

Coille Beith Wind Farm

Technical Appendix 8.6: Private Water Supply (PWS) Assessment

June 2025



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1 Introduction

1.1 Introduction

- 1.1.1 This Private Water Supply (PWS) Assessment document has been prepared by Fluid Environmental Consulting (Fluid) to support the Environmental Impact Assessment (EIA) for Coille Beith Wind Farm (the 'Proposed Development'). The Site is located 18 km southwest of Lairg in Sutherland, Scotland and covers an area of approximately 1,306 ha (inclusive of both access options). Access to the Site is from a local road off the A837.
- 1.1.2 This PWS assessment includes an area of 2 km beyond the Site boundary.
- 1.1.3 **Figure 8.6** (EIA Report Volume 3a) shows the locations of three active PWSs (properties and sources) where hydrological connectivity to the Site is possible.

2 Environmental Context

2.1 Summary

- 2.1.1 The Site is characterised by hilly terrain covered with forestry plantations with some open grassy areas.
- 2.1.2 The majority of the Site is underlain by Altnaharra Psammite Formation metamorphic bedrock. A small south western part of the Site is underlain by Glen Achall Psammite and Semipelite Member. There are six faults on the Site, four run southwest to northeast, with only one that entirely transects the Site, two run northwest to southeast but neither transect the Site.
- 2.1.3 The superficial deposits across much of the Site (including the western access option) are shown by The British Geological Survey (BGS) mapping to be peat and till. Superficial geology is presented on Figure 8.4 (EIA Report Volume 3a).
- 2.1.4 There are significant deposits of alluvium along the River Oykel in the north of the Site, and significant areas where no superficial deposits are displayed on BGS mapping. There are small areas of hummocky glacial deposits in the centre of the Site.
- 2.1.5 The Site is located within the Lochan Phàil and Allt Fliuch Bhadain, Allt badan Uilleim, Allt a' Bhràigh, Na h-Easan, Allt Lon a' Bhadain Bhig, Allt a' Choire Bhuidhe, Meòir Leathan, Allt a' Phris Mhòir, Meur an da Sgoiltein, Allt Mòr, Allt an Fhithich, Allt an Ruadh, Allt an Beaga, Allt na Mna Baine and Allt a' Bhainne, Allt Loch Mhic-Mharsaill, Allt an Easain Duibh, Allt na h-Innse Tioraim water catchments.
- 2.1.6 The Site is mostly located on a hillside that slopes from south to north into the River Oykel valley which runs to the north of the Site.
- 2.1.7 Due to the rural nature of the Site, some properties are not on mains water supply and are therefore reliant on PWS.

3 Scope of Works

3.1 Aims of Assessment

- 3.1.1 The purpose of this PWS Assessment is to:
- Identify properties and their associated water supplies within the Study Area that could have a hydrological or hydrogeological link to the Proposed Development;
 - Obtain specific information on these water supply sources, conveyance, and storage infrastructure that could potentially be connected to the Proposed Development;
 - Ascertain the risk to any of these PWS as a result of the construction and operation of the Proposed Development;
 - Use this information as an input to layout design; and
 - Where appropriate, provide recommendations for potential mitigation measures.

3.2 Limitations

- 3.2.1 The information presented in this document is based on the list of property names provided by The Highland Council (THC), a review of Ordnance Survey (OS) and aerial imagery mapping, PWS questionnaire responses and site visits undertaken in March 2025.
- 3.2.2 It is possible that additional new supplies or property name changes could have occurred since the March 2025 survey. In addition, information was not able to be obtained from some properties for the western access option, therefore for those properties the assessment relies on desk based information. However, this assessment is considered to be as accurate as possible at this stage.

4 Legislation, Policy and Guidance

4.1 Relevant documents

4.1.1 The main legislative drivers, relevant to the assessment are:

- The Water Framework Directive (WFD) (2000/60/EC)¹:
 - The WFD aims to protect and enhance the quality of surface freshwater (including lakes, rivers and streams), groundwater, groundwater dependent ecosystems, estuaries and coastal waters and to establish a framework of protection for surface freshwater and groundwater.
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017²:
 - The regulations aim to ensure the provision of clean, safe drinking water and to deliver significant health benefits to those using Type A private water supplies (serving 50 or more persons in total, or more than 10 m³ per day, or supplies to commercial or public activities irrespective of size. Under these regulations, rented properties are considered commercial premises); and
 - It is the responsibility of the local authorities to enforce and regulate PWS.
- The Private Water Supplies (Scotland) Regulations 2006³:
 - The regulations aim to ensure the provision of clean, safe drinking water and to deliver significant health benefits to those using private water supplies (Type B supplies - Supplies serving only domestic premises with less than 50 persons in total supplied).
- The Water Quality (Scotland) Regulations 2010⁴:
 - These regulations relate to managing water quality failures on a PWS, attributable to the domestic distribution or its maintenance, in premises where water is supplied to the public.
- Scottish Environment Protection Agency (SEPA), Land Use Planning Guidance Note 31 (2017)⁵: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3:
- SEPA Guidance on Assessing the Impacts of Development on Groundwater Abstractions⁶ provides guidance on how excavations should be considered to support planning applications;
 - Guidance requires quantitative assessments for groundwater abstractions within 100 m of excavations up to 1 m depth and within 250 m of excavations greater than 1 m depth; and
 - Whilst specific to planning phase, guidance is a useful tool to help assess risk to groundwater abstractions.

5 Methodology

5.1 Description of assessment

5.1.1 The PWS assessment has been undertaken based on the following methodology:

- Completion of a high-level desktop assessment to put the hydrological and hydrogeological setting of the Proposed Development into context;
- Consultation with SEPA, Scottish Water, and THC to gather and review existing records of water supply sources within the vicinity of the Proposed Development and the Study Area;
- Initiate contact with residents of properties within the Study Area via the submission of a questionnaire to confirm the location and nature of their supply;
- Complete site visits of properties closest to the Proposed Development where: data gaps were identified, confirmation was required for locations of supply sources or, residents had requested a visit;
- Preparation of a risk assessment to determine the potential effects of the Proposed Development on the quality and quantity of the water serving the supplies screened into the assessment. The

¹ Water Framework Directive (WFD) 2000/60/EC: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000.

² The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017.

³ The Private Water Supplies (Scotland) Regulations 2006. Scottish Statutory Instruments 2006 No.209.

⁴ The Water Quality (Scotland) Regulations 2010. Scottish Statutory Instruments 2010 No. 95.

⁵ Scottish Environment Protection Agency (SEPA), Land Use Planning Guidance Note 31 (2017) Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3.

⁶ Guidance on Assessing the Impacts of Development on Groundwater Abstractions, SEPA, August 2024.

assessment has adopted a phased approach to evaluating risk through the formulation of a Source-Pathway-Receptor conceptual model; and

- Undertake an initial screening process, based on desk study information followed by further screening following completion of questionnaire and site visits to identify supplies that are considered unlikely to be affected by the Proposed Development through lack of hydrological connectivity. Screening carried out applying the risk assessment methodology;

6 Assessment

6.1 Desk Based Assessment

6.1.1 The desk-based assessment included a review of information from several secondary sources to build up a hydrological and hydrogeological context for the Study Area. These included:

- Geological and hydrogeological information obtained from BGS to understand hydrogeological conditions; and
- Mapping of surface water catchments and sub-catchments to determine potential hydrological connectivity to the Proposed Development.

6.2 Consultations

6.2.1 Consultations were undertaken with SEPA, Scottish Water and THC.

SEPA

6.2.2 An information request was made to SEPA on 23 February 2024. SEPA issued their response on 15 March 2024 listing two water abstraction licences within the Study Area and providing a copy of one of the licences (CAR/L/1011251). This is held by Lower Oykel Fishings for the purpose of fish production and includes an abstraction point and impoundment associated with the Tutim Burn, located approximately 2 km north of the Site and north of the River Oykel, within a different catchment to the Site. Therefore, it is not considered in hydrological continuity with the Site and is therefore not considered further within the assessment. The other licence (CAR/S/1192678) is for Easter Turnaig gauging station on the River Oykel. The gauging station relates to a 330.7 km² catchment area and is located on a 40m wide river section to the north west and upgradient of all site infrastructure with the exception of the western access track.

Scottish Water

6.2.3 A query was sent to Scottish Water requesting information on any Scottish Water Assets near the Site in March 2024. The response dated 25 July 2024, stated:

6.2.4 *No objection to this proposal and 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 Highland Council (THC)

6.2.5 An information request was sent to THC on 23 February 2024, to obtain information on PWS within 5 km of the Site. Council records were received on 11 March 2024. Data provided by THC was reviewed, together with OS mapping and aerial imagery to identify properties potentially reliant on private water supplies within the catchments of the Site and any data gaps where further investigation was required.

6.3 Questionnaires

6.3.1 In March 2025, PWS questionnaires were issued to three properties within the Study Area that could potentially have supply sources within the catchments of the Proposed Development.

6.3.2 This process involved sending residents a letter and questionnaire (example questionnaire provided in **Annex I**), aiming to obtain information regarding their supply together with a stamped addressed envelope for return. The letter explained the nature of the works and the purpose of the assessment and the questionnaire asked residents to provide details on their supply.

6.3.3 The questionnaire also included contact details for further consultation or to arrange property visit appointments. Two of the three residents returned the questionnaires via the pre-paid envelope, the third questionnaire was collected from the resident in person during the site visit.

6.4 Site Visits

6.4.1 The questionnaire responses were reviewed and follow up site visits were undertaken between 25th and 26th March 2025 to fill data gaps or the questionnaire hadn't been received prior to the site visit.

6.4.2 A methodology for risk assessment of PWS is contained within the Private Water Supplies Technical Manual⁷. Due to the nature of the works being carried out for the Proposed Development, it was deemed impractical to use the methodologies set out in this guidance as this would have required considering factors such as: proximity of the supply to cattle and wildlife, historical and current land use and historical maintenance carried out on the supply. While such factors are important for determining the baseline qualities of the supply, they are inappropriate for determining the risk to the private water supplies from the construction and operation of the Proposed Development.

6.4.3 Where possible, the locations of the PWS source were viewed and photographed in order to accurately locate them. Information was also gathered on the water supply system, such as tanks, pipelines, treatment systems, and water quantity and quality (as advised by the residents) where relevant. Much of this detail is not provided within this report as it is not relevant where supplies are screened out as they are not connected to the Proposed Development.

6.5 Risk Assessment Method

6.5.1 The methodology adopted is based on Fluid's extensive experience of assessing risks to PWS from wind farm developments, and relevant parts of the guidance used to establish the varying factors which influence the baseline conditions of the supplies.

6.5.2 The risk assessment considered the type of hazard associated with the Proposed Development, release and exposure potential, and severity of impact.

6.5.3 The Source-Pathway-Receptor conceptual model has been used as the underlying transfer mechanism to assess the risk posed by the construction and operational activities.

6.5.4 In this model:

- Source - refers to the source of the potential risk hazard;
- Pathway - refers to the mechanisms by which the hazard is transmitted to the receptor; and
- Receptor - refers to anything or anyone that could be adversely affected by the hazard (including supply source and associated infrastructure).

6.5.5 Where hydrological connectivity or linkage exists between a potential source and the receptor by means of a pathway, then a pollutant linkage and associated risk exists. Where there is no pollutant linkage, for example a PWS source is not within a catchment of the Proposed Development, there will be no associated risk.

6.5.6 The hydrogeological 'catchment areas' are likely to be similar to the surface water catchments and therefore bound by the same topographical restrictions. The methodologies for this qualitative assessment are based on a worst-case scenario and try to determine the greatest possible impact the Proposed Development will have on the quality and quantity of water serving the supply. As the direction of groundwater flow cannot be accurately assessed without detailed site investigations, it is assumed that the groundwater flow is in the direction to each supply source based on the topographical and hydrogeological regime (as a worst-case scenario).

6.5.7 The risks to the hydrological and hydrogeological environment during construction vary based on the location of each source and how that source is fed i.e. groundwater spring, borehole or surface water abstractions.

6.5.8 As a result, the assessment of the change in water resource or risk of contamination to PWS due to activities associated with the construction works consider the following:

- Type of PWS and likely disruption potential;
- Distance from water source and known supply infrastructure to the nearest point of construction associated with the Proposed Development; and
- Position of the source in relation to the construction works in terms of topography and catchment influence zones.

6.5.9 The risk assessment considers the type of hazard associated with the Proposed Development, and the probability, and magnitude of an impact occurring based on topographical and hydrological relationships between the supply and the Proposed Development. This is consistent with the assessment of significance as detailed within **Chapter 8** (EIA Report Volume 2).

Receptors

6.5.10 Receptors refer to anything or anyone that could be adversely affected by the hazard (including supply source and associated infrastructure).

⁷ Private Water Supplies Technical Manual, Scottish Executive, 2006.

- 6.5.11 The PWS are mainly used for domestic supply, including potable drinking water supply. One supply is also used for small scale commercial purposes, and one is additionally used for irrigation, two are also used for livestock.
- 6.5.12 As a conservative approach it is assumed that all identified PWS are used for domestic potable supply (drinking water) as they have a right to access the water supply for this purpose and human consumption is the most sensitive receptor category.

6.6 Screening of Supplies

- 6.6.1 The initial review identified three properties within the 5 km Study Area that could be potentially hydraulically or hydrogeologically connected to the Site due to their locations within the same catchment as the Site. These are as follows:
- **PWS 1:** The borehole supply for Corriemulzie Larder-Amat Cottage, Rosehall, Lairg at NGR 239050 900057. Potable and commercial use; Supply located approximately 300 m from the proposed westerly access option;
 - **PWS 2:** The shallow groundwater sourced well supply at Langwell Lodge-Rosehall, by Lairg at NGR 241630 901019. Potable use. Supply located over 250 m from proposed infrastructure; and
 - **PWS 3:** The surface water supply for Langwell Lodge, Langwell, Lairg sourced from a reservoir at NGR 241520 900767 uphill of the lodge for potable, irrigation and livestock uses. Supply located over 250 m from proposed infrastructure.
- 6.6.2 A screening review of these three supplies was completed following receipt of the information provided by the residents within the questionnaires and from site visits. The details of the supplies are provided in **Annex II**.
- 6.6.3 The screening took into consideration the following:
- Catchment boundaries and channel networks;
 - Properties of the underlying superficial and bedrock geology;
 - Dominant land use;
 - Topographical considerations; and
 - Proximity to Proposed Development infrastructure (the following buffers were used for groundwater sources: 100 m where excavations less than 1 m deep are proposed and 250 m where excavations greater than 1 m deep are proposed).
- 6.6.4 PW 2 and 3 were discounted for the following reasons:
- PWS 2 - Supply catchment is outside of the Site boundary and no proposed infrastructure is within the supply catchment; and
 - PWS 3 - Supply located over 250m from proposed infrastructure. Although the supply catchment is close to the Site boundary, there is no proposed infrastructure within the supply catchment.
- 6.6.5 Further assessment of PWS 1 indicates that although partly within the infrastructure catchment, the supply catchment is predominantly outside of the Site boundary and the borehole, which is 24 m deep and likely into the bedrock, is over 250 m from proposed infrastructure.
- 6.6.6 All sources are located further than 100 m and 250 m from shallow and deep excavations respectively. Therefore, no additional mitigation to that outlined in Appendix 8.1 (EIA Report Volume 4) are required.

Annex I - Private Water Supply Questionnaire

1. Do you receive water from a private water supply (PWS)? Yes / No
2. Is the location of this PWS on land owned or occupied by you? Yes / No
If you are a tenant please give name and address of the owner:
3. What is the location of the PWS? (please supply a grid reference if you know it, or indicate on the attached map if preferred)
4. What sort of supply is it? (e.g., borehole/well, collection facility)
5. Is the source of the supply:
 groundwater
 surface water
 a spring (please tick one)
6. If there is a borehole/well:
 How deep is it and what is its diameter?

 When was it installed?
7. If there is a collection facility please give details of any drains feeding the collection tank.
8. Please provide details of any pumps used.
9. Please provide any other information about the source of the water or nature of the collection facility not covered above.
10. Do you have facilities for storing water and to what capacity?
11. Does the supply have seasonal variation in flow and has it been known to dry up?
 Please provide details.
12. Does the water undergo any form of treatment? (e.g., filter, UV, ozone, chlorination)
13. Please provide details of any maintenance or inspection routines carried out on the supply?
14. Do you maintain any water quality records and have there ever been any problems with the quality or clarity of the water?
15. What is the water used for (e.g. drinking water, house supply, livestock, irrigation), and how much water is required for each different usage?
16. Please list any other properties, if any, which also use this PWS.
17. Please give any details you know of other PWS in the area.
18. Please give any further information not covered in this questionnaire that might help in this investigation (continue on a separate sheet if necessary).

Name:

Date:

Address:

Tel No:

The information provided in this questionnaire will be used solely for the purposes of the Coille Beith Wind Farm water supply assessment and will be treated with confidentiality.

Annex II – Private Water Supply Details

| PWS ID | Property ID | PWS Source Type | PWS Source Location Grid Reference | | Property Location Grid Reference | | Source within Proposed Development Boundary | Source potentially connected to Infrastructure | Justification – Hydrogeological Regime | Comments on Supply Information |
|--------|--------------------------|---------------------------|------------------------------------|----------|----------------------------------|----------|---|--|--|---|
| | | | Easting | Northing | Easting | Northing | | | | |
| PWS 1 | Amat | Groundwater - Borehole | 239050 | 900057 | 239050 | 900057 | No | No | <p>Part of the supply's catchment is within the western Site boundary.</p> <p>Supply is over 250 m from proposed infrastructure.</p> <p>There is no proposed infrastructure within the supply's catchment.</p> | <p>Borehole is 80 ft deep (24 m). Supplies house and Deer Larder. Installed 25 years ago. Water storage facilities consist of 1000 gallon (4,546 litres) tank. Water goes through a filter and UV treatment. Serviced every year.</p> <p>Information provided via questionnaire</p> |
| PWS 2 | Langwell Lodge, Rosehall | Groundwater - Well | 241630 | 901019 | 241625 | 901012 | No | No | <p>Supply catchment is outside of the Site boundary</p> <p>No proposed infrastructure is within the supply catchment</p> | <p>Well is 5m deep, 1m in diameter. Installed c. 2012. Used for domestic purposes, and livestock</p> <p>Pump installed. No facilities for storing water.</p> <p>Water level shows seasonal variation.</p> <p>Filtered and UV treated</p> |
| PWS 3 | Langwell Lodge, Langwell | Surface water - reservoir | 241520 | 900767 | 241578 | 901058 | No | No | <p>The supply catchment is on the edge of Site boundary</p> <p>There is no proposed infrastructure within the supply catchment.</p> | <p>Supply is from reservoir uphill of property and piped from there.</p> <p>Water supply is for domestic, livestock and irrigation use.</p> <p>Not treated.</p> <p>Information provided via questionnaire and site visit.</p> |