decommissioning	Pollution from accidental spillages and increased runoff	Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	Further PWS Investigation will be carried post-consent. It will include a site visit to confirm the exact positions of PWS HLD/33827 and PWS HLD/30560. This visit would gather information on installation conditions, borehole depths, current use of the PWS, the number of properties to PWS serves, age of the PWS and information on any other PWS within the area that would be relevant to the project.	Minor Adverse (no change)
PWS HLD/30560					
Construction and Decommissioning	Pollution from accidental spillages and increased runoff	Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	Further PWS Investigation will be carried post-consent. It will include a site visit to confirm the exact positions of PWS HLD/33827 and PWS HLD/30560. This visit would gather information on installation conditions, borehole depths,	Minor Adverse (no change)

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
				current use of the PWS, the number of properties to PWS serves, age of the PWS and information on any other PWS within the area that would be relevant to the project.	
PWS					
Construction and Decommissioning	Dewatering of ground during turbine foundation construction.	Design avoids PWS as far as possible. Adherence to SEPA buffer zones. Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
	Pollution of groundwater due to leaching of concrete residue from foundations.	Design avoids PWS as far as possible. Adherence to SEPA buffer zones. Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
Operation and Maintenance	Accidental spills from operation and maintenance activities	Design avoids PWS as far as possible. Adherence to SEPA buffer zones. Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
	Pollution from BESS fire water	Each BESS unit—housed within an enclosed container—will include an automated gas-based fire suppression system, removing the need to store firewater on site.	Minor Adverse	N/A	Minor Adverse (no change)
	Pollutants leaching from BESS units to sensitive receptors nearby.	The BESS units will comprise of enclosed impermeable containers and will be located on bunded hardstands.	Minor Adverse	N/A	Minor Adverse (no change)
Watercourses					
Construction and Decommissioning	The excavation for MDA Access Tracks, cable trenches and borrow pits has the potential to increase surface water runoff on exposed ground, which could lead to pollution of nearby watercourses.	Maintaining a minimum 50 m offset from watercourses Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
	The construction of the turbine foundations could lead to temporary ground dewatering and leaching of concrete during construction.	Maintaining a minimum 50 m offset from watercourses Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
	The construction of the Proposed Development could lead to	Maintaining a minimum 50 m offsets from watercourses,	Minor Adverse	N/A	Minor Adverse (no change)

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
	increases in river, surface water and small watercourse flooding.	Watercourse crossings to accommodate a 1:200-year flood event, 100 m micrositing prescribed for all infrastructure for post-consent refinement. Implementing and adherence to best-practice controls though the CMS and CEMP			
	The construction of new watercourse crossings could result in pollution from construction materials entering watercourses or disrupting the natural flow regime, potentially causing bank erosion or affecting aquatic species migration.	Number of new crossings reduced as far as practical. Crossings will be bottomless arched culverts or clear span bridges to reduce impacts on riverbanks. Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
Operation and Maintenance	Accidental spills from operation and maintenance activities	Maintaining a minimum 50 m offsets from watercourses, Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
	Pollution from BESS fire water	Each BESS unit—housed within an enclosed container—will include an automated gas-based fire	Minor Adverse	N/A	Minor Adverse (no change)

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
		suppression system, removing the need to store firewater on site.			
	Pollutants leaching from BESS units to sensitive receptors nearby.	The BESS units will comprise of enclosed impermeable containers and will be located on bunded hardstands.	Minor Adverse	N/A	Minor Adverse (no change)
Cromarty Firth SPA					
Construction and Decommissioning	Construction of the Proposed Development could result in pollution of watercourses which could impact hydrologically linked SPA. Potential impacts covered in "Watercourses" above.	Maintaining a minimum 50 m offset from watercourses Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
Dornoch Firth and Loch Fleet SPA					
Construction and Decommissioning	Construction of the Proposed Development could result in pollution of watercourses which could impact hydrologically linked SPA. Potential impacts covered in "Watercourses" above.	Maintaining a minimum 50 m offset from watercourses Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
Dornoch Firth and Morrich More SAC					

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
Construction and Decommissioning	Construction of the Proposed Development could result in pollution of watercourses which could impact hydrologically linked SAC. Potential impacts covered in "Watercourses" above.	Maintaining a minimum 50 m offset from watercourses Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
GWDTE					
Construction and Decommissioning	The construction of turbine foundations could create barriers to groundwater flow and alter natural drainage patterns during construction	GWDTE Assessment (Appendix 13.5) prepared as part of this EIAR. Design avoids GWDTEs in accordance with SEPA buffer zones. Detailed drainage strategy will be developed post-consent along with a CSM.	Minor Adverse	N/A	Minor Adverse (no change)
	The construction of the Proposed Development could lead to accidental spillages, causing pollution to GWDTE habitats	GWDTE Assessment (Appendix 13.5) prepared as part of this EIAR. Design avoids GWDTEs in accordance with SEPA buffer zones. Detailed drainage strategy will be developed post-consent along with a CSM.	Minor Adverse	N/A	Minor Adverse (no change)

Receptor	Potential Effects	Embedded Mitigation	Significance of Effect	Additional Mitigation / Monitoring Proposed & Means of Implementation	Residual Effect
	The construction of turbine foundations could lead to groundwater pollution from leaching of concrete residue	GWDTE Assessment (Appendix 13.5) prepared as part of this EIAR. Design avoids GWDTEs in accordance with SEPA buffer zones. Detailed drainage strategy will be developed post-consent along with a CSM.	Minor Adverse	N/A	Minor Adverse (no change)
Operation and Maintenance	Accidental spills from operation and maintenance activities	Design avoids GWDTEs in accordance with SEPA buffer zones. Implementing and adherence to best-practice controls though the CMS and CEMP	Minor Adverse	N/A	Minor Adverse (no change)
	Pollution from BESS fire water	Each BESS unit—housed within an enclosed container—will include an automated gas-based fire suppression system, removing the need to store firewater on site.	Minor Adverse	N/A	Minor Adverse (no change)
	Pollutants leaching from BESS units to sensitive receptors nearby.	The BESS units will comprise of enclosed impermeable containers and will be located on bunded hardstands.	Minor Adverse	N/A	Minor Adverse (no change)

13.12 References

British Geological Survey, 2015. BGS Hydrogeological Maps of Scotland, *Groundwater Vulnerability Scotland Version 2 dataset* [online] Available at https://www2.bgs.ac.uk/nationalgeosciencedatacentre/citedData/catalogue/95759d72-eae9-4b2b-a9ee-589b00a505b2.html [Accessed 16 June 2025].

British Geological Survey, 2024. GeoIndex Onshore. [online]. Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ [Accessed: 16 June 2025].

BS5930:1999+A2:2010 Code of practice for site investigations [online]. Available at: https://bsol.bsigroup.com/Bibliographic/BibliographicInfoData/000000000030190275 [Accessed: 11 June 2025].

BS 10175:2011 Investigation of potentially contaminated sites. Code of practice [online]. Available at: https://bsol.bsigroup.com/Bibliographic/BibliographicInfoData/000000000030362551 [Accessed: 11 June 2025].

Climate Change (Scotland) Act 2009 [online]. Available at: https://www.legislation.gov.uk/asp/2009/12/contents [Accessed: 11 June 2025].

Coal Authority, 2024. Data Mine. [online]. Available at: https://datamine-cauk.hub.arcgis.com/ [Accessed: 16 June 2025].

Control of water pollution from construction sites: Guidance for consultants and contractors (C532). [online]. Available at: https://www.ciria.org/ItemDetail?iProductCode=C532&iCategoryCode= [Accessed: 11 June 2025].

Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat, and the Minimisation of Waste [online]. Available at: Guidance+on+the+assessment+of+peat+volumes%2C+reuse+of+excavated+peat%2C+and+the+minimisation+of+waste.pdf [Accessed: 11 June 2025].

Directive (EU) 2024/3019 of the European Parliament and of the Council of November 2024 concerning urban wastewater treatment [online]. Available at: http://data.europa.eu/eli/dir/2024/3019/oj [Accessed: 11 June 2025].

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32000L0060 [Accessed: 11 June 2025].

Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32006L0118 [Accessed: 11 June 2025].

Environmental Good Practice on Site Guide (fourth edition) (C741) [online]. Available at: https://www.ciria.org/ItemDetail?iProductCode=C741&iCategoryCode= [Accessed: 11 June 2025].

Flood Risk Management (Scotland) Act 2009 [online]. Available at: https://www.legislation.gov.uk/asp/2009/6/contents [Accessed: 11 June 2025].

NetRegs, 2024. Guidance for Pollution Prevention (GPP) documents [online]. Available at: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/ [Accessed: 11 June 2025].

Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (LUPS-GU 31) [online]. Available at:https://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf [Accessed: 11 June 2025].

HHG001 – Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste, Scottish Renewables and SEPA, January 2012 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=65 [Accessed: 12 June 2025].

HHG002 – Carbon calculator for wind farms on Scottish peatlands – factsheet, Scottish Government, 2018 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=66 [Accessed 12 June 2025].

HHG003 – Guidance Developments on Peatland – Site Surveys, SEPA, 2011 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=67 [Accessed: 12 June 2025].

HHG004 – Peatland Survey, Guidance on Developments on Peatland, Scottish Government, SNH (NatureScot), SEPA, 2017 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=68 [Accessed: 12 June 2025].

HHG005 – Good Practice During Wind Farm Construction – 2024 [online]. Available at https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=3058 [Accessed: 12 June 2025].

HHG006 - Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, Dept for Environment, Food & Rural Affairs, Sept 2009 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=70 [Accessed: 12 June 2025].

HHG007 – Scotland's peatland – definitions and information resources (SNH Commissioned Report No. 701), Bruneau PMC and Johnson SM, 2014 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=158 [Accessed: 12 June 2025].

HHG008 – Scotland National Peat Plan, SNH (NatureScot), 2015 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=72 [Accessed: 12 June 2025].

HHG009 – Carbon and Peatland Map (online resource), NatureScot, 2016 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=73 [Accessed: 12 June 2025].

HHG010 – Draft Peatland and Energy Policy Statement, Scottish Government, 2016 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=74 [Accessed: 12 June 2025].

HHG011 - Calculating potential carbon losses & savings from wind farms on Scottish peatlands - technical guidance, Scot Govt, Technical Note V2.10.0 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=75 [Accessed: 12 June 2025].

HHG012 - Peat Landslide Hazard & Risk Assessments - Best Practice Guide for Proposed Energy Generation Developments. 2nd Edition, Scot Govt, 2017 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=76 [Accessed: 12 June 2025].

HHG013 - The Peatland Code, Version1.1, ICUN, March 2017 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=77 [Accessed: 12 June 2025].

HHG014 – Scotland's Aquifers and Groundwater Bodies, British Geological Society, 2015 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=159 [Accessed: 12 June 2025].

HHG015 – Assessing Impacts of Dev Proposals on Groundwater Abstractions & Groundwater Dependent Terrestrial Ecosystems, Guidance No. 31, SEPA, 2017 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=79 [Accessed: 12 June 2025].

HHG016 – Baseline Groundwater Chemistry in Scotland's Aquifers, British Geological Society, 2017 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=160 [Accessed: 12 June 2025].

HHG017 – Advising on carbon-rich soils deep peat and priority peatland habitat in development management, NatureScot, November 2023 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=2572 [Accessed: 12 June 2025].

HHG018 – Constructed tracks in the Scottish Uplands, SNH (NatureScot), 2015 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=1361 [Accessed: 12 June 2025].

HHG019 – Floating-Roads on Peat report, SNH (NatureScot) & Forestry Commission Scotland, 2010 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=1362 [Accessed: 12 June 2025].

HHG020 - Advising on peatland, carbon-rich soils and priority peatland habitats in development management, November 2023 [online]. Available at: https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=159 [Accessed: 12 June 2025].

Highland Renewable Energy Strategy and Planning Guidelines (2006) [online]. Available at: https://www.highland.gov.uk/downloads/file/1009/highland_renewable_energy_strategy_may_2006 [Accessed: 12 June 2025].

Microsoft Bing Maps (2025). *Bing Maps – Aerial View.* [online]. Available at: https://www.bing.com/maps/aerial?forcev8=1 [Accessed: 19 June 2025].

National Planning Framework 4 [online]. Available at: https://www.gov.scot/publications/national-planning-framework-4/ [Accessed: 11 June 2025].

Onshore Wind Energy: Supplementary Guidance (2016) [online]. Available at: https://www.highland.gov.uk/downloads/file/15173/finalised_environmental_report_september_2016 [Accessed: 12 June 2025].

RiverLevels.uk (no date). *Carron (Sutherland) at Sgodachail station – catchment overview.* [online]. Available at: Sgodachail Catchment :: River Levels :: the UK River Levels Website [Accessed: 19 June 2025].

RiverLevels.uk (no date). *Alness at Alness station – catchment overview.* [online]. Available at: Alness Catchment :: River Levels :: the UK River Levels Website [Accessed: 19 June 2025]

SEPA (2010c) Regulatory position Statement – Developments on Peat.

SEPA, 2024. *Guidance on assessing the impacts of developments on groundwater dependent terrestrial ecosystems*. [Online]. Available at: https://www.sepa.org.uk/media/a1yh0blq/guidance-on-

assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx [Accessed: 23 June 2025].

Scottish Environment Protection Agency (no date). *Water Classification Hub*. [online]. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/ [Accessed: 19 June 2025].

Scotland's Environment, 2024. National Soil Map of Scotland. [online]. Available at: https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/ [Accessed: 16 June 2025].

Scottish Environment Protection Agency, 2024. Flood Risk Postcode Map. [online]. Available at: https://map.sepa.org.uk/floodmaps/FloodRisk/PostCode [Accessed: 16 June 2025].

Scottish Government, 2024. Drinking water protected areas in the Scotland River basin district: maps. [Online]. Available at: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/ [Accessed: 22 June 2025].

Scottish Government (2025). *Scotland's Environment Web Map*. Scotland's Environment Web. [online]. Available at: https://map.environment.gov.scot/sewebmap/ [Accessed: 19 June 2025].

Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. *Guidance on Developments on Peatland*, on-line version only [online]. Available at: https://www.gov.scot/publications/peatland-survey-guidance/ [Accessed: 11 June 2025].

The UK Forestry Standard The governments' approach to sustainable forest management [online]. Available at: https://assets.publishing.service.gov.uk/media/651670336a423b0014f4c5c0/Revised_UK_Forestry_Standard_-_effective_October_2024.pdf [Accessed: 11 June 2025].

The Environmental Liability (Scotland) Regulations 2009 [online]. Available at: https://www.legislation.gov.uk/ssi/2009/266/contents/made [Accessed: 11 June 2025].

The Pollution Prevention and Control (Scotland) Regulations 2012 [online]. Available at: https://www.legislation.gov.uk/ssi/2000/323/introduction/made?view=plain [Accessed: 11 June 2025].

The Private Water Supplies (Scotland) Regulations 2006, S.S.I. 2006/209 [online]. Available at: https://www.legislation.gov.uk/ssi/2006/209/contents [Accessed: 23 June 2025].

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 [online]. Available at: https://www.legislation.gov.uk/ssi/2011/209/contents/made [Accessed: 11 June 2025].

The Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013 [online]. Available at: https://www.legislation.gov.uk/ssi/2013/323/contents/made [Accessed: 11 June 2025].

The Water Environment (Miscellaneous) (Scotland) Regulations 2017 [online]. Available at: https://www.legislation.gov.uk/ssi/2017/389/contents/made [Accessed: 11 June 2025].

The Water Intended for Human Consumption (Private Water Supplies) (Scotland) Regulations 2017 [online]. Available at: https://www.legislation.gov.uk/ssi/2017/282/contents/made [Accessed: 11 June 2025].

UK Centre for Ecology & Hydrology, 2024. National River Flow Archive Data Search. [online]. Available at: https://nrfa.ceh.ac.uk/data/search [Accessed: 16 June 2025].

Water Environment and Water Services (Scotland) Act 2003 [online]. Available at: https://www.legislation.gov.uk/asp/2003/3/contents [Accessed: 11 June 2025].