CONTENTS

7. GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

7.1 Executive Summary

7.1.1 An appraisal has been undertaken of the potential effects the Proposed Development would have on geology (including soils and peat), hydrology and hydrogeology (which together form the water environment). It considers both the construction and operational phases of the Proposed Development.

7.1.2 This Chapter summarises the existing baseline setting of the Proposed Development, which has been informed by a desk top study, field work and data supplied by The Highland Council (THC) and Scottish Environment Protection Agency (SEPA). It has also used information and data presented in appraisals and assessments for neighbouring developments. The Chapter is supported by a set of figures that show the setting of the Proposed Development, and the relative location of potential receptors.

7.1.3 It describes the results of site work which has been completed to verify the published information sources and which has included a detailed programme of peat depth probing and peat characterisation, visits to private water supply sources within the study area and preparation of a schedule of watercourse crossings. The data was gathered over a number of field campaigns, the results of which informed the emerging development design. As a consequence, many potential effects have been avoided by the iterative design of the Proposed Development.

7.1.4 A standalone peat depth and characterisation assessment has been completed and the potential effects on peat are discussed in full in **Appendix 7.1: Peat Landslide Hazard Risk Assessment** and **Appendix 7.2: Peat Management Plan,** a summary of which is included in this Chapter. A schedule of proposed watercourse crossings associated with the Proposed Development is included as **Appendix 7.3: Schedule of Watercourse Crossings.**

7.1.5 The mitigation included in the project design (embedded mitigation) is detailed, and potential residual effects of the Proposed Development have been appraised. It has been shown, subject to this embedded mitigation, and the use of industry standard best practice, that no effects are likely on geology, hydrology or hydrogeology as a result of the Proposed Development.

7.2 Introduction

7.2.1 This Chapter outlines the baseline conditions of the Proposed Development with respect to geology, hydrology or hydrogeology. It also details the embedded mitigation included in the design of the Proposed Development and considers the likely potential effects the Proposed Development on these receptors.

7.2.2 This Chapter has been prepared by SLR Consulting Limited (SLR) under the supervision of a Technical Director who has worked extensively in Scotland and has significant experience in the appraisal of electrical transmission infrastructure, and its potential effects on geology, hydrology or hydrogeology. Further details of the EA team can be seen in **Appendix 1.3**.

7.3 Scope of Appraisal

7.3.1 This appraisal is based on the description of the Proposed Development detailed in **Chapter 3: The Proposed Development** and shown on **Figure 3.1a-e**.

Study Area

7.3.2 The study area and features which have been identified as of relevance to the appraisal are indicted on **Figures 7.1** to **7.8**. The study area includes a 500 m buffer around the Proposed Development. Beyond this 500 m, any effect is considered to be so diminished as to be undetectable and therefore not significant.

Legislation and Guidance

7.3.3 The geological and aquatic environment in Scotland is afforded significant protection through key statutes and the regulatory activity of SEPA and the local authorities. The appraisal has been undertaken with respect to environmental legislation, planning policy and general guidance, including the following which are relevant to geology, hydrology or hydrogeology.

Legislation

- European Union (EU) Water Framework Directive (2000/60/European Commission (EC));
- EU Drinking Water Directive (98/83/EC);
- Water Environment and Water Services (WEWS)(Scotland) Act 2003 (WEWS Act);
- The Environment Act 1995;
- Environment Protection Act 1990;
- The Flood Risk Management (Scotland) Act 2009;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (Controlled Activities Regulations (CAR)) (as amended);
- The Water Supply (Water Quality) (Scotland) Regulations, 2001;
- Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017; and
- The Electricity Act 1989.

Planning Policy

7.3.4 National Planning Policy Framework 4 (NPF4) provides planning guidance and polices 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).

7.3.5 In addition, THC's Highland-wide Development Plan (HwDP) provides planning guidance on the type and location of development that can take place in the region. The HwDP presents policies of which the following are relevant to this appraisal:

- Policy 28 – Sustainable Design;
- Policy 55 – Peat and Soils;
- Policy 60 – Other Important Habitats and Article 10 features;
- Policy 62 – Geodiversity;
- Policy 63 – Water Environment;
- Policy 64 – Flood Risk;
- Policy 66 – Surface Water Drainage;
- Policy 69 – Electricity Transmission Infrastructure; and
- Policy 72 – Pollution.

Guidance

7.3.6 The following guidance is also applicable to the appraisal.

7.3.7 Planning Advice Notes (PANs) are published by the Scottish Government. Applicable PANs include:

- PAN 61 Planning and Sustainable Urban Drainage Systems (SuDS); and
- Online Planning Advice on Flood Risk (which supersedes PAN 69).

7.3.8 SEPA and NetRegs Guidance for Pollution Prevention (GPP):

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

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

- C532 Control of Water Pollution from Construction Sites (2001);
- C648 Control of Water Pollution from Linear Construction Projects – Technical Guidance (2006);
- C741 Environmental Good Practice on Site (2015); and
- C753 The SuDS Manual (2015).

7.3.10 SEPA Publications[1]:

- Engineering in the Water Environment: Good Practice Guide – River Crossings (2010);
- Engineering in the Water Environment: Good Practice Guide – Sediment Management (2010);
- Groundwater Protection Policy for Scotland, Version 3 (2009);
- Land Use Planning System, SEPA Guidance Note 2a, Version 4 – Flood Risk (2018);
- Land Use Planning System, SEPA Guidance Notes 31, Version 3 – GWDTE (2017);
- Position Statement - Culverting of Watercourses (2015); and
- Regulatory Position Statement – Developments on Peat (2010).

7.3.11 Other Guidance:

- Scottish Government, Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (2017);
- Forestry Commission, Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat (2006);
- Department of Environment, Food and Rural Affairs (DEFRA) Construction Code of Practice for the Sustainable Use of Soils on constructions Sites (2011); and
- DEFRA Good Practice Guide for Handling Soils (Ministry of Agriculture, Fisheries and Food (MAFF) 2000).

[1] Several SEPA guidance documents are currently in the process of being reviewed following publication of NPF4.

7.4 Consultation

7.4.1 A screening report was submitted to the Energy Consents Unit (ECU) in June 2023. **Table 7.1: Consultee Responses Relevant to Geology, Hydrology and Hydrogeology** summarises the key points relevant to geology, hydrology and hydrogeology raised through consultation for the Proposed Development.

Table 7.1: Consultee Responses Relevant to Geology, Hydrology and Hydrogeology

Consultee	Consultation Type / Date	Response	Comment
Energy Consents Unit	Screening Opinion 21 August 2023	The ECU noted that the Proposed Development would go through areas of peat the majority of which being Class 2 within the exception of crossing 2 smaller areas of Class 1 peat. The ECU noted that the Proposed Development would pass through an area of Class 2 peatland for approximately 7.5 km and two small areas of Class 1 peat. With peat probing surveys being carried out by the Applicant throughout the area as well as the implementation of a Peat Management Plan (PMP), the use of micro-sitting and the required land take, no likely significant effect is expected.	This was noted. A peat probing and characterisation assessment has been completed as part of the baseline appraisal and has been used to inform the design. Potential effects on peat and proposed safeguards are presented in full in **Appendix 7.1: PLHRA** and **Appendix 7.2: PMP**, a summary of which is included in this Chapter.
		The ECU highlighted that there are no statutory designated sites within the area of the Proposed Development, however The Caithness and Sutherland Peatlands Special Area of Conservation ("SAC"), Special Protection Area ("SPA"), Ramsar and Site of Special Scientific Interest ("SSSI") is within approximately 220 m at its closest point. The River Oykel SAC and Kyle of Sutherland Marshes SSSI lie approximately 1 km to the south at its closest point. Through good practice construction, pollution prevention and water quality control measures the proposed development is not expected to have any significant effect on the Caithness and Sutherland Peatlands SAC, Ramsar, SSSI, River Oykel SAC and Kyle Sutherland Marshes SSSI.	This was noted. Designated sites within the study area and those downstream of the development are considered in this appraisal. Potential effects are discussed in this Chapter. Required mitigation measures and good practice that would be adopted as part of the Proposed Development is also presented in this Chapter.
		The ECU noted that The Proposed Development would avoid the larger flood extents associated with the Allt an Rasail with particular care being taken at the water course crossings with extra attention paid to the Allt an Rasail floodplain. This work would be carried out in accordance with the applicants General Environmental Management Plan ("GEMP").	This was noted. A site specific flood risk screening assessment is included within this Chapter. A schedule of watercourse crossings is also presented as **Appendix 7.3** and measures to control the rate and quality of surface water runoff (using SuDS) are confirmed in this Chapter.

7.5 Methodology

7.5.1 This section outlines the methodology used for the appraisal of potential effects on geology, hydrology and hydrogeology.

Desk Study

7.5.2 An initial desk study has been undertaken to determine and confirm the baseline characteristics by reviewing available information on soils, geology, hydrology, and hydrogeology. The following sources of information have been consulted in order to characterise the baseline conditions of the study area:

- Achany Extension Wind Farm – Environmental Impact Assessment Report. SSE Generation Limited, July 2021.
- Ordnance Survey (OS) 1:50,000 and 1:25,000 scale mapping data;
- NatureScot Sitelink Online Information Service[2];
- James Hutton Institute, National Soil Map of Scotland (1:250,000)[3];
- Scottish Natural Heritage (now NatureScot) Carbon and Peatland 2016 Map[4];
- British Geological Survey (BGS) Onshore Geoindex[5];
- BGS Hydrogeological Maps of Scotland[6];
- UK Centre for Ecology and Hydrology, Flood Estimation Handbook (FEH) Webservice[7];
- UK Centre for Ecology and Hydrology, National River Flow Archive (NRFA)[8];
- SEPA Flood Maps[9];
- SEPA Reservoir Inundation Flood Maps[10]; and
- SEPA Environmental Data[11].

Field Survey

7.5.3 Site surveys were carried out in August 2023, May 2024 and June 2024 to:

- verify information that was collected during the desk study;
- allow an appreciation of the study area by the project specialists completing the appraisal;
- gather peat depth and condition data;
- assess the location and characterisation of private water supplies; and
- to complete a schedule of watercourse crossings.

7.5.4 This information was used to inform the emerging project design and to complete this appraisal.

Appraisal of Effects

7.5.5 The appraisal of receptors identified by the baseline and field studies has been undertaken considering best practice and safeguards incorporated into the Proposed Development design.

7.6 Baseline Conditions

7.6.1 This section outlines the baseline geology, hydrology and hydrogeology conditions within the study area.

2 NatureScot Sitelink, available at https://sitelink.nature.scot/home [Accessed July 2024]
3 James Hutton Institute, National Soil Map of Scotland, available at https://soils.environment.gov.scot/ [Accessed July 2024]
4 Scottish Natural Heritage (now NatureScot) Carbon and Peatland 2016 Map, available at https://soils.environment.gov.scot/ [Accessed July 2024]
5 British Geological Survey, Onshore Geoindex, available at https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed July 2024]
6 British Geological Survey, Hydrogeological maps of Scotland, available at https://www.bgs.ac.uk/datasets/hydrogeological-maps-of-scotland/ [Accessed July 2024]
7 UK Centre for Ecology and Hydrology, Flood Estimation Handbook Webservice, available online at https://fehweb.ceh.ac.uk/ [Accessed July 2024]
8 UK Centre for Ecology and Hydrology, National River Flow Archive, available online https://nrfa.ceh.ac.uk/ [Accessed July 2024]
9 Scottish Environment Protection Agency, Flood Maps, available online at https://beta.sepa.scot/flooding/flood-maps/ [Accessed July 2024]
10 Scottish Environmental Protection Agency, Reservoir Map, available online at https://map.sepa.org.uk/reservoirsfloodmap/Map.htm [Accessed July 2024]
11 Scottish Environmental Protection Agency, Environmental Data, available online at https://www.sepa.org.uk/environment/environmental-data/ [Accessed July 2024]

Site Setting

7.6.2 The Proposed Development is situated in a predominantly rural area, approximately 2.3 km north of Invershin and 300 m west of Inveran. The Proposed Development extends approximately 16 km, from its northern extent located at the consented Achany Wind Farm Extension on-site substation to the existing Shin substation.

7.6.3 Ground elevations across the study area range from approximately 400 m Above Ordnance Datum (AOD) within the northern extent, near Beinn Sgeireach, to approximately 2 m AOD at the southern extent of the study area near the Kyle of Sutherland and River Shin confluence. The approximate ground elevation of the connection point at the existing Shin substation is 10 m AOD.

Designations

7.6.4 Review of NatureScot's[2] Sitelink webpage confirms the following designated sites within the study area, and as shown on **Figures 7.1a-d**:

- Grudie Peatlands Site of Special Scientific Interest (SSSI) which also forms part of the larger Caithness and Sutherland Peatlands Special Protected Area (SPA), Special Area of Conservation (SAC) and RAMSAR site is located in the north-eastern extent of the study area. The site has been designated for several freshwater and upland habitats, including blanket bogs, otters and an assemblage of breeding birds. No development is proposed within the designated site or within the same surface water catchments as the designated site. The Proposed Development is not therefore considered to be hydraulically connected to the designated site and therefore the SSSI, SPA, SAC and RAMSAR site is not considered further in this appraisal.
- The River Oykel SAC is located along the banks of the River Cassley, River Oykel and Kyle of Sutherland. The SAC is located in the south-west of the study area, approximately 425 m west of the proposed connection to the existing Shin substation at its closest extent. The SAC has been designated for its Atlantic salmon and Kyle of Sutherland freshwater pearl mussel populations which are considered particularly sensitive to changes in water quality. Whilst no permanent development is proposed in the SAC, most of the Proposed Development drains to the SAC and therefore it is considered further within this appraisal.

7.6.5 No other designated sites are noted within the study area.

Soils and Geology

Soils

7.6.6 An extract of the 1:250,000 National Soil Map of Scotland[3] is presented as **Figure 7.2**, review of which indicates that the study area is predominantly underlain by peaty gleys.

7.6.7 An area of peat gleyed podzols is recorded within the centre of the proposed OHL whilst the southern extent of the alignment is underlain by mineral podzols, near the Kyle of Sutherland and River Shin.

7.6.8 Peat is recorded within part of the eastern extent of the study area near to Beinn Sgeireach, Aonach a' Choire Bhuig and also within Braemore Wood within the southern extent of the study area. No development is proposed where peat is recorded by the soils mapping.

Superficial Deposits (including Peat)

7.6.9 An extract of BGS superficial deposit mapping[5] is presented as **Figure 7.3**.

7.6.10 Superficial geology mapping shows that the northern extent of the study area is generally underlain by glacial till deposits whilst the southern extent of the study area is generally underlain by glacial till and morainic deposits.

Discrete areas of peat are noted, particularly within the north-eastern extent of the study area, near the slopes of Cnoc nan Imrichean and within the southern extent of the study area near Braemore Wood.

7.6.11 In the south-west of the study area, near to Kyle of Sutherland, alluvium, river terrace and alluvial fan deposits are noted. Alluvium deposits are also noted to bound the larger watercourses within the study area.

7.6.12 Part of the northern extent of the study area is shown to be absent from any superficial deposits.

7.6.13 Peatland classification data published by NatureScot[4], shown on **Figure 7.4**, indicates that the majority of the northern extent of the study area is underlain by Class 2 peatland with areas of Class 1 peatlands confined to the eastern edges of the study area, and corresponds to the boundary of the designated sites. Class 1 and Class 2 peatlands include nationally important carbon-rich soils, deep peat and priority peatland which are considered to be of high conservation value.

7.6.14 Much of the central and southern extents of the Proposed Development is located within Class 5 peatland (habitats which may contain carbon rich soils and deep peat but are not considered to be of high conservation value) with isolated areas of Class 1, Class 2 and Class 3 peatlands. The south-western extent of the study area is shown to be underlain by mineral soils (Class 0) whereby peatland habitats are not typically found.

7.6.15 As part of the baseline appraisal a peat probing and characterisation exercise has been undertaken, the result of which are presented in full in **Appendix 7.1** and **Appendix 7.2**. A review of the peat probing investigation confirms:

- the depth of soils / peat have been recorded at more than 14,800 locations;
- more than 88% of the probe locations recorded a soil / peat depth of <1m;
- at 9 locations the depth of peat was recorded to be >4m; and
- the peat was characterised using the Von Post classification as between H2 and H5, showing insignificant to moderate decomposition.

7.6.16 Peat was confirmed to vary across the Proposed Development in terms of thickness and coverage. Deeper peat was generally encountered in flatter, lower gradient areas of the Proposed Development. Plans which show the distribution of peat and its depth are shown in **Appendix 7.1** and **Appendix 7.2**.

7.6.17 The potential effects on peat are discussed in full in **Appendix 7.1** and **Appendix 7.2**. As part of the iterative development design, it is evident that areas of deep peat and areas prone to potential peat landslide risk have been avoided where technically feasible.

Bedrock Geology

7.6.18 An extract of BGS bedrock and linear features geology mapping[5] is presented as **Figures 7.5a-b**.

7.6.19 The majority of the Proposed Development is underlain by psammites of the Altnaharra Psammite Formation. A small extent across the centre of the study area, near Doir' a Chatha, is shown to be underlain by the Lewisianoid Gneiss Complex comprising orthogneisses. Several other igneous intrusions are noted across the southern parts of the study area.

7.6.20 There are no inferred faults recorded across the study area.

Hydrogeology

Groundwater Levels and Flow

7.6.21 SEPA's water monitoring points dataset indicates that no groundwater level monitoring is or has been undertaken within the study area.

7.6.22 An extract of the 1:625,000 scale Hydrogeological Map of Scotland and BGS 1:100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets are presented in **Figure 7.6** and **Figure 7.7** respectively.

7.6.23 **Figure 7.6** confirms that the majority of the Proposed Development is underlain by impermeable Precambrian rocks which have been classified as a low productivity aquifer whereby small amounts of groundwater are expected in near surface weathered zones and secondary fractures. The alluvium, river terrace and alluvial fan deposits, near Kyle of Sutherland, are classified as a concealed aquifer where groundwater may occur.

7.6.24 **Figure 7.7** confirms that the majority of the Proposed Development is underlain by very low productivity bedrock aquifers. These aquifers are defined as having limited groundwater potential. Any groundwater that is present would be confined to shallow depths and would flow exclusively through fractures.

7.6.25 The glacial superficial deposits are also predominantly classified as unproductive aquifers whilst the alluvium and river terrace deposits in the south-west of the study area are classified as moderate to high productivity aquifers whereby significant yields of groundwater may be present in continuity with the Kyle of Sutherland. Groundwater in the river terrace and alluvium deposits is likely to be at a shallow depth, perched above the low permeability bedrock, and be in hydraulic continuity with nearby watercourses.

7.6.26 The Aquifer Productivity and Groundwater Vulnerability datasets classify the underlying aquifer (superficial and bedrock) according to the predominant groundwater flow mechanism (fracture or intergranular) and the estimated groundwater productivity. Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being most vulnerable.

7.6.27 The Proposed Development is shown to be underlain by groundwater vulnerability Classes 3 to 5. The highest vulnerability is noted within the northern parts of the study area near the elevated areas of Carn nam Bo Maota and Coire Buidhe and in some southern areas where superficial deposits are absent and thus there is little attenuation of potential pollutants prior to entry to groundwater.

Groundwater Quality

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

7.6.29 SEPA has identified that the Proposed Development is underlain by the Northern Highlands groundwater body (SEPA ID: 150701). It was classified in 2022 (last reporting cycle) with a Good overall status with no pressures identified.

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

7.6.30 A National Vegetation Classification (NVC) habitat mapping exercise was conducted as part of the ecology appraisal, and this has been used to identify potential areas of GWDTE within the study area. The methodology and results of the NVC habitat mapping exercise are discussed in detail within **Chapter 5: Ecology**. With reference to SEPA guidance[12], areas of potential GWDTE are shown on **Figures 7.8a-d**. Where mosaic habitats are recorded the dominant habitat is used to assess vegetation type.

[12] SEPA (2024) *Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems*

7.6.31 The location of potential GWDTE and their likely dependency on groundwater is discussed in **Table 7.2: Groundwater Dependent Terrestrial Ecosystems**.

Table 7.2: Groundwater Dependent Terrestrial Ecosystems

NVC Community as listed in SEPA Guidance	Location and Distribution within the Study Area and Likely Groundwater Dependency
M6	M6 dominant polygons are noted on the banks of the Allt an Rasail, approximately 160 m east of pole 1, and along the banks of the Allt Doir' a' Chatha north of poles 71 to 73. The habitat is noted adjacent to watercourses. It is therefore likely that the M6 habitats are predominately sustained by surface water, runoff and waterlogging of soils rather than by groundwater.
M15	M15 dominant polygons are noted over wide areas across the study area, particularly within the northern extent of the Proposed Development. These are typically underlain by low permeability peat and glacial till and morainic deposits which will facilitate local water logging of soils in response to rainfall. The habitat is not rare and is present across large areas of Scotland. This distribution is typical of that sustained by surface water rather than emergent groundwater. It is therefore considered that these M15 communities are predominately sustained by rainfall and surface water runoff and not groundwater.
M23	M23 dominant polygons are located adjacent to watercourses, particularly near the banks of Loch Doire a'Chatha and Allt an Ràsail and its tributaries. It is therefore considered that the M23 habitats are predominately sustained by surface water, runoff and waterlogging of soils rather than by groundwater.
M25	M25 dominant polygons are noted across the northern extent of the study area and are typically underlain by low permeability peat and glacial till and morainic deposits or located adjacent to watercourses. It is therefore considered that the M25 are predominately sustained by surface water, runoff and waterlogging of soils rather than groundwater.
MG10	MG10 dominant polygon is noted approximately 90 m south-west of the operational Shin substation. The habitat is underlain by river terrace and alluvial fan deposits associated with the Kyle of Sutherland. Any groundwater within these deposits are likely to be in hydraulic continuity with the Kyle of Sutherland. It is unlikely therefore that this habitat is sustained by groundwater but rather is sustained by rainfall and surface water ponding on ground of shallow relief.

7.6.32 Review of **Table 7.2: Groundwater Dependent Terrestrial Ecosystems** shows that the potential high and moderate GWDTE are generally located on ground which is underlain by peat, glacial till and morainic deposits or adjacent to watercourses and lochs. As such, it is considered that the habitats are predominately sustained by surface water, runoff and waterlogging of soils rather than by groundwater.

7.6.33 Therefore although buffers to areas of potential GWDTE specified in SEPA guidance do not apply, safeguards to maintain these habitats, and the surface water sources to these habitats will need to be maintained during construction and operation of the Proposed Development, details of which are included in **Section 7.7.**

Hydrology

Local Hydrology

7.6.34 The local hydrology is shown on **Figures 7.1a-d**.

7.6.35 The study area for the Proposed Development is located entirely within the Kyle of Sutherland surface water catchment, in particularly the following three sub catchments:

- The northern extent of the study area is largely located within the surface water catchment of the River Cassley. The River Cassley flows in a generally north-west to south-east direction from Fionn Loch Mor to Dornoch Firth, approximately 1.8 km west of the Proposed Development. A number of smaller watercourses drain into the River Cassley, notably the Allt Bad an t-Segairt and Allt an Rasail which cross the study area.
- The central part of the study area is located within the surface water management catchment of the Allt Mor. Allt Mor flows from Loch Doire a' Chatha generally south-westerly towards its discharge into the Kyle of Sutherland.
- The south-eastern extent of the study area lies within the River Shin surface water catchment. A small area in the north of the study area, near to Loch Sgeireach, also falls into this catchment. The River Shin flows from Loch Shin to Dornoch Firth with many smaller burns draining towards it. The river is approximately 200 m east of the Proposed Development near to the operational Shin substation and is within the study area.

7.6.36 None of the surface water catchments which drain the study area have been designated as a DWPA, nor is the Proposed Development upstream of any DWPA.

Rainfall and Surface Water Flow

7.6.37 The Met Office maintains a rain gauge at Loch Glascarnoch, located at grid reference NH 27635 74268 (approximately 36 km south-west of the Proposed Development). Review of the previous 30 years data (1991 – 2020) indicates an average annual rainfall of 660 mm.

7.6.38 SEPA maintains precipitation data at the Sgodachail rainfall gauge (station number 234305) which is located at grid reference NC 56400 16600 (approximately 9.5 km south-west of the Proposed Development). An average annual rainfall of 1,444 mm was recorded during 2023. The FEH webservice[7] records a standard average annual rainfall (SAAR) of 1,523 mm for the River Shin catchment.

7.6.39 The National River Flow Archive[8] records stream flow data for gauges at the following locations:

- River Cassley at Rosehall (located at NC 47176 02133, approximately 2.2 km south of the Proposed Development). The National Flow Archive indicates a mean flow of 7.1m^3/s; and
- River Shin at Inveran (located at NH 57412 97418, approximately 200 m south-east of the operational Shin substation). The National Flow Archive indicates a mean flow of 5.0 m^3/s.

Surface Water Quality

7.6.40 The larger watercourses within the study area are monitored by SEPA and were classified in 2022 (the latest reporting cycle). A summary of the SEPA classifications is shown in **Table 7.3: SEPA Waterbody Classification (2022)**.

Table 7.3: SEPA Waterbody Classification (2022)

Waterbody (SEPA ID)	Overall Status	Overall Ecology	Overall Chemistry	Hydro-morphology	Pressures
River Shin – Dornoch Firth to Loch Shin (20093)	Good ecological potential	Moderate	Pass	Moderate	Heavy modifications and pressures to water flows and levels as a result of water abstraction and water storage due to hydroelectricity generation
River Cassley – Dornoch Firth	Good ecological potential	Moderate	Pass	Moderate	Heavy modifications and pressures to water flows and levels as a result of water

Waterbody (SEPA ID)	Overall Status	Overall Ecology	Overall Chemistry	Hydro-morphology	Pressures
to Glenmuick (20110)					abstraction due to hydroelectricity generation
Allt Mor (20083)	Good	Good	Not monitored	Good	None
Dornoch Firth (Kyle of Sutherland) (200165)	Good	Good	Not monitored	High	None

Flood Risk

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

- 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.

7.6.42 A summary of the potential sources of flooding and a review of the potential risks posed by each source is presented in **Table 7.4: Potential Sources of Flooding.**

Table 7.4: Potential Sources of Flooding

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal Flooding	No	The southern extent of the Proposed Development is located near to the Kyle of Sutherland whose tidal extent reaches Inveroykel. SEPA flood mapping confirms that none of the Proposed Development is at risk of coastal flooding.
River Flooding	No	SEPA river flood mapping highlights that the Proposed Development is predominantly not at risk of flooding from fluvial flood sources. SEPA floodplain mapping indicates that there is a floodplain along the River Shin, Kyle of Sutherland, Allt Mor and Allt an Rasail, however, the majority of the areas denoted as being at risk of flooding are generally confined to the channels of the watercourses. None of the proposed OHL poles are shown to be located within the mapped floodplain. It is noted that SEPA flood maps do not show flooding extents associated with smaller watercourses within the study area, however, floodplains associated with the watercourses are also likely to be limited and confined to watercourse corridors. It is therefore considered that the Proposed Development is not at risk from fluvial flooding.

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Surface Water Flooding	No	SEPA mapping has identified several areas of high surface water flood risk across the study area, however these generally coincide with existing waterbodies or watercourse corridors. Flood extents are shown to be small localised areas that do not form larger linked areas or flow paths. Therefore, surface water is not considered a development constraint, and potential effects can be mitigated by good site design.
Groundwater Flooding	No	SEPA groundwater flood mapping highlights the study area is not at risk of groundwater flooding. This concurs with the desk-based appraisal whereby geology beneath the Proposed Development is unlikely to yield significant quantities of groundwater.
Flooding due to dam or reservoir failure	Yes	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of the SEPA Inundation Mapping highlights that the majority of the Proposed Development is not at risk from any potential breach scenarios. The southern extent of the Proposed Development, where it will connect to the operational Shin substation, is shown to be at risk of flooding associated with a breach from Loch Shin and Little Shin. Reservoirs in Scotland are regulated under the Reservoirs (Scotland) Act 2011 and there has been no loss of life in the UK as a result of reservoir flooding since 1925, therefore it is considered that risk from such an event is low.
Flood Defence Breach	No	SEPA indicate there are no Flood Protection Schemes or formal flood defences in proximity to the Proposed Development.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no significant drainage systems are present near the Proposed Development.

Watercourse Crossings

7.6.43 The length of proposed new permanent access tracks has been minimised and the Proposed Development has sought to utilise existing tracks and access routes where possible. Four new temporary track watercourse crossings and four new permanent watercourse crossings are required (three associated with the UGC and one associated with permanent access track).

7.6.44 The locations of the proposed crossings are shown on **Figures 7.1a-d** and a schedule of these crossing points, which includes photographs and dimensions of each crossing is shown in **Appendix 7.3**.

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

7.6.45 THC hold publicly available records of known Private Water Supplies (PWS). SEPA hold publicly available records of Controlled Activity Regulation (CAR) registrations / licenses. Recorded Private Water Supplies (PWS) and SEPA CAR registrations / licenses are illustrated on **Figures 7.1a-d**.

Private Water Supplies

7.6.46 THC database confirms that there are no private water supply sources within the study area. This data was augmented with information from Ordnance Survey mapping and aerial photography in order to identify any additional properties, and potential water users not recorded by THC. Properties were also identified following a programme of site-specific field investigation that involved visiting properties, enquiring about their water use and source, and mapping water abstraction locations.

7.6.47 Details of PWS sources within the study area are presented in **Table 7.5: Private Water Supply Risk Assessment**. A conceptual site model approach has been used and a source-pathway-receptor linkage discussed to assess the risk to each PWS.

Table 7.5: Private Water Supply Risk Assessment

PWS ID (see Figures 7.1a-d)	Property Name	PWS Source	Location of PWS Source and Distance from Proposed Development	Details	Potential Complete Source-Pathway-Receptor Linkage
PWS01	Middle Hill	Spring (unconfirmed)	E 252387 / N 901056 95 m south-west of temporary access track	Neighbour confirmed that the property is supplied by a spring which is thought to be located approximately 120 m south-west of the property, although this is has not been confirmed by the property owner (there was no response when the PWS survey was completed and the questionnaire response left at the property has not been returned at the time of reporting). A temporary track which is proposed as part of the Proposed Development is noted within 100 m of the spring, and the distribution pipework between the spring and the property might pass under the proposed access track. Therefore the PWS is considered to be at risk from the Proposed Development.	Yes
M1	Scottish Shooting Centre	Mains	E 252026 / N 900545 (property location) Approximately 690 m south-west of temporary access track.	Property confirmed during site survey to be supplied by Scottish Water mains.	N/A
M2	Kyle View and Lockyer	Mains	E 257030 / N 897485 (property locations) Approximately 170 m west of the operational Shin substation.	Properties confirmed during site survey to be supplied by Scottish Water mains.	N/A

7.6.48 A review of **Table 7.5: Private Water Supply Risk Assessment** indicates that one PWS source is potentially at risk from the Proposed Development. Measures required to safeguard this PWS source are discussed later in this Chapter.

Licenced Sites

7.6.49 CAR authorisations within the study area have been obtained from SEPA's environmental database, a review of which indicates that there are sixteen CAR authorisations within the study area. Two of the CAR authorisations (CAR/L/1011463 and CAR/R/1018060) are associated with the operational Shin substation.

Cumulative

7.6.50 In relation to the potential for cumulative effects, no consented developments, or developments for which an application has been submitted, in the same water catchments of the Proposed Development have been identified and which are considered likely to lead to any significant change to the geology, hydrology and hydrogeology.[13] The consented Achany Wind Farm Extension has been considered within the baseline for the appraisal, as the Proposed Development is reliant on its construction and operation.

7.7 Potential Effects

Good Practice and Embedded Mitigation by Design

7.7.1 The Applicant has established best 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 3.2**. The Proposed Development would be constructed in accordance with these plans.

7.7.2 A contractual management requirement of the successful Principal Contractor would be the development and implementation of a comprehensive and site-specific Construction Environmental Management Plan (CEMP). This document would detail how the successful Principal Contractor would manage the works in accordance with all commitments and mitigation detailed in the Environmental Appraisal, the Applicant's GEMPs, statutory consents and authorisations, and industry best practice and guidance.

7.7.3 The CEMP will also outline measures to ensure that the works minimise the risk to soils, peat, geology, groundwater, surface water and licensed water uses. It will include a project specific drainage plan and materials (soils and peat) management plan. The drainage plan would detail the passive measures that would be deployed to treat both the quality and quantity of water shed from the working areas in accordance with Sustainable Drainage Systems (SuDS) techniques. The materials management plan will show how soils and peat arisings will be safeguarded, managed, and beneficially used in restoration within the Proposed Development.

7.7.4 It is expected that the following will be included within the CEMP and would ensure the works are undertaken in accordance with good practice guidance, as detailed in **Section 7.2**:

- during construction there would be heavy plant and machinery required and as a result it is appropriate to adopt best working practices and measures to protect the water environment, including those set out in GPP01;
- in accordance with GPP02 any above ground on-site fuel and chemical storage would be bunded;
- emergency spill response kits would be maintained during the construction works (GPP21);
- a vehicle management system would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision (GPP21);

[13] *Based on a cumulative baseline search of consented or submitted planning applications three months prior to submission of the application to allow finalisation of the EA.*

- suitable access routes would be chosen which minimise the potential requirement for either new temporary access tracks or for tracking across open land which could contribute to the generation of suspended solids;
- a speed limit would be used to reduce the likelihood and significance of any collisions;
- plant nappies would be placed under stationary vehicles which could potentially leak fuel / oils;
- any temporary construction / storage compounds required would be located remote from any sensitive surface water receptors and would be constructed to manage surface water run-off in accordance with best practice;
- any water contaminated with silt or chemicals would not be discharged directly or indirectly to a watercourse without prior treatment; and
- water for temporary welfare facilities would either be brought to the Proposed Development or a local surface water or groundwater abstraction would be identified. Any water abstraction would be made in accordance with SEPA's General Binding Rules or an authorisation would be obtained from SEPA in accordance with the Controlled Activity Regulations (CAR);
- foul water would either be collected in a tank for offsite disposal at an appropriately licensed facility or discharged to a septic tank or soakaway in accordance with the Controlled Activity Regulations (CAR).

7.7.5 The implementation of the CEMP would be managed by a suitably qualified and experienced Environmental Clerk of Works (ECoW), with support from other environmental professionals as required. The ECoW would have authority to stop any works that are or have potential to impair geology, hydrology or hydrogeology.

7.7.6 In general, construction access would be taken via the existing public road network and would make use of existing tracks as far as practicable, as well as temporary access routes. For temporary watercourse crossings less than 2 m wide, CAR General Binding Rules would be adhered to. All proposed crossing locations and methodologies would be reviewed and approved by the ECoW, prior to any works being undertaken.

Safeguarding of Carbon Rich Soils and Peat

7.7.7 As required by NPF4, a detailed review of the distribution, condition and depth of peat at the Proposed Development is contained in **Appendix 7.1** and **Appendix 7.2**. The Proposed Development design has applied the mitigation hierarchy detailed in Policy 5 of NPF4 and specifically avoided areas of deep peat wherever technically feasible. It is shown (**Appendix 7.2**) that disturbed soils and peat can be readily managed and beneficially reused and would not be degraded. No surplus peat would be generated. The PMP will be further developed and revised as part of the detailed design stage of the project and will befit from additional site investigation and design details developed at that stage of the project. The updated PMP will from part of the final project CEMP.

7.7.8 A Design and Geotechnical Risk Register would be compiled to include risks relating to peat instability.

7.7.9 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;
- careful micro-siting 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 the Site Induction (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 ensure that degradation and erosion of exposed peat deposits does not occur as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. minimisation of off-track plant movements within areas of peat); and
- developing drainage systems that would not create areas of concentrated flow or cause over-, or under-saturation of peat habitats.

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

Pollution Risks

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

- refuelling would take place at least 30 m from watercourses and where possible it would not occur when 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 would be avoided;
- foul water generated onsite would be managed in accordance with PPG4;
- areas would be designated for washout of vehicles should avoid important habitats (as directed by the project ECoW);
- washout water would also be stored in the washout area before being treated and disposed of;
- if any water is contaminated with silt or chemicals, runoff would not enter a watercourse directly or indirectly prior to treatment;
- water would be prevented, as far as possible, from entering excavations, such as pole foundations;
- 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 effect as far as practicable. This would be included in the final CEMP for the Proposed Development.

Erosion and Sedimentation

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

- the height of soil stockpiles should be minimised and incorporate gently graded side slopes;
- 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 lagoons and silt / sediment traps to remove silt prior to discharge into the surrounding drainage system. Detailed assessment of ground conditions would be required to identify locations where settlement lagoons would be feasible;
- clean and dirty water onsite would be separated and dirty water would be filtered before entering the water environment;
- if the material is stockpiled on a slope, silt fences would be located at the toe of the slope to reduce sediment transport;
- the amount of ground exposed, and time period during which it is exposed, would be kept to a minimum and appropriate drainage would be in place to prevent surface water entering deep excavations;

- 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 and the Principal Contractor would carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas.

Fluvial Flood Risk

7.7.13 It is proposed to adopt Sustainable Drainage Systems (SuDS) as part of the Proposed Development. SuDS techniques aim to mimic pre-development runoff conditions and balance or throttle flows to the rate of runoff that might have been experienced prior to development. Good practice in relation to the management of surface water runoff rates and volumes where new permanent tracks or temporary compounds and laydown areas are proposed would include the following:

- drainage systems would be designed to ensure that any sediment, pollutants or foreign materials which may cause blockages are removed before water is discharged into a watercourse;
- onsite drainage would be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the original drainage design causing localised flooding and
- drainage systems would attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk.

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

Temporary Access Tracks

7.7.15 In general, proposed construction access would be taken via the existing public road network and would make use of existing forest and estate tracks as far as practicable, upgraded as required.

7.7.16 The majority of access will be achieved through the upgrade of existing tracks and installation of temporary trackway. In the limited instances where new track is proposed it 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.

7.7.17 Fording would be used where an appropriate crossing point is already in place (on current tracks) with a suitable bed for crossing (where necessary the bed will be protected by the installation of bog mats or similar for running on). Fording would only be used where limited traffic is expected. Effects on the bed and crossing point generally would be monitored with appropriate mitigation being implemented if required.

7.7.18 For watercourse crossings less than 2 m wide CAR General Binding Rules will be adhered to. Bog mats, or similar, would be positioned across the water course to enable access. Where necessary, side rails would be installed with silt mitigation at either end, and across if required, to ensure that effects from silt from vehicles crossing are controlled at all times. Crossings would be cleaned at the end of the day if required.

7.7.19 All proposed temporary crossing locations and methodologies would be reviewed and approved by the ECoW, prior to any works being undertaken.

Water Abstraction

7.7.20 Abstraction of water for construction activities may be required from a suitable source yet to be identified. An 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, water bowsers would be used.

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

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

OHL Pole Foundation Construction

7.7.22 The following measures are proposed to mitigate the effects of OHL pole foundation construction on the water environment:

- foundations would be located and excavated wherever possible in the driest locations with well consolidated superficial geology. Wetland areas, areas of deep peat would be avoided and a standoff of 30 m to waterbodies and 10 m to watercourses would be adhered to wherever possible;
- wherever possible, poles would be located outwith floodplains to reduce potential effects on flooding;
- where excavations for OHL pole foundations encounter localised limited quantities of groundwater or become flooded due to surface water runoff or heavy rainfall, appropriate treatment of dewatering would be instigated under direction of the project ECoW;
- no dewatering discharge would be permitted directly adjacent to watercourses;
- unless directed otherwise by the project ECoW, dewatering discharge would drain across buffer areas of vegetation (e.g. grassland, heather) of at least 20 m width, which would provide for natural attenuation and dispersal of the flow and removal of silt;
- where no suitable vegetation is available for natural treatment of dewatering, the discharge would be passed through on-site settling tanks / lagoons prior to discharge by soakaway or to watercourse;
- the requirement for dewatering would be minimised in all locations by timely and efficient excavation of the foundation void and subsequent concrete pouring and backfilling;
- all procedures for dewatering would be agreed by the Principal Contractor with SEPA, THC and NatureScot and recorded in the CEMP; and
- the Principal Contractor would develop a method statement to address the transport, transfer, handling and pouring of liquid concrete at OHL pole foundation locations.

Concrete Batching, Transport, and Pouring

7.7.23 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 in proximity to watercourses or areas of standing water;
- there would be no wash-out of concrete carrying vehicles at OHL pole foundation locations (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 of 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 facility; and
- vehicles and plant working at OHL pole foundations 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.

Appraisal of Potential Effects

7.7.24 During operation of the OHL only very occasional inspection and maintenance of the Proposed Development would be required. Access for inspection would be taken from the same routes used during construction, and any maintenance activities would be undertaken using the same safeguards and best practice agreed with consultees prior to construction. An appraisal of potential operational effects has therefore not been undertaken.

7.7.25 During the construction phase the following activities have the potential to impair the geology, hydrology and hydrogeology:

- tracking and use of machinery has the potential to damage soils peat and by compaction or indirectly by draining water from the peat;
- soil compaction from vehicular movement may cause an increase of local flood risk;
- excavation of soils, peat and shallow geology has the potential to induce local ground instability;
- the use of and tracking of machinery has the potential to generate suspended solids in runoff;
- the use of machinery has the potential to introduce oils or hydrocarbons; and
- new permanent access tracks may change surface drainage paths which might increase flood risk and / or impair water supplies.

7.7.26 The potential for the Proposed Development to realise these effects is discussed below.

Peat Resources and Peat Slide Risk

7.7.27 A programme of peat depth probing has been undertaken as part of the baseline appraisal, ensuring that the areas of deepest peat are avoided by the Proposed Development. A limit of deviation (LoD) is also proposed to allow for micrositing of the Proposed Development and associated access tracks, so that at the time of construction, works can be micro-sited to avoid deep peat. Further site investigation would be undertaken as part of the detailed project design and additional peat depth data collected and used to update the peat depth plan, peat management proposals and ensure works are not undertaken in areas of potential high peat slide hazard risk. It is envisaged that this would be secured by a pre-commencement planning condition and form part of the project-specific CEMP.

7.7.28 The Peat Management Plan (**Appendix 7.2**) and Peat Landslide Hazard Risk Assessment (**Appendix 7.1**) present the result of a detailed programme of site investigation and show that areas of deeper peat and organic soils have generally been avoided by the design of the Proposed Development. This 'embedded mitigation' greatly reduces the potential adverse effect on peat and carbon rich soils.

7.7.29 Best practice measures to maintain the integrity and structure of peat and organic soils are outlined in the Sections above. These safeguards would ensure that pat and carbon rich soils are not impaired and peat slide risk not increased.

Soils and Geology

7.7.30 No significant earthworks are required. With careful management of soils and adoption of the above best practice, their value would not be impaired as a result of the Proposed Development.

7.7.31 The local geology is not considered sensitive, and with the safeguards proposed the geology would not be impaired.

Surface Water and Groundwater Quality

7.7.32 As stated above the works would be undertaken in accordance with the Applicant's GEMPs 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 project-specific CEMP would be prepared by the Principal Contractor and include a surface and groundwater quality management plan.

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

7.7.34 It is proposed that water required for the Proposed Development welfare facilities used during the construction phase would be provided by water bowser or tanker. Water from the welfare facilities would be discharged to a sealed tank which would be routinely emptied and disposed of at an appropriately licensed off-site facility.

7.7.35 Should a need for water abstraction / discharge arise during works (e.g. vehicular / wheel washing), this would be dealt with through a registration with SEPA as required under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).

7.7.36 With these safeguards in place, surface and groundwater quality would not be impaired.

Flood Risk

7.7.37 As part of the detailed project design the Principal Contractor would identify locations for construction compounds which would be subject to a separate planning application. These would have regard to areas of known and potential flood risk.

7.7.38 The design and capacity of watercourse crossings would be agreed by the Principal Contractor in consultation with SEPA during the detailed project design stage. The crossings would be designed to pass a design flood event agreed with SEPA and of a design agreed with SEPA. If any existing crossings on the existing tracks need to be replaced, then their design would also be agreed, and authorisation obtained from SEPA.

7.7.39 During construction the efficacy of existing track side drains would be subject to routine inspection and blockages that might impede water flow, and increase flood risk, would be removed as required.

7.7.40 With these safeguards in place, any potential increase in flood risk to and downstream the Proposed Development can be mitigated.

Surface and Groundwater Flow

7.7.41 The protection measures for soils would ensure no significant change to the existing hydrological characteristics. There would, therefore, be no effect on surface water flows or flood risk as there would be no permanent change to ground conditions.

7.7.42 Surface water flow paths to areas identified as potential GWDTE would be maintained and thus these habitats would be safeguarded.

Private Water Supplies

7.7.43 The appraisal has confirmed that one spring PWS source (PWS01) is noted within 100 m of a temporary access track which is proposed as part of the Proposed Development. Given the proximity of the PWS sources to the Proposed Development, controls would be required to safeguard the PWS.

7.7.44 The spring, and pipeline to the property holding tank would need to be clearly marked and protected. Where water distribution pipework is crossed by the Proposed Development, it would be marked, and structural

analysis completed. Additional protection to pipework would be placed for duration of works / traffic movement as required.

7.7.45 A detailed description of the safeguards would be given in the project CEMP which would be prepared by the Principal Contractor and agreed with SEPA and THC prior to construction commencing.

7.7.46 It is proposed that confirmatory water quality sampling of PWS01 and principal watercourses which drain the Proposed Development is undertaken prior to, during and for a period following construction to confirm that Proposed Development has had no effect on the water supplies or resources. Details of the monitoring suite and monitoring frequency, assessment levels and contingency measures that would be adopted in the unlikely event that the water supply is impaired, would also be specified in the CEMP.

7.7.47 In addition, prior to any works being undertaken, and as part of the detailed project design, if any PWS supplies which have not been identified as part of this appraisal are discovered, then appropriate safeguards would be applied to ensure the integrity of any such abstractions, if required.

Designated Sites within Hydraulic Connection to the Proposed Development

7.7.48 The appraisal has confirmed that the majority of the Proposed Development would drain to the River Oykel SAC and therefore the SAC is hydraulically connected to the Proposed Development.

7.7.49 The controls which would be adopted at Proposed Development in accordance with best practice and discussed above would be used to ensure water resources are not impaired and significant erosion and sedimentation does not occur.

Cumulative Effects

7.7.50 No cumulative effects are predicted in relation to geology, hydrology and hydrogeology and the Proposed Development.

7.8 Summary

7.8.1 Existing or baseline conditions have been identified and used to appraise the potential effects the Proposed Development may have on geology, hydrology and hydrogeology.

7.8.2 Best practice construction techniques that would safeguard geology, hydrology and hydrogeology, and would be incorporated in the detailed design of the works and be used during the construction phase have been identified.

7.8.3 Subject to the adoption of the best practice and targeted monitoring prior to, during and following construction (e.g. water quality and PWS monitoring and maintenance of a geotechnical risk register), it is confirmed that, geology (including peat resources and carbon rich soils), hydrology and hydrogeology can be safeguarded during and following development.