Beinn Ghlas Wind Farm Repowering EIA Report

Technical Appendix 8.5: Private Water Supply Assessment

Table of Contents

1 Introduction 1

1.1 Environmental Context 1
1.2 Scope of Works 2
1.3 Limitations 2
1.4 Legislation, Policy and Guidance 2

2 Methodology 3

3 Data Review and Environmental Setting 4

3.1 Hydrological and Hydrogeological Context 4
3.2 Consultations 4
3.3 Initial Screening 4

4 Additional Investigations to Inform Risk Assessment 5

4.1 Questionnaires 5
4.2 Site Visits 5
4.3 Investigation Results 5
4.4 Secondary Screening 6
4.5 Impact Assessment Method 7
4.6 Impact Assessment of PWS Potentially Connected to the Proposed Development 8

5 Conclusion 10

Figures

Figure 8.5.1 Private Water Supplies

Annexes

Annex I Consultation and Site Visit Screening Summary

Annex II Example of Private Water Supply Letter and Questionnaire

1 Introduction

This Private Water Supply (PWS) Assessment document has been prepared by Fluid Environmental Consulting (Fluid) on behalf of the Applicant for the construction of the Proposed Development. The site is located on the undulating uplands around Carn Gaibhre to the east of Beinn Ghlas summit on the Barguillean Estate south-east of Taynuilt and north of Loch Nant, Argyll and Bute.

The infrastructure of the proposed layout comprises of the Site Access and Internal Access Tracks with a total length of approximately 12.83 km of which 2.71 km is new access track (1.6 km floating) with associated new watercourse crossings and 8.52 km is existing access track and watercourse crossings which would need to be upgraded, 7 turbine locations and associated crane hardstandings, two temporary construction compounds, and a permanent meteorological mast.

This private water supply (PWS) assessment Study Area covers an area including the Site and Site Access up to a 2 km buffer (**Figure 8.5.1**) where hydrological connectivity to the Site is possible.

1.1 Environmental Context

The Site boundary is approximately 428 hectares (ha) in area and ranges from less than 30 m AOD at the A85 in the north to approximately 330 m Above Ordnance Datum (AOD) along the existing Fearnoch Forest and Beinn Ghlas Wind Farm Site Access tracks and up to 461 m AOD at the summit of Carn Gaibhre within the Site. The Site comprises undulating topography with rock outcrops and depressions resulting in areas of deeper peat between crags and thinner peat or thin organic soils on the steeper slopes around rock outcrops.

The Site is underlain by relatively impermeable bedrock and largely devoid of superficial deposits, with the exception of blanket peat deposits found to cover about 46 % of the Site in localised pockets based on the peat depth penetration surveys undertaken (**Volume 4, Technical Appendix 8.2** of the EIA Report) and very localised section of alluvial deposits associated with watercourses.

The Site and the Site Access is located within three main surface water catchments: the River Nant, Foechan Mhor/River Nell and the Allt Nathais. The majority of the Site is within the River Nant and Foechan Mhor/River Nell catchments. The majority of the Site Access is within the Allt Nathais catchment which discharges to Loch Etive north of the Site. The northern section of the Site drains to the south via un-named tributaries of River Lonan which flows west to Loch Nell before discharging as Foechan Mhor/River Nell before discharging to Loch Foechan, near Kilmore.

Due to the rural nature of the Site most properties are not on mains water supply and are therefore reliant on private water supplies (PWS).

1.2 Scope of Works

The purpose of this PWS Assessment is to:

- Identify any properties and their associated water supplies that could have a hydrological or hydrogeological link to the Proposed Development,
- Obtain specific information on water supply sources, conveyance and storage infrastructure that could potentially be connected to the Site,
- Ascertain the risk to any of these PWS as a result of construction and operation of the Proposed Development,
- Use these details to inform the layout design, and
- Where appropriate, provide recommendations for potential mitigation measures.

1.3 Limitations

The information presented in this document is based on the list of property names and information provided by Argyll and Bute Council (A&BC), a review of Ordnance Survey (OS) and aerial imagery mapping and site visits undertaken 2 - 4 March 2023.

1.4 Legislation, Policy and Guidance

The main legislative drivers, relevant to the assessment are:

- The Water Framework Directive (WFD) (2000/60/EC):
    - 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 2017:
    - The regulations aim to ensure the provision of clean, safe drinking water to those using Type A private water supplies (serving 50 or more persons in total, or more than 10 m^3 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 private water supplies.
- The Private Water Supplies (Scotland) Regulations 2006:
    - The regulations aim to ensure the provision of clean, safe drinking water to those using private water supplies (Type B supplies - Supplies serving only domestic premises with less than 50 persons in total supplied), and

- It is the responsibility of the Local Authorities to enforce and regulate private water supplies.

- The Water Quality (Scotland) Regulations 2010:
  - These regulations relate to managing water quality failures on a private water supply, attributable to the domestic distribution or its maintenance, in premises where water is supplied to the public.
- Drinking Water Quality Regulator for Scotland (DWQR) Private Water Supply (PWS) Technical Manual (2006):
  - The PWS Technical Manual was created to support local authorities when the previous PWS regulations were introduced in 2006. Much of the information contained in it is still relevant and provides a framework for PWS risk assessment.
- 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:
  - SEPA 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 1m 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.

2 Methodology

The PWS Assessment has been undertaken based on the following methodology:

- Consultation with A&BC and Barguillean Estate Manager to gather and review existing records of water supply sources within the vicinity of the Proposed Development,
- Completion of a high-level desktop assessment to put the hydrological and hydrogeological setting of the Proposed Development into context,
- Review of A&BC PWS records to identify properties potentially reliant of PWSs hydrologically connected to the Proposed Development,
- Preparation of a risk assessment to determine the potential effects of the Proposed Development on the quality and quantity of the water serving the supply. The assessment has adopted a phased approach to evaluating risk through the formulation of a Source-Pathway-Receptor conceptual model,

- Identification of any additional measures that should be included as part of the construction of the Proposed Development, to avoid and mitigate against any potential adverse effects resulting from the Proposed Development,
- Complete site visits where possible of the identified PWSs.

3 Data Review and Environmental Setting

3.1 Hydrological and Hydrogeological Context

The desk-based assessment reviewed information from several secondary sources to build up a hydrological and hydrogeological context for the Proposed Development and the surrounding area. These included:

- Geological and hydrogeological information obtained from The British Geological Survey (BGS) to understand hydrogeological conditions throughout the area considered for assessment; and
- Mapping of surface water catchments and sub-catchments to determine potential hydrological connectivity to the Proposed Development.

Details of the existing site conditions can be found detailed within **Volume 2, Chapter 8: Hydrology, Geology and Hydrogeology** of the EIA Report.

OS mapping and aerial imagery was used to identify properties potentially reliant on private water supplies within the catchments connected to the Proposed Development. Further investigation was undertaken to determine if the identified properties had private water supplies and to determine the location and characteristics of the source and conveyance infrastructure.

3.2 Consultations

Consultation with the A&BC was undertaken requesting the records held on PWS within a ~10 km radius from the centre of the Proposed Development.

A&BC provided an excel spreadsheet of information (labelled 2022 OLI FOI 14819) they hold with regards to PWSs detailing the PWS source approximate location, name of associated property and number of properties reliant on the supply on 17 November 2022. A&BC stated most properties in the area will be on a private supply due to limited mains in the area.

During the public exhibitions in January 2023, PWS questionnaire forms were made available to the community for completion. One resident completed a form however their property was not located in the vicinity of the Proposed Development.

3.3 Initial Screening

Data provided by A&BC was reviewed, together with OS mapping and aerial imagery to identify properties potentially reliant on private water supplies within the potential catchments of the Site and any potential data gaps where further investigation was required.

The initial review of the A&BC PWS information provided listed 191 PWSs within 10 km of the centre of the Site. The locations and type of PWSs were plotted up onto OS mapping with the Proposed Development using GIS. PWS were then screened out of being potentially connected from the Application Boundary for the following reasons:

- Groundwater (springs or boreholes) PWSs have screened out where they are located greater than:
    - 100 m from the Site Access track (where excavation will be less than 1 metre), and/or
    - 250 m from the wind farm infrastructure where excavations could be greater than 1 metre (turbine foundations, potentially crane pads and substation).
- Surface Water (burn) PWSs have screened out where they are:
    - In separate sub-catchments to the Proposed Development infrastructure, or
    - If within the same catchment as the Proposed Development and they are over 1 km downstream from the infrastructure as the effects of distance and dilution will minimise any effects of the Proposed Development.

Based on the initial screening only four private water supplies were potentially connected to the proposed development and were therefore investigated in more detail.

4 Additional Investigations to Inform Risk Assessment

4.1 Questionnaires

Questionnaires were sent to those private water supplies that were potentially connected to the development with the exception of the two sources near Barguillean Farm as a meeting had already been set up with the Estate Manager.

4.2 Site Visits

A site visit was completed by Fluid in March 2023 to examine the source locations for the private water supplies close to Barguillean Farm with the Estate Manager. The locations of the PWS sources were viewed, photographed and an accurate GPS grid reference was taken. Information was also gathered on the water supply system, such as tanks, pipelines, treatment systems and quantity and quality from the residents where relevant.

Subsequently a further visit was completed to examine the location of the private water supply and conveyance infrastructure for Logan House.

4.3 Investigation Results

The additional investigations on the five potential PWSs that had the potential to be connected to the proposed infrastructure identified the following information:

- PWS 1 (type A1) supplies Barguillean Farmhouse, Josephine's Wing (self catering cottage), Granary Cottage and farm buildings. PWS 1 source taken from a spring at approximately NGR NM 98157 28481 located in close proximity to the existing Barguillean Farm access track and approximately 25 m from the closest section of proposed new excavated track. The pipeline from the source to the nearby collection tanks crosses the existing access track to the Site.
- PWS 2 (type B) supplies Bar Glas and Bar Beag properties and its source is from a wide diffuse area that becomes a small watercourse with dam at approximately NGR NM 97922 28513 200 m north-west of the proposed new excavated track section.
- PWS 3 (type B) supplies Lonan House and its source is from a burn, the Allt na h-Airdh, at approximately NGR NM 99050 28950, approximately 95 m distance south and downgradient of the public minor road.
- PWS 4 (type B) supplies the Dailnamac property directly from the Eas na Làraiche Mòire watercourse. The water is abstracted from the watercourse at NGR NM 97315 31810 about 200 m west of the existing track to be upgraded at its closest point, however it is separated by a topographical boundary. The source is also about 500 m down gradient of where the Eas na Làraiche Mòire watercourse crosses the existing track to be upgraded (watercourse crossing 3).
- PWS 5 (type B) supplies Achnameadhonach and its source is from a burn, the Allt Nathais, at approximately NGR NM 98571 30627. The water is abstracted via a basic intake located in woodland, feeding into a settling tank. From there, it is gravity-fed to the property. The source is understood to be perennial with no seasonal drying reported. The PWS is located approximately 1.5 km downstream of temporary construction compound 1**.** The supply undergoes treatment including settling, 20 µm and 5 µm filtration, and UV sterilisation.

4.4 Secondary Screening

A screening assessment was then completed following information gathered during site visits. The screening was based on the source of the PWS in relation to the work areas associated with the Proposed Development in order to eliminate any sources that would not be hydrologically or hydrogeologically connected to the Proposed Development.

The screening exercise excluded properties where inconceivable hydrological or hydrogeological connectivity is likely to exist. These were determined through considering the following:

- Catchment boundaries and channel networks,
- Properties of the underlying superficial and bedrock geology,
- Dominant land uses, and
- Topographical considerations.

The details of the supplies are presented in **Annex I** with their source locations, conveyance infrastructure, property locations and source catchments presented in **Figure 8.5.7** in Volume

3 of the EIA Report. The secondary screening indicates which supplies are taken forward to the risk assessment.

PWS1, PWS4 and PWS5 are all taken forward to the risk assessment.

PWS 2 supplying Bar Glas and Bar Beag properties is located over 100 m from the Existing Access track and proposed new access track requiring excavations less than 1 metre in depth, therefore no additional mitigation to the good practice outlined in **Technical Appendix 8.1** of the EIA Report is required. It is also located with a separate sub-catchment, with there being a topographical mound between the supply source and the track further demonstrating there is unlikely to be a hydrological connection between the existing or new access track and the PWS.

PWS 3, which supplies Lonan House, is located over 1 km from any proposed wind farm infrastructure associated with the Beinn Ghlas Wind Farm. The supply source is also situated within a separate sub-catchment, with intervening topography further reducing the likelihood of any hydrological connectivity between the PWS and the Proposed Development. As such, no additional mitigation beyond the good practice measures outlined in **Technical Appendix 8.1** of the EIA Report is considered necessary to protect this supply.

5 Impact Assessment

5.1 Impact Assessment Method

A methodology for impact assessment of PWSs is contained within the Private Water Supplies Technical Manual (DWQR, 2006). 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 taking into account 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 will be important for determining the baseline qualities of the supply, they are inappropriate for determining the risk to the private water supplies from the construction of the Proposed Development.

The methodology adopted is based on Fluid Environmental Consulting's extensive experience of assessing impacts to private water supplies for wind farm developments, however, the guidance has been utilised where possible when trying to establish the varying factors which influence the baseline conditions of the supplies.

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

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. 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;
- **Receptor** - refers to anything or anyone that could be adversely affected by the hazard (including supply source and associated infrastructure).

Where hydrological connectivity or linkage exists between a potential contamination 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.

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 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.

The potential for impact 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. As a result, the assessment of the potential of contamination to PWS due to activities associated with the construction works will consider the following:

- Type of private water supply 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.

The impact assessment considers the type of hazard associated with the Proposed Development, the probability or likelihood and severity or 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** of the EIA Report.

5.2 Impact Assessment of PWS Potentially Connected to the Proposed Development

Three potential PWSs have been identified as being potentially connected to the Proposed Development.

The specific details of these supplies and the associated risk assessment are presented in **Annex II.**

PWS 1 source supplying Barguillean Farmhouse, Josephine's Wing (self catering cottage), Granary Cottage and farm buildings is located adjacent to the existing track and approximately 25m distance east of the proposed new track section at its closest point. The bedrock is a low productivity aquifer and therefore any groundwater flow will be within a weathered zone of about 1 m depth, will mimic the topography. It is likely that the catchment for this supply originates from the slopes to the south south-west, which include sections of the existing and the proposed new sections of the track. The existing track activities and the new proposed track section construction have the potential to disturb the groundwater supply and quality by disturbing the

ground conditions by maintenance, excavations and earthworks, poor management of runoff and/or a potential pollution incident. Therefore, the following mitigation is required:

- Micrositing of the proposed track further away from the PWS source where possible considering other constraints.
- The area of the PWS source and header tank will be fenced off and all those on site will be made aware of the sensitive receptor as part of the induction process.
- A robust drainage management plan to manage potential sedimentation, flow alteration and pollution.
- Storage of fuels, refuelling and concrete batching will not occur within 250 m of PWS 1 unless the area is lined and the discharge is captured.
- Monitoring of the Barguillean Farm PWS flow and water quality before, during and post construction. A contingency emergency water supply will be provided and activated if there are any significant changes to the water supply.
- Any track widening required in this area must be undertaken to the east of the existing track which is further away from the water supply and measures will be undertaken to protect the water supply piping.
- Development of an emergency response plan and temporary contingency water supply and /or permanent alternative water supply and system will be provided.

PWS 4 (type B) supplies the Dailnamac property directly from the Eas na Làraiche Mòire watercourse. The water is abstracted directly from the watercourse at NGR NM 97315 31810 about 500 m down gradient of where the Eas na Làraiche Mòire watercourse crosses the existing track to be upgraded (watercourse crossing 3). The access track to be upgraded also runs alongside the Eas na Làraiche Mòire watercourse for about 185 m upstream of the watercourse crossing and includes existing watercourse crossing 30 and therefore there is a direct connection between upgrading works on the track and crossing and the source.

The following mitigation is therefore required:

- Implementation of a robust drainage management plan to manage potential sedimentation, flow alteration and pollution.
- Storage of fuels, refuelling and concrete batching will not occur within 250 m of PWS 4.
- Monitoring of the Dailmanac PWS flow and water quality before, during and post construction. A contingency emergency water supply will be provided and activated if there are any significant changes to the water supply.
- Any track widening required in this area must be undertaken to the east of the existing track which is further away from the adjacent watercourse and therefore the source.
- Development of an emergency response plan and temporary contingency water supply and /or permanent alternative water supply and system will be provided.

PWS 5 (type B) supplies the Achnameadhonach property directly from the Allt Nathais watercourse. The abstraction point is located at NGR NM 98571 30627, where water is

collected via a surface intake and conveyed through a settling tank before being gravity-fed to a 10,000 L holding tank. The water is then pumped to an 800 L intermediate tank near the house and subsequently distributed for household use.

The PWS is located approximately 1.5 km downstream of Temporary Construction Compound 1 and other associated infrastructure including sections of the access track. While the PWS is located a significant distance downstream, it lies within the same catchment as the proposed infrastructure. This means that any potential sedimentation, contamination, or hydrological alteration introduced upstream could — in theory — reach the PWS intake.

However, dilution, natural attenuation processes, and dispersion over the >1.5 km flow path within the watercourse will significantly reduce the risk of impact. Despite this, as the PWS is hydrologically connected via the Allt Nathais, potential risk cannot be entirely ruled out, and precautionary mitigation is recommended.

The following mitigation is therefore required:

- Implementation of a robust drainage management plan to manage potential sedimentation, flow alteration and pollution.
- Storage of fuels, refuelling and concrete batching will not occur within 250 m of PWS 5.
- Pre-construction baseline monitoring of the Achnameadhonach PWS, followed by ongoing flow and quality monitoring during and post-construction, to detect any changes potentially linked to construction activities.
- An emergency contingency water supply will be identified and made available in the event of significant degradation to the PWS (e.g. due to turbidity, contamination, or reduced yield).
- Development of an emergency response plan for rapid mitigation in case of accidental pollution or failure of upstream controls.

6 Conclusion

The assessment has determined that only three PWS sources (PWS1, PWS4 and PWS5) are potentially connected to the Site Access (to be upgraded).

The PWS1 for Barguillean Farmhouse, Josephine's Wing (self catering cottage), Granary Cottage and farm buildings is taken from a groundwater spring located in close proximity to the existing Barguillean Farm access track and approximately 25 m from the closest section of proposed new excavated track (Site Access). It is likely that the catchment for this supply originates from the slopes to the south south-west, which include sections of the existing and the proposed new sections of the track. The supply is then piped under the existing track to fenced off holding tanks at approximately NGR NM 98116 28510 immediately downgradient of the existing access track.

The existing track activities and the new proposed track section construction have the potential to disturb the groundwater/surface supply (source and infrastructure, pipeline and header tank)

and quality by disturbing the ground conditions by maintenance, excavations and earthworks, poor management of runoff and/or a potential pollution incident.

A number of mitigation measures are proposed including additional drainage management, monitoring, restrictions on refuelling and monitoring.

With the additional mitigation in place, which includes worst case scenario, replacing the water supply, the residual significance of effect to the Barguillean Farm PWS 1 is considered to be **Minor**.

PWS 4 (type B) supplies the Dailnamac property directly from the Eas na Làraiche Mòire watercourse. The water is abstracted directly from the watercourse at NGR NM 97315 31810 about 500 m down gradient of where the Eas na Làraiche Mòire watercourse crosses the existing track to be upgraded (watercourse crossing 3). The access track to be upgraded also runs alongside the Eas na Làraiche Mòire watercourse for about 725 m upstream of the source and therefore there is a direct connection between upgrading works on the track and crossing and the source.

A number of mitigation measures are proposed including additional drainage management, monitoring, conditions on construction and monitoring.

With the additional mitigation in place, which includes worst case scenario, replacing the water supply, the residual significant of effect to the Dailmanac PWS 4 is considered to be **Minor**.

PWS 5 (type B) supplies the Achnameadhonach property directly from the Allt Nathais watercourse. The water is abstracted from the watercourse at NGR NM 98571 30627, located approximately 1.7 km downstream of Temporary Construction Compound 1 and other elements of the proposed development including sections of the access track. While the PWS is a significant distance from the proposed works, it lies within the same hydrological catchment, and therefore a direct surface water connection exists between the construction area and the source.

Given this connection, a precautionary approach has been adopted and a number of mitigation measures are proposed, including robust drainage management, pollution prevention controls, exclusion zones for high-risk activities near watercourses, and pre-, during- and post-construction monitoring of the water supply. As a worst-case scenario, provision will also be made to supply a temporary or permanent alternative water source if a significant degradation of supply occurs.

With these additional mitigation measures in place — including the commitment to provide an emergency contingency water supply — the residual significance of effect to the Achnameadhonach PWS 5 is considered to be **Minor**.

Annex I

Private Water Supply Consultation and Site Visit Screening Summary

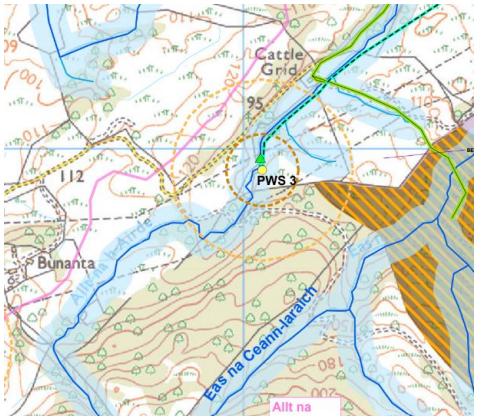
Table 1 Private Water Supply Screening Summary

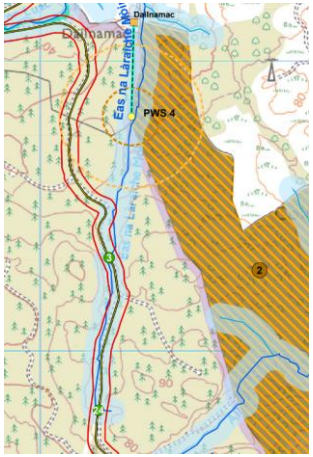
The key for these figures is presented on **Figure 9.5.1 Private Water Supplies**

PWS Source ID	Property Name	PWS Source Type	PWS Source Location Grid Reference		Property Location Grid Reference		Comments on Supply Information	Source within Application Boundary	Source potentially Connected to Infrastructure	Justification – Hydrogeological Regime
			Easting	Northing	Easting	Northing				
PWS 1	Barguillean Farm	Groundwater seepage collect with some surface water run off influence	198112	728456	198048	728812	Information from A&BC, Barguillean Farm Manager and ground truthed.	Yes	Yes	A section of proposed new excavated wind farm track lies within the catchment of the abstraction source, around 25 m to the west of the source location and crosses the supply pipeline 30 m north of the source location. Sections of the existing and new track are upgradient of this supply There is therefore a potential for the source to be impacted by the Proposed Development.

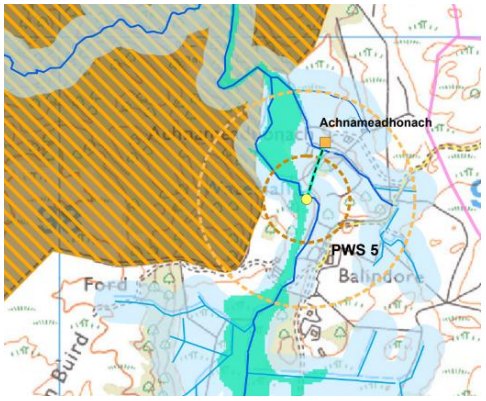
PWS Source ID	Property Name	PWS Source Type	PWS Source Location Grid Reference		Property Location Grid Reference		Comments on Supply Information	Source within Application Boundary	Source potentially Connected to Infrastructure	Justification – Hydrogeological Regime
			Easting	Northing	Easting	Northing				
PWS 2	Bar Beag	Surface water / Burn	197900	728500	197856	728777	Information from A&BC, Barguillean Farm Manager and ground truthed.	No	No	The supply is located over 100m from the Existing Access track and proposed new access track. It is also located with a separate sub-catchment, with there being a topographical mound between the supply source and the track further demonstrating there is unlikely to be a hydrological connection between the existing or new access track and the PWS.
	Bar Glas				197765	728718				

PWS Source ID	Property Name	PWS Source Type	PWS Source Location Grid Reference		Property Location Grid Reference		Comments on Supply Information	Source within Application Boundary	Source potentially Connected to Infrastructure	Justification – Hydrogeological Regime
			Easting	Northing	Easting	Northing				
PWS 3	Lonan House	Surface water / Burn	199050	728950	199847	729610	Information from A&BC and site observations of infrastructure. Type B supply from upper stem of Allt na hAirde. Substantial concrete weir in watercourse with piping down to a concrete tank at approximately NGR NM 99045 28970. It is the assumed the water supply follows the line of the watercourse for much of the route to the property.	No	No	Existing minor public road upstream. No upgrades proposed.



PWS Source ID	Property Name	PWS Source Type	PWS Source Location Grid Reference		Property Location Grid Reference		Comments on Supply Information	Source within Application Boundary	Source potentially Connected to Infrastructure	Justification – Hydrogeological Regime
			Easting	Northing	Easting	Northing				
PWS 4	Dailnamac	Surface water / Burn	197315	731810	197320	732140	Information from A&BC incorrect. Type B supply from the Eas na Làraiche Mòire watercourse. It is the assumed the water supply follows the line of the watercourse for much of the route to the property.	No	Yes	The water is abstracted from the watercourse at NGR NM 97315 31810 source is about 200m west of the existing track to be upgraded however it is separated by a topographical boundary. The source is also about 500 m down gradient of where the Eas na Làraiche Mòire watercourse crosses the existing track to be upgraded (watercourse crossing 3).
 										

PWS Source ID	Property Name	PWS Source Type	PWS Source Location Grid Reference		Property Location Grid Reference		Comments on Supply Information	Source within Application Boundary	Source potentially Connected to Infrastructure	Justification – Hydrogeological Regime
			Easting	Northing	Easting	Northing				
PWS 5	Achnameadhonach	Surface Water	198571	730627	198618	730753	Information confirmed via landowner questionnaire. Water is collected from the Allt Nathais, initially into a settling tank, then gravity-fed into a 10,000L holding tank. A positive head pump transfers water to an 800L tank near the house, from which it is pumped into the domestic supply. This system provides water for the house and associated systems. The tank is constantly refreshed from the burn. The supply does not dry up and undergoes no water treatment.	No	Yes	The PWS source is located over 1.5 km downstream of Temporary Construction Compound 1 and the access track, but lies within the same catchment. Despite the distance allowing for significant dilution, a hydrological connection exists via the Allt Nathais. Therefore, potential impact from surface water contamination during construction cannot be fully ruled out and mitigation has been proposed accordingly.



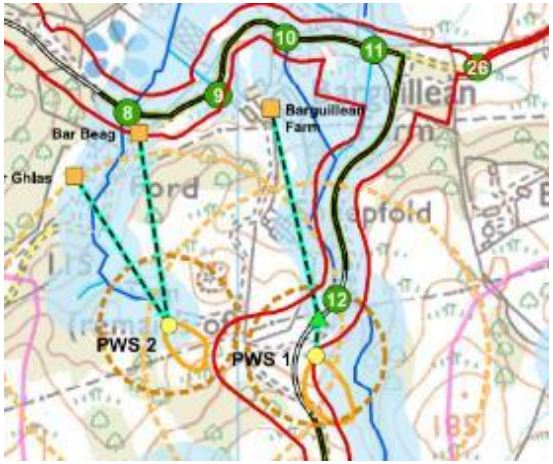
Photos provided by Achnameadhonach property owner

Annex II

Private Water Supply Risk Assessment and Mitigation Summary

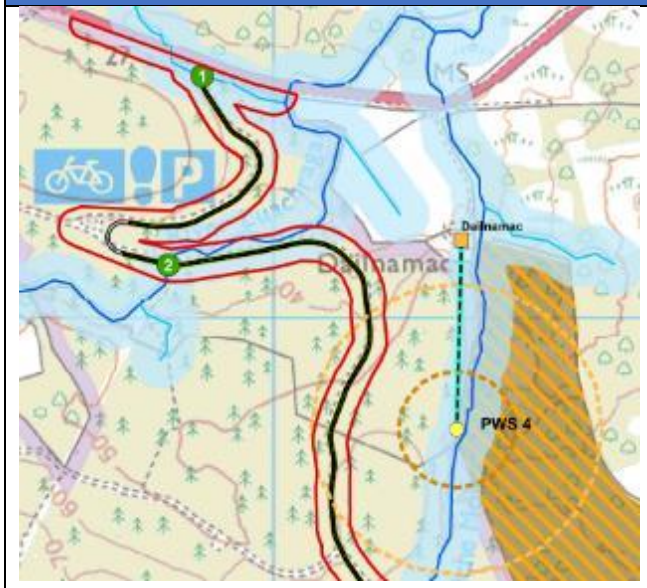
Table 2 Private Water Supply Impact Assessment and Mitigation for PWS 1

The key for these figures is presented on **Figure 9.5.1 Private Water Supplies**.

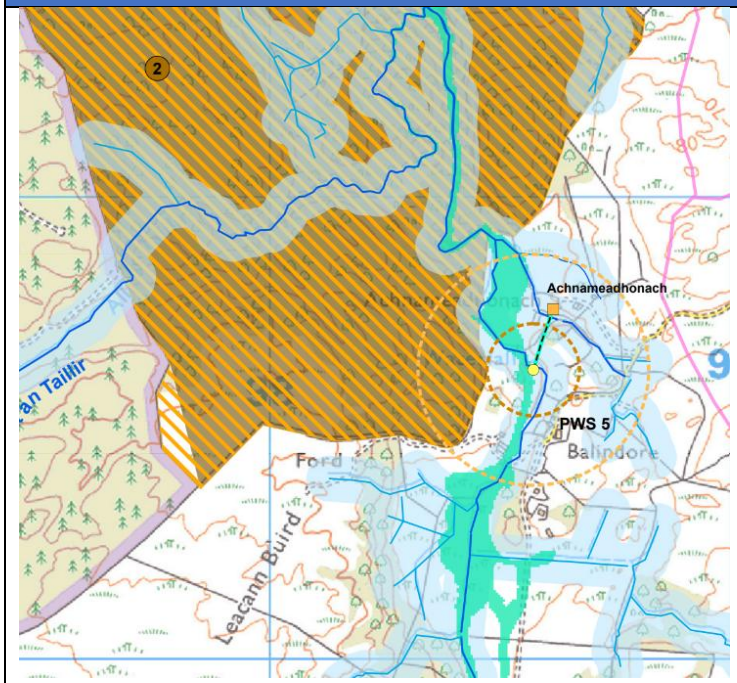
PWS 1 Barguillean Farmhouse, Josephine's Wing (self catering cottage), Granary Cottage and farm buildings	
  	Type A1 – used for potable supply The PWS is from a groundwater spring collect adjacent to the existing Barguillean Farm access track. The PWS is located approximately 50 m distance to the south, on the opposite side of the existing access track to the property. There are two holding tanks downstream of the abstraction point on opposite side of track. The source is piped to Barguillean Farm approximately 330 m to the north. The bedrock geology is characterised as a low productivity aquifer with storage and transport of water constrained to weathered zones and discontinuities. Therefore, the catchment of this spring is likely to be dominated by the topographical regime and relatively small. The likely catchment of the spring is shown to the left and on **Figure 8.5.1** in Volume 3 of the EIA Report. A section of new excavated access track is proposed approximately 25 m west of the source the PWS pipeline will require to be crossed and track in close proximity to holding tanks. The existing track and new proposed track will be within 100 m of the PWS and upgradient within the PWS catchment. Appropriate mitigation will be required.

PWS 1 Barguillean Farmhouse, Josephine's Wing (self catering cottage), Granary Cottage and farm buildings					
Effect Assessed	Magnitude	Sensitivity	Significance	Mitigation measures required	Residual Effect
Sediment into surface water	Medium	Very High	Moderate	Due to the close proximity of the existing and proposed new track to the source location, a robust drainage management plan will be created in order to mitigate potential impacts on this receptor. Any track widening or upgrades required in this area will be further away from the water supply and will protect the water supply piping. Monitoring of flow and water quality is required before, during and after construction to demonstrate no disturbance to the PWS source has occurred. A contingency emergency water supply will be provided if there are any significant changes to the water supply.	Minor
Flow alteration	Medium	Very High	Moderate	Due to the close proximity of the existing and proposed new track to the source location, a robust drainage management plan will be created in order to mitigate potential impacts on this receptor. Any track widening required in this area will be to the east of the existing track or further away from the water supply and will protect the water supply piping. Monitoring of flow and water quality is required before, during and after construction to demonstrate no disturbance to the PWS source has occurred. A contingency emergency water supply will be provided if there are any significant changes to the water supply.	Minor

PWS 1 Barguillean Farmhouse, Josephine's Wing (self catering cottage), Granary Cottage and farm buildings					
Pollution	Medium	Very High	Moderate	Due to the close proximity of the existing and proposed new track to the source location, a robust drainage management plan will be created in order to mitigate potential impacts on this receptor. Any track widening required in this area will be to the east of the existing track or further away from the water supply and will protect the water supply piping. There will be no storage of fuel, refuelling or concrete use within 250 m of the supply. Monitoring of flow and water quality is required before, during and after construction to demonstrate no disturbance to the PWS source has occurred. A contingency emergency water supply will be provided if there are any significant changes to the water supply.	Minor

PWS 4 Dailmanac						
					Type B – used for potable supply Supplies Dailmanac property directly from the Eas na Làraiche Mòire watercourse. The water is abstracted directly from the watercourse at NGR NM 97315 31810 about 500m down gradient of where the Eas na Làraiche Mòire watercourse crosses the existing track to be upgraded (watercourse crossing 3). The access track to be upgraded also runs alongside the Eas na Làraiche Mòire watercourse for about 725m upstream of the source and therefore there is a direct connection between upgrading works on the track and crossing and the source. The supply and property location are shown on **Figure 8.5.1** in Volume 3 of the EIA Report. It is likely that the PWS piping follows the course of the Eas na Làraiche Mòire watercourse. Appropriate mitigation will be required.	
Effect Assessed	Magnitude	Sensitivity		Significance	Mitigation measures required	Residual Effect
Sediment into surface water	Medium	Very High		Moderate	Due to the close proximity of the existing track to be upgraded to the watercourse upgradient of the source location, a robust drainage management plan will be created in order to mitigate potential impacts on this receptor. Any track widening required in this area will be further away from the watercourse and therefore further from water supply source. Monitoring of flow and water quality is required before, during and after construction to identify any effects on the PWS source. A contingency emergency water supply will be	Minor

PWS 4 Dailmanac						
					in place and will be brought on line if there are any significant changes to the water supply.	
Flow alteration	Low	Very High		Minor	There is unlikely to be any substantial alteration to flow at the abstraction location. Existing watercourse crossings 3 and 30 will be appropriately upgraded and managed to prevent alteration to flow.	Minor
Pollution	Medium	Very High		Moderate	Due to the close proximity of the existing track to be upgraded to the watercourse supplying the source location, a robust drainage management plan will be created in order to mitigate potential impacts on this receptor. Any track widening required in this area will be to the east of the existing track or further away from the water supply. There will be no storage of fuel, refuelling or concrete use in the catchment of the Eas na Làraiche Mòire watercourse. Monitoring of flow and water quality is required before, during and after construction to identify any effects on the PWS source. A contingency emergency water supply will be in place and will be brought on line if there are any significant changes to the water supply.	Minor

PWS 5 Achnameadhonach						
					Type B – Used for Potable Supply Supplies the Achnameadhonach property directly from the Allt Nathais watercourse. Water is abstracted from the Allt Nathais at NGR NM 98571 30627, collected into a settling tank, gravity-fed into a 10,000L holding tank, and pumped through an 800L tank for use in the domestic system. The PWS is located within the same catchment as Temporary Construction Compound 1 and parts of the proposed access track; however, it is located over 1.5 km downstream. While the distance provides considerable dilution potential, the hydrological connectivity means that appropriate mitigation is still required to protect the water source. The PWS source and property location are shown on **Figure 8.5.1** in Volume 3 of the EIA Report. It is assumed the supply pipe follows a similar alignment to the burn.	
Effect Assessed	Magnitude	Sensitivity		Significance	Mitigation measures required	Residual Effect
Sediment into surface water	Low	Very High		Minor	Given the >1.5 km distance downstream from construction activities, there is opportunity for dilution and attenuation of any suspended sediments. However, due to the hydrological connection and potable use, precautionary measures are warranted. A robust drainage management plan will be implemented at Temporary Construction Compound 1 and access track upgrades to reduce sediment mobilisation. Monitoring of	Minor

PWS 5 Achnameadhonach						
					the PWS will be carried out before, during, and after construction. A contingency supply will be provided if needed.	
Flow alteration	Low	Very High		Minor	No direct modification of the Allt Nathais watercourse is proposed near the PWS, and no abstraction from the burn by the project. Flow changes over 1.5 km are highly unlikely. Standard good practice drainage design will ensure no appreciable change in burn hydrology at the source.	Minor
Pollution	Low	Very High		Minor	There is potential for contaminants (e.g., hydrocarbons, concrete washout) to reach the Allt Nathais during construction. However, the significant distance to the PWS and presence of dilution reduce the risk. Even so, the following measures will be adopted: no fuel storage, refuelling or concrete use within 250 m of the Allt Nathais, emergency response planning, and ongoing water quality monitoring. A temporary or alternative water supply will be made available if any deterioration in quality is identified.	Minor