Coille Beith Wind Farm

Technical Appendix 8.7: Watercourse Crossing Inventory and Inventory of Infrastructure within 50m of a Water Feature

June 2025

Contents

1. Introduction

1.1 Background

1.1.1 The Proposed Development is located on land ('the Site') which covers an area of approximately 1,306 hectares (ha) (inclusive of both access options) and is located approximately 18 km southwest of Lairg and 20 km northwest of Bonar Bridge, the Highlands, Scotland (approximate Ordnance Survey (OS) National Grid Reference (NGR) for Site centre: NH415986) as illustrated in **Figure 1.1** (EIA Report, Volume 3a).

1.1.2 The Site is located on the southern slopes of Strath Oykel. The Site is located within an area of commercial forestry, typical of the valley sides along Strath Oykel, while more open hills rise to the north and south of the valley sides. The River Oykel and singletrack A837 pass through the strath, around 2 km north of the Site, and there is another minor road around 2 km to the northeast that runs along the southern side of the river linking up areas of dispersed settlement.

1.1.3 Wind farms are an existing feature of the surrounding landscape. As illustrated on Figure 2.12 (EIA Report, Volume 3a) there is a cluster of existing and consented wind farms to the east, southeast, and northeast. The closest of these being the consented Strath Oykel wind farm immediately adjacent and the operational Rosehall and Achany wind farms, around 7.5 km northeast of the Site and located on the northern slopes and hills of the strath. Extending east of these and to the south of Lairg there are further consented schemes and a small operational scheme of three turbines south southeast of Lairg, around 17 km east as illustrated in Figure 2.12 (EIA Report Volume 3a).

1.1.4 There are no residential properties located within the Site boundary; however, there are various farmsteads and dispersed rural properties to the northwest of the Site. The majority of settlement lies to the east of the Site along the A837, although there are a small number of properties located on the minor road south of the river extending between Doune and Inveroykel, the closest of which are located around 1.7 km northwest of the nearest turbine. The nearest settlement is at Rosehall (4.5 km northeast).

1.1.5 The infrastructure of the Proposed Development will be comprised of a total of 9.54 km of new on-site tracks and approximately 4.1 km will be existing tracks, upgraded as required (not including access options). The eastern access option has a total of approximately 2.14 km of new on-site access tracks and approximately 3.6 km of existing tracks. The western access option has a total of approximately 3.18 km of new on-site access tracks. The track layout has been designed to avoid watercourses, minimise the number of watercourse crossings and use existing access tracks where possible, with a preference for crossing of smaller scale watercourses or replacing and improving existing crossings that currently impede fish passage or restrict peak flows.

1.1.6 This appendix provides an inventory of information on each watercourse crossing including scale, dimensions, bed substrate, vegetation, and other characteristics, along with the proposed type of crossing to be installed. At design phase these crossings will be sized to allow the 200 year plus climate change flows.

1.1.7 This appendix also provides an inventory of infrastructure within the 50 m buffers of watercourses.

1.1.8 Only the western access track is considered in this assessment as this represents the worst-case scenario in terms of watercourse crossings.

1.1.9 This appendix should be read in conjunction with **Chapter 8** (EIA Report Volume 2).

1.2 Hydrological Context

1.2.1 The Site is located northwest of the Dornoch Firth, within the catchment area of the River Oykel. The River Oykel which meets the River Cassely to the east of Inveroykel and discharges to the Kyle of Sutherland, 3.9 km east of the Site. The River Oykel originates from Loch Ailsh in the northwest highlands, the rainfall is relatively high and there is steep terrain leading to a flashy hydrological regime due to the rapid run off.

1.2.2 The southern boundary of the Site lies just south of the catchment boundary divide between the River Oykel catchment and the Abhainn an t-Srath ‘Chuileannaich catchment. South of this boundary the Site drains southwest to the Abhainn an t-Srath ‘Chuileannaich via the Allt a’ Ghuail and several other tributaries. The Abhainn an t-Srath ‘Chuileannaich joins the River Carron downstream which discharges to the Kyle of Sutherland at Bonar Bridge.

1.3 Legislative Context

1.3.1 The water environment includes wetlands, rivers, lochs, transitional waters (estuaries), coastal waters, and groundwater. The Water Environment (Controlled Activities) (Scotland) Regulations 2011[1] (known as CAR), specify that it is an offence to undertake the following activities without a CAR authorisation:

- Discharges to all wetlands, surface waters, and groundwater (replacing the Control of Pollution Act2;
- Disposal to land (replacing the Groundwater Regulations 19983);
- Abstractions from all wetlands, surface waters and groundwaters;
- Impoundments (dams and weirs) of rivers, lochs, wetlands and transitional waters; and
- Engineering

1.3.2 Watercourse crossings (engineering works in inland waters and wetlands) come under Section 6 of CAR[1]. Three different types of authorisations under CAR allow for proportionate and risk-based regulation.

1.3.3 The authorisation process operates at three levels which are:

- General Binding Rules (GBR);
- Registration; and,
- Licence.

1.3.4 These levels cover activities with increasing potential impact upon the environment. Minor watercourses, which do not feature on the 1:50,000 scale Ordnance Survey mapping, are not within the remit of CAR regulations. However, these minor watercourse crossings have also been considered within this appendix.

1.3.5 It will be the objective of Coille Beith Wind Farm Limited (the Applicant) to ensure that all activities remain within the GBR (Engineering Activities) identified in the CAR regulations[1] and guide document.

1.3.6 The applicable Engineering Activities GBR and Registrations that this application shall adhere to are as follows:

- GBR 6 – Minor bridges with no construction on bed or banks;
- GBR 8 – Controlling bank erosion by green bank reinforcement or re-profiling;
- GBR 9 – Operating any vehicle, plant or equipment (machinery) when undertaking other GBR activities (which includes GBR 6 and 8).
- Registration – Bridges with no construction on bed and <20 m of total bank affected (open-based culverts would be anticipated to fall within this category);
- Registration – Where cables are not appropriately located to cross water channels via newly installed track infrastructure, it would be anticipated that a Registration would be required, as cables would be anticipated being installed via isolated open-cut technique, due to small channel size; and,
- Simple Licence – for all other bridges, fords and causeways, such as those with construction on bed and greater than 20 m of total bank affected. Larger culverts may fall within this category.

1.3.7 Should activities be determined to be outwith the above GBR and Registration authorisations, it would be appropriate to consider a licence application (simple or complex). The SEPA Regulatory Methods for Engineering Activities (SEPA, 2022)[4] lists conservation, environmental standards for morphology and good practice as tests for any licence application. During the determination, SEPA shall consider the specific location, type, size, and existing water quality of the local water features.

1.3.8 A Construction Site Licence is anticipated to be required, in accordance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (amended 2021)[1]. This application process shall be undertaken pre-construction, providing supplementary information to that available at the EIA Report stage.

1.3.9 A large and complex construction project licence authorisation from SEPA will be required as it is a development project that undertakes one or more 'controlled activity' including the discharge of water run-off from a construction site to the water environment, has greater than 5 km new track and is 'an

[1] The Water Environment (Controlled Activities) (Scotland) Regulations 2011, Scottish Statutory Instruments 2011, no. 209 with amendments in 2013, 2017 and 2021.
[2] Control of Pollution Act 1974 (CoPA));
[3] The Groundwater Regulations 1998 (revoked)
[4] Regulatory Method (WAT-RM-02) Regulation of Licence-level Engineering Activities, v8.0 SEPA 2022

onshore electricity generating station, wind farm or power station with a capacity of greater than 50 megawatts'.

1.3.10 The SEPA large and complex construction project licence must be applied for and be granted before the activity can take place.

2. Walk Over Surveys

2.1.1 Subsequent to the initial desk study, a walkover survey of the Site was conducted between 25th and 27th March 2025, during which the identified crossings were visited to obtain specific information about each location. Photographs and detailed field notes were taken reporting channel and valley dimensions, channel substrate and type of either the existing or proposed crossing. A hand-held Global Positioning System (GPS) unit was used to obtain locations with greater than 5 m accuracy.

2.1.2 During the site survey visits, weather conditions were generally warm and dry, with little or no precipitation. Surface water flows were generally low.

2.1.3 Based on the observations during the site walkover, the watercourses crossed by the western access option were all very minor watercourses and more like small natural drainage line comprising incised ditches or diffuse flow.

2.1.4 Watercourses on the main Site were small rill-like minor watercourses on steep terrain, mostly within forestry rides that have the potential to be flashy and responsive to flow more in high rainfall. This information was used to further inform the design process to minimise watercourse crossing and improve watercourse crossing locations and approaches.

3. Watercourse Crossings

3.1.1 Based on a worst-case scenario of the western access option, a total of 25 watercourse crossings will be constructed for the Proposed Development.

- 14 are existing crossings (WC1-WC14); and
- 11 are new crossings (WC15-WC25).

3.1.2 11 crossings are on watercourses shown on 1:50,000 scale OS mapping, and 14 watercourses are shown on 1:25,000 scale OS mapping, Of the eleven new crossings, one is on 1:50,000 scale and ten are on 1:25,000 scale OS mapping.

3.1.3 The existing watercourse crossings are culverted crossings along a section of the existing forestry track. These existing watercourse crossings will either be re-used, extended, or replaced as determined later in the design process depending on specific engineering requirements and opportunities for habitat improvement. Seven watercourse crossings are located on the western access track option.

3.1.4 All proposed watercourse crossings are listed and described in **Table 4.1** and shown in **Figure 8.6** (EIA Report Volume 3a).

3.1.5 The number of watercourse crossings have been minimised where possible and where required will allow mammal and fish migration.

3.1.6 Watercourse crossings will be subject to appropriate SEPA CAR licencing and will be designed to allow the conveyance of a 0.5% AP (200 year) flow event plus an allowance for climate change and freeboard. Additionally, mitigation will put in place to control and attenuate runoff during all phases of the development and crossings will be regularly check and maintained during operation.

4. Inventory of Infrastructure within 50m of a Water Feature

4.1.1 Earthworks for infrastructure at turbine T11 encroaches within 50 m of Allt a Choire Bhuidhe watercourse (42 m from the watercourse) and 30 m from an unnamed watercourse, as detailed in **Table 4.2**. These are temporary works that will be reinstated post construction and there is sufficient space to undertake appropriate sediment control and drainage management to limit any sediment release.

The western access track option encroaches on an unnamed watercourse at three locations as shown in **Table 4.2,** although this is mainly associated with upgrades to an existing track and in connection with watercourse crossings. Sediment control and drainage management will be implemented to control and attenuate runoff during all phases of the Proposed Development.

Table 4.1: Watercourse Crossing Inventory

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC1	242985	898145	– Tributary to Allt Lon a' Bhadain Bhig – Shown on 1:50,000 OS mapping.	Existing track	– Existing culvert crossing. – Metal culvert, 60 cm diameter	– Channel: 0.40 m width, 0.2 m deep, moderate flow. – Valley: Narrow valley, some undercutting. 0.8 m diameter, gentle gradient upstream. Moderate flow. Heather and grass. – Substrate: Cobbles.
 Downstream of the culvert	 Upstream entrance to the culvert	 Watercourse upstream				
WC2	242776	898148	– Allt Lon a' Bhadain Bhig – Shown on 1:50,000 OS mapping.	Existing track	– Existing crossing. – Metal culvert, 90 cm diameter	– Channel dimensions: 0.5 m width x 0.3 m depth, good flow, moderate gradient. – Valley dimensions: 2 m wide, mossy and grassy. – Substrate: Boulders and cobbles.
 Upstream of the culvert	 View upstream	 Downstream of the culvert				

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC3	242329	898097	– Allt a' Choire Bhuidhe – Shown on 1:25,000 mapping	Existing track	– Existing crossing. – Eroded culvert	– Channel: 0.6 m width, increasing to 1.3 m wide near the culvert. 0.3 m deep. – Valley: 2 m valley, grassy. – Substrate: cobbles, some boulders.

Upstream of metal culvert

Upstream view

Downstream of the crossing

WC4	242211	898065	– Meoir Leathan – Shown on 1:50,000 OS mapping.	Existing track	– Existing Crossing – Metal Culvert	– Channel dimensions: approximately 0.5 m width x 0.3 m depth. Peaty coloured, fast flowing. – Valley dimensions: 4 m wide valley, incised upstream, juncus and moss. – Substrate: Cobbles

Culvert downstream

Downstream of the crossing

Culvert upstream

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC5	242014	898023	– Shown on 1:50,000 OS mapping. – Tributary to Meoir Leathan	Existing track	– Existing crossing. – Metal Culvert	– Channel dimensions: pool in front of culvert 0.5 m width and 0.2 m depth. – Valley dimensions: Diffuse upstream and incised downstream. Juncus and mos.. – Substrate: Cobbles

Upstream of the crossing

Crossing upstream

Downstream of the crossing

WC6	241857	898118	– Tributary to Meur an da Sgoiltein – Shown on 1:50,000 OS mapping.	Existing track	– Existing crossing. – Metal 60cm culvert.	– Channel dimensions: approximately 0.4 m width x 0.1 m depth, moderate flow. – Valley dimensions: 5m valley, moss and juncus. – Substrate: Cobbles and gravel.

Upstream of the crossing

Pool upstream of the culvert

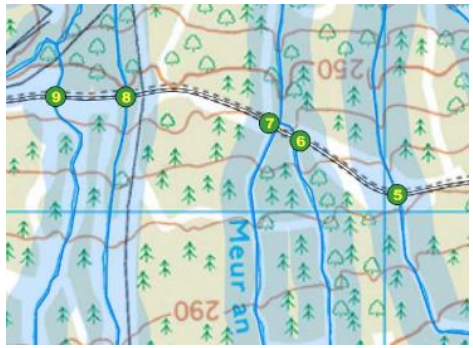
Downstream of the culvert

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC7	241821	898133	– Meur an da Sgoiltein – 1:25k OS mapped watercourse	Existing track	– Existing crossing. – 2 x 90 cm culverts, one metal (not in use) and one plastic	– Channel dimensions: 0.8 m width x 0.2 m depth, incised channel upstream. Moderate flow. – Valley dimensions: valley width 1.5m, juncus and moss, – Substrate: Cobbles and boulders.


Channel downstream


Upstream of the crossing


Downstream of the crossing



WC8	241579	898189	– Tributary to Allt a' Phris Mhoir – Shown on 1:50,000 OS mapping	Existing track	– Existing crossing. – 90 cm diameter metal culvert, overloaded and eroded at the base.	– Channel dimensions: 0.4 m width x 0.2 m depth. Pool 1.2m in diameter upstream of the culvert. Moderate flow. – Grassy and mossy. – Substrate: Boulders and cobbles.


Downstream of the crossing


Upstream of the crossing

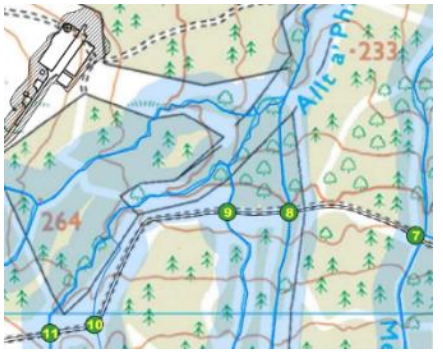

Channel upstream

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC9	241481	898183	– Tributary to Allt a' Phris Mhoir – Shown on 1:50,000 OS mapping.	Existing track	– Existing crossing – 60 cm diameter metal culvert	– Channel dimensions: 0.3 m width x 0.2 m depth Moderate stream flow. – Valley dimensions: 10 m wide upstream, juncus and moss present. – Substrate: Soil and cobbles, some boulders.


Downstream of the crossing


Upstream of the crossing


Channel downstream



WC10	241242	897980	– Unnamed watercourse – Shown on 1:50,000 OS mapping.	Existing track	– Existing crossing. – Metal 0.9 m culvert.	– Channel dimensions: 0.6 m width x 0.2 m depth. Moderate flow. – Valley dimensions:8 m wide in places, juncus and grasses. – Substrate: Cobbles


Upstream of the crossing


Downstream of the crossing


Channel downstream

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC11	241135	897959	– Tributary to Allt a' Phris Mhoir – Shown on 1:50,000 OS mapping.	Existing track	– Existing Crossing – Metal 0.9m culvert, eroded.	– Channel dimensions: 5m wide channel,moderate flow, peaty colour. – Valley dimensions: 7m wide channel, steep sides, bracken, grasses, juncus and moss. – Substrate: Boulders and cobbles.


Upstream of the crossing


Metal culvert


Downstream of the crossing

WC12	240876	898132	– Tributary to Allt a' Phris Mhoir – Shown on 1:25,000 OS mapping.	Existing track	– Existing Crossing – Metal 0.9 m culvert.	– Channel dimensions: 0.4 m width x 0.2 m deep, incised channel. – Valley: 2 m wide valley with low gradient juncus and moss present. – Substrate: Gravel with some boulders.


Downtream of the culvert


Upstream of the culvert


Channel

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC13	240849	898257	– Tributary to Allt a' Phris Mhoir – Shown on 1:50,000 OS mapping	Existing track	– Existing Crossing – Metal 0.9 m culvert.	– Channel dimensions: diffuse channel, low-no flow. Valley: Juncus present.

Downstream of the culvert

Upstream of the watercourse

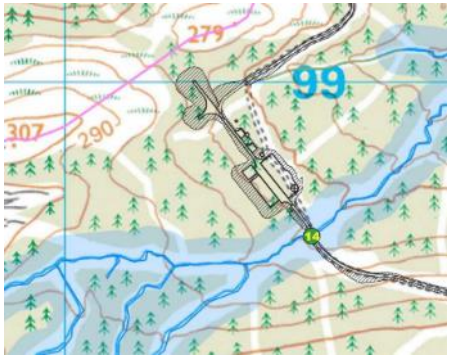
Upstream of the culvert

WC14	240470	898691	– Allt Mor – Shown on 1:25,000 OS mapping.	Existing track By turbine 1	– Existing Crossing. – 1.2m plastic culvert	– Channel dimensions: 0.6 m width x 0.3m depth, pool downstream of culvert with 1.2m diameter. Fast flow, moderate gradient. – Valley dimensions: 3m wide, mossy and grassy. – Substrate: Cobbles

Upstream of the culvert

Watercourse downstream

Downstream of the culvert



ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC15	239913	898356	– Unnamed tributary to Allt Mor – Shown on 1:25,000 OS mapping.	Access track to Turbine 2	– New crossing – Bottomless arch or culvert	– Channel dimensions: 0.3 m width x 0.1m depth, incised. – Substrate: peaty soil

Channel

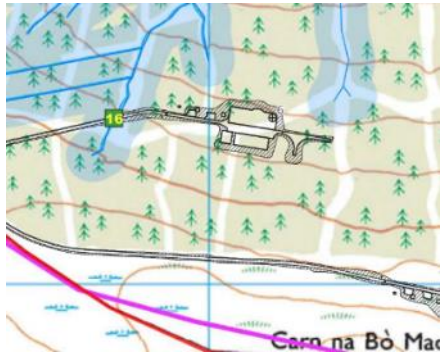
Crossing area

WC16	240830	897318	– Allt a' Phris Mhoir – Shown on 1:25,000 OS mapping.	Access track to Turbine 6	– New crossing – Bottomless arch or culvert	– Channel dimensions: 1 m width x 0.5 m depth, low flow, diffuse upstream, incised. – Valley: Heather, trees and moss – Substrate: Peaty soil

Crossing area

Incised channel at crossing location

Diffuse upstream



ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC17	242435	897199	– Tributary to Meoir Leathan – Shown on 1:25k OS mapping	Access track between Turbine 8 and Turbine 9	– New Crossing – Bottomless arch or box culvert or single span crossing	– Channel dimensions : 0.2m narrow visible channel, diffuse surroundings, moderate flow – Valley dimensions: 6m wide, juncus, heather and grasses present. – Substrate: peaty soils


Directional junctus at the crossing location


Narrow channel within a wide valley

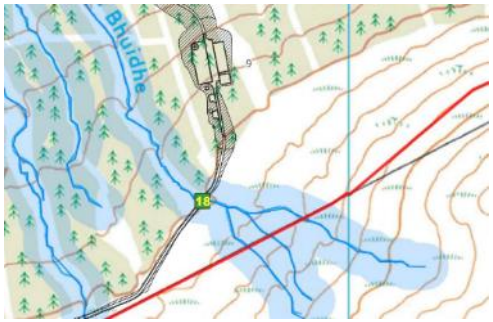

Junctus, Heather and Grasses in the surrounding area

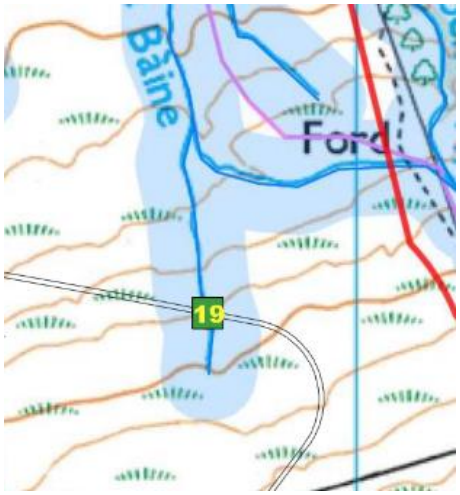
WC18	242725	897432	– Alt a' Choire Bhuidhe – Shown on 1:50,000 OS mapping.	Access track between Turbine 9 and 8.	– New crossing – Bottomless arch or box culvert or single span crossing	– Channel dimensions: 0.2 – 1.2 m width x 0.4m depth, good flow, moderate gradient. – Valley dimensions: 8-10m wide, steep incline to watercourse, juncus, heather and grasses. – Substrate: cobbles,peaty soil, some bedrock visible.

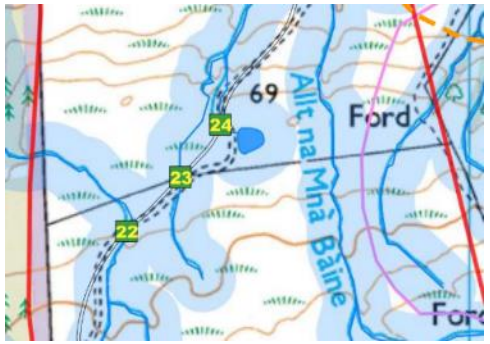

Looking upstream along the watercourse

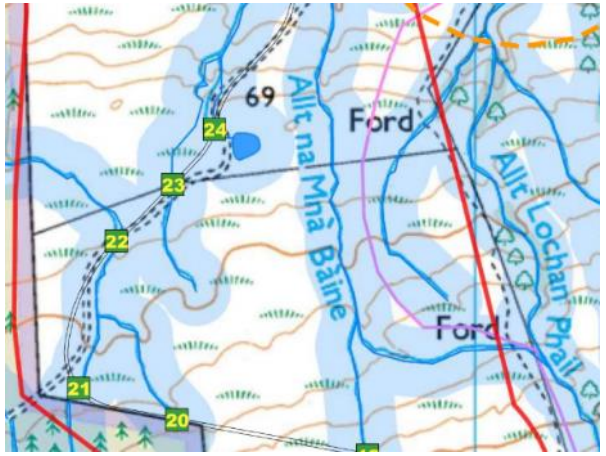
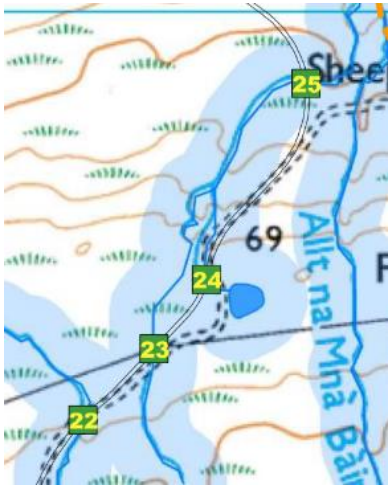

Crossing location


Downstream of the proposed crossing



ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC19	238847	899235	– Allt na Mna Baine – 1:25000 OS mapping	West access Track	– New crossing – Bottomless arch or culvert	– Channel dimensions: 0.1 m wide x 0.1 m depth, slow flow, moderate gradient. – Valley: Deep narrow ditch in soil – Substrate: Gritty silt
   						
WC20	238575	899285	– Unnamed watercourse – 1:25,000 OS mapping	West access Track	– New crossing – Bottomless arch or culverts	– Channel dimensions: 0.3 m wide x 0.1 m depth, slow flow. – Valley dimensions: 3 m wide x 0.75 m depth. – Substrate: peaty soil
–    						

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC21	238436	– 899330	– Unnamed watercourse – 1:25,000 OS mapping	West access Track	– New crossing – Bottomless arch or culvert	– Channel dimensions: 8 m wide x 2 m depth, slow flow. – Valley dimensions: 0.7 m wide x 0.1 m depth. – Substrate: peaty soil
   						
WC22	238489	899539	– Unnamed watercourse – 1:25,000 OS mapping	West access Track	– New crossing – Bottomless arch or culvert	– Channel dimensions: 0.25 m wide x 0.25 m depth, slow flow. – Valley dimensions: 3 m wide x 0.75 m depth. – Substrate: peaty soil
   						
WC23	238569	899619	– Unnamed watercourse	West access Track	– New crossing	– Channel dimensions: 0.25 m wide x 0.25 m depth, slow flow.

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
			– 1:25,000 OS mapping			– Valley dimensions: 3 m wide x 0.75 m depth. – Substrate: peaty soil and gravel
   						
WC24	238629	899698	– Unnamed watercourse – 1:25,000 OS mapping	West access Track	– New crossing	– Channel dimensions: 0.1 m wide x 0.1 m depth, slow flow. – Substrate: peaty soil
   						

ID	Grid Reference		Watercourse Name	Infrastructure Location	Type of Crossing	Description
	Easting	Northing				
WC25	238742	899920	– Unnamed watercourse – 1:25,000 OS mapping	West access Track	– New crossing	– Channel dimensions: 0.3 m wide x 0.1 m depth, slow flow. Diffuse and vegetated – Substrate: Gritty Silt

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Table 4.2: Infrastructure Within 50m of a Water Feature

Infrastructure	Grid Reference		Water feature name	Distance to water feature	Area/length of encroachment
	Easting	Northing			
Earthworks of Turbine 11	242295	898668	Allt a Choire Bhuidhe, shown on 1:50,000 OS mapping	42 m	628 m²
	242426	898674	Unnamed watercourse shown on 1:25,000 OS mapping.	30 m	991 m²
  Image looking towards the proposed location of Turbine 11. Watercourse is diffuse.					
Sections of Western Access Track between watercourse crossings 24 and 25	238677	899786	Unnamed watercourse shown on 1:25,000 OS mapping.	30 m at closest point	195 m (length)

Sections of Western Access Track between watercourse crossings 21 and 22	238429	899450	Unnamed watercourse shown on 1:25,000 OS mapping.	15 m at closest point	215 m (length)