Chapter 9: Hydrology, Hydrogeology, Geology and Peat

Contents

9. Hydrology, Hydrogeology, Geology and Peat

9.1 Introduction

9.1.1 This chapter considers the likely significant effects of the proposed Glenouther Wind Farm (hereafter referred to as 'the Proposed Development') and the Likely Grid Connection Route on hydrology, hydrogeology, geology and peat. It details the baseline environmental conditions, based on desk studies and a comprehensive suite of field surveys conducted between March 2025 and January 2026. A description of potential effects and their significance, together with mitigation measures is also provided, including an assessment of the cumulative and decommissioning effects. The assessment was undertaken by Kaya Consulting Limited. Details of the lead authors and their experience in EIA assessment is provided in **Technical Appendix 1.1: Statement of Expertise**.

9.1.2 This chapter should be read alongside **Chapter 7: Ecology** due to interactions between both disciplines in terms of the potential effects on water quality and Ground Water Dependent Terrestrial Ecosystems (GWDTEs). Potential effects on any GWDTEs are considered within this chapter. The assessment is based on the project description and construction methods described in **Chapter 4: Development Description**.

9.1.3 This chapter is supported by a number of figures which are referenced throughout the text and which can be found at **Volume 3a: Figures**. The figures are:

- **Figure 9.1: Hydrological Features**;
- **Figure 9.2: Watercourse Buffers, Crossings and Flood Risk**;
- **Figure 9.3: Hydrology Overview and Peatland Classification for the Grid Connection**;
- **Figure 9.4: Superficial and Bedrock Geology**;
- **Figure 9.5: Soils**;
- **Figure 9.6: NatureScot Peatland Classification**; and
- **Figure 9.7: Peat Depth**.

9.1.4 The following appendices also support the chapter and can be found in **Volume 4: Technical Appendices**:

- **Technical Appendix 9.1: Watercourse Crossings and Buffer Assessment**;
- **Technical Appendix 9.2: Peat Survey Report**;
- **Technical Appendix 9.3: Outline Peat Management Plan**; and
- **Technical Appendix 9.4: Peat Landslide Hazard and Risk Assessment**.

9.1.5 Where relevant, and to avoid duplication, these technical appendices reference the above figures which support this chapter.

9.1.6 The following terminology is referred to throughout this chapter and included in the Glossary at the end of this chapter:

- EAC – East Ayrshire Council;
- GWDTE – Groundwater Dependent Terrestrial Ecosystems;
- PWS – Private Water Supply;
- DWPA - Drinking Water Protection Area; and
- SEPA – Scottish Environment Protection Agency.

9.2 Assessment Methodology

Legislation, Policy and Guidance

9.2.1 This assessment is carried out in accordance with relevant legislation, policy and guidance relating to the water and geological environment. It is noted that the following lists are not exhaustive.

Legislation

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Flood Risk Management (Scotland) Act 2009[1];
- Environmental Authorisation (Scotland) Regulations 2018 (EASR)[2];
- The Control of Pollution Act 1974[3];
- The Public Water Supplies (Scotland) Regulations, 2014 (as amended)[4];
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order, 2013[5];
- The Pollution Prevention and Control (Scotland) Regulations 2012[6];
- The Scotland River Basin District (Standards) Directions 2014[7];
- The Public Water Supplies (Scotland) Regulations 2014[8];
- The Private Water Supplies (Scotland) Regulations 2006[9];
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017[10]; and
- The Water Framework Directive (2000/60/EC) (WFD), and Water Environment and Water Services (Scotland) Act (WEWS Act) 2003[11].

Policy

9.2.2 The following policies of relevance to the assessment have been considered:

- National Planning Framework (NPF) 4[12]; and
- East Ayrshire Council Adopted Local Development Plan 2[13],

Guidance

9.2.3 This assessment is carried out in accordance with the principles contained within the following documents:

- Good Practice during Windfarm Construction[14];
- SEPA's Guidance for Pollution Prevention (GPPs), including GPPs 1, 2, 4, 5, 6, 8, 21, 22 and 26[15];
- WAT-G-024 EASR Guidance: Engineering: Activity Guide: Crossings[16];
- WAT-G-034 EASR Guidance: Construction works and silt / pollution mitigation[17];
- WAT-G-030 EASR Guidance: Engineering: Meeting Good Practice v1[18];

[1] Scottish Government (2009), The Flood Risk Management (Scotland) Act 2009
[2] From 1 November 2025, water, waste management and industrial activities are regulated under Environmental Authorisation (Scotland) Regulations 2018 (EASR), replacing the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR). Under EASR, activities that could harm the environment now fall into four categories: General Binding Rule, Notification, Registration and Permit, in order of increasing environmental risk.
[3] UK Government (1974), The Control of Pollution Act
[4] Scottish Government (2014), The Public Water Supplies (Scotland) Regulations, as amended
[5] Scottish Government (2013), The Water Environment (Drinking Water Protected Areas) (Scotland) Order
[6] Scottish Government (2012), The Pollution Prevention and Control (Scotland) Regulations
[7] The Scottish Government (2014), The Scotland River Basin District (Standards) Directions
[8] Scottish Government (2014), The Public Water Supplies (Scotland) Regulations
[9] Scottish Government (2006), The Private Water Supplies (Scotland) Regulations
[10] Scottish Government (2017), The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations
[11] Scottish Government (2003), The Water Framework Directive (2000/60/EC), and Water Environment and Water Services (Scotland) Act 2003
[12] Scottish Government (2024), National Planning Framework 4
[13] East Ayrshire Council (2024), Local Development Plan 2
[14] Scottish Renewables et al. 2024, https://www.nature.scot/doc/good-practice-during-wind-farm-construction, accessed 26/03/2026
[15] https://www.netregs.org.uk/tools/guidance-for-pollution-prevention-gpp-documents/, accessed 26/03/2026
[16] SEPA (2025), WAT-G-024 EASR Guidance: Engineering: Activity Guide: Crossings
[17] SEPA (2025), WAT-G-034 EASR Guidance: Construction works and silt / pollution mitigation
[18] SEPA (2025), WAT-G-030 EASR Guidance: Engineering: Meeting Good Practice v1

- WAT-G-075 EASR Guidance: The discharge of water run-off from construction sites[19];
- SEPA: Flood Risk Standing Advice[20];
- SEPA: Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems[21];
- SEPA: Guidance on Assessing the Impacts of Developments on Groundwater Abstractions[22];
- SEPA: Recommended Riparian Corridor Layer for use in Land Use Planning[23]
- Forest Research: The UK Forestry Standard, 5th Edition[24];
- The SuDS Manual (C753)[25];
- Control of water pollution from construction Sites: Guidance for consultants and contractors (C532)[26];
- Peatland Survey – Guidance on Developments on Peatland[27];
- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)[28]; and
- NatureScot: Advising on peatland, carbon-rich soils and priority peatland habitats in development management[29].

Consultation

9.2.4 In undertaking the assessment, consideration has been given to the consultation which has been undertaken as detailed in **Table 9.1**.

Table 9.1 : Consultation Responses

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
East Ayrshire Council (EAC) 11/12/25	Scoping	EAC stated that a private water supply (PWS) risk assessment should be undertaken if it is found that any PWS are located within the study area or same catchment as the proposed infrastructure.	PWS data was obtained from EAC and PWS questionnaires were sent to all properties within 1 kilometre (km) of the Site boundary to inform the assessment. The assessment considers potential effects to PWS within 1 km of the Site, with effects to PWS scoped out of the assessment. A map showing private water supplies (PWS) and abstractions near the Site is shown in **Figure 9.1**.
		Borrow pits: noted that if this is part of the Proposed Development details should be provided in the EIA report including associated impacts.	There are no borrow pits proposed. All stone will be imported from nearby quarries.

[19] SEPA (2025), WAT-G-075 EASR Guidance: The discharge of water run-off from construction sites
[20] SEPA (2024), Flood Risk Standing Advice
[21] SEPA (2024), Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems
[22] SEPA (2024), Guidance on Assessing the Impacts of Developments on Groundwater Abstractions
[23] SEPA (2024), Recommended Riparian Corridor Layer for use in Land Use Planning [online]. available at: https://www.sepa.org.uk/media/puqhuwhn/recommended-riparian-corridor-note.docx.
[24] Forest Research (2023), The UK Forestry Standard, 5th Edition
[25] CIRIA (2015), The SuDS Manual (C753)
[26] CIRIA (2001), Control of water pollution from construction Sites: Guidance for consultants and contractors (C532)
[27] Scottish Government, Scottish Natural Heritage, SEPA (2017), Peatland Survey – Guidance on Developments on Peatland
[28] Scottish Government (2017), Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)
[29] NatureScot (2023, Revised March 2026), Advising on peatland, carbon-rich soils and priority peatland habitats in development management

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		Peat excavation: any potential for the release of water from peat excavation should be considered as a potential cause of flooding. There is some 1 in 200-year flood risk in various locations throughout the site based on SEPA's flood mapping, though the nature of this is likely to be capable of being avoided through appropriate siting and design, however on the basis there are flood risks onsite then flooding should be scoped into the EIA report.	The Proposed Development has been designed to fully avoid flood risk areas, where practicable. Flood risk is scoped into the assessment.
		Fisheries board: The relevant fisheries boards should be consulted to discuss their expectations and requirements regarding the extent of hydrological surveys required to inform the assessment of hydrological impacts, including water quality impacts / monitoring, which also links to the ecology chapter and any potential ecological impacts on aquatic life.	Ayrshire Rivers Trust (ART) were consulted and ART undertook fish surveys for the baseline assessment. The results of the fish surveys are referenced in **Chapter 7: Ecology** and presented in detail in **Technical Appendix 7.4: Fish Survey Report**. The effects on surface water quality and hydrology during construction are assessed in this chapter.
		Carbon Calculator: noted to provide a full report from the Scottish Government's Carbon calculation, accounting for carbon emissions and losses through construction and savings over the lifetime of the development as part of the EIA.	Noted **-** see **Technical Appendix 12.1: Carbon Balance Assessment**.
		Climate Change: EAC noted that effects on climate change be addressed within the EIA Report by incorporating into separate, related chapters.	Noted. Climate change is considered in detail in **Chapter 12**. The hydrology assessment has considered climate change by avoiding development in flood risk areas where practicable, as defined by SEPA future flood maps (which take account of an appropriate uplift for climate change). In addition, new permanent watercourse crossings will be designed to account for local fluvial geomorphology and will be designed for the 200-year + climate change flow, as per SEPA guidance.
EAC Environmental Health 30/10/25	Scoping	No objection to the approach to PWS outlined in the scoping report.	Noted. Further details on PWS are provided in this chapter and in **Figure 9.1**.
NatureScot 31/10/25	Scoping	Regarding peatland and habitats: NatureScot are pleased that Groundwater Dependent Terrestrial Ecosystems (GWDTEs) will be scoped in, but they note that there are areas of peatland habitats, blanket bog and wet modified bog identified in the Scoping report, notably M18	Hydrological and ecological surveys have been conducted to identify and assess GWDTEs within the Site based on National Vegetation Classification (NVC) and hydrological walkover surveys. No GWDTE were identified within the Site.

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		Sphagnum papillosum, and M19 Calluna vulgaris, which could raise issues of national interest. NatureScot recommend following their advice on peatlands provided in NatureScot (2023) Advising on peatland, carbon-rich soils and priority peatland habitats in development management. (https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management).	The assessment of effects on peatland follows NatureScot guidance.
		Much of the site has peat over 1 metre(m) deep, raising potential issues of national interest. The proposal must follow the NPF4 mitigation hierarchy and include biodiversity enhancement to compensate for any peat loss.	Detailed maps of the peat depths across the Site are provided in **Figure 9.7: Peat Depths** and in **Technical Appendices 9.3 and 9.4**. The NPF4 mitigation hierarchy has been followed and evidence of the design iteration to avoid deeper peat and minimise excavation during the design process is provided in **Chapter 3: Site Selection and Design Strategy**. The Outline Peat Management Plan (OPMP),Peat Landslide Hazard and Risk Assessment (PLHRA) and Outline Biodiversity Enhancement Management Plan (OBEMP) – **Technical Appendices 9.3, 9.4 and 7.6** respectively cover peatland mitigation and forest-to-bog habitat enhancement as part of the Proposed Development.
Scottish Water 20/10/25	Scoping	A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.	Noted and used to inform the baseline.
		Scottish Water wish to ensure that there are no surface water connections into their combined sewer systems. There are limited circumstances in which they would allow such a connection, such as brownfield sites. However, this would require significant justification.	No combined sewer system connections are planned as part of the Proposed Development.
		All developments that propose a connection to the public water or waste water infrastructure are required to submit a Pre-Development Enquiry (PDE) Form via our Customer Portal prior to any formal technical application being submitted, allowing us to fully appraise the proposals.	The Proposed Development will not require connection to Scottish Water infrastructure.

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
Scottish Environment Protection Agency (SEPA) 20/11/25	Scoping response with supporting 'Appendix 1: SEPA Energy generation and transmission EIA scoping requirements'	The EIA submission must include clear, scaled drawings of sensitivities (for example, peat depth, peat condition, GWDTE, proximity to waterbodies) overlain with proposed permanent and temporary development. This is needed to ensure the EIA process has informed the layout of the development to firstly avoid, then reduce and then mitigate significant impacts to the environment.	**Figures 9.2 and 9.7** show the temporary and permanent infrastructure overlain on waterbodies, GWDTE and peat, with relevant buffers at a scale suitable to show how the layout was informed by constraints.
		SEPA note that the Phase 1 peat survey has identified peat across much of the site. SEPA therefore expects comprehensive peat survey work and a site-specific Peat Management Plan to accompany the application. This must meet SEPAs requirements set out section 2 of Appendix 1. SEPA note that the EIA must demonstrate compliance with NPF4 policy 5 and clearly demonstrate how the mitigation hierarchy (as defined in NPF4) has been followed, to firstly avoid areas of peat, natural and near natural condition peat habitat, and, where this is not possible, to minimise the amount of peat that requires to be excavated.	Extensive Phase 2 peat surveys were carried out to support the design process – see **Technical Appendix 9.2**. The peat survey methodology complies with SEPAs requirements set out in section 2 of Appendix 1 and Scottish Government, Scottish Natural Heritage & SEPA (2017)[27] guidance. The outline PMP for the Site is provided at **Technical Appendix 9.3**.
		Based on information provided in the Scoping Report, it seems unlikely that any development will take place within 250m of a groundwater supply source. If this is the case, the EIAR should evidence this.	A map showing private water supplies (PWS) and groundwater abstractions within 1 km of the Site is provided in **Figure 9.1**. A postal survey of remote properties within a 1 km radius of the Site, consultation with EAC and two rounds of public consultation was undertaken to identify abstraction sources near the Site and used to inform the PWS baseline assessment. There are no groundwater supply sources within 250m of the Proposed Development's limit of micrositing.
	SEPA Scoping response Appendix 1, Section 1 – Site layout	Buffers should be based on the outer extent of any proposed micrositing, and this must be shown on the drawings. Micrositing must also not increase impacts on sensitivities, like peat and watercourse for example.	Maps of all engineering activities and 50 m micrositing extents is provided in **Figure 9.1 and 9.2**. The map shows all water environment features and relevant buffers. There will be no micrositing undertaken which moves infrastructure closer to sensitive water features and deeper peat. All micrositing will be subject to approval of an Ecological Clerk of Works (ECoW).

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
	SEPA Scoping response Appendix 1 Section 2 – Peatland and other carbon rich soils	Detailed peat surveys, peat condition mapping and excavation plans are required. EIA must demonstrate avoidance of near-natural peatland and of peat greater than 1 metre depth, and avoidance of and minimisation of peat excavation where avoidance is not possible.	Details of peat depth surveys undertaken are provided in **Technical Appendix 9.2** and reuse proposals described in **Technical Appendix 9.3**. Details of the iterative design approach are provided in **Chapter 3** of the EIA Report and form the first tier of the peat management strategy ('prevent') for the Proposed Development.
		Detailed plans should be provided showing: a) Peat depth survey showing peat probe locations, colour coded using distinct colours for each depth category. b) Peat depth survey showing interpolated peat depths. c) Peatland condition mapping	**Figure 9.7** provides detailed plans of peat probe depth and interpolated peat depth across the Site in relation to the Proposed Development. Peatland condition is described in the baseline assessment and **Technical Appendix 9.2**.
		A detailed site-specific peat management plan is required; it must cover quantified peat volumes, reuse, restoration, storage and disposal proposals and regulatory considerations.	The outline PMP for the Site is detailed in **Technical Appendix 9.3** and lays out full details of peat volumes, reuse, restoration, storage and disposal proposals.
	SEPA Scoping response Appendix 1 Section 3 – Water Environment	The EIA must show how impacts on hydrology and the water environment have been minimised. Measures should be put in place to protect any downstream sensitive receptors. Drawings must show infrastructure footprint, both temporary and permanent, overlain with water bodies.	A map of all watercourses, 50 m watercourse buffers and SEPAs Recommended Riparian Corridors with the Proposed Development overlain is shown in **Figure 9.2**. Further detail on watercourses and mitigation measures to protect downstream receptors are described in this chapter.
		The minimum buffer around each waterbody, as detailed in Table 1 of Recommended Riparian Corridor Layer for use in Land Use Planning, from all construction activities including working and storage areas, or 50m where subsurface activities are more than 1m in depth. If these minimum buffers cannot be achieved each breach must be numbered on a plan with an associated photograph of the location, dimensions of the waterbody, drawings of what is proposed in terms of any engineering works, and details of why the minimum buffer cannot be achieved and mitigation measures to protect the feature.	A 50 m buffer from all mapped waterbodies shown on OS 1:25K mapping was achieved at the early design stage – see **Chapter 3**. Subsequent hydrology surveys of the Site identified several smaller watercourses and drains not shown on OS mapping that were also buffered and avoided where practicable. A 50 m buffer around all waterbodies (including the smaller watercourses/drains mapped during Site surveys) is shown on **Figure 9.2** to reflect potential interactions with subsurface activities greater than 1m in depth. SEPA's Recommended Riparian Corridor Layer is also shown on **Figure 9.2** to reflect interactions with all other construction activities. In locations where the minimum buffers could not be achieved, details of buffer encroachments are provided in **Technical**

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
			Appendix 9.1, along with an assessment of likely effects and additional mitigation measures to protect the feature, if required.
		A map showing the location, size, depths and dimensions of all borrow pits overlain with all waterbodies within 250m and showing a site-specific buffer around each waterbody proportionate to the depth of excavations.	There are no borrow pits proposed. Materials will be sourced and transported to the Site from local suppliers, where possible.
	SEPA Scoping response Appendix 1 Section 4 – GWDTE	Phase 1 habitat surveys and National Vegetation Classification surveys must be undertaken where relevant.	NVC surveys have been carried out for the Site and potentially groundwater-dependent areas were assessed for groundwater dependency during hydrological surveys. Hydrology surveys confirmed that the *potential* groundwater dependent areas identified by habitat surveys were either associated with surface water features (i.e. watercourses) or forestry drainage within the forestry rides and are not groundwater dependent. There are no GWDTE identified within the Site.
	SEPA Scoping response Appendix 1 Section 5 – Existing water abstractions	SEPA expect developments and infrastructure to be designed and constructed such that the water environment, including existing water abstractions, are protected. Buffer distances must be demonstrated; risk assessment and monitoring are required where buffers cannot be achieved.	A comprehensive PWS survey and assessment was carried out. Extensive efforts have been made through postal survey within a 1 km radius of the Site, liaison with EAC and two rounds of public consultation to identify abstraction sources near the Site. A map showing private water supplies (PWS) and groundwater abstractions within 1 km of the Site is shown in **Figure 9.1**. None of the PWS/abstractions in the vicinity of the Site lie within the recommended buffers from the micrositing limit associated with the Proposed Development.
	SEPA Scoping response Appendix 1 Section 5 – Existing water abstractions SEPA Scoping response Appendix 1 Section 6 – Flood Risk	Engagement with Scottish Water is required where public supplies may be affected.	Scottish Water were consulted (see above) and confirmed that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.
		The source (rather than the property it supplies) of both public and private water supply abstractions should be identified. The survey needs to extend beyond the Site boundary where the distances require it.	Sources have been identified, where possible and the survey extends beyond the Site boundary.

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		The following information should be submitted where the assessment results indicate groundwater abstractions may be present: a) A set of drawings demonstrating the locations of the sources of all groundwater abstractions are out with a 10m radius of all activities, 100m radius of all excavations shallower than 1m and out with 250m of all excavations deeper than 1m b) If the minimum buffers cannot be achieved a conceptual site model should be provided that includes interpretation of the hydrogeological setting, including the groundwater flow regime.	A map showing PWS, groundwater abstractions and buffers within 1 km of the Site is shown in **Figure 9.1**.
		Crossings must be designed to accommodate the 0.5% annual exceedance probability flows with an appropriate allowance for climate change, or information provided to justify smaller structures.	All new permanent watercourse crossings will be designed to the 1 in 200-year flood event with an allowance for climate change – see **Technical Appendix 9.1**.
	SEPA Scoping response Appendix 1 Section 6 – Flood Risk SEPA Scoping response Appendix 1 Section 7 – Environmental Enhancements	A flood risk assessment (FRA) must be submitted in order to establish that the five bullet points within NPF4 policy 22a have been satisfied and where it is considered the development could result in an increased risk of flooding to a nearby receptor.	Flood risk areas based on SEPA future flood maps were avoided, where practicable. However, small areas of the Proposed Development lie within the surface water and small watercourses flood risk area. No land raising will take place in flood risk areas. Flood risk is described in the baseline and assessment. The Proposed Development will not result in an increased risk of flooding to any nearby receptors, and a stand-alone FRA is not required.
		SEPA generally discourage land raising and culverting unless policy tests are met.	No land-raising will take place within flood risk areas. New and upgraded crossings will be designed as bottomless arch culverts or single span bridges in accordance with

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
			SEPA guidance[30] - see **Technical Appendix 9.1**.
		Culverting for land gain would not be supported. If any works to alter watercourse channels are proposed, SEPA would expect betterment to the channel and utilisation of this opportunity to help reduce flood risk to the wider Site and any other nearby receptors.	Noted – no culverting for land gain is proposed and there are no proposals to alter watercourse channels. Some re-routing of small forestry drains around proposed permanent infrastructure will be required. This is described in the chapter and **Technical Appendix 9.1**.
		Policy 3 of NPF4 requires EIA developments to first fully mitigate any potential negative impacts on biodiversity, and then deliver additional measures that conserve, restore, and enhance biodiversity and nature networks, ensuring they are in a better condition than if the development had not taken place.	An assessment of effects on terrestrial ecology and birds is provided in **Chapter 7: Ecology** and **Chapter 8: Ornithology**, respectively. Proposals for conserving, restoring and enhancing biodiversity are provided in **Technical Appendix 7.6: Outline Biodiversity Enhancement Management Plan**.
	SEPA Scoping response Appendix 1 Section 9 – Pollution prevention and environmental management	The submission must include a schedule of mitigation, which includes reference to best practice pollution prevention and construction techniques (for example, limiting the maximum area to be stripped of soils and peat at any one time) and regulatory requirements.	Good practice pollution prevention measures are described in this chapter. A summary of all mitigation, good practice, enhancement and monitoring measures are included in **Technical Appendix 2.2**.
	SEPA Scoping response Appendix 1 Section 9 – Pollution prevention and environmental management	A commitment must also be included in the schedule of mitigation that micrositing will not encroach into sensitive areas, to avoid adversely affecting mitigation measures identified in the EIAR that seek to avoid and/or minimise adverse effects on sensitive receptors (e.g. peat, watercourse and GWDTE buffers).	A summary of all mitigation, good practice, enhancement and monitoring measures are included in **Technical Appendix 2.2**. All micrositing will be subject to approval of an ECoW.
EAC 14/03/2025	Response to Data Request	EAC provided details on PWS properties and sources within 1 km of the Site boundary.	Used to inform the baseline assessment.
ERC 19/03/2025	Response to Data Request	ERC provided details on PWS properties and sources within 1 km of the Site boundary.	Used to inform the baseline assessment.
SEPA 08/04/2025	Response to Data Request	SEPA provided details on licenced abstractions within a 3 km radius of the Site centre.	Used to inform the baseline assessment.

Study Area

9.2.5 The Site is located within the catchment of the Swinzie Burn (**Figure 9.1**), with peripheral areas of the wider Site lying within the Annick Water and Earn Water catchments. The Proposed Development lies entirely within the Swinzie Burn catchment. The Swinzie Burn flows in a westerly direction and joins the Annick Water approximately 4 km west

[30] *SEPA: Engineering in the Water Environment Good Practice Guide – River Crossings, WAT-SG-25, 2010*

of the Site, lying within the wider catchment of the Annick Water. There are numerous smaller unnamed tributaries within the Site. A small unnamed bog pool lies within the Site within Glenouther Moor.

9.2.6 The study area for the assessment is shown in **Figure 9.1**. The study area for the hydrology and hydrogeology assessment comprises the Site itself and watercourses/waterbodies downstream within the Swinzie Burn catchment. The study area for geology and peat comprises the Site, although a wider area was surveyed to cover early design iterations.

9.2.7 The study area for detailed assessment of groundwater abstractions, including Private Water Supplies (PWS), and ground water dependent terrestrial ecosystems (GWDTE) comprises a 250 m buffer from the proposed infrastructure's micrositing limits, as per SEPA guidance[31,32] and scoping advice. A wider search area (1 km buffer) from the Site boundary for PWS was undertaken for the assessment.

9.2.8 The study area for the assessment of effects of the Likely Grid Connection Route is shown in **Figure 9.3** and comprises the route and the watercourses and catchments it passes through. The grid connection will be underground along the existing public road network outside of the Site boundary. Within the Site boundary it will be underground along the route of the access track to the proposed substation (see **Figure 9.3**).

Desk Based Research and Data Sources

9.2.9 The following data sources have informed the assessment of the Proposed Development and the Likely Grid Connection Route:

- Ordnance Survey (OS) mapping at 1:10,000 and 1:25,000 scales;
- British Geological Survey (BGS) online digital mapping at 1:50,000 and 1:625,000 scales[33];
- Scottish Soil mapping at 1:250,000 scale;
- NatureScot Carbon and Peatland 2016 mapping at 1:250,000 scale;
- Aerial imagery of the Site and surrounding area;
- The Flood Estimation Handbook (FEH) Web-service;
- SEPA Future Flood Maps[34];
- OS Terrain 5 Topographic Data (5 m resolution), in addition to Phase 3 0.5m LiDAR DTM data from the Scottish LiDAR Remote Sensing datasets;
- Scotland's Environment Website and Interactive Map[35];
- Scottish Water Asset Plan Extranet Web Service;
- SEPA Licenced Abstraction Data;
- Private Water Supply Data (PWS) provided by EAC and East Renfrewshire Council (ERC);
- Responses to PWS questionnaires from local residents; and
- 2015 Glenouther Renewable Energy Park Environmental Statement (ES) (AECOM, 2015).

Field Survey

9.2.10 The following field surveys were carried out to inform the assessment:

- 12th to 19th September 2024 – Phase 1 peat survey, provided by Force 9;
- 24th March 2025 – Hydrology and GWDTE walkover to ground-truth ecology potential GWDTE data. The weather was sunny and clear;

[31] SEPA (2024) Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems
[32] SEPA (2024) Guidance on Assessing the Impacts of Development on Groundwater Abstractions
[33] BGS Geology Viewer, accessed March 2026, Available online at https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/
[34] SEPA Flood Maps, accessed March 2026, Available online at https://map.sepa.org.uk/floodmaps
[35] Scottish Government, accessed March 2026, Available online at https://map.environment.gov.scot/sewebmap/

- 27th to 29th August 2025 – Phase 2 peat and hydrology survey. The weather was wet, with very heavy downpours; and
- 22nd January 2026 – additional Phase 2 peat and hydrology survey. The weather was showery and overcast.

9.2.11 No field surveys were undertaken to inform the assessment of the Likely Grid Connection Route at this stage. Baseline information for the Likely Grid Connection Route assessment has been gathered through desk-based sources only.

Assessing Significance

Sensitivity

9.2.12 The criteria used to assess the sensitivity of water and geological features are summarised in **Table 9.2**.

Table 9.2 : Criteria to Assess the Sensitivity of Receptor

Sensitivity of Receptor	Typical Indicators
High	■ Receptor is of national or international value (i.e., Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA), and RAMSAR). ■ Overall water quality classified by SEPA as high and salmonid spawning grounds present. ■ Abstractions for public water supply. ■ Groundwater classified under the WFD as 'good' or groundwater resource with numerous sensitive users/receptors ■ The flooding of property or public roads that have been susceptible to flooding in the past. ■ Watercourse floodplain/hydrological feature that provides critical flood alleviation benefits. ■ Natural channel and of high morphological diversity. ■ Receptor supports GWTDE confirmed as highly groundwater dependent, and ecological importance of the community assessed to be High in accordance with SEPA (2024) guidance[36]. ■ Class 1 or 2 priority peatland. ■ >25 % of the infrastructure is located on peat >2 m in open terrain or >3 m in forestry, densely drained, eroded, or gullied open terrain.
Medium	■ Receptor is of regional or local value (e.g. Local Nature Reserve). ■ Overall water quality classified by SEPA as good or moderate, salmonid species may be present and may be locally important for fisheries. ■ Smaller watercourse lying upstream of larger river that is an SSSI, SAC SPA or RAMSAR. May be subject to improvement plans by SEPA. ■ Abstractions for private water supplies for domestic use. ■ Groundwater resource with sensitive users/receptors. ■ Environmental equilibrium copes well with natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. ■ The flooding of property or public roads that may be susceptible to flooding. ■ Watercourse/floodplain/hydrological feature that provide some flood alleviation benefits. ■ Semi-natural channel, with morphological diversity. May have some minor morphological constraints.

[36] Ecological importance of a GWDTE receptor is assessed in accordance with SEPA guidance (2024) on factors such as designated sites, conservation status (e.g. Scottish Biodiversity List), connectivity, extent within Scotland, and supporting notable or particularly sensitive species. Where the ecological importance of a GWDTE is assessed to be lower than the groundwater-dependency status of the receptor, a lower sensitivity may be selected and presented with the corresponding rationale.

Sensitivity of Receptor	Typical Indicators
	■ Receptor supports GWTDE confirmed as moderately groundwater dependent, and ecological importance of the community assessed to be Moderate in accordance with SEPA (2024a) guidance. ■ >25% of infrastructure is located on peat with depth between 1 m – 2 m in open and undegraded terrain or >2 m in forestry, densely drained, eroded or gullied open terrain.
Low	■ Receptor is of low environmental importance (e.g., water quality classified by SEPA as bad or poor, fish sporadically present or restricted). ■ Not subject to water quality improvement plans by SEPA. ■ Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. ■ Abstractions for non-potable use. ■ No significant groundwater resource and no identified sensitive users/receptors. ■ No flooding of property or public roads. ■ Watercourse/floodplain/hydrological feature that provides minimal flood alleviation benefits. ■ Heavily engineered or artificially modified and may dry up during summer months. ■ No GWDTE confirmed as either moderately or highly groundwater dependent, and ecological importance of the community assessed to be at most Low in accordance with SEPA (2024a) guidance. ■ >25% of infrastructure located on peat with depth between 0.5 m – 1 m in open and undegraded terrain or with depth between 1 m – 2 m in forestry, densely drained, eroded or gullied open terrain.
Negligible	■ Receptor is of low environmental importance (e.g., water quality classified by SEPA as Bad or Poor, fish sporadically present or restricted). ■ Not subject to water quality improvement plans by SEPA. ■ Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. ■ No abstractions. ■ No groundwater resource and no identified sensitive users/receptors. ■ No flooding of property or public roads. ■ Watercourse/floodplain/hydrological feature that provides no flood alleviation benefits. ■ Heavily engineered or artificially modified and may dry up during summer months. ■ >75% of the infrastructure is located on non-peat or peaty/organic rich soils less than <0.5 m in depth, or peat <1m in depth that is in forestry, densely drained, eroded or gullied open terrain.

Magnitude

9.2.13 The magnitude of change has been assessed based on the criteria presented in **Table 9.3**. These criteria are based on professional judgement and experience of other similar studies.

Table 9.3 : Criteria for Estimating the Magnitude of Impact

Magnitude of Effect	Typical Indicators
Major	■ Fundamental changes to the hydrology, water quality, geology, peat or hydrogeology (in terms of quantity, quality, and morphology). ■ A >10% change in average or >5% change in flood flows.

Magnitude of Effect	Typical Indicators
	■ The extent of flood risk areas (as classified by NPF4 – i.e. land or built form with an annual probability of being flooded of greater than 0.5% including an appropriate allowance for future climate change) will be significantly increased. ■ Change that would render water supply unusable for longer than one month. ■ Change resulting in total loss of feature or integrity of feature or use. ■ Excavated peat volume associated with the infrastructure footprint and associated earthworks is >10% of the peat volume across the peat survey area within the Site.
Moderate	■ Material but non-fundamental changes to the hydrology, water quality, geology, peat or hydrogeology (in terms of quantity, quality, and morphology). ■ A >5% change in average and minimal change in flood flows. Extent of flood risk areas will be moderately increased/or decreased. ■ Change that would render water supply unusable for days or weeks with no alternative. ■ Excavated peat volume associated with the infrastructure footprint and associated earthworks is >5% and <10% of the peat volume across the peat survey area within the Site.
Minor	■ Detectable but non-material changes to the hydrology, water quality, geology, peat or hydrogeology (in terms of quantity, quality, and morphology). ■ A >1% change in average flows and no increase in flood flows. No change in extent of flood risk areas. ■ Change that would render water supply unusable for short period (days) or for longer period if alternative supply put in place. ■ Excavated peat volume associated with the infrastructure footprint and associated earthworks is >2% and <5% of the peat volume across the peat survey area within the Site.
Negligible	■ No perceptible changes to the hydrology, water quality, geology, peat or hydrogeology (in terms of quantity, quality, and morphology). ■ A <1% change in average and no change in flood flows. ■ No change in water supply or minor change (days) where alternative is put in place. ■ Excavated peat volume associated with the infrastructure footprint and associated earthworks is <2% of the peat volume across the peat survey area within the Site.

Significance

9.2.14 The predicted significance of the effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity and magnitude of change as detailed in **Table 9.4** below. **Major** and **moderate** effects are considered **significant** in the context of the EIA Regulations.

9.2.15 The assessment of effects is undertaken assuming that embedded and good practice mitigation is an integral part of the project design (See **Section 9.6: Embedded Design Mitigation** and **Section 9.7: Good Practice Mitigation Measures** for details). Site specific additional mitigation will be put in place to address significant effects, if required, prior to the assessment of residual effects.

Table 9.4 : Matrix for Determination of Significance of Effects

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

Assessment Assumptions

9.2.16 The following assumptions have been made when undertaking the assessment of effects:

- The depth of excavation for turbine foundations will be 3.5 m deep;
- The foundations and hardstanding for T1, T2 and T3 will be piled to minimise peat excavation and T4 and T5 will be excavated. Further information on piled foundations is provided in **Chapter 4**.
- Areas of temporary hardstanding will be restored back to the original surface as soon as possible after construction.
- It is assumed that all other Site infrastructure, including tracks, will require excavations of less than 1 m.

Assessment Limitations

9.2.17 The assessment was based on existing, available data, supplemented by hydrology and peat depth surveys of the Site. It is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant environmental effects on geology, hydrology, hydrogeology and peat.

9.3 Existing Conditions

The Proposed Development Site

Climate

9.3.1 The average annual temperature range in this region of Scotland is 5.4 °C to 12.1 °C[37]. The average annual rainfall on the Site for the 1991-2020 period is approximately 1655 mm[2].[38]

Topography

9.3.2 The Site is located within an afforested blanket bog. The topography of the Site is predominantly flat, with gentle undulations close to watercourses where wide, gently sloping riparian areas are found. Ground levels across the wider Site slope very gently to the south towards the Swinzie Burn. Slightly higher ground lies along the north-east boundary at approximately 236 m AOD, gradually falling to the south where topographic lows of approximately 200 m AOD can be found along the bed of the Swinzie Burn. The topography of the Site is shown in **Figure 9.1**.

Watercourses, Surface Water and Existing Site Drainage

9.3.3 The main watercourses within and close to the Site are the Swinzie Burn, the Annick Water and the Earn Water. The Corsehouse Reservoir is fed by the Annick Water and lies ~ 350 m north of the Site.

- The Swinzie Burn is the main watercourse at the Site and flows from east to west along the southern boundary of the Site. The Burn drains a catchment of ~ 8.2 km^2 where it joins the Annick Water ~ 4 km west of the Site. All

[37] Met Office Website, Accessed 26/03/2026
[38] FEH Web Service, Accessed 26/03/2026

of the Proposed Development infrastructure lies within the Swinzie Burn catchment (**Figure 9.1**). The Swinzie Burn is culverted underneath the M77 motorway east of the Site.

- The Annick Water is the largest watercourse in the vicinity of the Site, lying ~700 m north of the Site boundary and flowing from north-east to south-west. The catchment of the watercourse measures ~ 13.8 km^2 and encompasses the Corsehouse Reservoir, which lies north of the Site. A small area along the northern Site boundary lies within the catchment of this watercourse, but there is no proposed infrastructure within the Annick Water catchment.
- The Earn Water is a small watercourse to the north-east of the Site that flows north-east, away from the Site. A small portion of the Site along the eastern site boundary lies within the ~ 4.7 km^2 catchment of the Earn Water, but there is no proposed infrastructure within the Earn Water catchment.
- The Corsehouse Reservoir lies ~ 350 m north of the Site. The reservoir is fed by the Annick Water and drains to the west. It is understood that the reservoir is no longer used for drinking water supply and Scottish Water have confirmed that there are no Scottish Water drinking water catchments or water abstraction sources in the area that may be affected by the proposed activity There is no proposed infrastructure within the Corsehouse Reservoir catchment (see **Figure 9.1**).

9.3.4 The hydrology walkover surveys identified an extensive network of drainage features and minor watercourses not shown on the 1:25,000 scale OS mapping within the catchments of the Swinzie Burn, Annick Water and Earn Water. These were mapped in Geographic Information System (GIS) using aerial imagery and then ground-truthed on Site to feed into the PLHRA, **Technical Appendix 9.4**. The network of drains and minor watercourses within the survey area are shown in **Figure 9.4.4** in **Technical Appendix 9.4**. Much of this drainage is artificial and is intended to lower the water table of the peat soils within the Site to facilitate tree growth in the conifer plantation to the detriment of the natural hydrology and peat of the Site.

Watercourse Crossings

9.3.5 New crossings were reduced as far as practicable by minimising the number of crossings during initial design iterations. The Proposed Development includes 12 new crossings; this includes crossing five minor watercourses and five artificial drains not shown on the OS 1:25K mapping but mapped in the field and two watercourses shown on OS 1:50K mapping data. Details and photographs of all new crossings are provided in **Technical Appendix 9.1** with the locations shown on **Figure 9.2**.

9.3.6 Access to the Site will be from the existing track east of the Site.

Hydrology and Flood Risk

9.3.7 The SEPA future flood maps indicate that the main fluvial flood risk to the Site is the flood risk area associated with the Swinzie Burn, which lies along the southern Site boundary and encroaches into the south-western section of the Site. There is no infrastructure proposed within the Swinzie Burn flood risk areas, except for a small section of floated access track between T4 and T5.

9.3.8 The SEPA flood maps predict very small areas of the Site are at risk of pluvial (surface water) flooding and flooding from small watercourses, as shown in **Figure 9.2**. The areas identified as being at pluvial flood risk are generally located along the low-lying areas close to watercourses. Flood risk areas have been avoided where practicable during early iterations of the design.

9.3.9 There are no properties or receptors immediately downstream of the Site that are currently at risk of flooding from the named and unnamed watercourses within the Site.

Water Supplies, Abstractions, Discharges and Services

9.3.10 PWS data on properties and supplies held by EAC, ERC and SEPA, alongside a review of remote properties, were used to identify properties within a 1 km buffer of the Site that may use a PWS. Postal questionnaires were sent to those properties and information on PWS was also obtained via public consultation at the events held on 23rd and 24th February 2026.

9.3.11 Nine PWS source locations supplying 11 properties were determined through review of returned postal questionnaires, council data, SEPA abstraction data and prior data collected as part of the 2015 Glenouther Renewable Energy Park ES (AECOM, 2015). **Figure 9.1** shows the locations of the nine known PWS sources. Five

other potential PWS properties, which are potentially supplied by PWS, but the PWS source locations are currently unknown, are also shown in **Figure 9.1**. **Table 9.5** presents a summary of the PWS data along with an initial assessment of potential impact based on proximity to proposed infrastructure and hydrological connectivity to the Proposed Development.

9.3.12 The five unidentified potential PWS sources (for properties Marramead, The Stables, Greenfinch, Corsehouse Farm and Corsehouse Cottage) are not likely to be hydrologically connected to the Proposed Development based on the location of the properties and likely abstraction locations (see **Table 9.5** and **Figure 9.1** for more information).

Table 9.5 : Private Water Supplies Within 1 km of the Site

Property Address	Source Coordinates (Easting, Northing)		Source Type and Use	Closest Distance from Proposed Infrastructure	Comment and Initial Assessment	Scoped In/Out
Floak Farm, Floak	249398	650000	Borehole, Domestic, Livestock	Source located ~ 850 m north of the micrositing buffer from the proposed new access track.	The source location lies ~ 17 m higher than the proposed new access track. Surface water flow paths indicate that run-off from the access track does not drain towards the source.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity.
Townhead of Floak Farm and Townhead of Floak Bungalow, Floak	249300	650304	Unknown	Source located 1150 m north of the micrositing buffer from the proposed new access track	The PWS source lies ~ 33 m higher than the existing access track. Surface water flow paths indicate that the access track does not drain towards the source location.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity.
Mid Floak Bungalow and Mid Floak Farm, Floak	249300	650203	Unknown	Source located 1025 m north of the micrositing buffer from the proposed new access track	The PWS source lies ~ 25 m higher than the existing access track. Surface water flow paths indicate that the access track does not drain towards the source location.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity.
Floak Quarry, Ayr Road, Newton Mearns	249454	649721	Borehole Quarry and worker use	Source located 600 m north of the micrositing buffer from the proposed new access track.	Surface water flow paths indicate that run-off from the Proposed Development does not drain towards the PWS source. ERC data describes the PWS as a 'Deep borehole - good construction and security'.	**Scoped out** due lack of surface flow connectivity and large distance from new proposed infrastructure.
North Drumboy Quarry,	249719	649298	Domestic, Commercial (quarry)	Source located 500 m east of the micrositing buffer from the	The PWS source lies ~ 17 m higher than the existing access track.	**Scoped out** due to large elevation difference, distance from

Property Address	Source Coordinates (Easting, Northing)		Source Type and Use	Closest Distance from Proposed Infrastructure	Comment and Initial Assessment	Scoped In/Out
Glasgow Road,				proposed new access track	Surface water flow paths indicate that the access track does not drain towards the source location, with the M77 lying in-between.	proposed infrastructure and lack of surface flow connectivity.
Sunrise Lodge, North Drumboy, Glasgow Road	249453	648828	Unknown	Source located 320 m south-east of the micrositing buffer from the proposed new access track	The PWS source lies ~ 23 m higher than the proposed new access track. The PWS source lies on the opposite side of the Swinzie Burn than the Proposed Development. Surface water flow paths indicate that the access track does not drain towards the source location, with the M77 lying in-between.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity.
Marramead, North Drumboy, Glasgow Road	Unknown (Property easting: 249403)	Unknown (Property northing: 648916)	Unknown	Property located 225 m south-east of the micrositing buffer from the proposed new access track.	The property lies ~ 21 m higher than the proposed new access track. The property lies on the opposite side of the Swinzie Burn than the Proposed Development and is not hydrologically connected. Surface water flow paths indicate that the access track does not drain towards the property, with the M77 lying in-between. Likely source location is further to the east, based on nearby confirmed PWS sources that are further upslope to the east. OS maps show wells upslope to the east.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity from property.
The Stables, North Drumboy, Glasgow Road	Unknown (Property easting: 249382)	Unknown (Property northing: 648835)	Unknown	Property located 220 m south-east of the proposed micrositing buffer from the proposed new access track	The property lies ~ 21 m higher than the proposed new access track. The property lies on the opposite side of the Swinzie Burn than the Proposed Development	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow

Property Address	Source Coordinates (Easting, Northing)		Source Type and Use	Closest Distance from Proposed Infrastructure	Comment and Initial Assessment	Scoped In/Out
					and is not hydrologically connected. Surface water flow paths indicate that the access track does not drain towards the property, with the M77 lying in-between. Likely source location is further to the east, based on nearby confirmed PWS sources that are further upslope to the east. OS maps show wells upslope to the east.	connectivity from property.
Greenfinch	Unknown (Property easting: 249386)	Unknown (Property northing: 648793)	Unknown	This is a new property located 230 m south-east of the micrositing buffer from the proposed new access track.	The property lies ~ 21 m higher than the proposed new access track. The property lies on the opposite side of the Swinzie Burn than the Proposed Development and is not hydrologically connected. Surface water flow paths indicate that the access track does not drain towards the property, with the M77 lying in-between.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity from property.
South Drumboy Farm, South Drumboy, Glasgow Road	249697	648501	Unknown	Source located 730 m south-east of the micrositing buffer from the proposed new access track	The source lies ~ 23 m higher than the existing access track. The source lies on the opposite side of the Swinzie Burn than the Proposed Development and is not hydrologically connected. Surface water flow paths indicate that the access track does not drain towards the property, with the M77 lying in-between.	**Scoped out** due to large elevation difference, distance from proposed infrastructure and lack of surface flow connectivity.
High Clunch, Stewarton,	246934	647519	Domestic, Livestock	Source located 1 km south-west of T4 micrositing buffer	The PWS source lies on the opposite side of the Swinzie Burn to the Proposed Development and is not hydrologically connected.	**Scoped out** due to large distance from proposed infrastructure and lack of

Property Address	Source Coordinates (Easting, Northing)		Source Type and Use	Closest Distance from Proposed Infrastructure	Comment and Initial Assessment	Scoped In/Out
						surface flow connectivity
Glenouther Farm, Kilmarnock	246572	648361	Unknown	Source located 1 km west of proposed new access track micrositing buffer	Surface water flow paths indicate that the access track does not drain towards the source.	**Scoped out** due to large distance from proposed infrastructure and lack of surface flow connectivity.
Corsehouse Farm, Old Glasgow Road	Unknown (Property easting: 247772)	Unknown (Property northing: 650220)	Unknown	Property located 1 km north of T3 hardstanding micrositing buffer	Property located within Annick Water catchment - there is no hydrological connection between this area and the Proposed Development	**Scoped out** due to large distance from proposed infrastructure and lack of surface flow connectivity.
Corsehouse Cottage, Old Glasgow Road	Unknown (Property easting: 247332.9	Unknown (Property northing: 650036)	Unknown	Property located 1 km north-west of T3 hardstanding micro siting buffer	Property located within Annick Water catchment - there is no hydrological connection between this area and the Proposed Development	**Scoped out** due to large distance from proposed infrastructure and lack of surface flow connectivity.

9.3.13 None of the identified PWS sources or properties within the search area lie within either the 100 m buffer from excavations shallower than 1 m or 250 m buffer from excavations deeper than 1 m of the LOD associated with the Proposed Development. Surface water flow path analysis using available DTM data indicates that no proposed excavations drain towards any of the identified PWS sources or properties. Therefore, PWS are scoped out and not considered further in this assessment.

9.3.14 The Site is not located within a surface water Drinking Water Protection Area (DWPA) or where a Scottish Water abstraction is located, as confirmed by consultation with Scottish Water (see **Table 9.1**). There is no proposed infrastructure within the Corsehouse Reservoir catchment (see **Figure 9.1**).

9.3.15 A review of Scottish Water assets shows the only Scottish Water assets within the Site to be a public distribution supply pipe that runs adjacent to the eastern Site boundary under the existing M77 service road. The road is not part of the Proposed Development, however a new junction off it will be required for access to the Proposed Development. Cognisance of the location and depth of the pipe will be considered in advance of construction work required for the access track junction and the Principal Contractor will liaise with Scottish Water to ensure no damage to the distribution pipe during construction.

9.3.16 The Site is within the Whitelee DWPA for groundwater. However, it is noted that the whole of Scotland is a DWPA for groundwater.

Water Quality and Protected Areas

9.3.17 Under the terms of the Water Framework Directive (WFD), all river basin districts are required to be characterised, a process which requires SEPA to produce an initial assessment of the impact of all significant pressures acting on the water environment. Surface water bodies are defined as being whole or parts of rivers, canals, lochs, estuaries or coastal waters. The main purpose of identifying water bodies is so that their status can be described accurately and compared with environmental objectives.

9.3.18 The SEPA Water Classification Hub has characterised surface water quality status under the terms of the WFD. Classification by SEPA considers water quality, hydromorphology, biological elements including fish, plant life and

invertebrates, and specific pollutants known to be problematic. The classification grades watercourses through High, Good, Moderate, Poor and Bad status. This provides a holistic assessment of aquatic ecological health. Both the Annick Water and the Earn Water have been classified, while the Swinzie Burn is not large enough to be classified.

9.3.19 As of 2024, the overall status of the Annick Water (Waterbody ID: 10394) is classified as 'Moderate ecological potential' since 2022, an improvement over prior years of data which classified the overall status as 'Poor' / 'Poor ecological potential' (2014 – 2022) due to improvements in water quality and plant ecology. However, the watercourse was graded as 'Bad' for hydromorphology and overall ecology in 2024.

9.3.20 As of 2024, the overall status of the Earn Water (Waterbody ID: 10011) is classified as 'Poor' since 2019, a downgrade over prior years of data which classified the overall status as 'Moderate" (2014 – 2018) due to deteriorations in hydromorphology.

9.3.21 There are no geological or hydrological SSSI or SAC within or downstream of the Site that could be affected by the Proposed Development.

Geology and Soils

9.3.22 The bedrock geology underlying the Site is shown in **Figure 9.5**. The Site is split between two lithologies. The northern and central areas of the Site are underlain by igneous Trachyte of the Harelaw Lava Member Formation (British Geological Survey, n.d). These igneous rocks are volcanic (extrusive) in origin. Rich in silica, they were formed by viscous flows of lava with feeder dykes and sills.

9.3.23 The western, southern and eastern sections of the Site are underlain by Olivine-macrophyric basalt of the Flow Moss Lava Member formation. These igneous rocks are volcanic (extrusive) in origin. Poor in silica, they were formed by fluid flows of lava with feeder dykes and sills.

9.3.24 BGS mapping does not show any dykes or intrusive features within the Site, however there are a number of linear fault features that run north-east to south-west along the lithological boundary between the two underlying rock formations.

9.3.25 The BGS superficial deposits map shows the Site to be nearly entirely dominated by quaternary peat deposits (**Figure 9.5**). Peat soils within the Site are lacustrine and palustrine in origin. They comprise accumulated and detrital organic material, forming beds and lenses within lagoons, bogs and swamps. Small sections of the Site are comprised of glacial till and alluvial deposits along the bed of the Swinzie Burn, as well as a small area along the northern Site boundary.

9.3.26 The National Soil Map of Scotland[39] (**Figure 9.6**) shows that the Site is predominantly underlain by dystrophic blanket peat deposits which cover most of the Site. Along the fluvial area of the Swinzie Burn and its main tributaries within the Site, a wide range of soil types, including immature soils and alluvial soils, can be found. A small pocket of the Site along the north-east boundary is underlain by peaty gleyed podzols.

Peat

9.3.27 The NatureScot Carbon and Peatland Map (NatureScot, 2016) (**Figure 9.6**) indicates that carbon-rich soils and areas of peatland are present within the Site. The NatureScot map was developed to be used as a high-level planning tool and is indicative only. Site surveys of the condition and peat depths have been used in the effects assessment to determine the importance of peat on the Site. Based on the NatureScot mapping, the Site comprises predominantly of Class 5, with some smaller areas of Class 1 and Class 4:

- Class 1 comprise nationally important carbon-rich soils, deep peat and priority peatland habitat. Class 1 areas are likely to be of high conservation value. None of the Proposed Development is located within or close to a Class 1 area, with Class 1 being found only along the eastern Site boundary and the north-western corner of the Site.
- Class 4 areas are unlikely to be associated with peatland habitats or wet and acidic type. Class 4 areas are predominantly mineral soil with some peat soil. The only area of Class 4 within the Site lies on higher ground along the northern Site boundary, encompassing a small part of the northern section of the hardstanding for T3.

[39] The James Hutton Institute, https://map.environment.gov.scot/Soil_maps/?layer=1, Accessed 26/03/2026

- Class 5 comprises areas where soil information takes precedence over vegetation data. Typically, no peatland habitat is recorded. This Class is often used to designate areas where peat has been planted with commercial forestry, as is the case with the Site. In this circumstance, the underlying peat deposits can be of significant depth despite the degraded quality of the habitat. Class 5 comprises the majority of the Site, with the vast majority of the Proposed Development lying within this Class 5 peat.

9.3.28 Peat surveys have been undertaken on the Site following Scottish Government (2017) peat survey guidance. The results of the peat survey are shown in **Figure 9.7** and presented in full in **Technical Appendix 9.2** and summarised below:

- 3.0% of probes were recorded as having a depth of less than or equal to 30 cm. These probes are not classified as peat.
- 6.2% of probes were recorded as having a depth of between 30 – 50 cm. These probes are classified as organo-mineral soils and not formally considered to be peat.
- 24.8% of probes were recorded as having a peat depth of between 50 – 100 cm.
- 65.9% of the probes were recorded as having a peat depth of over 100 cm.
- The deepest probe depth recorded on the Site was 820 cm.

9.3.29 A total of 13 cores were taken across the peat survey area at the locations shown in **Figure 9.7**. The cores are described in detail in **Technical Appendix 9.2**. The coring determined that the acrotelm layer was between 10 cm and 70 cm in the cores surveyed, with a mean acrotelm depth of 26 cm. 64% of the cores had a clay base and 34% had a gravel base. Based on the interpolated peat depth model, the total volume of peat within the Site is c. 5,966,000 m^3 at an average Site-wide depth of 2.9 m.

9.3.30 A peatland condition survey showed that the majority of the peat within the Site is in a degraded and afforested state. Small areas of modified peatland can be found within forestry clearings and the large open Glenouther Moss within the Site.

9.3.31 The peat survey results were used to inform the design layout during the iterative design process (deeper peat was avoided where possible - see **Chapter 3**) and also to inform the Outline Peat Management Plan (**Technical Appendix 9.3**) and Peat Landslide Hazard and Risk Assessment (**Technical Appendix 9.4**).

Groundwater

9.3.32 The Whitelee aquifer is the only groundwater body underlying the Site. The Whitelee aquifer is part of the low productivity igneous volcanic aquifer body within Scotland. The main controls on aquifer permeability are the degree and nature of rock fracturing, and the degree of weathering along junctions between individual lava flows. Intergranular pore flow is negligible[40]. The Whitelee aquifer is classified by SEPA to be of 'Good' overall condition as of 2024.

9.3.33 SEPA groundwater flood maps indicate that the Site is not at risk of groundwater flooding.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

9.3.34 Areas of potential GWDTEs were identified during the ecology NVC surveys and are shown and described in **Chapter 7**. A walkover survey of potential GWDTE polygons and target notes within the Site was undertaken by a team of two hydrologists in March 2025.

9.3.35 Based on field observations, the potential GWDTE habitats were found to have at most a low dependency on groundwater and are not considered to be GWDTE, as they are associated with surface water drainage within the forestry rides and along watercourses.

9.3.36 Two groundwater flush/spring upwellings were identified during peat and hydrology surveys, both within the commercial forestry plantation. Based on feedback from ecology survey data and consultation with the project ecologists, as both features are within the plantation they do not have the appropriate communities to be designated as GWDTE. There are therefore no GWDTE within the Site.

[40] Ó Dochartaigh, B É, MacDonald, A M, Fitzsimmons, V, and Ward, R. (2015) Scotland's aquifers and groundwater bodies. British Geological Survey Open Report, OR/15/028. 76pp.

The Likely Grid Connection Route

Hydrology and Flood Risk

9.3.37 The Likely Grid Connection Route is located within the River Irvine and White Cart Water surface water catchments. The majority of the route lies within the White Cart Water catchment, with only the southern 1.2 km lying within the River Irvine catchment. The route lies within five smaller sub catchments, namely the Annick Water, Earn Water, Auldhouse Burn, Brock Burn and the Levern Water. None of these catchments are designated as a Drinking Water Protected Area (DWPA) and no water dependent or geological designated sites are noted in proximity of the route. The route is entirely within the public road network, which crosses approximately seven small watercourses and the Levern Water on existing bridges. The main watercourses and surface water bodies in the vicinity of the Likely Grid Connection Route are shown in **Figure 9.3**. The Likely Grid Connection Route passes close to the several reservoirs (e.g. Balgray Reservoir, Ryat Linn Reservoir).

9.3.38 SEPA Future Flood Mapping (**Figure 9.3**) indicates there are flood risk areas in proximity to the Likely Grid Connection Route at the existing road watercourse crossings and close to the reservoirs.

9.3.39 Private water supplies may be present within 250 m of the route; however, as the Likely Grid Connection Route will be underneath the public road network, there will be no effects on private water supplies.

Geology and Peat

9.3.40 The NatureScot (2017) Carbon and Peatland map (**Figure 9.3**) indicates that the majority of the Likely Grid Connection Route is shown to be classed as mineral soils or non-soil, which are not considered to be representative of peatland habitats.

9.3.41 A very short section (approximately 75 m) of the Likely Grid Connection Route close to the Site entrance is shown to pass through an area of Class 1 peatland and then a section of Class 5 peatland for another approximately 200 m before reaching the Site boundary. Within the Site the Likely Grid Connection Route cable will be laid beneath the proposed access track to the substation in an area of Class 5 peatland.

9.4 Implications of Climate Change for Existing Conditions

9.4.1 The assessment takes into account the implications of climate change for the Proposed Development and Likely Grid Connection Route. Based on UK Climate Change Projections 2018 (UKCP18) for Scotland:

- Temperatures are projected to increase, particularly in summer;
- Winter rainfall is projected to increase and summer rainfall is most likely to decrease;
- Heavy rain days (rainfall greater than 25 mm) are projected to increase, particularly in winter;
- Near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant effects of winds; however, the increase in wind speeds is projected to be modest; and
- An increase in frequency of winter storms.

9.4.2 SEPA guidance[12] on climate change in Scotland provides a regional based approach to estimate uplift in future river flows in Scotland. For large river catchments (over 50 km^2), the peak (200-year) design flow should be increased by 49% in the Clyde Basin to account for projected climate change increases to the year 2100. The peak rainfall intensity allowance for the Clyde region of Scotland is 41% to the year 2100. Thus, this part of Scotland, which includes the Site, is likely to get wetter with higher peak flows in the watercourses in the future.

9.4.3 Hydrological implications of the UKCP18 predictions and the SEPA guidance[12] are that river flows will increase as weather events grow more extreme. Baseline hydrological conditions for flood events are likely to become flashier and more intense. This is accounted for when applying SEPA climate change uplifts to hydrological estimates and drainage / watercourse crossing design and adhering to SEPA guidance on watercourse buffers. SEPA future flood maps include relevant uplifts to account for climate change.

9.4.4 Increased temperatures and disruption to seasonal rainfall is likely to lead to increased peat degradation as localised water table decreases are exacerbated. Micro-siting of proposed turbine locations to avoid areas of deeper peat has been incorporated to mitigate peatland degradation.

9.4.5 The National Planning Framework 4 (NPF4) notes "Development proposals will be sited and designed to adapt to current and future risks from climate change"[5].

9.5 Future Baseline in the Absence of the Proposed Development and Likely Grid Connection Route

9.5.1 The main change to the future baseline would be as a result of climate change. Climate change projections highlight that summer and winter temperatures are likely to be greater that the current baseline, with winter rainfall increasing and summer rainfall decreasing. Increased rainfall will result in higher peak flows in the watercourses in the future. In addition, there may be more drought periods in the summer months, with drier, hotter conditions predicted resulting in lower flows during the summer months.

9.5.2 Without the Proposed Development, the drainage and drying-out effects caused by the commercial forestry planation on the peat within the Site would lead to the continued degradation of the carbon sink capability of peat soils within the Site.

9.6 Embedded Design Mitigation

9.6.1 A 50 m infrastructure buffer from all water features shown on 1:25,000 OS maps was applied during the early project design phase. The 50 m buffer from all mapped water features within the Site was achieved, with the exception of two new crossings required for the access track (see **Figure 3.1**).

9.6.2 The Applicant and Principal Contractors will maintain close consultation with Scottish Water before and during construction to be cognisant of Scottish Water assets and ensure avoidance and protection of distribution pipe on the public road during the construction works of the access track junction.

9.6.3 Embedded design mitigation for the Likely Grid Connection Route is described in **Chapter 3** and not repeated here.

Additional Design Mitigation Based on Site Surveys

9.6.4 Detailed hydrology, hydrogeology and peat surveys undertaken during the EIA process identified several smaller unmapped waterbodies (small natural watercourses and artificial drains) which were also considered in the design process and buffered where practicable, during design iterations.

9.6.5 SEPA's scoping response (see **Table 9.1**) requests a minimum buffer around each waterbody, as detailed in Table 1 of Recommended Riparian Corridor Layer for use in Land Use Planning (the table is reproduced below), from all construction activities including working and storage areas, or 50 m where subsurface activities are more than 1 m in depth.

Table 9.6 : Recommended riparian corridor width on each side of the channel. This is measured from the bank top, perpendicular to the watercourse (from SEPA, 2024)[23]

Channel Width	Recommended Corridor Width on Each Channel Bank
<2 m	10 m
2-15 m	15 m
>15 m	30 m

9.6.6 SEPA's Recommended Riparian Corridor buffers (relevant for subsurface activities less than 1 m) and the 50 m buffer (relevant for subsurface activities more than 1 m in depth) are both shown in **Figure 9.2** around OS mapped waterbodies and water features identified during Site surveys. Locations where the relevant buffers from proposed infrastructure (based on subsurface activity depths) could not be met are assessed in detail in **Technical Appendix 9.1** and summarised in the Effects Assessment within this chapter. It is highlighted that all OS mapped waterbodies have been buffered by a minimum of 50 m (with the exception of two track crossings) and all buffer encroachments relate to small watercourses or artificial drains mapped during Site surveys.

9.6.7 Watercourse crossings were avoided and minimised as much as possible during early iterations of the turbine and track layouts. Small artificial forestry drains will be re-routed around the permanent infrastructure as part of the detailed drainage design.

9.6.8 From the outset of the project, the widespread presence of deep peat has been treated as a key constraint to siting the Proposed Development infrastructure. Through a series of design workshops, the overlap of infrastructure with the deepest peat deposits has been minimised. Details of the iterative design approach are provided in **Chapter 3** of the EIA Report and forms the first tier of the peat management strategy ('prevent') at the Proposed Development. This includes the use of piled foundations and hardstanding for T1, T2 and T3 to avoid excavation of peat. Temporary hardstands at T1, T2 and T3 will be floated, and tracks will be floated within the Site based on the following criteria (peat >0.5m, track length of 100 m or more and slopes less than 3 degrees). The second tier of the strategy is to reuse excavated peat, and the approach to reuse is described in the Outline Peat Management Plan (OPMP) (**Technical Appendix 9.3**). The OPMP includes full calculations for peat and soil excavation over the entire infrastructure footprint including earthworks and provides an account of peat reuse in temporary infrastructure reinstatement and for reuse in forest-to-bog restoration. No need has been identified for recycling or disposal of excavated materials.

9.6.9 The proposed hardstanding at T1 has been designed with respect to peat and the water environment and the Applicant has proposed a bespoke design for the permanent and temporary hardstands to reduce excavation of peat and to reduce the extent to which hardstand areas will encroach into the buffer of the small watercourse mapped during Site surveys. Details of the design strategy and bespoke design for T1 is provided in **Chapter 3** and **Chapter 4**, respectively.

9.6.10 The PLHRA (**Technical Appendix 9.4**) has assessed potential landslide risks from both peat slides and bog bursts (the latter due to the low gradients at the Site) while also assessing stability associated with floating track and with temporary sidecasting of materials around development infrastructure. Through careful design, including consideration of early PLHRA likelihood results, all proposed infrastructure has been sited or routed away from areas of Moderate peat landslide likelihood or Factor of Safety <1.4 (using best estimate parameters).

9.7 Good Practice Mitigation Measures

9.7.1 A number of good practice pollution prevention and control measures will be put in place during the construction phase. These reflect best practice guidance and recognised industry standards, as well as the Applicant's experience of constructing wind farms. Many of the measures mitigate several potential effects (e.g. mitigation to minimise sedimentation and pollution such as SuDS which can also serve to attenuate surface water run-off and minimise flood risk). These measures are described in the **Schedule of Mitigation, Good Practice, Enhancement and Monitoring** (**Technical Appendix 2.2**) and the **Outline Construction Environmental Management Plan (OCEMP)** (**Technical Appendix 4.2**) and include:

- SuDS to minimise/attenuate surface run-off from new hardstanding and tracks;
- SuDS to reduce sedimentation and erosion;
- SuDS to reduce pollution and accidental spillage;
- Pollution control measures to be put in place at watercourse crossings;
- Peat management measures;
- Measures to reduce sedimentation, erosion, and pollution during forestry felling; and
- Good practice construction and pollution control measures during the construction of the Likely Grid Connection Route, including following SEPA Guidance for Pollution Prevention (GPP) publications, in particular:
  - GPP1: Understanding your environmental responsibilities – good environmental practices;
  - GPP5: Works and maintenance in or near water; and
  - GPP6: Working at construction and demolition sites.

9.7.2 Drainage measures for new access tracks and infrastructure include (but are not limited to):

- Appropriately sized culverts passing under the tracks that do not restrict flow and allow small watercourses, intercepted field drains and ephemeral streams/surface water flow pathways to pass under the tracks;

- Interceptor drainage ditches on the upgradient side of all proposed infrastructure to intercept and divert 'clean' surface water run-off draining towards the construction areas; and
- Installation and maintenance of swales and track drains to intercept, collect and treat run-off from access tracks and hardstanding areas of the Site and channel run-off to stilling ponds for sediment settling.

9.7.3 Forestry felling and removal will follow the good practice guidance and legal requirements set out in Section 8 (Forests and Soil) and Section 9 (Forests and Water) of the UK Forestry Standard (Forest Research, 2023).

9.7.4 As a minimum, the Contractor will be required to follow the guidance contained in SEPA Guidance for Pollution Prevention (GPPs) and to follow SEPA's general binding rules (GBR) under the Environmental Authorisation (Scotland) Regulations 2018 (EASR) (Scottish Government, 2018).

9.7.5 There will be no concrete batching undertaken onsite.

9.7.6 In terms of watercourse crossings (shown in **Figure 9.2**), engineering activities on minor watercourses do not normally require authorisation under the SEPA EASR Regulations. SEPA defines minor watercourses as those not shown on the 1:50,000 scale OS maps[41]. Of the 12 new crossings required for the Proposed Development, ten are over minor watercourses and fall under General Binding Rule 6 (the installation of an outfall or a crossing with no part of the crossing on the bed or banks). These crossings will not require registration or a permit under EASR; however, the work will follow general good construction practice and SEPA GBR 6 and 9. Further details are provided in **Appendix 9.1**.

9.7.7 Of the two watercourse crossings over OS-marked watercourses, watercourse crossing 1 will use a single-span bottomless culvert with no part of the crossing on the bed or banks. This type of crossing is subject to GBR 6 and 9 and does not require registration or a permit.

9.7.8 The other OS-marked watercourse crossing, watercourse crossing 6, crosses the watercourse in an area shown on SEPA Future Flood maps[42] to have a wide fluvial flood risk zone. Due to the large flood risk area associated with this watercourse, a single span bridge or suitable drainage (e.g. numerous pipes) within the track is proposed. The track is proposed to be floated in this location which will allow hydrological connectivity beneath the track. No infrastructure is proposed on the bed or banks of the watercourse, which will be spanned by either a single-span bridge or bottomless culvert.

9.7.9 Bridging solutions will be designed to minimise effects to the bed and banks of watercourses. Fording of watercourses will be avoided. Design and implementation of crossings will follow best practice, including recommendations in Engineering in the Water Environment Good Practice Guide - River Crossings (SEPA, 2010), WAT-G-024 EASR Guidance: Engineering: Activity Guide: Crossings (SEPA, 2025), Good Practice during Windfarm Construction (Scottish Renewable *et al,* 2024) and Constructed tracks in the Scottish Uplands (SNH, 2015).

9.7.10 There are no existing watercourse crossings as part of the Proposed Development.

9.7.11 During construction, temporary construction SuDS will be put in place at each watercourse crossing to ensure no sedimentation from construction works or pollution from plant or machinery can enter the watercourse. This could be a series of settlement ponds or settlement tanks and silt fences.

9.7.12 A 'P-WAT-E1: The discharge of water run-off from a construction site' Permit will be obtained from SEPA under the EASR Regulations in advance of the construction works. This will include a detailed Pollution Prevention Plan (PPP) to ensure that any discharges of water run-off from the Site to the water environment do not cause pollution. This will be prepared in advance of construction and authorisation from SEPA is required before construction commences.

9.7.13 Prior to construction and on completion of ground investigations and micro-siting, a site waste management plan (SWMP) shall be produced, including for site soil and peat management good practice. Any excavated peat will be appropriately managed and re-used. This is detailed further in the outline PMP (**Technical Appendix 9.3**).

9.7.14 A detailed CEMP will be developed and agreed with EAC and SEPA in advance of the works. An Outline CEMP is provided as **Technical Appendix 4.2**. The CEMP will establish a framework to ensure that health and safety and environmental best practices are adopted throughout the works and will include:

[41] SEPA, https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/activities-that-do-not-require-an-authorisation/#anchor-wateractivities, Accessed 26/03/2026
[42] SEPA Future Flood maps, https://beta.sepa.scot/flooding/flood-maps/, accessed 26/03/2026

- A Surface Water Management Plan, or similar, which will detail proposed surface drainage measures to treat and deal with all the surface run-off from the Site, to be designed in accordance with SuDS principles and all best practice guides and recognised industry standards.
- The approved PPP which will detail the proposed mitigation measures as identified within this EIA to address each identified pollution risk.
- A plan to monitor and plan the timing of works to avoid construction during periods of the heaviest rainfall.
- A plan to detail emergency procedures in the event of spillages or any other breach.
- A plan to detail monitoring and inspections of watercourses. All actions will be recorded.
- A Site Waste Management Plan to detail proposals for managing the extraction and storage of waste.
- A Peat Management Plan (see **Technical Appendix 9.3**).

9.7.15 An ECoW (or equivalent) will be onsite throughout the construction to monitor the effectiveness of the mitigation measures.

9.7.16 The assessment of effects is undertaken assuming that good practice mitigation is an integral part of project design. Additional mitigation is identified during the assessment to address localised site or issue specific likely significant adverse effects and is described within the 'Additional Mitigation' sections.

9.8 Micrositing

9.8.1 A 50 m micrositing allowance will be used for the Proposed Development's infrastructure during construction (refer to **Chapter 4**), i.e. a 50 m allowance on any side of all infrastructure to provide flexibility in the location of infrastructure as determined by detailed ground investigations. The 50 m micrositing allowance has been taken into consideration in the assessment. However, it should be noted that micrositing will not encroach into sensitive areas, to avoid adversely affecting mitigation measures that seek to avoid and/or minimise adverse effects on sensitive receptors (e.g. peat, watercourse and GWDTE buffers)., unless agreed by the Planning Authority in consultation with SEPA. All micrositing would be subject to approval of the ECoW. Micrositing within the allowance will be undertaken to move infrastructure further away from sensitive water features, GWDTE and deeper peat, where possible.

9.9 Scope of the Assessment

Effects Assessed in Full

9.9.1 The EIA Scoping process, baseline conditions and professional judgement have identified the following effects for detailed assessment:

- Direct and indirect effects during construction of the Proposed Development and Likely Grid Connection Route on surface and ground water quality, hydrology (flood risk), channel morphology and peat (including in-combination effects);
- Direct effects of the Proposed Development during operation on hydrology (flood risk);
- Cumulative effects of the Proposed Development (and the Likely Grid Connection Route as a single project for EIA purposes) during construction on water quality, hydrology and peat; and
- Decommissioning effects of the Proposed Development and Likely Grid Connection (including in-combination effects).

Effects Scoped Out

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

- Effects on bedrock geology during both construction and operation;
- Effects on groundwater abstractions, including PWS;
- Effects on GWDTE

- Operational effects on surface water quality and quantity, GWDTEs and channel morphology.
- Operational effects of the Likely Grid Connection Route. As the proposed route comprises an underground cable under the existing road network, once in situ, there will be no potential impacts to Geology, Hydrology, Hydrogeology and Peat receptors during operation; and
- Cumulative effects during operation and decommissioning.

9.10 Assessment of Effects

9.10.1 The assessment of effects identified above is based on the project description as outlined in **Chapter 4: Project Description**. Unless otherwise stated, potential effects identified are considered to be adverse. Effects associated with the Likely Grid Connection Route are assessed in-combination with the Proposed Development as noted in **Chapter 2: Approach to the EIA**. Given that the Likely Grid Connection Route is not being included within the planning application, this means that there is no legal mechanism through which to enforce additional mitigation i.e. through planning conditions and assess the effectiveness of this in this EIA Report. Therefore, all reported effects of the Likely Grid Connection Route should be treated as residual and have taken into account any relevant good practice measures only.

Construction Effects

The Proposed Development

Predicted Construction Effects

9.10.2 The sensitivity of receptors taken forward for detailed assessment has been determined in **Table 9.7**, using the criteria in **Table 9.2**.

Table 9.7 : Sensitivity of Receptors

Receptor	Sensitivity	Comment
Watercourse and Waterbodies Swinzie Burn Smaller named and unnamed watercourses and drainage features within the Site Unnamed Bog Pool	Water quality – Medium Flood risk – Low Morphology – Low	■ The only catchment where proposed infrastructure is located is the Swinzie Burn catchment. The Swinzie Burn and numerous smaller named and unnamed watercourses within the Site are not large enough to be classified by SEPA for water quality. ■ There are no properties or receptors immediately downstream of the Proposed Development infrastructure that are currently at risk of flooding from the named and unnamed watercourses within the Site. ■ The watercourses within the Site are a mix of natural channels and artificial forestry drainage and are generally of low morphological diversity. ■ A small unnamed bog pool lies within the Site within Glenouther Moor.
Peat	High – where >2.0 m depth under forest and >1.0 m depth in open ground Medium – where 1.0 - 2.0 m in forest and 0.5 - 1.0m in open ground Low – where <1.0 m in forest and organic soil (<0.5 m) in open ground	■ The Site is predominantly made up of Class 5 peatland, with Class 1 peatland found within the unforested clearing of the Moor and a pocket of Class 4 peatland associated with peaty gleyed podzols at the north-east Site boundary. Peat deposits across the majority of the Site are deeper than 1 m, with some shallower areas closer to the fluvial area of the Swinzie Burn. ■ With the exception of a small area of T3 hardstanding, which lies on Class 4, all proposed infrastructure is located on Class 5. These areas are densely afforested and have been modified and artificially drained. ■ In order to minimise the requirement for the extraction of peat, the layout design process has avoided and minimised the potential impact on deeper peat (> 0.5 m) where possible e.g. through proposal for floating tracks and piled foundations/crane pads and floated hardstandings. Where proposed infrastructure has been

Receptor	Sensitivity	Comment
		located on peat greater than 0.5 m, details of excavated peat use are provided in the PMP (**Technical Appendix 6.3**).
Groundwater	Low	■ The Proposed Development is located on low productivity aquifers. The groundwater body is classified by SEPA as 'Good'. ■ There are no groundwater abstractions or PWS within 300 m of the Proposed Development (this is the 250 m buffer plus a 50 m micrositing allowance) ■ The area is within a DWPA for groundwater (as is the whole of Scotland). However, there is no significant groundwater resource and no identified sensitive users/receptors.

9.10.3 The main environmental effects are predicted to occur during construction. The activities that will occur during construction that may have an impact on the water environment and peat include:

- Site clearance and vegetation removal (including forestry);
- Use of heavy plant machinery;
- Construction of permanent hardstanding areas (for the life of the Proposed Development) and temporary hardstand areas (including their restoration after use);
- Piling (T1-T3) and excavations (T4-T5) for turbine foundations and hardstandings;
- Construction of approximately 4.1 km of access tracks comprising approximately 1.3 km of excavated track and 2.8 km of floated track;
- Watercourse crossings; and
- Associated earthworks/excavation/re-profiling and construction traffic on access tracks.

9.10.4 During the initial design stage, a buffer of 50 m was applied to all watercourses and water features identified from OS 1:25K mapping. A 50 m buffer from all OS mapped waterbodies was achieved except at watercourse crossings. Small watercourses and drains identified during site walkover surveys were also buffered appropriately (based on the proposed depth of excavations) where practicable. Therefore, apart from the exceptions below, where it is assumed on a precautionary basis that there will be excavations in excess of 1m (labelled A-F on **Figure 9.2** and described in detail in **Technical Appendix 9.1**), all recommended buffers from waterbodies have been achieved:

- A – The substation compound could not achieve the 50 m watercourse buffer from a small forestry drainage feature. Due to other constraints (primarily associated with deep peat in the surrounding area) the substation encroaches to within 25 m of the drain.
- B – Substation compound. As part of the proposed design of the compound, an artificial forestry drain will be re-routed around the compound perimeter where it was not possible to maintain an appropriate buffer from the watercourse. This allows for the optimal positioning of the substation to avoid deeper peat in the vicinity.
- C - T5 and associated permanent and temporary hardstanding. As part of the proposed design of the turbine and hardstanding, an artificial forestry drain will be re-routed around the hardstanding where it was not possible to maintain an appropriate buffer from the watercourse. This is to allow for the maximum utilisation of the shallowest areas of peat within the Site.
- D – Floating access track to T3. A small section of the floating access track lies within the 10 m Recommended Riparian Corridor buffer of an artificial forestry drain. The track has been aligned, as far as possible, to allow an approach to T3 that facilitates the best T3 alignment for the avoidance of deeper pockets of peat. A buffer of 6 m from the track has been achieved.
- E – Temporary auxiliary crane pad (piled) for T1. A very small part of the temporary crane pad for T1 encroaches upon an artificial forestry drain. The Applicant will review the crane pad design at detailed design stage to reduce encroachment of the buffer and has committed to micrositing the crane pad through detailed design to achieve a 10 m buffer. If this cannot be achieved, the drain will be diverted during construction.

- F – Permanent and temporary hardstanding for T1. The boggy headwater area of an unmapped section of watercourse was found in this location. The headwater channel is fed by a potential groundwater spring to the north-east, which was observed during hydrological walkover survey. The OS-marked section of the watercourse lies 75 m south-west of the proposed infrastructure. The permanent (piled) hardstanding for T1 encroaches upon the 50 m buffer of the headwater. This permanent hardstanding is to be set on piled foundations to minimize peat excavation. A 26 m buffer was achieved from the permanent piled hardstanding. T1 itself lies 72 m from the headwater channel. There is a small area of floated temporary hardstanding for T1, which is currently shown to encroach over the headwater channel. As this will be floated, hydrological connectivity will be maintained beneath the temporary hardstanding. However, the Applicant has also committed to micrositing the temporary hardstanding through detailed design to avoid the watercourse and achieve a 10 m buffer from the watercourse, if possible.

9.10.5 Given the hydrological setting and that no existing tracks are found within Glenouther Moor itself, no existing watercourse crossings will be used as part of the Proposed Development, while 12 new watercourse crossings are required. Construction of new watercourse crossings could potentially impact channel morphology during construction.

9.10.6 Of the 12 new crossings (**Technical Appendix 9.1**), ten are over minor watercourses/drains[43] and will be covered by SEPA's General Binding Rules. These crossings will not require registration or a permit under EASR; however, the work will follow general good construction practice and GBR 6 and GBR 9.

9.10.7 Two of the new watercourse crossings will require authorisation under the EASR Regulations (either registration or a permit depending on the culvert/bridge design). These constitute crossings of two unnamed tributaries of the Swinzie Burn (ID1 and ID6). Full details of crossings and EASR requirements are provided in **Annex 9.1.1**, **Technical Appendix 9.1**.

9.10.8 Catchment areas upstream of watercourse crossings were calculated based on watershed analysis using the available topographic data, supplemented by field observations. The catchment areas at crossing locations range from less than 0.05 km^2 to 0.64 km^2, the largest catchment at the proposed crossing ID6, where the proposed new access track crosses a tributary of the Swinzie Burn.

Effects During Construction on Surface and Ground Water Quality and Quantity

9.10.9 The potential effects on surface water quality during construction are:

- Pollution of surface waters caused by the release of sediment to watercourses from excavated material during construction, piling works, heavy plant movement on the access tracks, construction compound, substation and the felling of forestry/vegetation.
- Pollution of surface water caused by the release of hydrocarbon pollution resulting from accidental oil or fuel leaks or spillages. There is also a risk posed by concrete (and other construction material) spillages and during the formation of hardstanding areas at the turbine bases.
- Pollution/sediment run-off during construction of new watercourse crossings for access tracks.

9.10.10 The potential effects on groundwater quality include:

- The risk of hydrocarbon pollution of groundwater resulting from accidental oil or fuel leaks from construction traffic and construction works. There are also potential pollution effects caused by silt and sediment disturbed during construction infiltrating into the groundwater and pollution from concrete pouring and spillages.

9.10.11 Risks to surface water quality will be greatest during construction when works involve the exposure of bare earth which could result in increased erosion and sedimentation. Without good practice mitigation, the increase in sediment concentration in run-off from construction areas and access tracks may result in excessive levels of suspended sediment in watercourses.

9.10.12 Felling can result in increased surface water run-off and sediment run-off. Direct construction felling of an area of approximately 105 ha of forestry is required for the construction of the Proposed Development, wider forestry management and habitat enhancement. Approximately 58 ha of coniferous forestry will be restocked with a mixture of coniferous and broadleaved trees and approximately 47 ha will be permanently felled for infrastructure and

[43] SEPA defines minor watercourses as those not shown on the 1:50,000 scale OS maps.

associated operational clearance buffers or for forest-to-bog restoration. All forestry operations will comply with UK Forest Standard (2023, 5th Edition) Forest and Water guidelines to manage surface water runoff.

9.10.13 Pollutants can enter the watercourses in the event of accidental spills or leaks from machinery and vehicles and in the event of an accidental release of concrete or other building materials. Pollutants and silt/sediment could enter watercourses directly, or via the network of artificial drains though the Site or via overland flow pathways. Shallow groundwater could also be affected.

9.10.14 An assessment of the potential effects on watercourses and water features at locations where recommended buffers could not be achieved is set out in **Annex 9.1.2** of **Technical Appendix 9.1** and summarised below. It is noted that micrositing will be carried out in advance of construction at all locations with the aim to increase the distance from the water features:

- A - This is a small artificial forestry drain that sits at the same elevation as a proposed new substation compound which has been positioned to minimise the excavation of deeper peat in the vicinity. Flow path analysis indicates that surface water runoff paths are from the infrastructure towards the drain. The buffer width achieved (25 m) is considered adequate for the size of the water feature and the hydrological setting. The magnitude of effect is assessed to be negligible resulting in an effect of **negligible** significance.
- B - This is an artificial forestry drain that is to be re-routed around the perimeter of the substation compound as part of the development. As set out in Scottish Renewables et al. 2024, “Good Practice during Windfarm Construction”[6] in relation to drain management:
- “Where the surface drainage across the compound could affect its integrity a perimeter drain should be designed taking into account mitigation for sediment transport”.
- Good practice mitigation (i.e. construction and permanent SuDS) will be included in the design. Surface water runoff will be treated and attenuated. The magnitude of effect is assessed to be negligible resulting in an effect of **negligible** significance.
- C – This is an artificial peat drain that shows some signs of naturalisation. The watercourse is to be re-routed around the hardstanding as part of the development. Good practice mitigation (i.e. construction and permanent SuDS) will be implemented. Surface water runoff will be treated and attenuated. The magnitude of effect is assessed to be negligible resulting in an effect of **negligible** significance.
- D - This is an artificial forestry drain that follows a forestry partition and lies 6 m from proposed floating access track to T3. The track has been aligned, as far as possible, to allow an approach to T3 that facilitates the best T3 alignment for the avoidance of deeper pockets of peat. Flow path analysis indicates that there is no hydrological connectivity between the track and the watercourse. The 6 m buffer width achieved is considered adequate for the size of water feature and the hydrological setting. The magnitude of effect is assessed to be negligible resulting in an effect of **negligible** significance.
- E – This is an artificial forestry drain. A temporary crane pad (piled) for T1 is within 10 m of the drain. There is a risk of sediment run-off/ pollution temporarily entering the drain during construction if an appropriate buffer cannot be achieved for the temporary crane pad. The effect on water quality is considered to be temporary and of minor magnitude. The sensitivity is medium resulting in an effect of **minor** significance before additional mitigation.
- F – This is an unmapped headwater channel, upstream of a marked 1:25K OS watercourse. There is a risk of sediment run-off/ pollution temporarily entering the headwater during construction and piling works for the turbine hardstanding if an appropriate buffer cannot be achieved. The effect on water quality is considered to be temporary and of moderate magnitude. The sensitivity is medium resulting in an effect of **moderate** significance before additional mitigation.

9.10.15 With the good practice measures described above in place, including buffers, following good practice construction and site drainage management guidance from relevant bodies (e.g. SEPA[8,9,10,11], CIRIA[16,17], Scottish Renewables[6] and The UK Forestry Standard[15]), the magnitude of the effect of increased sediment/silt run-off causing a deterioration in surface water quality in waterbodies and watercourses within and downstream of the Site during construction as a result of infrastructure buffer encroachment, is considered to be negligible to minor and of short duration, with the exception of buffer encroachment F where the magnitude is considered to be moderate and of short duration. The sensitivity of all downstream receptors is medium, with respect to water quality, and the

significance of the effect is **negligible** to **minor** at all locations, with the exception of buffer encroachment F, which is assessed to be **moderate**, before additional mitigation.

9.10.16 Good practice measures to minimise the risk of pollution and accidental spillage will minimise the likelihood and severity of such incidents happening, however, there is still a residual risk. The magnitude of effect of pollution of surface water and groundwater caused by the release of hydrocarbon pollution and concrete resulting from accidental oil or fuel leaks or spillages is considered to be minor and of short duration and the significance of the effect is **minor**.

Potential Effects on Channel Morphology (Bank Erosion and Channel Form) During Construction

9.10.17 For the majority of watercourses, the effect on channel morphology (bank erosion and channel form) during construction is assessed to be of negligible magnitude, as embedded mitigation measures, including a minimum 50 m buffer zone (where possible) and environmentally sensitive bridge design, have been incorporated into the Proposed Development design. Locations where the 50 m buffer could not be met are described and assessed in **Technical Appendix 9.1**; at all buffer encroachments the effect on channel morphology was assessed to be of negligible magnitude, with the exception of encroachment F, which was assessed to be temporary and of minor magnitude.

9.10.18 The watercourses in the Site are considered to be of low sensitivity in terms of morphology. New and upgraded crossings will be designed as bottomless arch culverts or single span bridges, which have a negligible effect on channel morphology. Therefore, the effect is considered to be of **negligible** significance at all watercourses, with the exception of the headwater channel at buffer encroachment F which is assessed to be of **minor** significance before additional mitigation.

Potential Effects during Construction on Run-Off Rates, Flood Risk and Ground-Water Levels/Recharge

9.10.19 National Planning Framework 4[4,5] Policy 22 generally restricts development in flood risk areas, although exceptions may be permitted if the proposals are for essential infrastructure where the location is required for operational reasons. NPF4 defines a flood risk area as one that lies within the 200-year floodplain, including an appropriate allowance for future climate change. The SEPA flood maps predict very small areas of the Site are at risk of pluvial (surface water) flooding and flooding from small watercourses. The areas identified as being at pluvial flood risk are generally located along the low-lying areas close to the watercourses. The Proposed Development has been designed to fully avoid flood risk areas, where practicable. This has been achieved with the exception of new watercourse crossings and a small part of the temporary (floating) hardstanding for T1.

9.10.20 A 50 m buffer from all surface waterbodies shown on OS 1:25K mapping has been achieved. Smaller unmapped waterbodies and drains mapped during site surveys were avoided and buffered where practicable, apart from the exceptions described above and in **Annex 9.1.1** of **Technical Appendix 9.1**.

9.10.21 New permanent watercourse crossings will be designed to accommodate the 200 year return period flow, plus an allowance for climate change, and will follow an environmentally sensitive bridge design (i.e. single span bridges with no effect on the channel bed or banks). The Site is rural and there are no properties or assets at risk of flooding immediately downstream of the Site.

9.10.22 Compaction of soils and increased areas of hardstanding reduces the infiltration rate and can lead to a greater rate and volume of surface water run-off. Clear felling forestry and other vegetation can also lead to an increase in surface water run-off rates[44]. This can result in a 'flashier' catchment response and could potentially increase flood risk downstream. However, the magnitude of the change will not be anticipated to be great due to the small area of hardstanding or semi-permeable surfaces (**Table 9.8**) compared to the total catchment area of the downstream watercourses.

[44] The UK Forest Standard (2023) notes that forest felling can temporarily increase flood flows until trees are replanted and regrow. The Standard also states; 'as a guide, the scale of felling is unlikely to be large enough to significantly increase food risk where there is less than 40% forest cover present within the upstream catchment of vulnerable communities or assets' (Section 9, P127 of the UK Forest Standard)

Table 9.8 : Areas of Land Take for the Proposed Development

Main River Catchment	Catchment Area (km^2)	Temporary Hardstanding* (km^2)	Permanent Hardstanding** (km^2)	Permanent Land Take as % of Catchment Area
Swinzie Burn	8.22	0.021	0.47	5.67

** This includes all proposed temporary hardstanding and the construction compound*

***This includes Turbine Foundations, Crane Hardstandings (piled, floated and excavated), Substation/Control Building Compound, New Excavated Onsite Access Tracks, New Floated Onsite Access Tracks, Cut Earthworks and Fill Earthworks*

*** Permanent forestry felling (of approximately 47 ha) is accounted for in the land take for hardstanding areas (permanent and temporary)*

9.10.23 The construction of infrastructure, such as access tracks, could affect (block or realign) natural flow pathways, resulting in changes to the local run-off rate and volume and potentially resulting in the change in contributing catchment areas. This would also have an effect on the rate and volume of water reaching receiving watercourses and other downstream receptors.

9.10.24 Changes to the rate and volume of infiltration due to the construction of infrastructure could also affect recharge rates to the groundwater body. Excavations and piling for turbine foundations during construction could also result in local changes to groundwater levels, as water would tend to fill up the excavated areas and could temporarily modify local shallow groundwater flow paths.

9.10.25 The Proposed Development incorporates SuDS and other good practice mitigation measures to minimise the risk of increased run-off and flood risk (see **Section 1.7: Good Practice Measures** above) and the discharge of attenuated surface water run-off from the working areas and access tracks into the watercourses will be limited to greenfield run-off rates entering each watercourse from the Site at present.

9.10.26 All proposed infrastructure is located within the Swinzie Burn Catchment. The catchment area of the Swinzie Burn downstream of the Site is 8.22 km^2, as shown in **Table 9.7**. The combined area of temporary and permanent land take for the Proposed Development is approximately 0.49 km^2 (see **Table 9.7**). This represents approximately 5.7% of the total Swinzie Burn catchment area.

9.10.27 Based on the small percentage of the total catchment area impacted by temporary and permanent hardstanding and forestry felling, and the good practice mitigation, including SuDS, which will attenuate run-off to greenfield rates, the effect of construction on run-off rates and flood risk is considered to be of negligible magnitude. The sensitivity of the receptors in terms of flood risk is low, resulting in an effect of negligible significance on watercourses and waterbodies downstream of the Proposed Development.

9.10.28 Excavations and piling for turbine foundations could temporarily impact local groundwater recharge levels. The effect is considered to be of short duration, highly localised and reversible and is considered to be of negligible magnitude, resulting in an effect of **negligible** significance on the groundwater body as a whole, based on low sensitivity.

Potential Effects due to Direct and Indirect Disturbance of Peat During Construction

9.10.29 Construction work on peat has the potential to cause peat instability, which may affect both peat soils (and their inherent carbon stores), peatland habitats and nearby watercourses, infrastructure or land uses. A PLHRA has been undertaken and is documented in **Technical Appendix 9.4**. The PLHRA included detailed site mapping and field walkover, qualitative and quantitative assessment of peat stability, identification of on- and offsite receptors and calculation of risk associated with peat landslides. Assessed likelihoods of both peat slide and bog burst were generally Low to Very Low over the vast majority of the Site. Factors of Safety using best estimate parameters indicated the Site to be stable. Assessment of crane loading on floating track and of temporary sidecasting of peat to the margins of infrastructure footprints indicated stability in all locations. In all cases, the low likelihoods of instability reflect the very gentle slopes present across the development footprint.

9.10.30 The excavation of the subsoil and peat required to build the infrastructure such as turbine bases, construction compounds, access tracks and felling will result in some disturbance of soils. In particular, any underlying topsoil and peat may be temporarily removed and will need to be managed appropriately. Activities, or effects of activities, which have the potential to alter the geological environment include:

- Earthworks, piling and site drainage;
- Reduction in water table levels resulting in the drying out, oxidation and potential erosion of peat;
- Excavation and removal of peat;
- The disturbance and loading of peat by vehicle tracking; and
- Forest felling activities.

9.10.31 The outline PMP (**Technical Appendix 9.3**) considers the excavation and reuse of peat based on a peat depth model interpolated from Phase 1 and 2 peat depth data across the Site. Excavation calculations have been undertaken for all site infrastructure, including permanent excavations (turbine foundations and the main hardstandings, the main compound with substation and all tracks of cut and fill construction) and temporary excavations (secondary crane hardstandings and laydowns and the construction compound). Excavation calculations treat all soils ≥ 0.5 m as peat, with the uppermost 0.3 m as acrotelm, and all soils < 0.5 m as organic soils.

9.10.32 A total of c. 23,187 m^3 of peat is proposed to be permanently excavated from infrastructure footprints, and 10,993 m^3 of peat is to be temporarily excavated. Only nominal volumes of soil are proposed for excavation (181 m^3 permanently and 149 m^3 temporary). Approximately 96,000 m^3 of peat excavation has been avoided through the specification of floating hardstandings and piled foundations and permanent hardstandings at T1-T3 in the locations with deepest peat.

9.10.33 All peat and soils that are temporarily excavated will be stored locally and directly reinstated at their point of origin following construction. All permanently excavated peat and soils require alternative uses, ideally as restoration materials. Approximately 7,620 m^3 of peat will be used as additional reinstatement for the temporary construction compound. The remaining c. 15,779 m^3 will be reused in restoring areas of conifer plantation as part of forest-to-bog restoration proposals (8,310 m^3) (as proposed in **Technical Appendix 7.6: Outline Biodiversity Enhancement Management Plan**) and to support forest-to-bog restoration within Turbine 3 and 5 bat exclusion areas (BEAs). The target areas have been selected to be within bat exclusion areas around turbine footprints, along the upslope side of the T1 to T4 track and around the edge of an existing glade in the centre of the Site. These locations are most likely to provide beneficial outcomes in restoring temporary working areas while minimising the requirement for construction of additional infrastructure to access them for this purpose.

9.10.34 Based on the Proposed Development layout and peat depth model, >25% of the proposed infrastructure is located on peat of >2 m in depth within forestry with negligible infrastructure in open ground. This corresponds to a Medium sensitivity by the criteria in **Table 9.2**. Comparison of the total temporary and permanent excavation volume in the PMP (c.34,180 m^3) indicates c. 0.6% of peat at the Site will be excavated, corresponding to a negligible magnitude of impact according to **Table 9.3**. As a result, effects on peat soil and carbon associated with construction are assessed as **Negligible**, and not significant.

9.10.35 Any excavated peat will be stored appropriately nearby and re-used as soon as possible for reinstatement or restoration (see paragraphs above).

9.10.36 In addition to the reuse of excavated peat to restore eroded areas, forest drain blocking will be undertaken within coupes felled for forest-to-bog using standard blocking techniques (to be determined by Peatland ACTION best practice at the time of construction). It is anticipated that all restoration works will be undertaken by a specialist forest-to-bog restoration contractor, rather than the Balance of Plant (BoP) contractor (unless the BoP contractor's personnel have undertaken appropriate training and are suitably skilled). Further details of the restoration and enhancement plans for peat are provided in the OPMP (**Technical Appendix 9.3**). On this basis, it is considered reasonable at the present time to predict **minor** positive effects on the peat resource at Glenouther from the proposed forest-to-bog restoration measures, albeit that the magnitude of these effects is more difficult to predict, as the evidence base in this respect is currently evolving.

Committed Additional Mitigation

9.10.37 Additional mitigation, including additional SuDS will be installed around the following working areas and access tracks during construction to reduce the risk of sediment/silt run-off to the water environment during construction:

- Buffer encroachment E – Auxiliary temporary crane pad for T1. The temporary crane pad will be microsited to maintain a 10 m buffer distance from the drain. If this cannot be achieved, the drain will be diverted during

construction. Additional Mitigation (e.g. silt fences/additional SuDS) will be installed between the crane pad and the drain to reduce the risk of sediment/silt runoff during construction.

- Buffer Encroachment F – Permanent and temporary hardstanding for T1. The temporary hardstanding will be microsited to maintain a 10 m buffer distance from the headwater channel, if possible. If this cannot be achieved, the channel will be temporarily culverted to pass under the floating hardstanding during construction. If temporary culverting is required, the channel morphology will be restored post culverting. Additional Mitigation (e.g. silt fences/additional SuDS) will be installed between the hardstanding areas and the watercourse to reduce the risk of sediment/silt runoff during construction.

9.10.38 The bed and banks of watercourses and crossing locations will be re-established to their previous condition immediately after construction.

Residual Construction Effects

9.10.39 With additional mitigation, including the peat restoration and enhancement plans, and monitoring described above, the residual construction effects are either minor, minor (beneficial) or negligible and are summarised in **Table 9.9**.

Table 9.9 : Summary of Residual Construction Effects

Effect	Significance before additional mitigation (including embedded and good practice mitigation measures)	Additional Mitigation	Significance after additional mitigation
Effects during construction on surface and ground water quality and quantity	**Negligible** to **Minor** (at buffer encroachments A-E) **Moderate** (at buffer encroachment F)	Additional mitigation will be put in place during the construction and working at the following watercourse buffer encroachments, as below: ■ E – the temporary crane pad will be microsited to achieve a 10 m buffer from the drain. If a 10 m buffer cannot be achieved, the drain will be diverted during construction. Silt fences/additional SuDS will be installed. ■ F - The temporary floating hardstanding will be microsited to maintain a 10 m buffer distance from the headwater channel, if possible. If this cannot be achieved, the channel will be temporarily culverted under the floating hardstanding during construction. If temporary culverting is required, the channel morphology will be restored post culverting. Additional Mitigation (e.g. silt fences/additional SuDS) will be installed between the hardstanding areas and the watercourse to reduce the risk of sediment/silt runoff during construction.	**Negligible** (at buffer encroachments A to E) **Minor** (at buffer encroachment F)
Effects on channel morphology (bank erosion and channel form)	**Negligible** (at buffer encroachments A-E) **Minor** (at buffer encroachment F)	Buffer encroachment F- If temporary culverting is required for the temporary hardstanding, the channel morphology will be restored post culverting.	**Negligible** (at all buffer encroachments)
Effects of Proposed	**Negligible**	None	**Negligible**

Effect	Significance before additional mitigation (including embedded and good practice mitigation measures)	Additional Mitigation	Significance after additional mitigation
Development on run-off rates, flood risk			
Effects on ground-water levels and recharge	**Negligible**	None	**Negligible**
Effects on Peat	**Negligible**	Post-consent detailed restoration design (restore eroded areas, forest drain blocking and forest-to-bog) (see **Technical Appendix 9.3**) will be undertaken to maximise potential benefits to the peat resource and habitats.	**Minor (beneficial)**

The Likely Grid Connection Route

Predicted Construction Effects (including in-combination effects with the Proposed Development)

9.10.40 Construction of the Likely Grid Connection Route will take place in the road or roadside verge, and works will be confined to the verge and existing road where there is already existing drainage infrastructure.

9.10.41 Works will be undertaken in accordance with the description provided in **Chapter 4** and the good practice measures assumed to be in place to minimise potential effects which includes SEPA's GPPs.

9.10.42 Where the Likely Grid Connection Route will cross watercourses, the watercourse crossings will be regulated by the Environmental Authorisation (Scotland) Regulations 2018 (EASR) and installed with standard industry good practice, where these regulations apply.

9.10.43 Pre-construction checks and surveys will be carried out to establish if any private water supply abstractions will be affected by the Likely Grid Connection Route works.

9.10.44 Works at the Site entrance will not affect the peat resource as the works will be contained within the existing access track. Limiting construction activities to the road and roadside verge, alongside the application of best practice as set out in SEPA's GPP notes and regulatory control through EASR where required, will reduce effects to ensure that no significant geological, hydrological, hydrogeological and peat effects including any effects on PWS would occur as a result of the Likely Grid Connection Route. There will therefore be no change to the geological, hydrological and hydrogeological environment as a result of construction of the Likely Grid Connection Route and so **no significant effects** as a result of the Likely Grid Connection Route works (including in-combination with the Proposed Development) on Geology, Hydrology, Hydrogeology and Peat during construction are predicted.

Operational Effects

The Proposed Development

Predicted Operational Effects

9.10.45 Following construction of the Proposed Development, all infrastructure will be left in situ to permit maintenance, with the exception of the construction compounds and temporary hardstandings which will be restored.

9.10.46 The potential operational impacts of the Proposed Development are associated with the permanent Site infrastructure, including the access tracks, turbine bases, substation and hardstanding areas and any required maintenance work during operation.

9.10.47 The assessment of operational effects considers that the pollution prevention controls, and permanent drainage installed during construction will remain in place during operation. Hence, operational effects on peat, hydrogeology and surface water quality are considered to be **negligible**.

9.10.48 During operation, the increase in hardstanding areas (turbine bases, substation and tracks) could potentially result in an increase in the rate and volume of surface water run-off, leading to an increase in flood risk downstream. However, given the permanent SuDS drainage measures at the substation and permanent infrastructure and the size of the areas of hardstanding compared to the catchment areas of the downstream watercourse (See **Table 9.7**), the magnitude of the effect on flood risk downstream is considered to be negligible and thus is assessed to be **negligible**.

Committed Additional Mitigation

9.10.49 No additional mitigation is proposed during operation.

Residual Operational Effects

9.10.50 There are **negligible** residual operational effects on the water and soil environment.

Decommissioning Effects

The Proposed Development

Predicted Decommissioning Effects

9.10.51 A description of the decommissioning methodology is provided as part of **Chapter 4**. This outlines the decommissioning requirements relevant to the soil and water environment for the proposed infrastructure onsite. In summary, where appropriate, all new proposed infrastructure will be removed, with the top 1 m of material underlying new tracks, foundations and hardstanding disposed of appropriately before being reprofiled and re-seeded. Where infrastructure lies deeper than 1 m (i.e. buried utilities, turbine foundations), it is considered preferential not to excavate materials due to the potentially lower environmental impacts when compared with excavating, processing and removing concrete from the Site. When dismantling turbines, turbine oils or any other oils would be removed from the Site and disposed of appropriately.

9.10.52 Potential effects during decommissioning are expected to be no greater than during construction. Embedded and good practice mitigation will be followed as per the construction phase. and in combination with the decommissioning approach outlined above decommissioning effects are likely to be of **minor** to **negligible** significance.

Committed Additional Mitigation

9.10.53 No additional mitigation is proposed during decommissioning.

Residual Decommissioning Effects

9.10.54 There are **minor** to **negligible** residual decommissioning effects on the water and soil environment.

The Likely Grid Connection

Predicted Decommissioning Effects (including in-combination with the Proposed Development)

9.10.55 Decommissioning effects will be no greater than construction effects. There would therefore be no significant effects as a result of the Likely Grid Connection Route on Geology, Hydrology, Hydrogeology and Peat during construction, including in-combination with the decommissioning of the Proposed Development.

Cumulative Effects During Construction

Predicted Cumulative Effects During Construction

9.10.56 There are a number of proposed and completed developments within the surrounding area, the majority of which are in different catchments than the Site, meaning that there is less chance of a cumulative effect occurring. However, the (consented) Blacklaw Hill single turbine and operational Middleton Wind Farms lie upstream of the Site within the

Annick Water catchment. While there is no proposed infrastructure within the Annick Water as part of the Proposed Development, the Swinzie Burn is a tributary of the Annick Water where they converge ~ 4km west of the Site.

9.10.57 The Clonherb single turbine lies on the boundary of the Swinzie Burn catchment downstream of the Site; There is a lone turbine at North Drumboy Farm that lies opposite the M77 within the Swinzie Burn catchment; and the (consented) Kingswell Whisky Maturation Facility lies partially within the catchment of the Swinzie Burn to the east of the Site on the opposite side of the M77 motorway.

9.10.58 Assuming that the nearby wind farm schemes and whisky maturation facility are designed and constructed in line with Policy 22, NPF4 and national guidelines with respect to SuDS and GPPs, there will be **negligible** cumulative effect on the downstream catchments.

9.10.59 There are no significant effects predicted for the Likely Grid Connection Route and therefore no change to the effects reported in respect of the Proposed Development combined with the effects of the Likely Grid Connection Route during construction.

9.10.60 Cumulative effects on peat are not anticipated, given the distance of other proposed and completed developments from the areas of proposed construction and restoration.

Committed Additional Mitigation

9.10.61 No specific mitigation is proposed.

Residual Cumulative Effects During Construction

9.10.62 There are **negligible** residual cumulative effects on the water and soil environment.

9.11 Interrelationship Between Effects

9.11.1 Excessive levels of suspended sediment in watercourses as a result of construction activities can have an indirect effect on watercourse ecology and fish. However, with embedded design, good practice measures and additional site-specific mitigation (e.g. adherence to GPPs, SuDS, buffers etc) there is considered to be no significant residual effect on water quality of the downstream watercourses. Therefore, effects on fisheries remain scoped out of this assessment (see **Chapter 7**).

9.12 Further Survey Requirements and Monitoring

9.12.1 A detailed water quality monitoring plan will be submitted in advance of construction. Based on the effects assessment, it is recommended that water quality monitoring is carried out on the Swinzie Burn downstream of the Proposed Development during construction, as well as at selected locations downstream of new watercourse crossings and buffer encroachments. These will be defined in the CEMP and agreed with SEPA.

9.12.2 Mitigation of residual peat instability risks will be supported by good practice construction measures and by monitoring both during and after construction. Further details are provided in **Technical Appendix 9.4**.

9.12.3 Satisfactory implementation of the outline PMP in order to mitigate peat loss / disturbance will be assured by monitoring both during and after construction. Further details are provided in **Technical Appendix 9.3**.

9.12.4 An ECoW (or equivalent) will be on site throughout the construction to monitor the effectiveness of the embedded and additional mitigation measures.

9.13 Summary of Likely Significant Effects

9.13.1 **Table 9.10** below summarises the likely significant effects of the Proposed Development on hydrology, hydrogeology, geology and peat. Most of the potential effects prior to additional mitigation were either of **negligible** or **minor** significance (**not significant**), assuming good practice mitigation measures are in place, and are therefore not included in **Table 9.10**. The exception is at watercourse buffer encroachment F where a **moderate** significant effect on water quality is predicted due to the risk of sediment run-off/ pollution temporarily entering the headwater during construction and piling works for the T1 hardstanding. Additional mitigation measures will be applied at this location, as well as at buffer encroachment E (see **Table 9.9**) to further minimise potential impacts on water quality.

9.13.2 With additional mitigation in place, the likely residual effects are considered to be of **negligible** or **minor** significance and are **not significant**.

Table 9.10 : Summary of Likely Significant Effects

Predicted Effects	Significance	Committed Additional Mitigation	Significance of Residual Effect
Construction			
Effects during construction on surface and ground water quality and quantity	**Moderate (significant)** (at buffer encroachment F)	F - The temporary floating hardstanding will be microsited to maintain a 10 m buffer distance from the headwater channel, if possible. If this cannot be achieved, the channel will be temporarily culverted under the floating hardstanding during construction. Additional Mitigation (e.g. silt fences/additional SuDS) will be installed between the hardstanding areas and the watercourse to reduce the risk of sediment/silt runoff during construction.	**Minor (not significant)**

Glossary/Abbreviations

Table 9.11 : Glossary

Term in Full	Abbreviation	Meaning
AOD	Above Ordnance Datum	Elevation unit reference from sea level
NVC	National Vegetation Classification	The National Vegetation Classification is one of the key common standards developed for the country nature conservation agencies
GIS	Geographic Information System	Software for the analysis of maps and geospatial data
DWPA	Drinking Water Protected Area	A designated surface water or groundwater body used to abstract raw water for human consumption that supplies an average of over 10 cubic meters per day, serves more than 50 people, or is intended for future use
OPMP	Outline Peat Management Plan	Provides an outline for how a project will survey, excavate, store, and reuse peat to minimize ecological damage, prevent pollution, and reduce carbon loss during construction like wind farms or power lines
PLHRA	Peat Landslide Hazard and Risk Assessment	A technical evaluation used to identify, analyse and mitigate the potential for peat slope failures
ECoW	Ecological Clerk of Works	An independent, qualified specialist who ensures that building work follows wildlife laws, environmental rules, and planning conditions
CAR	Controlled Activities Regulations	Legislation for the permitting of works that will affect the environment – now replaced by EASR.
EASR	Environmental Authorisations Scotland Regulations	From 1 November 2025, water, waste management and industrial activities are regulated under Environmental Authorisation (Scotland) Regulations 2018 (EASR), replacing the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR). Under EASR, activities that could harm the environment now fall into four categories: General Binding Rule, Notification, Registration and Permit, in order of increasing environmental risk
CIRIA	Construction Industry Research and Information Association	A member-based research and information organisation who publish reports and technical papers covering building and civil engineering as well as transport and utilities infrastructure
DTM	Digital Terrain Model	Raster elevation model detailing ground surface elevations, produced via LiDAR survey
FEH	Flood Estimation Handbook	A set of methods and associated data to enable recognised standard national methods for rainfall and flood estimation

Term in Full	Abbreviation	Meaning
FRA	Flood Risk Assessment	A site-specific technical report that establishes how likely a site is to flood, how severe that flooding could be and potential mitigation measures
GPP	Guidance for Pollution Prevention	Guidance to provide practical, environmental good practice advice for businesses across the UK
GWDTE	Groundwater Dependent Terrestrial Ecosystems	Wetland habitats like fens, marshes, and springs that critically rely on underground water flows and specific mineral chemistries for their survival
LDP	Local Development Plan	Local Authority plan that guides future land use, housing, businesses, and environmental protection in an area over a 10-to-20-year period
LiDAR	Light Detection and Ranging	An active remote sensing technology that uses pulsed laser light to measure distances and create precise, three-dimensional maps and models of objects and the Earth's surface
LNR	Local Nature Reserve	Managed areas of land that protect wildlife, habitats and natural features, declared by local authorities
NPF4	National Planning Framework 4	Scotland's long-term national spatial strategy and planning policy
PWS	Private Water Supply	Drinking water not supplied from the Scottish Water network but from a private source, typically a localised borehole, well or spring.
SAC	Special Area of Conservation	Protected natural habitat and species sites designated under the EU Habitats Directive
SPA	Special Protection Area	Protected sites designated for the conservation of rare, vulnerable, and migratory wild birds, originating under the European Union Birds Directive
SSSI	Site of Special Scientific Interest	A conservation designation used in the United Kingdom to protect land or water that has high value for wildlife, rare species, plant life, or geological and landform features
SuDS	Sustainable Urban Drainage System	Drainage designed to manage surface water run-off by mimicking natural processes
WFD	Water Framework Directive	The Water Framework Directive requires member states to protect and improve inland surface waters, transitional waters, coastal waters, and groundwater, aiming for all water bodies to achieve "good status"
EAC	East Ayrshire Council	The local authority for East Ayrshire