VOLUME 1: GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

Figures (Volume 2 of this EIA Report)

Appendices (Volume 4 of this EIA Report)

9. GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

9.1 Executive Summary

9.1.1 An assessment has been undertaken of the potential effects on geology (including soils and peat), hydrology and hydrogeology (comprising the water environment), during the construction and operational phases of the Proposed Development.

9.1.2 Information for the study area was compiled using baseline information from a desk study, verified by an extensive programme of field work. The assessment undertaken considered the sensitivity of receptors identified during the baseline study and mitigation measures incorporated in the development design. It has also considered potential future changes to baseline conditions.

9.1.3 The scope of the assessment was informed by pre-application advice, scoping and consultation responses received during the routeing and alignment stages of the Proposed Development design process.

9.1.4 The assessment is supported by Appendices that consider potential effects on carbon rich soils and peat (outline peat management plan) and peat stability (peat landslide hazard risk assessment) and peatland condition. Potential effects on nearby private water supplies and a schedule of proposed watercourse crossings associated with the Proposed Development are also provided in supporting appendices.

9.1.5 The design of the Proposed Development has been informed by a detailed programme of peat depth probing, consistent with National Planning Framework 4 (NPF4), and it has been shown that wherever possible areas of deep peat have been avoided. The assessment of peat and carbon rich soils has considered all of the proposed infrastructure, including temporary and permanent access tracks (see **Chapter 3**: **The Proposed Development**). A project specific peat management plan, peatland condition assessment and peat landslide hazard and risk assessment has been prepared. These assessments confirm the carbon rich soils and peat disturbed by construction of the Proposed Development are limited in volume and that these areas can be readily and beneficially reused in restoration works.

9.1.6 A detailed peatland condition assessment has been completed which has considered key hydrological, ecological and land-use based indicators of peatland condition. In summary it confirms that the peat deposits within the footprint of the Proposed Development are found to be extensively drained and modified, with numerous areas of active erosion. Subject to adoption of best practice industry safeguards, it is concluded that the Proposed Development would not result in any significant adverse effects to peatlands during construction or operation.

9.1.7 Subject to adoption of best practice construction techniques and a site-specific Construction Environmental Management Plan (CEMP), no significant adverse effects on geology (including soils and peat), hydrology and hydrogeology have been identified. The CEMP would include provision for drainage management plans and would be used to safeguard water resources and manage flood risk. A commitment to deploy Sustainable Drainage Systems (SuDS) in these plans has been made. The CEMP also includes provision of a Pollution Prevention Plan. The CEMP would be agreed with statutory consultees, including Scottish Environment Protection Agency (SEPA), prior to any construction works being undertaken.

9.1.8 Notwithstanding these safeguards, a programme of predevelopment, construction and post construction water quality monitoring is also proposed. Monitoring results would be used to confirm that the Proposed Development does not have a significant adverse effect on the water environment and would be used ensure the effectiveness of any good practice or remedial measures implemented. Further, additional site investigation is proposed as part of the detailed design stage of the Proposed Development, to ensure ground stability risk is not increased as a direct consequence. A geotechnical risk register and programme of monitoring is therefore

proposed, with agreement of monitoring type and frequency with statutory consultees, secured by a predevelopment planning condition.

9.2 Introduction

9.2.1 This Chapter considers the potential effects of the Proposed Development on geology (including soils and peat) and the water environment (hydrology and hydrogeology) during construction and operation. Where likely significant effects are predicted mitigation measures are proposed, and the significance of predicted residual effects are assessed.

9.2.2 The assessment should be read in conjunction with **Chapter 7: Ecology** as information contained in that Chapter and assessment has been used to complete the assessment of habitats (such as peat, Groundwater Dependent Terrestrial Ecosystems (GWDTE) and peatland condition) and ecological receptors (such as designated sites) sustained by water.

9.2.3 This Chapter is supported by the following Appendices:

- Appendix 9.1: Peat Landslide Hazard Risk Assessment (PLHRA);
- Appendix 9.2: Peat Management Plan (PMP);
- Appendix 9.3: Peatland Condition Assessment (PCA);
- Appendix 9.4: Schedule of Watercourse Crossings;
- Appendix 9.5: Private Water Supply Risk Assessment (PWSRA); and
- Appendix 9.6: Carbon Calculator.

9.2.4 The findings of these assessments are summarised in this Chapter.

9.2.5 **Figures 9.1** to **9.8** are also referenced in the text where relevant.

Statement of Qualifications

9.2.6 This assessment has been carried out by SLR Consulting Ltd (SLR) and overseen and reviewed by Gordon Robb (BSc, MSc, MBA, C.WEM, FCIWEM). Gordon is a Technical Director (Hydrology and Hydrogeology) and has more than 30 years' experience assessing renewable energy and electrical infrastructure projects; specifically, their potential effects on soils, geology and the water environment. He is based in Scotland and has worked throughout Scotland, including on sites in similar environments to the Proposed Development. He has also prepared and given expert witness testimony for renewable and electrical infrastructure projects. A table presenting relevant qualifications and experience of key staff involved in the preparation of this Chapter is included in **Appendix 5.1** of this EIA Report.

9.2.7 The peatland condition assessment has been prepared by Dr. Chris Marshall, a Principal Consultant at SLR Consulting Limited. Chris holds a BSc (Hons) Environmental Geology, a MSc in Geochemistry and a PhD in Earth Sciences, with 10 years of experience in peatland condition and restoration monitoring and assessment; including peer reviewed scientific papers, policy documents, governmental reports and membership of scientific and technical advisory groups.

9.3 Scope of Assessment

Study Area

9.3.1 The study area encompasses the area over which all desk-based and field data were gathered to inform the assessment presented in this Chapter, as shown on **Figures 9.1** to **9.8**. This includes a buffer of 500 m of the proposed overhead line (OHL) and new, temporary and existing access tracks that would be constructed or upgraded to facilitate construction and maintenance of the Proposed Development, as agreed with consultees

at the scoping stage of the Proposed Development. Beyond this distance, any effect is considered to be so diminished as to be undetectable and therefore not significant. Beyond this distance, any effect is considered to be so diminished as to be undetectable and therefore not significant.

9.4 Consultation

9.4.1 To inform the scope of the assessment for the Proposed Development, consultation was undertaken with statutory and non-statutory bodies through a formal EIA scoping process. Full details of the consultation process and responses are included in **Chapter 4: Scope and Consultation** and associated appendices.

9.4.2 Specific responses relating to geology, hydrology and hydrogeology are included below in **Table 9.1**.

Table 9.1: Consultation Responses regarding Geology, Hydrology and Hydrogeology

Consultee	Summary of Key Issues	Where addressed in Chapter
Aberdeenshire Council (AC) Screening Response 24 September 2024	It is noted that part of the Proposed Route, approximately 8 km, would cross an area designated as Class 1 peatland. Class 1 is listed as nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas are likely to be of high conservation value. The construction of access tracks and tower construction could have potentially significant impacts on the peat.	A detailed programme of peat depth probing and a site-specific peatland condition survey has been undertaken and used to inform the design of the Proposed Development. Potential impacts on peat and proposed safeguards are summarised in **Section 9.8** of this Chapter and discussed in full in **Appendix 9.1: PLHRA** and **Appendix 9.2: PMP**. The condition of peat is discussed in **Appendix 9.3: PCA.**
AC Scoping Response 04 February 2025	The Council's Flood Risk and Coastal Protection Team have noted that flood risk is not quantifiable at this stage, however it is not a major concern. Drainage details will need to be provided, to demonstrate how surface water will be managed at locations of permanent structures. Flood Risk Assessment (FRA) and Drainage Impact Assessment (DIA) may still be required, depending on the location of permanent structures.	A screening of flood risk is presented in **Section 9.7** of this Chapter. Best practice that would be adopted, including the use of SuDS, to manage drainage and mitigate flood risk impacts are presented in this Chapter (**Section 9.8**). A commitment is made to provide further information on drainage measures which will be incorporated into the outline CEMP (see **Appendix 3.5**).
	Additional comments have been provided by the Council's Contaminated Land Team who note that the site is in a historically poorly mapped area. Historically there are 3 quarries, and a limekiln recorded within the site boundary; there are likely to be more such land uses within the site boundary and, in common	A commitment is made at the detailed design stage of the project to undertake ground investigation and confirm ground conditions. The findings would be used to inform the design of all works that will result in ground

Consultee	Summary of Key Issues	Where addressed in Chapter
	with other upland parts of the council area, places where shooting has taken place. Given the proposals are for an overhead line, the development is unlikely to encounter potentially contaminated land except via pylon placement or substations along the route. This Service would expect an EIA report for the site to acknowledge possible encounters with contaminated land during development and comment on procedures should that occur.	disturbance, and which will be incorporated into the outline CEMP (see **Appendix 3.5**) for identification of measures to prevent pollution from areas of potential ground contamination.
	SEPA have provided comment directly to the Energy Consents Unit (ECU) and therefore their advice is not duplicated within this response.	See SEPA response below.
ECU Scoping Response 28 February 2025	Scottish Water provided information and advised the proposed Development falls within the Inchgarth River Dee catchment which supplies Mannofield Water Treatment Works. They state that although there should be low risk, water quality mitigations will be required. They further advise of live infrastructure in the proximity of the proposed Development. Scottish Ministers request that the company contacts Scottish Water (via EIA@scottishwater.co.uk) and makes further enquires to confirm whether there any Scottish Water assets which may be affected by the development and includes details in the EIA report of any relevant mitigation measures to be provided.	See Scottish Water response below.
	Scottish Ministers request that the Company investigates the presence of any private water supplies which may be impacted by the development. The EIA report should include details of any supplies identified by this investigation, and if any supplies are identified, the Company should provide an assessment of the potential impacts, risks, and any mitigation which would be provided.	Potential impacts on private water supplies are summarised in **Section 9.7** of this Chapter and reported in full in **Appendix 9.5: PWSRA**.
	Scottish Ministers consider that where there is a demonstrable requirement for peat landslide hazard and risk assessment (PLHRA), the assessment should be undertaken as part of the EIA process to provide Ministers with a clear understanding of whether the risks are acceptable and capable of being controlled by mitigation measures.	A site specific PLHRA is presented in **Appendix 9.1** which has been prepared following best practice guidance published by Scottish Government[1].
NatureScot Scoping Response	The underground cable section (UGC) and the majority of the western overhead line (OHL) are within the catchment of the River Dee and	Potential impacts on the water environment, including potential impacts on

1 Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments

Consultee	Summary of Key Issues	Where addressed in Chapter
15 January 2025	whilst they are, at their closest, still 2.5 km from the boundary of the River Dee Special Area of Conservation (SAC), measures will need to be taken, particularly in respect to handling of peat soils, to ensure that no pollution of local watercourses could result in SAC species and their supporting habitats being adversely impacted downstream. We acknowledge that SSEN and their contractors have an adopted approach to construction management that includes a suite of best practice Species Protection Plans (SPPs) and General Environmental Management Plans (GEMPs) that sit within the project's Construction Environmental Management Plan (CEMP) and when implemented can afford a very high level of protection against disturbance and harm to sensitive species and habitats. The Applicant will provide information to inform a Habitats Regulations Appraisal (HRA).	watercourses which drain to the River Dee SAC is discussed in **Section 9.7** and **9.8** of this Chapter. Relevant good practice which will be incorporated into the CEMP is also presented in **Section 9.8.** Assessment of the direct and indirect impacts on the River Dee SAC is presented in **Chapter 7: Ecology**. A shadow HRA (sHRA) is presented as **Appendix 7 7.** The environmental effects of the installation of the permitted development UGC are considered within **Appendix 1.1: Permitted Development Works Appraisal** and form part of the cumulative assessment in **Section 9.10.**
	The western section of UGC and OHL includes large areas of Class 1 peatland as identified on NatureScot's Carbon and Peatland map 2016[46]. Our online guidance sets out the level of information that should be made available when the project is submitted as an application. Wherever possible the alignment, access tracks and other associated works should avoid deeper sections of peat and protect priority peatland habitats.	A detailed programme of peat depth probing and a site-specific peatland condition survey has been undertaken and used to inform the Proposed Development design. Potential impacts on peat and proposed safeguards are summarised in **Sections 9.7** and **9.8** of this Chapter and discussed in full in **Appendix 9.1: PLHRA** and **Appendix 9.2: PMP**. The condition of peat is discussed in **Appendix 9.3: PCA.** The environmental effects of the installation of the permitted development UGC are considered within **Appendix 1.1: Permitted Development Works Appraisal** and form part of the cumulative assessment in **Section 9.10.**
SEPA Scoping Response 21 January 2025	To avoid delay and potential objection the EIA submission must contain a series of scale drawings of sensitivities, for example peat depth, peat condition, Groundwater Dependent Terrestrial Ecosystems (GWDTE) and	See **Figures 9.1** to **9.8.** Peat depth, peat slide risk and peat condition figures are presented in **Appendix 9.1,**

Consultee	Summary of Key Issues	Where addressed in Chapter
	proximity to watercourses, overlain with the Proposed Development. This is necessary to ensure the EIA process has informed the layout of the development to firstly avoid, then reduce and then mitigate significant impacts on the environment. We request that the issues covered in Appendix 1 of the scoping response be addressed to our satisfaction in the EIA process. This provides details on our information requirements and the form in which they must be submitted.	**9.2** and **9.3**, with information regarding private water supplies presented in **Appendix 9.5**.
	A detailed flood risk assessment – In general we agree this can be scoped out and we would refer you to our Standing Advice on Flood Risk for more information relevant to this type of development. However, if landraising is proposed on site then we will expect further detailed information to establish whether compensatory storage will be required, to ensure the development complies with NPF4 Policy 22. Additional information will be needed if landraising is proposed within SEPAs recommended watercourse buffers or SEPA Future Flood Mapping extents[53]. As stated above, an update to our surface water maps (the new official title will be SEPA Surface Water and Small Watercourse Maps) will go online sometime in early 2025.	It is confirmed that a 20 m buffer from permanent infrastructure to watercourses has been applied where technically feasible, as shown on **Figure 9.1**. With the exception of a small part of a proposed permanent track, no development is proposed within mapped floodplains. It is noted that no land raising is proposed at this location in the floodplain, as discussed in **Section 9.7** of this Chapter. A flood risk screening assessment is presented in **Section 9.7** of this Chapter which uses the latest SEPA flood mapping[53].
	Baseline water quality monitoring – Notwithstanding the possible requirement for water quality monitoring in association with any private water supply monitoring required, we are in agreement this can be scoped out.	Confirmatory predevelopment, construction and post construction water quality monitoring is proposed which would be agreed with consultees during the detailed design stage of the Proposed Development and be contained within the CEMP. Principles for water monitoring are discussed in **Section 9.8** of this Chapter and within **Appendix 9.5**.
	A Geomorphological assessment of watercourse crossings – We highlight we have identified potential geomorphic risk on the following watercourses which lie within the proposed route corridor: • Water of Charr; and • Spittal Burn. We agree with the scoping out of a geomorphological assessment of watercourse	With the exception of watercourse crossings, micrositing allowances will be used to maintain a buffer of at least 10 m from working areas to the Water of Charr and Spittal Burn (see **Figure 9.1**), during construction of the Proposed Development.

Consultee	Summary of Key Issues	Where addressed in Chapter
	crossings, if no development occurs within a 10 m buffer of affected watercourses. Should the placement of a watercourse crossing, or other construction element, occur within these buffers, a detailed geomorphological assessment maybe required.	
Dee District Salmon Fishery Board Scoping Response 22 January 2025	River Dee Special Area of Conservation (SAC). The SAC is protected for its internationally important populations of Atlantic salmon (*Salmo Salar*), brook (*Lampetra planeri)),* river (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*), eels (*Anguilla Anguilla*) and trout (*Oncorhynchus mykiss*). Tributaries within the western extent of the Proposed Development are hydrologically connected to the River Dee SAC and therefore direct and indirect impacts to the SAC should be considered, including impacts on water quality. As the Proposed Development is hydrologically connected to the River Dee SAC, we welcome the recognition that a Habitats Regulations Appraisal (HRA) Screening report will be undertaken to inform the requirement for a Stage 2 Appropriate Assessment.	Potential impacts on the water environment, including potential impacts on watercourses which drain to the River Dee SAC is discussed in **Section 9.7** and **9.8** of this Chapter. Relevant good practice which will be incorporated into the CEMP is also presented in **Section 9.8** of this Chapter. Assessment of the direct and indirect impacts on the River Dee SAC is presented in **Chapter 7: Ecology**. A sHRA is presented as **Appendix 7.7.**
	We would strongly disagree with the following elements which are scoped out in the Hydrology, Geology and Hydrogeology section; • Drainage Impact Assessment (DIA); • Water quality monitoring; • Cumulative impacts; and • Increased flood risk caused by blockages to flow in watercourses during operation and maintenance of the Proposed Development. We feel that there is potential for these to have significant impacts upon our salmonid populations present within the development and those hydraulically connected to it.	Confirmatory predevelopment, construction and post construction water quality monitoring is proposed which would be agreed with consultees during the detailed design stage of the Proposed Development and specified in the CEMP. The scope of the monitoring is discussed in **Section 9.8** of this Chapter and within **Appendix 9.5**. It is confirmed that watercourse crossings would be designed to a pass a design flood event as agreed with SEPA, which is expected to be to pass the 200-year event plus an allowance for climate change. A schedule of watercourse crossings in presented in **Appendix 9.4**. To ensure protection of the water environment throughout Proposed Development construction, principles, design standards and best practice measures for the management and control of drainage that would be

Consultee	Summary of Key Issues	Where addressed in Chapter
		adopted by the Principal Contractor are included within **Section 9.8** of this Chapter.
Feughside Community Council Scoping Response 18 February 2025	The majority of the area is peat bog designated by NatureScot as Grade 1. The peat is important as a carbon sink and as a water store to limit flooding down the valley. We note the comments in NatureScot's letter of 31/5/22 regarding the Peatland Restoration and Habitats Enhancement Clarification. If the development is approved, we will wish to make sure this is properly funded with robust independent monitoring and reporting.	Potential impacts on peat and proposed safeguards are summarised in **Section 9.7** of this Chapter and discussed in full in **Appendix 9.1: PLHRA** and **Appendix 9.2: PMP**. The condition of peat is discussed in **Appendix 9.3: PCA**. A Habitat Management Plan would be developed to deliver habitat enhancement measures in line with SSEN's BNG commitments, as well as to compensate for direct and indirect impacts on peatland. An outline Biodiversity Enhancement Plan (oBEP) is presented in **Appendix 7.6.**
Scottish Water Scoping Response 09 February 2025	The OHL route, proposed bridges or culverts and temporary access tracks all fall within the Inchgarth River Dee catchment which supplies Mannofield Water Treatment Works. Scottish Water abstractions are designated as Drinking Water Protected Areas (DWPA) under Article 7 of the Water Framework Directive[2]. Given the location within the catchment, the activity should be low risk, however water quality mitigations will be required, and it would be appreciated if we could get a timeline for when work is expected to start and finish.	Details of relevant DWPAs is presented in **Section 9.7** and committed measures to safeguard water quality to the water treatment works are given in **Section 9.8** of this Chapter.
	Scottish Water records indicate that there is live infrastructure in the proximity of your development area that may impact on existing Scottish Water assets. The applicant must identify any potential conflicts with Scottish Water assets and contact our Asset Impact Team via our Customer Portal for an appraisal of the proposals.	Potential impacts on the water environment, including Scottish Water assets is presented in **Section 9.7** of this Chapter.

Potential Impacts Assessed in Full

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

- pollution risk, including potential impact on surface water and groundwater quality, water dependent designated sites and public and private water supplies during construction and operation;
- erosion and sedimentation, which could give rise to potential impact on surface water and groundwater quality, and public and private water supplies during construction and operation;

2 European Union (2000) Water Framework Directive (2000/60/EC) (online) Available at: https://eur-lex.europa.eu/eli/dir/2000/60/oj/eng (last accessed 08/10/2025)

- flood risk, resulting from changes to runoff volumes, rates and modifications to natural and man-made drainage patterns during construction and operation;
- potential impact upon the linkage between groundwater and surface water during construction and operation;
- potential impact on areas of peat, including peat stability and condition, during construction and operation;
- potential impact on GWDTEs during construction and operation; and
- potential cumulative impacts during construction and operation.

Issues Scoped Out of Assessment

9.4.4 On the basis of the desk based and survey work undertaken, policy, guidance and standards, the professional judgement of the EIA team, feedback from consultees during the scoping stage, and experience from other relevant projects in similar settings, the following topic areas have been 'scoped out' on the basis that there is no likelihood of a significant adverse effect arising from the Proposed Development:

- Effects on geology as, with the exception of carbon rich soils and peat, no sensitive geological features have been identified within the study area.
- Detailed Flood Risk and Drainage Impact Assessment (DIA). A flood risk screening assessment has been completed and is presented in this Chapter. Published mapping confirms that virtually all of the Proposed Development is not located in an area identified as being at flood risk and where flood risk is recorded, it is typically small in extent and bounds watercourse corridors. A simple screening of potential flooding sources (fluvial, coastal, groundwater, infrastructure etc.) is therefore presented, including measures used to control the rate and quality of runoff, which will be specified in the CEMP. This will form part of a DIA which will be prepared as part of the detailed design stage of the Proposed Development, secured by a predevelopment planning condition.
- On site water quality monitoring to inform the EIA assessment presented in this chapter, as water quality data is published by SEPA and can be used to characterise baseline water quality to inform this assessment (see **Section 9.7**). A commitment has been made by the Applicant to agree a programme of pre-development, construction and post construction water quality monitoring which will be agreed with consultees.
- Increased flood risk caused by blockages to flow in watercourses during operation and maintenance of the Proposed Development, as any required permanent watercourse crossings would be appropriately sized and subject to maintenance requirements under the Water Environment (Controlled Activity) (Scotland) Regulations 2013[3].
- A Geomorphological Assessment, as photographs and records of baseline water features are recorded and presented in this EIA and with the safeguards proposed no geomorphological effects are anticipated.
- Decommissioning Effects. If the Proposed Development were to be decommissioned all components of the OHL, inclusive of steel from the poles, conductors and fittings would be removed from site and either recycled or disposed of appropriately. A method statement would be agreed with the local authority setting out the detail of the decommissioning process for OHL. Efforts would be made to repurpose the Proposed Development for future connections prior to any decommissioning. Consent to be applied for is therefore in perpetuity. The effects associated with the construction phase can be considered to be representative of worst-case decommissioning effects, and therefore no separate assessment of decommissioning has been undertaken as part of this EIA Report.

3 Scottish Government (2013) The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2013 (online) Available at: https://www.legislation.gov.uk/ssi/2013/176/made (last accessed 08/10/2025)

9.5 Legislation, Policy and Guidance

9.5.1 The aquatic environment in Scotland is afforded significant protection through key statutes and the regulatory activity of SEPA and the local authorities.

9.5.2 Relevant legislation which has been reviewed and considered as part of this assessment includes:

- EU Water Framework Directive (2000/60/EC)[2];
- EU Drinking Water Directive (98/83/EC)[4];
- EU The Habitats Directive (92/43/EEC)[5];
- The Conservation of Habitats and Species Regulations 2017[6];
- The Water Environment (Controlled Activities) (Scotland) Amendment Regulations, 2013 (CAR)[3];
- The Environment Act 2021[7];
- Environmental Protection Act 1990[8];
- The Water Supply (Water Quality) (Scotland) Regulations, 2001[9];
- The Flood Risk Management (Scotland) Act 2009[10];
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS)[11];
- The Water Environment (Drinking Water Protected Area) (Scotland) Order 2013[12];
- Private Water Supplies (Scotland) Regulations 2006[13];
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017[14]; and
- The Electricity Act 1989[15].

Policy

9.5.3 NPF4[16] provides planning guidance and policies regarding sustainable development, tackling climate change and achieving net zero. Policies relevant to this Chapter include:

- Policy 2 (Climate Mitigation and Adaptation);
- Policy 5 (Soils);
- Policy 20 (Blue and Green Infrastructure); and
- Policy 22 (Flood Risk and Water Management).

4 European Union (1998) Drinking Water Directive (98/83/EC) (online) Available at: https://eur-lex.europa.eu/eli/dir/1998/83/oj/eng (last accessed 08/10/1025)
5 European Union (1992) The Habitats Directive (92/43/EEC)(online) Available at: https://eur-lex.europa.eu/eli/dir/1992/43/oj/eng (last accessed 08/10/2025)
6 The Conservation of Habitats and Species Regulations 2017 (online) Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents (last accessed 08/10/2025)
7 The Environment Act 2021 (online) Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents (last accessed 08/10/2025)
8 Environmental Protection Act 1990 (online) Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents (last accessed 08/10/2025)
9 Scottish Government (2001) The Water Supply (Water Quality) (Scotland) Regulations (online) Available at: https://www.legislation.gov.uk/ssi/2001/207/contents (last accessed 08/10/2025)
10 Scottish Government (2009) The Flood Risk Management (Scotland) Act 2009 (online) Available at: https://www.legislation.gov.uk/asp/2009/6/contents (last accessed 08/10/2025)
11 Scottish Government (2003) The Water Environment and Water Services (Scotland) Act 2003 (WEWS) (online) Available at: https://www.legislation.gov.uk/asp/2003/3/contents (last accessed 08/10/2025)
12Scottish Government (2013) Water Environment (Drinking Water Protected Area) (Scotland) Order (online) Available at: https://www.legislation.gov.uk/ssi/2013/29/contents/made (last accessed 08/10/2025)
13Scottish Government (2006) Private Water Supplies (Scotland) Regulations (online) Available at: https://www.legislation.gov.uk/ssi/2006/209/contents (last accessed 08/10/2025)
14 Scottish Government (2017) The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations (online) available at: https://www.legislation.gov.uk/ssi/2017/282/contents/made (last accessed 08/10/2025)
15The Electricity Act 1989 (online) Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents (last accessed 08/10/2025)
16 Scottish Government (2023) National Planning Framework 4 (NPF4) (online) Available at: https://www.gov.scot/publications/national-planning-framework-4/ (last accessed 08/10/2025)

9.5.4 In addition, the AC Local Development Plan (LDP)[17] provides planning guidance on the type and location of development that can take place in the region. The LDP presents policies of which the following are relevant to this assessment:

- Policy E1: Natural Heritage;
- Policy PR1: Protecting Important Resources;
- Policy C2: Renewable Energy;
- Policy C3: Carbon Sinks and Stores;
- Policy C4: Flooding; and
- Policy RD1: Responsibilities of Developers.

Guidance

9.5.5 Planning Advice Notes (PANs) are published by the Scottish Government and applicable PANs include:

- PAN 61 Planning and Sustainable Urban Drainage Systems (SUDS)[18]; and
- Online Planning Advice on Flood Risk (which supersedes PAN 69)[19].

9.5.6 SEPA and NetRegs Guidance for Pollution Prevention (GPP)[20]:

- GPP01 Understanding your environmental responsibilities – good environmental practices;
- GPP02 Above Ground Oil Storage;
- GPP03 Use and Design of Oil Separators in Surface Water Drainage Systems;
- GPP05 Works and Maintenance in or near Water;
- GPP06 Working on Construction and Demolition Sites;
- GPP08 Safe Storage and Disposal of Used Oils;
- GPP13 Vehicle Washing and Cleaning;
- GPP21 Pollution Incident Response Planning; and
- GPP22 Dealing with Spills.

9.5.7 Construction Industry Research and Information Association (CIRIA) publications:

- C532 Control of Water Pollution from Construction Sites (2001)[21];
- C648 Control of Water Pollution from Linear Construction Projects – Technical Guidance (2006)[22];
- C741 Environmental Good Practice on Site (2015)[23];
- C753 The SUDS Manual (2015)[24];
- C809 Sustainable Management of Surplus Soil and Aggregates from Construction[25]; and

17 Aberdeenshire Council (2023) Local Development Plan (online) Available at: https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/ (last accessed 08/10/2025)
18 Scottish Government (2001) Planning Advice Note (PAN) 61: Sustainable urban Drainage Systems (online) Available at: https://www.gov.scot/publications/pan-61-sustainable-urban-drainage-systems/ (last accessed 08/10/2025)
19 Scottish Government (2015) Flood Risk: Planning Advice (online) Available at: https://www.gov.scot/publications/flood-risk-planning-advice/ (last accessed 08/10/205)
20 NetRegs, Guidance for Pollution Prevention (GPP) documents, available online at Guidance for Pollution Prevention (GPP) documents https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/ [Accessed August 2025]
21 Construction Industry Research and Information Association (2001) Control of Water Pollution from Construction Sites C532
22 Construction Industry Research and Information Association (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance
23 Construction Industry Research and Information Association (2015) Environmental Good Practice on Site C741
24 Construction Industry Research and Information Association (2015) The SuDS Manual C753
25 Construction Industry Research and Information Association (2003) Sustainable Management of Surplus Soil and Aggregates from Construction Part 2: Scotland

- R179 Ground Engineering Spoil: Good Management Practice (1997)[26].

9.5.8 SEPA Publications:

- The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide v9.4 (2024)[27]
- Engineering in the Water Environment: Good Practice Guide – River Crossings (2010)[28];
- Technical Flood Risk Guidance (2022)[29]
- Engineering in the Water Environment: Good Practice Guide – Sediment Management (2010)[30];
- Groundwater Protection Policy for Scotland, Version 3 (2009)[31];
- Guidance on Assessing the Impacts of Development on Groundwater Abstractions (2024)[32];
- Guidance on Assessing the Impacts of Developments on Groundwater Dependant Terrestrial Ecosystems (2024)[33];
- Land Use Planning System SEPA Guidance Note 2a, Version 4 – Flood Risk (2018)[34];
- Position Statement – Culverting of Watercourses (2015)[35]; and
- Regulatory Position Statement – Developments on Peat (2010)[36].

9.5.9 Other Guidance:

- Scottish Government, Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (2017)[1];
- Scottish National Heritage (now NatureScot) Constructed Tracks in Scottish Uplands (2013)[37];
- Forestry Commission Scotland and Scottish National Heritage (now NatureScot), Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads (2010)[38];
- Institute of Civil Engineers, Managing Geotechnical Risk: Improving Productivity in UK Building and Construction (2001)[39];
- Scottish Executive, Scottish Roads Network Landslides Study Summary Report (2005)[40];
- Forestry Commission, Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat (2006)[41];
- Department of Environment, Food and Rural Affairs (DEFRA) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2011)[42]; and

26 Construction Industry Research and Information Association (1997) Ground Engineering Spoil: Good Management Practice R179
27 Scottish Environment Protection Agency (2024) The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide v9.4
28 Scottish Environment Protection Agency (2010) Engineering in the Water Environment: Good Practice Guide – River Crossings
29 Scottish Environment Protection Agency (2022) Technical Flood Risk Guidance for Stakeholders, Version 13
30 Scottish Environment Protection Agency (2010) Engineering in the Water Environment: Good Practice Guide – Sediment Management
31 Scottish Environment Protection Agency (2009) Groundwater Protection Policy for Scotland, Version 3
32 Scottish Environment Protection Agency (2024) Guidance on Assessing the Impacts of Development on Groundwater Abstractions
33 Scottish Environment Protection Agency (2024) Guidance on Assessing the Impacts of Developments on Groundwater Dependant Terrestrial Ecosystems
34 Scottish Environment Protection Agency (2018) Land Use Planning System SEPA Guidance Note 2a, Version 4 – Flood Risk
35 Scottish Environment Protection Agency (2015) Position Statement – Culverting of Watercourses
36 Scottish Environment Protection Agency (2010) Regulatory Position Statement – Developments on Peat
37 Scottish National Heritage (now NatureScot) (2013) Constructed Tracks in Scottish Uplands
38 Forestry Commission Scotland and Scottish National Heritage (now NatureScot) (2010) Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads
39 Institute of Civil Engineers (2001) Managing Geotechnical Risk: Improving Productivity in UK Building and Construction
40 Scottish Executive (2005) Scottish Roads Network Landslides Study Summary Report
41 Forestry Commission (2006) Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat
42 Department of Environment, Food and Rural Affairs (DEFRA) (2011) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites

- DEFRA Good Practice Guide for Handling Soils (Ministry of Agriculture, Fisheries and Food (MAFF) 2000)[43].

9.6 Methodology

Desk Study

9.6.1 An initial desk study was undertaken to determine and confirm the baseline characteristics by reviewing available information relating to geology, hydrology and hydrogeology. The following sources of information were consulted to characterise and assess the baseline conditions within the study area:

- Ordnance Survey (OS) 1:50,000 and 1:25,000 scale mapping[44];
- NatureScot SiteLink[45];
- NatureScot Carbon and Peatland 2016 Map[46];
- James Hutton Institute, The National Soil Map of Scotland (1:250,000)[47];
- British Geological Survey (BGS) Onshore GeoIndex (1:50,000)[48];
- BGS Hydrogeological maps of Scotland (1,100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets)[49];
- Details of private water supplies provided by AC[50];
- Details of Drinking Water Protected Areas[51];
- SEPA river and loch waterbody nested catchments[52]; flood maps[53]; reservoir flooding map[54]; Water Classification Hub[55]; Water Environment Hub[56]; Rainfall Data[57];
- National River Flow Archive[58];
- SEPA environmental data[59]; and
- The Scottish Flood Defence Asset Database[60].

43 Department of Environment, Food and Rural Affairs (DEFRA) (2000) Good Practice Guide for Handling Soils (Ministry of Agriculture, Fisheries and Food (MAFF)
44 Ordnance Survey, 1:50,000 and 1:25,000 scale mapping (online) Available at: https://www.ordnancesurvey.co.uk/products (last accessed 08/10/2025)
45 NatureScot SiteLink (online) Available at: https://sitelink.nature.scot/home (last accessed 08/10/2025)
46 Scottish Natural Heritage (now NatureScot), Carbon and Peatland 2016 Map, (online) Available at https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ (last accessed 08/10/2025)
47 James Hutton Institute, National soil map of Scotland (online) Available at: https://soils.environment.gov.scot/maps/ (last accessed 08/10/2025)
48 British Geological Survey GeoIndex (onshore) (online) Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (last accessed 08/10/2025)
49 British Geological Survey Hydrogeological maps of Scotland, (online) Available at https://www.bgs.ac.uk/datasets/hydrogeological-maps-of-scotland/ (last accessed 08/10/2025)
50 AC Private Water Supplies, Accessed through Freedom of Information request, Available on request (last accessed 08/10/2025)
51 Drinking Water Protected Areas – Scotland River Basin District Maps, (online) Available at https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/ and https://www.sepa.org.uk/environment/environmental-data/ (last accessed 08/10/2025)
52 SEPA river and loch waterbody nested catchments, (online) Available at https://www.sepa.org.uk/environment/environmental-data/ (last accessed 08/10/2025)
53 SEPA Flood Map (online) Available at https://www.sepa.org.uk/environment/water/flooding/flood-maps/ (last accessed 08/10/2025)
54 SEPA Reservoirs Inundation Map, (online) Available at: https://map.sepa.org.uk/reservoirsfloodmap/Map.htm (last accessed 08/10/2025)
55 SEPA Water Classification Hub, (online) Available at https://www.sepa.org.uk/data-visualisation/water-classification-hub/ (last accessed 08/10/2025)
56 SEPA Water Environment Hub (online) Available at: https://www.sepa.org.uk/data-visualisation/water-environment-hub/ (last accessed 08/10/2025)
57 SEPA Rainfall Data for Scotland (online) Available at https://www2.sepa.org.uk/rainfall (last accessed 08/10/2025)
58 UK Centre for Ecology and Hydrology, National River Flow Archive (online) Available at: https://nrfa.ceh.ac.uk/ (last accessed 08/10/2025)
59 SEPA environmental data (online) available at https://www.sepa.org.uk/environment/environmental-data/ (last accessed 08/10/2025)
60 Scottish Government, the Scottish Flood Defence Asset Database (SFDAD) (online) Available at https://www.scottishflooddefences.gov.uk/ (last accessed 08/10/2025)

Field Survey

9.6.2 The project hydrologists, geologists and ecologists have worked closely on this assessment to ensure that appropriate information is gathered, enabling a comprehensive impact assessment. Detailed site visits and walkover surveys were undertaken by authors of this Chapter on the following dates:

- November 2023 – site reconnaissance and walkover survey;
- April 2024 – Phase I peat probing and condition assessment;
- May and September 2024 – Phase II peat probing and condition assessment, geomorphological assessment, watercourse crossing survey and private water supply survey; and
- February and March 2025 – Additional Phase II peat probing and condition assessment, watercourse crossing survey and private water supply survey.

9.6.3 In addition, site surveys were undertaken by the project ecologists to undertake habitat and National Vegetation Classification (NVC) surveys (see **Chapter 7: Ecology**).

9.6.4 With regard to this Chapter, the field work has been undertaken in order to:

- verify the information collected during the desk and baseline study;
- assess peat depths and condition;
- allow appreciation of the study area and undertake visual assessment of the main surface waters;
- identify drainage patterns, areas vulnerable to erosion or sedimentation deposition and any pollution risks;
- visit private water supply sources and gather details of water use locally; and
- visit proposed watercourse crossings and prepare a schedule of these.

Assessment of Effects

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

9.6.6 This approach provides a mechanism for identification of mitigation, including measures appropriate to the significance of likely effects presented by the Proposed Development. Criteria for determining the significance of effects are provided below in **Table 9.2**, **Table 9.3**, and **Table 9.4**.

Sensitivity / Importance of Receptors

9.6.7 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria set out below in **Table 9.2**. Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

Table 9.2: Criteria for Assessing Sensitivity of Receptor

Sensitivity	Definition
High	• soil type and associated land use is highly sensitive (e.g. unmodified blanket bog or peatland); • SEPA Water Framework Directive Water Body Classification[55]: High-Good or is close to the boundary of a classification: Moderate to Good or Good to High; • receptor is of high ecological importance or of National or International conservation value (e.g. Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), habitat for protected species) which may be dependent upon the hydrology of the site; • receptor is at high risk from flooding now or in the future and / or water body acts as an active floodplain or flood defence;

Sensitivity	Definition
	• receptor is used for public and / or private water supply (including Drinking Water Protected Areas); • groundwater vulnerability is classified as High; and • if a Groundwater Dependent Terrestrial Ecosystem or Geological Conservation Review site is present and identified as being of high sensitivity.
Moderate	• soil type and associated land use is moderately sensitive (e.g. modified blanket bog or peatland, arable, commercial forestry); • SEPA Water Framework Directive Water Body Classification[55]: Moderate or is close to the boundary of a classification: Low to Moderate; and • moderate classification of groundwater aquifer vulnerability.
Low	• soil type and associated land use not sensitive to change in hydrological regime and associated land use (e.g. intensive grazing of sheep and cattle); • SEPA Water Framework Directive Water Body Classification[55]: Poor or Bad; • receptor is not at risk of flooding in the future; and • receptor not used for water supplies (public or private).
Not Sensitive	• receptor would not be affected by the Proposed Development e.g. lies within a different and unconnected hydrological / hydrogeological catchment.

Magnitude of Impact

9.6.8 The potential magnitude of impact would depend upon whether the potential impact would cause a fundamental, material or detectable change from the baseline. In addition, the timing, scale, size and duration of potential impact resulting from the Proposed Development are also determining factors in impact magnitude. The criteria used to assess the magnitude of impact are defined below in **Table 9.3**.

Table 9.3: Criteria for Assessing Magnitude of Impact

Magnitude of Impact	Criteria	Definition
Major	Results in loss of attribute	Long term or permanent changes to the baseline geology, hydrology, hydrogeology and water quality such as: • permanent degradation and total loss of soils habitat (inc. peat) and geology; • loss of important geological structure/features; • wholesale changes to watercourse channel, route, hydrology or hydrodynamics; • changes to the site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns; • permanent or long term changes to the water chemistry; and • permanent or long term changes to groundwater levels, flow regime and risk of groundwater flooding.
Medium	Results in impact on integrity of attribute or loss of part of attribute	Material and short to medium term changes to baseline geology, hydrology, hydrogeology and water quality, such as: • loss of extensive areas of soils and peat habitat, damage to important geological structures / features; • some changes to watercourses, hydrology or hydrodynamics; • changes to water environment as a result of an increase in runoff; • changes to erosion and sedimentation patterns; • changes to the water chemistry of surface runoff and groundwater; and

Magnitude of Impact	Criteria	Definition
		• changes to groundwater levels, flow regime and risk of groundwater flooding.
Low	Results in minor impact on attribute	Detectable but non-material and transitory changes to the baseline geology, hydrology, hydrogeology and water quality, such as: • minor or slight loss of soils and peat or slight damage to geological structures / feature; • minor or slight changes to the watercourse, hydrology or hydrodynamics; • minor or slight changes to the water environment as a result from a slight increase in runoff; • minor or slight changes to erosion and sedimentation patterns; • minor or slight changes to the water chemistry of surface runoff and groundwater; and • minor or slight changes to groundwater levels, flow regime and risk of groundwater flooding.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	No perceptible changes to the baseline geology, hydrology, hydrogeology and water quality such as: • no impact or alteration to existing important soils (inc. peat) geological features; • no alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns; • no pollution or change in water chemistry to either groundwater or surface water; and • no alteration to groundwater recharge or flow mechanisms.

Significance of Effect

9.6.9 The sensitivity of the receiving environment together with the magnitude of the impact determines the significance of the effect, which can be categorised into levels of significance as identified below in **Table 9.4**.

Table 9.4: Significance of Effect

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

9.6.10 In some cases, the potential sensitivity of the receiving environment or the magnitude of potential impact cannot be quantified with certainty using the above method and, therefore, professional judgement remains the most robust method for identifying the predicted significance of a potential effect.

9.6.11 Effects of 'Major' and 'Moderate' significance within this assessment are considered to be 'significant' in terms of the EIA Regulations[61].

Cumulative Assessment

9.6.12 The assessment considers the potential cumulative effects associated with other developments of a comparable scale within 5 km and within the same surface water catchments as the Proposed Development. A cumulative effect is considered to be the combined or synergistic effect on a hydrological, hydrogeological or geological receptor arising from the Proposed Development in addition to or in combination with other developments.

Limitations to the Assessment

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

9.6.14 It is considered that the data and information used to complete this assessment is robust and that there are no significant data gaps or limitations.

9.7 Baseline Conditions

9.7.1 This section outlines the baseline geology (including soils and peat), hydrology and hydrogeology within the study area. The study area is shown on **Figures 9.1** to **Figure 9.8**.

Designations

9.7.2 Review of the NatureScot SiteLink website[45] indicates that no statutory designated sites are located within the study area.

9.7.3 The River Dee Special Area for Conservation (SAC) is located approximately 2.1 km north of the Proposed Development (see **Figure 9.1**). The SAC has been designated for Atlantic salmon (*Salmo salar*), otters (*Lutra lutra*) and freshwater pearl mussels (*Margaritifera margaritifera*) which are recognised as particularly sensitive to changes in water quality. The western extent of the study area is located within the River Dee catchment, specifically the Water of Dye sub catchment, discussed in further details below. The SAC is therefore considered to be hydraulically connected to the Proposed Development, as the designated site is located downstream of the western extent of the Proposed Development. Therefore, the River Dee SAC has been considered further in this Chapter, with further consideration of ecological elements in **Chapter 7: Ecology**.

Geology and Soils

Soils

9.7.4 An extract of 1:250,000 National Soil Map of Scotland[47] is presented as **Figure 9.2**, which indicates that the western extent of the Proposed Development is underlain by peat whilst the eastern extent is underlain by peaty podzols and mineral podzols.

9.7.5 AC's Contaminated Land team has confirmed they have records of three historic quarries and a limekiln within the study area. AC have confirmed that no historic landfills are located within the study area. No evidence of contaminated ground conditions were observed during the site surveys.

61 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (online) Available at: https://www.legislation.gov.uk/ssi/2017/101/contents (last accessed 08/10/2025)

Peat and Superficial Geology

9.7.6 An extract of BGS superficial deposit mapping[48] is presented as **Figure 9.3** and shows that majority of the western extent of the Proposed Development is underlain by peat. The majority of the eastern extent of the Proposed Development is shown to be absent of any superficial deposits, with small discrete areas of peat and glacial till. Alluvium is also recorded adjacent to the larger watercourses within the study area including the Water of Charr, Bervie Water and Carron Water.

9.7.7 Peatland classification mapping[46] (**Figure 9.4**) indicates that approximately 8 km of the western extent of the Proposed Development is underlain by Class 1 peatland. This includes poles 115 to 183, and the proposed access tracks in the western extent of the Proposed Development. Class 1 peatland is considered nationally important carbon rich soil, deep peat and priority peatland habitat with high conservation and restoration value.

9.7.8 The eastern extent of the Proposed Development is generally underlain by Class 4 peat and mineral soils (Class 0) with small areas of Class 5 peatland recorded within the centre and eastern extent of the Proposed Development. Class 5 peatland is not considered priority peatland habitat; however, soils within these habitats may remain carbon rich with areas of deep peat, whilst Class 4 and mineral soils are not considered to represent peatland habitats.

9.7.9 As part of this assessment, a comprehensive peat probing exercise has been completed, the results of which are presented in full in **Appendix 9.1: PLHRA** and **Appendix 9.2: PMP**. Review of the peat probing data confirms the following:

- the depth of peat was recorded across the site at more than 17,000 locations;
- 68% of all the peat probe locations recorded a peat depth of <0.5 m and 75% of peat probes recorded a peat depth of <1 m; and
- an auger was used to record the condition of the peat and the underlying substrate at 6 locations, as detailed in **Appendix 9.1: PLHRA**, – the peat sampled was recorded as typically fibrous to pseudo fibrous, with reference to the Von Post Classification[62].

9.7.10 A detailed peatland condition assessment has been completed (see **Appendix 9.3: PCA**) which considered hydrological, ecological and land-use based indicators of peatland condition. The peat beneath the Proposed Development has been found to be extensively drained and modified for land uses including rough grazing and commercial forestry. This has led to a loss of microtopography and peatland plant species diversity necessary for active peatland function, with extensive colonisation of non-peatland plant communities forming across the area.

9.7.11 Much of the western extent of the Proposed Development was found to contain numerous areas of active peat erosion with features such as haggs, gullies and other erosional features which have a further draining effect on the peat present. The majority of the Proposed Development is located on areas lacking significant peat deposits and where peatland is present, it is extensively drained with degraded condition indicators. This is further discussed **Appendix 9.3: PCA**.

Bedrock Geology

9.7.12 An extract of the BGS bedrock and linear features geology mapping[48] is presented as **Figure 9.5**; the review of which shows that Proposed Development is generally underlain by pelites, semipelites, psammites of the Glen Effock Schist Formation and Glen Lethnot Grit Formation.

9.7.13 The northwestern extent of the study area, including two poles (127 and 128), is underlain by igneous granitic bedrock of the Water of Dye Granite (Mount Battock Pluton). Part of the southeastern extent of the study area

62 Von Post , L. and Grunland, E., (1926), 'Sodra Sveriges torvillganger 1' Sverges Geol. Unders. Avh., C335, 1-127.

is underlain by sedimentary rocks comprising conglomerate and sandstones of the Arbuthnott Garvock Group and Carron Sandstone Formation. Several other minor igneous intrusions are also noted across the study area.

9.7.14 Several inferred faults are noted across the study area, particularly within the eastern extent.

Hydrogeology

Aquifer Characteristics and Groundwater Vulnerability

9.7.15 Extracts of the BGS 1:625,000 scale Hydrogeological Map of Scotland[48] and 1,100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets[49] and are presented in **Figure 9.6** and **Figure 9.7** respectively.

9.7.16 **Figure 9.6** confirms that the igneous and metamorphic bedrock which underlies the majority of the Proposed Development are classified as low productivity aquifers, whereby small amounts of groundwater are expected in near surface weathered zones and secondary fractures. The sedimentary bedrocks which underlie part of the southeastern extent of the Proposed Development are classified as a moderate productivity aquifer, which can locally yield moderate amounts of groundwater.

9.7.17 The Aquifer Productivity and Groundwater Vulnerability datasets[49] classify the underlying aquifer (superficial and bedrock) according to the predominant groundwater flow mechanism (fracture or intergranular) and the estimated groundwater productivity.

9.7.18 **Figure 9.7** shows that the peat and glacial till deposits within the study area are not considered as a significant aquifer as defined by BGS. The alluvial deposits, where present, support a moderate to high productive aquifer with intergranular flow. It also confirms that the majority of bedrock aquifer is considered as a low and very low productivity aquifer, generally without groundwater except at shallow depths, and with flow almost entirely through fractures and other discontinuities. The sedimentary bedrock is recorded as a moderately productivity aquifer.

9.7.19 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being most vulnerable[49]. The Proposed Development is shown to be underlain by groundwater vulnerability Classes 4a, 4b and 5. The highest vulnerability is noted within the central and eastern extent of the study area, where no superficial deposits are recorded, and thus in the event of an accidental pollution incident, there would be little attenuation of potential pollutants prior to entry to groundwater. Groundwater is less vulnerable where overlain by superficial deposits, notably in the west of the study area.

Groundwater Levels and Quality

9.7.20 Groundwater recharge at and surrounding the study area is limited by the following factors:

- steeper topographic gradient, resulting in rainfall forming surface water runoff;
- peat and glacial till deposits inhibiting infiltration capacity, owing to their generally low bulk permeability; and
- underlying metamorphic and igneous bedrock, displaying a low permeability that also inhibits groundwater recharge.

9.7.21 Review of SEPA's environmental data website indicates that no groundwater level monitoring is undertaken within the study area. In the absence of published information or data held by SEPA, it is anticipated that groundwater will be present as perched groundwater within the more permeable horizons of the glacial till and alluvium deposits, within the near surface weathered zone of the igneous and metamorphic bedrocks, and at depth within the sedimentary bedrock and within fractures or faults of the igneous and metamorphic deposits.

9.7.22 All of Scotland's groundwater bodies have been designated as a Drinking Water Protected Area (DWPA) under the Water Environment (Drinking Water Protected Area) (Scotland) Order 2013[12] and require protection for their current use or future potential as drinking water resources.

9.7.23 SEPA has identified that the Proposed Development is located within four groundwater bodies[55]:

- the western extent of the study area is underlain by the Clachnaben groundwater body (SEPA ID: 150705);
- approximately 1.4 km of the centre of the study area is located within the Killin, Aberfeldy & Angus Glens groundwater body (SEPA ID: 150699);
- the majority of the eastern extent of the study area is underlain by the Portlethen groundwater body (SEPA ID: 150625); and
- small part of the southeastern extent of the study area is within the Drumlithie groundwater body (SEPA ID: 150585).

9.7.24 In 2023 (latest reporting cycle) all four groundwater bodies have been classified with a Good overall status and no pressures have been identified.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

9.7.25 A NVC habitat mapping exercise was conducted as part of the ecology baseline assessment, and this has been used to identify potential areas of GWDTE. The methodology and results of the NVC habitat mapping exercise are discussed in detail within **Chapter 7: Ecology**. With reference to SEPA guidance[33], areas of potential GWDTE are shown on **Figure 9.8**.

9.7.26 The location of potential GWDTEs and their likely dependency on groundwater is identified and discussed below in **Table 9.5**.

Table 9.5: Site Specific Groundwater Dependent Terrestrial Ecosystems Assessment

NVC Community	Location and Distribution on Site
M6	M6 dominant polygons are located in linear polygons across the western extent of the Proposed Development. The polygons generally occur along the banks of watercourses or in surface water flow paths recorded across the study area. The polygons are underlain by low permeability peat deposits which will facilitate local water logging of soils in response to rainfall, or alluvium deposits where any groundwater within the deposits will be in hydraulic continuity with adjacent watercourses. Given this distribution, it is considered that these habitats are sustained by rainfall and surface water rather than groundwater; therefore, the M6 habitats within the study area are not considered groundwater dependent.
M23	M23 dominant polygons are noted within the western extent of the site, near the Water of Charr and west of the B974 within the upper reaches of the Cairn Burn. The polygons of M23 are shown to be underlain by low permeability peat or metamorphic bedrocks, or occur within existing watercourse corridors. Little groundwater is present in the peat deposits and metamorphic bedrocks by virtue of their low bulk permeability. The distribution of M23 recorded on site is not typical of that attributable to a dominant groundwater discharge zone, but rather by rainfall, surface water and waterlogging of soils above the low permeability deposits or adjacent to the watercourses. The occurrence of M23 is not therefore considered groundwater dependent.
MG9	An MG9 dominant polygon is located along the western side of the B974 within the study area. The polygon coincides with a roadside ditch which collects

NVC Community	Location and Distribution on Site
	surface water runoff from surrounding land and the road. The area is underlain by low permeability peat and metamorphic bedrock. Little groundwater is present in the peat deposits and the metamorphic bedrock by virtue of their low bulk permeability. This distribution is not typical of that attributable to a dominant groundwater discharge and therefore it is not considered groundwater dependent.
MG10	MG10 dominant polygons are located immediately west of the B974 or within the eastern extent of the Proposed Development, near an unnamed tributary of the Bervie Water and in the upper reaches of the Carron Water. The polygon near the B974 coincides with a roadside ditch which collects surface water runoff from surrounding land and the road. In addition, this area is underlain by low permeability peat and metamorphic bedrock. Little groundwater is present in the peat deposits and metamorphic bedrock by virtue of their low bulk permeability. The polygons within the eastern extent of the study area are shown to be underlain by low permeability metamorphic bedrock and glacial till deposits and on sloped ground near the watercourses where existing surface water flow paths are recorded. No emergent groundwater was also recorded during the site walkover in these areas. It is therefore considered that the distribution of MG10 recorded on site is not typical of that attributable to a dominant groundwater discharge, but rather by rainfall, surface water and waterlogging of soils above the low permeability deposits or adjacent to the watercourses. It is therefore not considered groundwater dependent.

9.7.27 Review of **Table 9.5** shows that the potential areas of GWDTE are generally located on ground underlain by low permeability peat, glacial till and metamorphic bedrock deposit, or located on ground adjacent to watercourses. This distribution is not typical of that which is sustained by a dominant emergence of groundwater, such as springs or seepage lines, but rather by rainfall, surface water runoff and water logging of soils adjacent to watercourses or above the low permeability deposits.

9.7.28 It is therefore considered that the potential areas of GWDTE habitats are not sustained by groundwater. However, safeguards to maintain these habitats, and sustain the surface water flows to them and preserve water quality to these habitats, will require implementation during construction and operation of the Proposed Development, details of which are included **Section 9.8**. In accordance with Step 1 of the SEPA's guidance no further assessment is required.

Hydrology

9.7.29 The local hydrology is shown on **Figure 9.1**.

9.7.30 The western extent of the study area is located within the River Dee catchment, specifically the Water of Dye sub catchment. The Water of Dye flows generally eastward and northwards to the north of the study area before discharging into the River Feugh and then the River Dee, approximately 10 km north of the Proposed Development. Several tributaries of the Water of Dye cross the study area including the Water of Charr, Stag Burn and Spittal Burn. The River Dee and Water of Dye watercourses are designated as part of the River Dee SAC.

9.7.31 A small part of the centre of the Proposed Development, including poles 101 to 114 and 131 to 134, are located within the River North Esk surface water catchment, specifically within the upper reaches of the Luther Water sub catchment.

9.7.32 The remainder of the study area is located within three surface water catchments, as follows:

- Part of the eastern extent of the study area, including poles 37 to 100, is located within the Bervie Water surface water catchment. The Bervie Water flows generally south eastwards from the Proposed Development before discharging into the North Sea at Inverbervie. The Bervie Water and three tributaries of the Bervie Water (Burn of Brumlieshank, Maxie Burn and Burn of Guinea and their tributaries) cross the Proposed Development.
- The eastern most extent of the Proposed Development, including poles 1 to 36, is located within the Carron Water surface water catchment. The Carron Water flows eastwards from the Proposed Development before discharging into the North Sea at Stonehaven. Several tributaries of the Carron Water, including the Burn of Annamuick, cross the Proposed Development.
- Part of the northeastern extent of the study area is located within the Cowie Water surface water catchment; however no development is proposed within this catchment.

9.7.33 None of the surface water catchments which drain the Proposed Development have been designated as a DWPA. The River Dee catchment at Inchgarth, downstream of the Proposed Development, has been designated as a DWPA, however this is located approximately 15 km northeast of the Proposed Development at its closest extent.

Rainfall and Surface Water Flows

9.7.34 SEPA provided precipitation data for Charr rainfall and Cleuchhead rainfall gauges (station numbers 234183 and 499810 respectively)[57] which are located approximately 2.9 km north and 900 m south of the Proposed Development respectively. In 2024 an annual rainfall of 1,193 mm and 1,076 mm was recorded at the two rain gauges respectively.

9.7.35 The National Flow Archive[58] records stream flow data in the Water of Dye at Charr (located at NGR NO 624 834, approximately 2.9 km north of the Proposed Development) and reports a mean flow of 1.286 m^3/s. None of the other watercourses within the study area are monitored.

Surface Water Quality

9.7.36 The larger watercourses within the study area are monitored by SEPA and were classified in 2023 (the last reporting cycle)[55]. A summary of the SEPA classifications for surface water bodies within the study area is shown below in **Table 9.6**.

Table 9.6: SEPA Surface Waterbody Classifications (2023)

Waterbody ID (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical	Hydro-morphology	Water Quality	Pressures
Water of Dye / Water of Charr (23911)	Good	Good	Not monitored	Good	Not monitored	None
Water of Dye / Spittal Burn (23912)	High	High	High	High	Not monitored	None
Luther Water – source to Dowrie Burn confluence (5706)	Moderate ecological potential	Bad	Good	Bad	Good	Heavily modified water body with physical alterations that cannot be addressed without impact to agricultural land drainage.

Waterbody ID (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical	Hydro-morphology	Water Quality	Pressures
						Diffuse source pollution from rural sources.
Bervie Water – upper catchment (23262)	Moderate ecological potential	Poor	Good	Poor	Moderate	Heavily modified water body due to physical alterations that cannot be addressed without impact to agricultural land drainage. Diffuse source pollution from rural sources.
Carron Water (23257)	Moderate ecological potential	Bad	Good	Bad	Moderate	Heavily modified water body due to physical alterations that cannot be addressed without impact to agricultural land drainage. Diffuse source pollution from rural sources.

Watercourse Crossings

9.7.37 The Proposed Development has sought to utilise existing tracks and access routes where possible; however, 15 new watercourse crossings and four existing crossings on tracks which are scheduled to be upgraded are required to facilitate the Proposed Development. The location of the proposed crossings are shown on **Figure 9.1** and a schedule of these crossing points, including photographs and dimensions of each crossing is presented in **Appendix 9.4: Schedule of Watercourse Crossings**.

Flood Risk

9.7.38 SEPA has developed national flood maps[53] that present modelled flood extents for river, coastal, surface water and groundwater flooding, developed using a consistent methodology to produce outputs for the whole of Scotland. Modelled flood extents are supplemented with more detailed, local assessments where available and suitable for use. Flood extents are presented in three likelihoods: High, Medium and Low as detailed below:

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

9.7.39 SEPA has also produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 2011[54].

9.7.40 A summary of the potential sources of flooding and a review of the potential risks posed by each source is presented below in **Table 9.7**. Future river (fluvial) and surface water / small watercourse (pluvial) flood extents published by SEPA and of relevance to the study area are shown on **Figure 9.1**.

Table 9.7: Flood Risk Screening Assessment

Potential Source	Potential Flood Risk to Application	Justification
Coastal flooding	No	The Proposed Development is remote from the coast. SEPA coastal flood mapping also confirms that the study area is not at risk of coastal or tidal flooding.
River Flooding	Yes (minor)	SEPA river flood mapping confirms that the majority of the study area is not at risk of fluvial flooding. Localised flooding is noted along the watercourse corridors of the Water of Charr and the Bervie Water within the study area. The areas denoted to be at risk of flooding are generally confined to the watercourse channels. With the exception of a small part of a proposed permanent track near pole 72, no development is proposed within mapped floodplains. It is noted that no land raising is proposed at the access track in the floodplain. It is therefore considered that fluvial flooding is not a design constraint, and potential effects can be mitigated (see **Section 9.8**).
Surface Water and Small Watercourses Flooding	Yes (minor)	SEPA surface water flood mapping for smaller watercourses confirms that there are potentially floodplains associated with the smaller watercourses within the study area. Flood extents are generally confined to watercourse corridors. Flood extents, outside of the watercourse corridors, within the study area are limited and flood depths are shown as shallow (<0.3 m deep). With the exception of watercourse crossings and small areas of proposed and existing access tracks (including a small part of existing tracks which are scheduled to be upgraded south of poles 41 to 44, small part of a proposed permanent track near pole 72 and a small part of proposed temporary new stone tracks near pole 60), no development has been proposed within 20 m of watercourses. Surface water flooding is not considered to present a development constraint, and potential effects can be mitigated (see **Section 9.8**).
Groundwater Flooding	No	SEPA groundwater flood mapping confirms the study area is not at risk of groundwater flooding.
Flooding due to dam failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 2011. Review of the SEPA's reservoir inundation mapping confirms that the study area is not at risk from flooding due to dam or reservoir failure from a regulated facility upstream of the site.
Flood Defence Breach (Failure)	No	No formal flood defences are noted on the Scottish Flood Defence Asset Database within the study area.
Flooding from artificial drainage systems	No	The site is located within a remote area and no artificial drainage systems are recorded.

Private Water Supplies and Licenced Sites (Abstractions / Discharges / Waste)

9.7.41 Consultation with AC and SEPA has been conducted regarding records of registered and licenced water abstractions and discharges.

Licenced Sites

9.7.42 SEPA Controlled Activity Regulations (CAR) authorisations within the study area are shown on **Figure 9.1**. Fifteen CAR authorisations have been identified within the study area, the details of which include:

- 12 discharges for private sewage;
- one discharge for existing sewage treatment systems;
- one discharge sheep dip on land; and
- one engineering authorisation for pipeline cable crossing.

9.7.43 No licenced water abstractions have been recorded within the study area.

Private Water Supplies

9.7.44 A data request was made to AC[50] who provided details of private water supply (PWS) sources within the study area. In addition, site investigation has been undertaken to confirm the location of PWS locations and gather information on potential PWS sources not available from AC data.

9.7.45 The risk the Proposed Development poses to PWS sources has been considered in detail as part of this assessment and is presented in **Appendix 9.5**, review of which confirms:

- six PWS sources have been identified as potentially at risk from the Proposed Development; and
- five PWS sources are not considered to be at risk from the Proposed Development.

9.7.46 Measures required to safeguard PWS sources and distribution pipework are given in **Appendix 9.5**.

Future Baseline

9.7.47 Due to consent being sought in perpetuity, the temporal scope requires consideration of the potential for climate change to impact on future baseline conditions. Climate change studies, such as UK Climate Projections (UKCP)18[63] and SEPA guidance[64] predict a decrease in summer precipitation and an increase in winter precipitation, alongside higher average temperatures. This suggests that there may be greater pressures on water supplies and lower water levels in summer months in the future. Additionally, summer storms are predicted to be of greater intensity. Therefore, peak fluvial and surface water flows associated with extreme storms events may also increase in volume and velocity. These potential changes are considered in the assessment of effects.

Summary of Sensitive Receptors

9.7.48 **Table 9.8** below outlines the receptors identified as part of the baseline study, and their sensitivity based upon the criteria contained in **Table 9.2**.

Table 9.8: Summary of Sensitive Receptors

Receptor	Sensitivity	Reason for Sensitivity
Water Dependent or Geological Statutory Designated Sites	High	The River Dee SAC is located downstream of the western extent of the Proposed Development and is considered sensitive to changes in water quality.
Peat and Carbon Rich Soils	High	Presence of peat and carbon rich soils have been confirmed by site investigation. These are important carbon stores and need to be safeguarded.

63 UK Climate Projections (UKCP18) - Met Office (online) Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index (last accessed 08/10/2025)

64 climate-change-allowances-guidance_v6.pdf

Receptor	Sensitivity	Reason for Sensitivity
Superficial and Bedrock Geology	Not Sensisitve	Deposits have been shown to be common regionally and have no rarity value. No geological designated sites are recorded with in the study area.
Groundwater	High	Groundwater has been classified by SEPA as Good, and vulnerability is classified as 4b, 4a and 5 which is considered as “Moderate to High”.
GWDTE	High	Areas of potential GWDTE have been identified by NVC mapping. It has been shown that the habitats within 250 m of the Proposed Development are not sustained by groundwater but by surface water. Measures will be required to sustain existing surface water flow paths to these habitats.
Surface Water	High	The principal watercourses which drain the study area have been classified by SEPA with a status of Moderate to High.
Flood risk receptors downstream of the Proposed Development	Moderate	Minor fluvial floodplains have been identified adjacent to the larger watercourses and surface water (pluvial) flow paths along smaller watercourses.
DWPA	High	None of the surface water catchments which drain the study area have been designated as a DWPA. The River Dee has been designated as a DWPA approximately 15 km northeast of the Proposed Development and the distance is such that any potential effects to the DWPA are unlikely to be discernible; however, given its importance it has been ascribed a High sensitivity.
Private Water Supplies	High	Private water supplies have been confirmed within the study area, several of which could be at risk from the Proposed Development without appropriate controls.
Licenced Sites	Not Sensitive	15 CAR authorisations have been recorded within the study area however no licenced abstractions are present within the study area therefore no licenced sites are considered at risk from the Proposed Development.

9.8 Embedded Mitigation

Mitigation by Design

9.8.1 Mitigation has been developed as the project design has progressed through routeing and alignment selection, and EIA stages of the project. The impact assessment and mitigation process has been iterative and therefore mitigation has developed as an assumed part of the OHL and associated infrastructure. This process has included, for example, using existing access tracks where possible, siting infrastructure generally in areas that avoid ecologically and hydrologically sensitive areas where practicable and technically feasible. Reference is made, by way of illustration, to: (i) the selection of Route Option 1(a) in order to reduce impacts upon the River Dee SAC and identified plans for peat restoration; and (ii) the development of an Alignment Variant in order to minimise impacts to a peat restoration scheme. Further reference is made to **Chapter 2: The Routeing Process and Alternatives**).

9.8.2 In addition to the mitigation embodied in the design and routeing of the Proposed Development, industry best practice construction measures (see **Section 9.5**) will be used to minimise disturbance and pollution during construction.

9.8.3 A description of all elements of the Proposed Development is given in **Chapter 3: The Proposed Development.** Embedded mitigation and mitigation by design relevant to soils, geology and the water environment is presented below.

Good Practice Measures

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

9.8.5 The Proposed Development will be constructed in accordance with good practice guidance, including UK and Scottish guidance on good practice for construction projects as detailed in **Section 9.5** of this Chapter and can be secured by an appropriately worded planning condition relating to the CEMP.

9.8.6 In addition, the Applicant has established good practice construction techniques and procedures that have been agreed with statutory consultees, including SEPA and NatureScot. These are set out within the Applicant's General Environmental Management Plans (GEMPs), included in **Appendix 3.3** The Proposed Development would be constructed in accordance with these plans.

Construction and Environmental Management Plan (CEMP)

9.8.7 A contractual management requirement of the successful Principal Contractor would be the development and implementation of a comprehensive and site-specific CEMP. This document would detail how the successful Principal Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIA Report, Applicant's SPPs and GEMPs, statutory consents and authorisations, and industry best practice and guidance, including pollution prevention guidance.

9.8.8 The CEMP will also outline measures to ensure that the works minimise the risk to soils (including peat), groundwater, surface water and water dependent designated sites.

9.8.9 It is expected that the following will be included within the CEMP and meaning the works are undertaken in accordance with good practice guidance, which includes, but is not limited to the following:

- any above ground on-site fuel and chemical storage would be bunded;
- emergency spill response kits would be maintained during the construction works;
- a vehicle management system would be put in place wherever possible to reduce the risk of collisions;
- a speed limit would be used to reduce the likelihood and significance of any collisions;
- drip trays will be placed under vehicles and plants which could potentially leak fuel / oils;
- any temporary construction / storage compounds will be located remote from any sensitive surface water receptors or private water supplies and will be constructed to manage surface water run-off in accordance with best practice;
- any water contaminated with silt or chemicals will not be discharged directly or indirectly to a watercourse without prior treatment; and
- water for temporary site welfare facilities will be brought to site, and foul water will be collected in a tank and collected for offsite disposal at an appropriately licensed facility.

9.8.10 A wet weather protocol would be developed. This would detail the procedures to be adopted by all staff during periods of heavy rainfall. Tool box talks would be given to engineering / construction / supervising personnel. Roles would be assigned, and the inspection and maintenance regimes of sediment and runoff control measures would be adopted during these periods.

9.8.11 In extreme cases, the above protocol would dictate that work on-site may have to be temporarily suspended until weather / ground conditions allow.

Environmental Clerk of Works

9.8.12 To ensure all reasonable precautions are taken to avoid negative effects on soils and the water environment, a suitably qualified Environmental Clerk of Works (ECoW) will be appointed, prior to the commencement of construction, to advise the Applicant and Principal Contractor on all ecological and hydrological matters. The ECoW will be required to be present onsite during the construction phase and will carry out monitoring of works. In addition, the ECoW will provide briefings with regards to any ecological and hydrological sensitivities on the site, to the relevant staff of the Principal Contractor and subcontractors.

9.8.13 With respect to the water environment, the ECoW would also have responsibility to ensure water flow paths and quality to water dependant habitats are sustained during all phases of the Proposed Development.

Safeguarding of Carbon Rich Soils and Peat

9.8.14 Consistent with NPF4[16], a detailed review of the distribution, condition and depth of peat at the site is contained in **Appendices 9.1**, **9.2** and **9.3**. The Proposed Development design has applied the mitigation hierarchy detailed in Policy 5 of NPF4[16] and specifically avoided areas of deep peat (>1 m deep) wherever technically feasible. It is shown (**Appendix 9.2: PMP**) that disturbed soils and peat can be readily managed and accommodated without degradation. No surplus peat would be generated as a result of construction of the Proposed Development.

9.8.15 A Design and Geotechnical Risk Register would be compiled to include risks relating to peat instability. Further good construction practice and methodologies to prevent peat instability within areas that contain peat deposits are identified in the PLHRA. These include:

- measures to ensure a well-maintained drainage system, to include the identification and demarcation of zones of sensitive drainage or hydrology in areas of construction;
- minimisation of 'undercutting' of peat slopes. Where this is necessary, a more detailed assessment of the area of concern would be required;
- careful micrositing of access track alignments to minimise effects on the prevailing surface and sub-surface hydrology;
- raising peat stability awareness for construction staff by incorporating the issue into any inductions (e.g. peat instability indicators and good practice);
- introducing a 'Peat Hazard Emergency Plan' to provide instructions in the event of a peat slide or discovery of peat instability indicators;
- developing methodologies to minimise degradation and erosion of exposed peat deposits, as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. minimisation of off-track plant movements within areas of peat); and
- developing drainage systems that would not create areas of concentrated flow or cause over-, or under-saturation of peat habitats.

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

Buffer to Water Features

9.8.17 As part of the Proposed Development design, with the exception of required watercourse crossings, a separation buffer of 20 m has been applied to watercourses and water features such as lochs and ponds (see **Figure 9.1**). The majority of the Proposed Development, except small areas of proposed new access track, temporary new stone access track and existing tracks which are scheduled to be upgraded, are located outside the 20 m watercourse buffer, as discussed in **Section 9.7**. In addition, all the proposed OHL poles have been located out with the 20 m watercourse buffer. To ensure protection of watercourses and surface water features throughout Proposed Development construction, the works associated with the access tracks proposed within the 20 m buffer would be demarked, and necessary additional safeguards agreed with the site ECoW prior to construction works commencing. These additional safeguards would be outlined in the CEMP and would include, but not be limited to the following:

- increased induction and training for staff highlighting sensitivities;
- a wet weather working protocol and provision to cease works during prolonged rainfall or periods of high runoff (pluvial or fluvial);
- reduction in extent of working area to minimise the potential to disturb ground;
- additional passive water quality control measures, such as temporary water diversion ditches, silt fences and silt traps to control and treat runoff from working areas;
- daily inspection of works and watercourses and full-time supervision of construction and restoration and works;
- deployment of real-time water quality monitoring telemetry with predetermined water quality trigger levels based on baseline water quality data (e.g. for pH, dissolved oxygen and electrical conductivity); and
- documentation that clearly identifies responsibilities and actions and contact details should a pollution event be recorded.

9.8.18 It is noted that a 10 m buffer is specified in SSEN Transmissions GEMP Working in or Near Water (see **Appendix 3.3)** (Revision 1.02, March 2024) and is typical for developments of this nature. Application of the 20 m buffer provides a standoff to watercourses and water features that, in combination with industry good practice, minimises the risk to water bodies.

Water Quality Monitoring (Designated Sites and PWSs)

9.8.19 It has been confirmed that the Proposed Development lies within the River Dee surface water catchment and is hydraulically connected within the River Dee SAC. Surface water on site also drains to a Scottish Water DWPA and locally sustains PWS sources, seven of which have been identified as potentially at risk from the Proposed Development.

9.8.20 Water quality monitoring would be used to confirm that the quality and / or quantity of water within the study area is not significantly impacted by the Proposed Development. Monitoring would be undertaken prior to construction, throughout the construction phase and immediately post construction. Analysis of monitoring data would allow for a rapid response to any pollution incident and would also enable assessment of good practice or remedial measures. Monitoring frequency would increase during the construction phase if remedial measures were implemented. A water quality and quantity monitoring plan would be developed during detailed design of the Proposed Development and it is expected that this would be subject to a predevelopment planning condition. The agreed water quality monitoring plan would then form part of the CEMP.

9.8.21 Throughout the Proposed Development construction performance of good practice measures would be constantly reviewed by the water quality monitoring schedule. This would be based on a comparison of data obtained during construction with a baseline data set sampled prior to the construction period, a minimum of 12 month prior to construction.

9.8.22 As discussed in **Appendix 9.5**, it is also proposed to include PWS sources that have a potential hydraulic connection to the Proposed Development in the water monitoring programme.

Pole Foundation Construction

9.8.23 The foundations required for the proposed poles are very small in scale compared to local surface water and groundwater catchments in which they are located. Typically, the pole foundations are 3 m long x 3 m wide and extend to a depth of 2.0 – 2.5 m (see **Chapter 3 – The Proposed Development, Section 3.9).**

9.8.24 Industry standard good practice methods would be used for pole foundation construction and would be detailed in the CEMP and include the following. A large section of turf would be removed to a depth of approximately 300 mm and carefully laid to the side (vegetation side up) for re-use in restoration works. The turves would be replaced on the backfilled excavations once each pole is installed (see below), with the aim of restoring disturbed ground vegetation to an original baseline condition.

9.8.25 Once the turf is removed the excavator operator would then commence excavating the soils to the required depth. The soil would be removed in roughly even layers down the excavation depth with different soil types stored separately.

9.8.26 With the pole installed, backfilling of the excavation would take place with the soils replaced in reverse order whilst being compacted with the excavator bucket in approximately 300 mm layers. At this time, it may be necessary to add imported inert backfill around the pole foundation to ensure stability.

9.8.27 Backfilling would continue until normal ground level is reached. The turves would then be replaced – using the excavator and deliberately left slightly proud of the surrounding ground level. This approach is based on two considerations. First, subsoils naturally settle following excavation and replacement due to the effects of bulking, even when compacted during reinstatement. Over time, this can result in the formation of a slight depression around the structure. Second, reinstating the turf slightly above the surrounding ground level helps prevent deterioration of the underlying materials and promotes faster turf recovery.

9.8.28 In practice, within 12 months of reinstatement, and from experience of similar projects in similar site settings excavated area returns to natural ground levels and no evidence of the excavation itself is visible.

9.8.29 Soils and turves would be handled sensitively to avoid cross contamination between distinct horizons and to ensure re-use potential is maximised. Any excess peat from excavation works that cannot be used in reinstatement, would be used locally for peat habitat enhancement and restoration under the direction of the site ECoW, as discussed in **Appendix 9.2**.

Pollution Risk

9.8.30 Good practice measures in relation to pollution prevention would applied, and in particular include:

- refuelling would take place at appropriately sited and designated refuelling bays. Where this is not possible refuelling would take place at least 30 m from watercourses, in accordance with the Applicant's GEMPs (see **Appendix 3.3**). Where there is risk that oil from a spill could directly enter the water environment, for example, periods of heavy rainfall or when standing water is present refuelling outside of the designated areas would be avoided;
- foul water generated on site from the proposed compound and site welfare would be collected and disposed of offsite by a licensed contractor;
- areas would be designated for washout of vehicles, located at a minimum distance of 30 m from surface water features;
- washout water would be stored in the washout area before being treated and disposed of;

- a vehicle management plan and speed limit would be strictly enforced onsite to minimise the potential for accidents to occur;
- if any water is contaminated with silt or chemicals, associated runoff would not enter a watercourse directly or indirectly prior to treatment;
- water would be prevented from entering excavations such as pole foundations, as far as is practicably possible by using appropriate drainage methods such as cut-off drains, catch pits and bunds;
- procedures would be adhered to for storage of fuels and other potentially contaminative materials in line with the Controlled Activity Regulations, to minimise the potential for accidental spillage; and
- a plan for dealing with spillage incidents would be designed prior to construction, and this would be adhered to should any incident occur, reducing the potential for environmental effects such as accidental pollution of surface water features, as far as practicable. This would be included in the CEMP for the Proposed Development.

9.8.31 As part of the detailed design stage of the Proposed Development further ground investigation will be undertaken. No evidence of made ground or historic land uses that might give rise to pollution if disturbed were witnessed during the walkover and peat probing surveys completed to date. However, if potentially contaminated ground was recorded then a strategy for managing any ground disturbance in these area(s) would be agreed with AC at that time and be subject to the controls agreed in the CEMP.

Erosion and Sedimentation

9.8.32 Good practice measures for the management of erosion and sedimentation would include the following:

- all stockpiled materials would be located a minimum of 10 m from watercourses, in accordance with Applicant's GEMPs (see **Appendix 3.3**);
- water would be prevented, as far as possible, from entering excavations such as pole foundations through the use of appropriate cut-off drainage;
- where the above is not possible, water would pass through a number of settlement areas and silt / sediment traps to remove silt prior to discharge into the surrounding drainage system;
- clean and dirty water onsite would be separated and dirty water would be filtered before entering the water environment;
- if the material is stockpiled on a slope, silt fences would be located at the toe of the slope to reduce sediment transport;
- the amount of ground exposed, and time period during which it is exposed, would be kept to a minimum;
- silt / sediment traps, single size aggregate, geotextiles or straw bales would be used to filter any coarse material and prevent increased levels of sediment. Further to this, activities involving the movement or use of fine sediment would avoid periods of heavy rainfall where possible; and
- SSEN construction personnel, the Principal Contractor and the ECoW would carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas.

Fluvial Flood Risk

9.8.33 SuDS will be adopted as part of the detailed drainage design for the Proposed Development where areas of hardstanding are proposed. SuDS techniques aim to mimic pre-development runoff conditions and balance or throttle flows to the rate of runoff that might have been experienced prior to development. Where new permanent tracks or temporary compounds and laydown areas are proposed, good practice in relation to the management of surface water runoff rates and volumes would include the following:

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

- onsite drainage would be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the drainage design; and
- appropriate drainage would attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk.

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

Water Abstraction

9.8.35 Abstraction of water for construction activities is not anticipated. If, however, a source of water is required for construction, application for a CAR Licence would be made to SEPA and managed through the regulation of the CAR Licence(s). Should a suitable source not be identified, a water bowser would be used.

9.8.36 Good practice that would be followed in addition to the CAR Licence regulations includes:

- planning of water use to minimise abstraction volumes;
- re-use of water where possible;
- recording of abstraction volumes; and
- careful control of abstraction rates to prevent significant water depletion in a source.

Watercourse Crossings

9.8.37 Good practice in relation to water crossings involves the following aspects:

- the design of the watercourse crossings would be agreed with SEPA prior to construction and be regulated in accordance with CAR;
- the appropriate crossing type would be identified from SEPA's good practice guidance[35] and would consider geomorphological, ecological and hydrological constraints; and
- the crossing would be sized and designed so as to minimise effect upon flood risk (the design flood event will be agreed with SEPA and is expected to be the 200-year flow plus an allowance for climate change).

9.8.38 In accordance with SEPA Technical Flood Risk Guidance[29] and Good Practice Guidance for river crossings[28] hydraulic modelling of watercourse crossing WX01 (as shown on **Figure 9.1b**) would be undertaken at the detailed design stage to inform the proposed bridge design. This would establish accurate baseline flood extents, depths and flow velocities of the watercourse. The hydraulic model would then be used to assess the preferred bridging solution and ensure that it is capable of passing the 200-year flood event plus climate change, without adversely impacting peak flood extents and flood depths upstream or downstream of the crossings. The output of the modelling would form part of a CAR application for the bridging solution, submitted to SEPA prior to commencement of construction.

9.8.39 It is proposed that the watercourse crossings detailed in the watercourse crossing schedule (see **Appendix 9.4**) are retained for the life of the Proposed Development, to ensure access is achievable for routine inspection and maintenance of the Proposed Development.

9.8.40 Where temporary watercourse crossings are required, for example of minor or unmapped watercourses, the following methodology would be applied:

- Fording would be used where an established crossing point is already in place (on current tracks) with a suitable bed for crossing (where necessary the bed would be protected by the installation of bog mats or similar for running on). Fording would only be used where limited traffic is expected and impacts on the bed and crossing point would be monitored. Where deemed necessary and as agreed with the ECoW, appropriate mitigation would be implemented in accordance with CAR;

- For watercourses less than 2 m wide, General Binding Rules (GBRs) (as set out in CAR) would be adhered to. Bog mats, or similar, would be positioned across the watercourse to enable access, where deemed necessary. In addition, side rails would be installed with silt mitigation at either end and / or across the watercourse to ensure that silt impacts from vehicles crossing are controlled at all times. Bog mats, side rails etc would be cleaned at the end of the day if required; and
- Where possible, large watercourse crossings would be avoided by works being accessed and undertaken on either side of the watercourse. Appropriate protection measures would be implemented for conductor works to ensure that the conductor does not enter the watercourse.

9.8.41 It is expected that temporary watercourse crossing works would be completed under appropriate GBRs. Notwithstanding this, all proposed crossing locations and methodologies would be reviewed and approved by the ECoW, prior to any works being undertaken and monitored for the duration of the work.

Access Tracks

9.8.42 In general, proposed construction site access would be taken via the existing public road network and would use existing access tracks where possible (see **Chapter 3: The Proposed Development** for further details). New permanent and temporary tracks are required for access to the Proposed Development where there are no existing tracks (see **Figures 3.1a-e**).

9.8.43 All new tracks would be constructed in accordance with best practice construction methods, and with reference to NatureScot's good practice guide on constructing tracks in Scottish uplands[37]. The design of new tracks would be confirmed as part of the Proposed Development detailed design and floating track construction techniques would be used in sensitive areas, such as over deeper peat. SuDS drainage measures (as detailed above) would be used to collect, treat and attenuate runoff from tracks and maintain existing surface water flow paths.

9.8.44 Upgrades to existing tracks would typically involve surface dressing to provide a suitable running surface for access vehicles. In some locations it may be necessary to undertake limited widening of the track or improvement of existing drainage measures. All upgrade works would also be undertaken in accordance with good practice construction methods, and with reference to NatureScot's good practice guide on constructing tracks in Scottish uplands[37].

9.8.45 New permanent access tracks would be constructed using inert stone. Temporary access tracks would be constructed using inert stone or trackway panels. Both permanent and temporary stone access tracks would be underlain by a geomembrane to minimise the potential for differential settlement during their use. Any soils disturbed to construct permanent tracks would be used locally to reinstate the track edges under the direction of the ECoW.

9.8.46 Temporary tracks would be removed as soon as they are no longer required. Stone above the geomembrane would be carefully lifted and re-used onsite where possible. If not suitable for re-use on site, the stones would be removed by suitably licensed waste carrier to a suitably licensed waste management facility for disposal, before the geomembrane is lifted and appropriately disposed of separately, in accordance with good practice[25]. Any soils disturbed to form the temporary track would then be replaced (in the order they were excavated) and restored using natural regeneration methods. Where track panels are deployed these will be lifted and removed from site for reuse or recycling.

Concrete Batching, Transport and Pouring

9.8.47 In relation to works involving concrete batching, transport and pouring, the following mitigation would be adopted:

- where concrete transfers are required, measures would be adopted at the point of concrete transfer to prevent accidental spillage of liquid concrete and no transfers would be undertaken at least 30 m to watercourses or areas of standing water;
- there would be no wash-out of concrete carrying vehicles (except the concrete chute) with wash-out undertaken at the nearest compounds where suitably bunded / protected facilities would be provided. Chutes would be washed out to a suitable container, allowed to settle and disposed at suitably licensed facilities;
- excess concrete or wash-out liquid would not be discharged to drains or watercourses. Drainage from washout facilities would be collected and treated or removed to an appropriate treatment point / licensed disposal site; and
- vehicles and plant would be confined to the area required for safe working only, to prevent compaction, rutting and habitat damage to adjacent areas of land. Working areas would be clearly marked out and temporary fencing used where risk assessments indicate a requirement. Similar procedures would be adopted to demarcate areas where plant access is required for conductor stringing and tensioning works.

Forest and Woodland Felling

9.8.48 Felling required to establish an appropriate operational corridor for the construction and safe operation of the Proposed Development, including the creation of access tracks, would be undertaken in accordance with good practice guidance outlined in Applicant's GEMPs (see **Appendix 3.3**) which would be detailed within the CEMP and overseen by the ECoW.

Protection of Scottish Water and PWS Distribution Pipework

9.8.49 Scottish Water has confirmed that there is live infrastructure in the proximity of the Proposed Development, and it has also been confirmed that the Proposed Development would cross the distribution pipework for two PWS sources (see **Appendix 9.5**). As part of the detailed design stage for the Proposed Development, the location of the Scottish Water and PWS distribution pipework would be confirmed and clearly marked. If necessary, protection measures would be agreed with Scottish Water and the property owners to ensure infrastructure integrity is maintained.

9.9 Potential Effects

9.9.1 The assessment of effects is based on the Proposed Development description outlined in **Chapter 3: The Proposed Development** and is structured as follows:

- construction effects of the Proposed Development; and
- operational effects of the Proposed Development.

9.9.2 It takes account of the embedded mitigation (described above) and is undertaken in accordance with the methodology described in **Section 9.6**.

Construction Effects

9.9.3 Potential construction impacts on geology, hydrology and hydrogeology have been considered for the different phases of the Proposed Development (construction and operation). The impacts have been identified with reference to relevant guidance, through consultation and project team discussions, targeted research on hydrological and water quality effects and by considering the information provided by the project engineers on infrastructure and construction methods.

9.9.4 During the construction phase, the Proposed Development would have the potential to result in the following effects without the appropriate controls:

- adverse effects on carbon rich soils and peat through inappropriate handling and safeguarding;

- an adverse effect on surface water or groundwater quality, including water dependent designated sites and public and private water supplies, from pollution; including fuel, oil, concrete, suspended solids or other hazardous substances;
- potential adverse change of surface and groundwater flow paths and contribution to areas of peat and GWDTEs, water dependent habitat and water supplies;
- increased flood risk to areas downstream of the Proposed Development through increased surface water runoff; and
- potential pollution impacts and adverse effects to sensitive receptors; including private water supplies, the River Dee SAC and Scottish Water DWPA.

Peat and Carbon Rich Soils

9.9.5 The peat landslide hazard risk assessment (**Appendix 9.1)** and peat management plan (**Appendix 9.2**) show that as a result of a detailed programme of site investigation to determine the baseline, areas of deeper peat and organic soils have generally been avoided by the design of the Proposed Development where technically feasible.

9.9.6 Further the proposed infrastructure has targeted areas where negative indicators of peatland condition, and few, if any, positive condition indicators are recorded. As detailed in the PCA (see **Appendix 9.3**) where peat is present, the peat is shown to be extensively drained with degraded condition indicators.

9.9.7 Best practice measures to maintain the integrity and structure of peat and organic soils are given in the sections above. This 'embedded mitigation' greatly reduces the potential adverse effect on peat and carbon rich soils.

9.9.8 Peat and organic soils are considered **high** sensitivity receptors. The Proposed Development and proposed safeguards embedded in its design reduce the magnitude of potential impact to **negligible**, during the construction phase. The significance of effect is therefore assessed as **negligible**.

9.9.9 No additional mitigation, over and above that detailed in the peat management plan (**Appendix 9.2**) and peat landslide hazard risk assessment (**Appendix 9.1**), is proposed in these circumstances.

Surface Water and Groundwater Quality

9.9.10 As stated above the works would be undertaken in accordance with the Applicant's GEMPs (**Appendix 3.3**) and relevant technical guidance, GPPs and other codes of best practice, to limit the potential for contamination of both ground and surface waters. In addition, a site-specific CEMP would be prepared by the Principal Contractor, including a surface and groundwater quality management plan.

9.9.11 The above measures would significantly reduce the likelihood of pollutants, including suspended solids, being discharged to nearby watercourses or groundwater.

9.9.12 The safeguards included in the Proposed Development design and the committed best practice construction techniques would also safeguard the quality of water which sustains the River Dee SAC, Scottish Water DWPA, and PWS sources, with potential hydraulic linkage to the Proposed Development.

9.9.13 Surface water, groundwater, water dependent designated sites, DWPA and PWS sources are considered high sensitivity receptors. The Proposed Development and proposed safeguards embedded in the development design reduce the magnitude of potential impact to low, during the construction phase. The significance of effect is therefore assessed as **negligible**.

9.9.14 No additional mitigation, over and above confirmatory water quality monitoring, is proposed in these circumstances. .

Surface and Groundwater Flow

9.9.15 No significant deep or expansive earthworks are proposed when compared to the overall extent of the surface and groundwater catchments at any location of the Proposed Development and therefore there will be no significant impact on catchment scale surface water or groundwater flows. Notwithstanding this, the best practice measures listed above would be included in the CEMP and would be used to control and manage surface and groundwater flows and maintain existing water flow paths at a local scale, to ensure water flow paths to water dependent habitat would be maintained.

9.9.16 Surface and groundwater are highly sensitive receptors. With these safeguards, the potential impact on ground and surface water flows is assessed as negligible and thus the resultant significance of effect is **negligible**.

9.9.17 No additional mitigation, over and above embedded mitigation by confirmatory monitoring, is proposed in these circumstances.

Flood Risk

9.9.18 Areas of flood risk are considered to have a moderate sensitivity. It has been shown (see **Section 9.7**) that limited areas of flood risk (limited to minor fluvial floodplains adjacent to the larger watercourses and surface water (pluvial) flow paths along smaller watercourses) have been identified within the study area. As part of the detailed site design, the Principal Contractor would prepare a detailed construction method statement which will have regard to areas of known and potential flood risk. This will ensure no new permanent infrastructure which is sensitive to flooding is located within the floodplain and no land raising of the floodplain occurs. Moreover, as the base of the proposed OHL poles are water compatible, they would not be considered to be at risk from fluvial flooding. In addition, SuDS will be adopted as part of the detailed drainage design for the Proposed Development where areas of hardstanding are proposed to ensure that flood risk does not increase downstream of the Proposed Development.

9.9.19 It is proposed that access to the Proposed Development will use existing tracks and existing watercourse crossings wherever possible. Where watercourse crossings or works to existing crossings are required, the following measures will be implemented to protect surface water and groundwater quality, as well as to mitigate a potential increase in flood risk:

- silt traps / check dams will be used to capture suspended solids generated during construction;
- construction will be carried out in accordance with appropriate SEPA[28] and CIRIA[24] guidance;
- watercourse crossings would be designed to pass a design flood event agreed with SEPA, which is expected to be the 200-year flood, plus an allowance for climate change; and
- the design and capacity of the watercourse crossings would be agreed by the Principal Contractor and the project ECoW, and, if required in consultation with SEPA, as part of the detailed design.

9.9.20 With these safeguards in place, the magnitude of potential impact is assessed as negligible and the resultant significance of effect is assessed as **negligible**.

Designated Sites, DWPA and PWS Sources

9.9.21 The baseline assessment has confirmed that the River Dee SAC is hydraulically connected to the Proposed Development. There is a public water supply DWPA downstream of the Proposed Development and seven PWS sources have also been identified as potentially at risk (see **Appendix 9.5**).

9.9.22 The controls which would be adopted for the Proposed Development, in accordance with best practice as discussed above, would be used to maintain water resources (e.g. quality and quantity). The potential impact on the River Dee SAC, DWPA and local PWS sources that are hydraulically connected to the Proposed Development is negligible and thus the significance of effect is **negligible**.

9.9.23 No additional mitigation, over and above embedded mitigation by confirmatory water quality monitoring, is proposed in these circumstances..

Operational Effects

9.9.24 During the operational phase of the Proposed Development, it is anticipated that routine maintenance of infrastructure and tracks would be occasionally required, during which there is potential to result in the following effects without appropriate controls or mitigation:

- adverse changes to surface water flow paths, watercourse discharge rates and volumes, and alteration of watercourse geomorphology;
- as a result of an alteration of groundwater and surface water flow paths, an adverse effect on water abstractions and water dependent habitat;
- an adverse effect on surface water or groundwater quality from accidental pollution, fuel, oil, concrete or other hazardous substances from site traffic associated with maintenance activities; and
- increased flood risk through increased surface water runoff from new impermeable areas.

9.9.25 Should any maintenance be required onsite which would involve construction activities, method statements would be developed, adopting best practices agreed with regulators, as part of the construction phase CEMP.

Peat and Carbon Rich Soils

9.9.26 During the operational phase there will be no requirement to undertake earthworks which could impair peat or carbon rich soils. In the unlikely event earthworks are required, these would be undertaken using the same controls and safeguards employed during the construction phase.

9.9.27 The likelihood, magnitude of impact and duration of works which have potential to impair peat or carbon rich soils would be negligible, following adherence to good practice measures. Therefore, the potential significance of effect on peat and carbon rich soils is **negligible**.

Surface Water and Groundwater Quality

9.9.28 The possibility of an accidental pollution event resulting in impairment of surface water or groundwater impairment and occurring during operation is very unlikely, as there would be a limited number of vehicles required onsite for routine maintenance.

9.9.29 Any maintenance activities occurring near watercourses would be undertaken using the same controls agreed with statutory consultees and deployed during the construction phase. Further, the scope of works which might be undertaken near watercourses are no different to the work which would be undertaken during the construction phase.

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

9.9.31 The surface water and groundwater receptors have a high degree of sensitivity. However, the magnitude of a potential impact on surface water or groundwater quality (and receptors sustained by surface and groundwater) during the operational phase of the Proposed Development would be negligible. Therefore, the significance of effect during the operational phase of the Proposed Development is predicted to be **negligible**. No further or additional mitigation, therefore, is proposed in these circumstances.

Surface and Groundwater Flow

9.9.32 During operation of the Proposed Development, it is not anticipated that there would be any excavation or need to stockpile large volumes of soils, reducing the potential for effects on surface and groundwater flows. Should any excavation be required, this is likely to be limited and required for example, for localised maintenance of tracks, or areas of hardstanding. Any excavation, handling and placement of material would be subject to the same safeguards that would be used during Proposed Development construction.

9.9.33 Should any non-routine maintenance be required at the sections of track crossing wet areas (defined visually onsite by a contractor or operational personnel), then good practice measures as detailed for the construction phase, would be required on a case-by-case basis. Extensive work at watercourse crossings / adjacent to the water environment may require approval from SEPA under the CAR (depending upon the nature of the activity).

9.9.34 The likelihood, magnitude and duration of works which have the potential to alter surface and groundwater flow paths would be negligible following adherence to good practice measures. Therefore, the potential significance of effect on surface and groundwater is **negligible**. No mitigation is, therefore, required.

Flood Risk

9.9.35 Culverts beneath permanent access tracks could become blocked without routine inspection or maintenance. Any reduction in flow or water conveyance could locally increase flood risk.

9.9.36 In accordance with the Applicants GEMPs (see **Appendix 3.4**) proposed infrastructure would be subject to routine inspection, and if required maintenance. Where identified, any remedial works would be undertaken using the same controls and authorisations detailed above, with deployment during Proposed Development construction.

9.9.37 The likelihood, magnitude of impact and duration of works with potential to alter surface and groundwater flow paths would be negligible following adherence to good practice measures (see **Section 9.8**). Therefore, the potential significance of effect on surface and groundwater is **negligible**. No mitigation is therefore required.

Designated Sites, DWPA and PWS Sources

9.9.38 The controls adopted during operation of the Proposed Development would be in accordance with good practice (see **Section 9.8**), to ensure safeguarding of surface water and groundwater quality, surface water and groundwater flows, and to mitigate flood risk. They would ensure that the potential impact of the River Dee SAC, DWPA and PWS sources is negligible and thus the significance of effect is **negligible**. No additional mitigation is required.

9.10 Cumulative Effects

9.10.1 Developments of a commensurate scale in proximity to the Proposed Development are shown on **Figure 5.1.** The following developments that are within 5 km of a commensurate scale, and in the same water catchments as the Proposed Development include the following:

- The installation of the permitted development UGC which are considered within **Appendix 1.1: Permitted Development Works Appraisal**;
- Glendye Wind Farm (consented) in the Water of Dye surface water catchment;
  - The EIA[65] predicted Moderate and Significant construction effects in isolation on peat landslide and soil loss but following the application of additional mitigation, no significant residual effects were anticipated.

65 Coriolis Energy Ltd (2022) Glendye Wind Farm EIAR, Volume 001 – Chapter 007 – Hydrology, Hydrogeology and Geology (online) Available at: https://www.dpea.scotland.gov.uk/CaseDetails.aspx?id=121949&T=66 (last accessed 08/10/2025)

- Fetteresso Wind Farm (consented) partially located in the Bervie Water surface water catchment, located upstream of the Proposed Development;
  - The EIA[66] does not identify any likely significant effects in isolation.
- Hurlie 400 kV Substation, Fetteresso Forest (application) partially located in the Carron Water surface water catchment;
  - The EIA[67] concluded that there is Negligible and Not Significant effect on the surface and ground water quality (including PWS), runoff rates, and flood risk in isolation.
- Kintore to Tealing 400 kV OHL (application) partially located in the Luther Water, Bervie Water and Carron Water surface water catchments;
  - The EIA[68] predicted Moderate and Significant effects on water quality and GWDTE prior to additional mitigation measures. Following the application of additional mitigation, no significant residual effects were anticipated.
- Quithel Battery Energy Storage System (BESS) (pre-application) located in the Carron Water surface water catchment;
- The Waters BESS (pre-application) located in the Carron Water surface water catchment;
- Bowdun Offshore Wind Farm Onshore Cable Connection and substation (pre application) partially located in the Bervie and Carron Water surface water catchments; and
- Fetteresso 132 kV Substation Extension (pre application) located in the Carron Water surface water catchment.

9.10.2 These developments are either operational or will be constructed shortly (if consented) and therefore have / would be expected to adopt current industry standard guidelines (see **Section 9.5**) and be managed in accordance with best practice, industry standards and relevant legalisation, planning policy and guidance regulated by statutory consultees. These standards are used, with respect to geology, hydrology and hydrogeology, to mitigate potential impacts and control these at source.

9.10.3 The magnitude of cumulative impact is therefore considered negligible and the potential effect on identified receptors is negligible and not significant.

9.11 Mitigation

9.11.1 As noted above, the adoption of embedded mitigation (including mitigation by design and standard good practice measures) means that no predicted likely significant effects will arise on the receptors studied in this chapter. As such, no further additional or bespoke mitigation measures are proposed.

9.12 Residual Effects

9.12.1 No significant residual effects on soils (inc. peat), geology, surface water or groundwater receptors including designated water dependent sites and PWS sources are predicted during the construction and operation of the Proposed Development.

9.13 Summary and Conclusions

9.13.1 Existing soils, geological, hydrogeological and hydrological conditions have been identified and used to assess the potential effects the Proposed Development may have on geology, hydrology and hydrogeology.

66 Fred Olsen Renewables. Fetteresso Wind Farm (online) Available at: https://fredolsenrenewables.com/all-projects/fetteresso/ (last accessed 08/10/2025)
67 SSEN Transmission. Hurlie 400 kV Substation (online) Available at: https://www.ssen-transmission.co.uk/projects/project-map/hurlie-400kv-substation/ (last accessed 08/10/2025)
68 SSEN Transmission. Kintore to Tealing 400 KV OHL EIA Report (online) Available at: https://www.ssen-transmission.co.uk/projects/project-map/kintore-tealing-400kv-ohl-connection/ (last accessed 08/10/2025)

9.13.2 Good practice construction techniques (see **Section 9.8**) that would safeguard soils, geology and the water environment and would be incorporated in the detailed design of the works have been identified. Subject to their adoption, peat resources, soils, geology and the water environment will be safeguarded during and following development.

9.13.3 A summary of assessed effects and identified mitigation measures required to reduce the potential effects to acceptable levels are identified below in **Table 9.9**.

Table 9.9: Summary of Effects and Proposed Mitigation Measures

Potential Effect	Embedded Mitigation	Resultant Significance of Effect
Construction Phase		
• Alteration of surface water or groundwater flow • Increased erosion and sedimentation • Impairment of surface water or groundwater quality • Increase in flood risk • Adverse effect on water dependent designated sites, DWPA and PWS sources	• Mitigation by design • Good practice construction techniques to be included in the CEMP • Confirmatory water quality monitoring • Protection of water supply infrastructure • Site investigation and use of a geotechnical risk register • Peat Management Plan; and • Outline Habitat Management Plan	Negligible and not significant.
Operational Phase		
No additional effects or mitigation / enhancements identified		
Cumulative Effects		
No additional effects or mitigation / enhancements identified		