Technical Appendix

Drummarnock Wind Farm – Additional Information

Technical Appendix 5: Private Water Supply Assessment

Drummarnock Wind Farm Limited

November 2025

GONDOLIN
Land & Water
Civil Engineering & Environmental Solutions

Drummarnock Wind Farm

Private Water Supply Assessment

Client:	Atmos Consulting Ltd
Project No:	GON.0986.0503
Version:	2.0
Date:	03/10/2025

Contents

Document References

Tables

Drawings

1. Introduction

1.1 Preamble

Gondolin Land and Water Ltd (Gondolin) has been appointed by Atmos Consulting Ltd (the Agent) on behalf of Drummarnock Wind Farm Limited (the Applicant) to prepare a Private Water Supply Assessment (PWSA) of an identified Private Water Supply (PWS) in support of a planning application for Drummarnock Wind Farm, located 5 km southwest of Stirling.

A planning application for Drummarnock Wind Farm (the Proposed Development) was submitted to Stirling Council (Ref 24/00494/FUL) in July 2024, and within the supporting Environmental Impact Assessment (EIA) Report Chapter 8 Hydrology, Geology and Hydrogeology, an assessment of PWS receptors was undertaken. The spring PWS supplying Muirpark Farm is determined to be potentially at risk, due to its unknown location which may be sited within SEPA recommended infrastructure buffers, in accordance with SEPA Guidance on Assessing the Impacts of Developments on Groundwater Abstractions.

A response from SEPA following submission in September 2024, provided further comments on the assessment undertaken and recommended further investigation:

> *We have reviewed the potential risk to groundwater. The Environmental Impact Assessment has identified one private water supply (PWS) source as potentially at risk from the development.*
>
> *In consultation with Stirling Council the applicant has identified 29 private water supplies (PWS) as within 3 km of the Site infrastructure. Of these just one, Muirpark Farm (275554, 687124) has been identified as potential within prescribed buffers i.e. within 100 m radius of excavations less than 1 m in depth or within 250 m of excavations deeper than 1 m. The NGR provided is for the supply not the source location. The landowner has advised that it is a spring to the southwest of the property, but the precise location and infrastructure route is unknown. The approximate location places the source upgradient, but possibly within, 100-250 m of the access track option B. A detailed hydrogeological investigation has not been undertaken as the source location has not been confirmed.*
>
> ***We recommend the following:***
>
> *The source location of Muirpark Farm PWS should be confirmed, and if found to be with prescribed buffers a bespoke risk assessment undertaken.*

As requested in SEPA's response, this assessment will confirm the source location of PWS Muirpark Farm, with a bespoke hydrological and hydrogeological risk assessment undertaken.

1.2 Background

1.2.1 EIA Report (2024)

As outlined above, within the EIA Report, an assessment of PWS was undertaken. Stirling Council provided details of registered PWS located within 3 km of the Site, which included 29 PWS. An initial screening was undertaken to determine whether there was potential for PWS to be hydrologically or hydrogeologically connected to the Proposed Development. Only one PWS was considered to be potentially connected, which was the PWS Muirpark Farm spring source, which was scoped into further assessment.

Consultation was undertaken with the landowner who confirmed the spring is located to the southwest of the property, however, the source, infrastructure location, and supply treatment were unknown.

The hydrogeological assessment of the area to the southwest of Muirpark Farm, is noted as being Diamicton till overlying Gargunnock Hills Lava, and groundwater is considered to be shallow and likely responsive to rainfall. Due to its unknown location and potential of being located '*within 100-250 m of the WC2 and WC3 watercourse crossings, access option track B, the construction compound and the substation*', the PWS is assessed to be at potential risk.

Mitigation outlined within the EIA Report was for the source to be visited and a detailed risk assessment undertaken. In addition, it is proposed for monitoring to be undertaken weekly at the source, supported by quarterly laboratory samples, which will be included within the proposed Water Quality Monitoring Plan for the Proposed Development.

The EIA report also noted the presence of an un-registered surface water abstraction supply, which is utilised by Muirpark Farm for livestock water supply. The abstraction is located at an artificially created pond along the surface watercourse immediately downstream of WC3. It is hydrologically connected to the Proposed Development, however following implementation of mitigation, including regular water quality monitoring and emergency contingency measures, the predicted effects are assessed to be negligible.

1.2.2 Legislation and Guidance

The following Scottish Government legislation has been reviewed to inform the assessment methodology of this PWSA, to ensure comprehensive assessment and any protective measures required are implemented.

- Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017; and
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).

To inform the assessment methodology of this PWSA, the following guidance has been reviewed:

- Scottish Environmental Protection Agency (SEPA) A Practical Guide to The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (Version 9.4) 2024; and
- SEPA Guidance on Assessing the Impacts of Developments on Groundwater Abstractions, 2024.

In accordance with SEPA Guidance on Assessing the Impacts of Development on Groundwater Abstractions (2024), all groundwater abstraction points within the distances outlined below have been identified and infrastructure buffers implemented, depending on excavation depths:

- 10 m of all activities;
- 100 m of all subsurface activities less than 1 m in depth; and
- 250 m of all subsurface activities deeper than 1 m.

1.2.3 Assessment Methodology

The findings of the previous EIA Report were reviewed, and an initial desk-based assessment of the surrounding area was undertaken. A Site visit was undertaken with the landowner of Muirpark Farm to visit the PWS source and associated infrastructure. The aim of the consultation was to confirm the presence of the PWS, and information on source type and location, including location of associated tanks and pipework.

Following the Site visit and confirmation of the PWS source location, an assessment of potential connectivity to the Proposed Development was undertaken in consideration of underlying geology, bedrock aquifers, surface water catchments, topography and drainage pathways. As the PWS was confirmed to be located within SEPA recommended infrastructure buffers, it is assessed to provide a risk rating.

The basis for assessing risk to identified PWS is to adopt the widely recognised **'Source-Pathway-Receptor'** model. Without a complete source-pathway-receptor linkage there is no potential for the Proposed Development to affect the yield or quality of a PWS source. The three elements of the model are defined in the context of PWS risk assessment as:

- **Source** – Nearest Proposed Development infrastructure;
- **Pathway** – Groundwater / surface water flow defined by catchment; and
- **Receptor** - PWS supply catchment to intake location.

In accordance with the SEPA Guidance, groundwater abstractions will be assessed through a 3-step approach:

- **Step 1** – identification of groundwater abstractions within the relevant 'buffer zones', progressing to Step 2 if so.
- **Step 2** – Conceptual Site Model (CSM) and Qualitative assessment, progressing to Step 3 if Medium or Major impact is found. Effect is quantified using the matrix within the SEPA Guidance which considers the scale of the effects and the importance of the abstraction. It is noted within the guidance that private water abstractions for human consumption are likely to be of Moderate importance. The scale of the effect considers the extent, magnitude, duration, frequency and reversibility, likelihood and cumulative effects. Infrastructure to be located outside source abstraction zones / buffer areas during this step through design evolution where possible.
- **Step 3** – Quantitative assessment using ground investigation and modelling predictions. If Medium and Major impact is confirmed, then Site specific mitigation is required, and residual impacts reassessed.

To determine the potential impact of effects to the identified PWS receptors, the following matrix will be utilised:

Table 1 Assessment of Potential Impacts

		How much is it affected?			
		Substantially	**Moderately**	**Slightly**	**Negligibly or not at all**
How Important is it?	**High / Important**	**Major**	**Major**	**Medium**	Negligible / no effect
	Moderately Important	**Major**	**Medium**	Low	Negligible / no effect
	Low Importance	**Medium**	Low	Low	Negligible / no effect
	Unimportant	Unimportant effect	Unimportant effect	Unimportant effect	Negligible / no effect

The approach in SEPA's 2024 Guidance is that should a Major or Medium effect be identified on any of the groundwater abstraction supplies following the qualitative assessment then a more detailed quantitative risk assessment will be required. If the potential impacts are considered to be Low or Unimportant, then no further risk assessment will be required.

The assessment has been overseen by Zak Ritchie (BEng, MSc, C.Eng, C.WEM, MCIWEM). Zak is Managing Director at Gondolin Land & Water and holds over 14 years' experience in assessing impacts from onshore renewable infrastructure developments on hydrology, hydrogeology and geology in the context of EIA Reports and has relevant expert witness experience. Gondolin has undertaken a Site visit and consultation with the landowners of Muirpark Farm to identify and characterise the PWS identified.

1.3 Baseline Conditions

1.3.1 Topography

The Site is located over low hills with elevation rising from c.206 m Above Ordnance Datum (AOD) on the eastern site boundary, via Muirpark Farm at 220 m AOD, to Drummarnock Hill at 278 m AOD in the centre. Elevation continues to rise westwards to several unnamed eastern hills (373 m and 357 m AOD), then falls away to the south and north. Earls Hill at 441 m AOD rises on the other side of the western boundary. The probable PWS spring location is located on the northeast slopes of Drummarnock in the centre of the Site.

1.3.2 Geology

Review of the 1:50,000 British Geological Survey (BGS) bedrock geology online maps indicates that Site is underlain by igneous bedrock of the Gargunnock Hills Lava Member, which consists of basalt and composite lavas, as shown in Drawing PWS-002. The northeast of the Site is underlain by sedimentary rocks of the Hurlet Limestone and Lower Limestone Formation, and igneous intrusive rocks of the Midland Valley Sill Complex. The BGS mapping indicates an inferred fault which bisects the Site east to west.

A review of the 1:50,000 BGS superficial deposits online maps indicate the Site is largely underlain by peat, with smaller areas of sporadic coverage of peat in the east. There are several small areas of hummocky (moundy) glacial deposits on higher slopes in the west of the Site, as shown in Drawing PWS-003. On lower slopes in the centre and east of the Site, the area is largely underlain by till, with limited peat deposits, and alluvium present along watercourses, including mapped along the Bannock Burn and Buckie Burn.

1.3.3 Hydrogeology

Review of the 1:625,000 BGS Hydrogeology maps indicate that the Site is largely underlain by unnamed extrusive rocks from the Dinantian epoch series. This is characterised as a low productivity aquifer, where limited groundwater is present *"in near surface weathered zone and secondary fractures. Up to 2L/s from rare springs."*

As described by the BGS Open Report (OR/15/028) 'Scotland's aquifers and groundwater bodies', igneous volcanic rocks are typically low productivity aquifers, with its permeability and resulting groundwater flows largely through fractured and weathered zones between distinct lava flows. The aquifer typically recharges through thin or permeable superficial deposits on hill slopes and discharges as springs where fractures meet the surface. Typical flow paths within the bedrock aquifer are of 0.1 – 1 km which largely follow surface water catchments.

SEPA's Water Classification Hub indicates that the west and south of the Site, including the potential PWS spring, is underlain by the Carron and Touch (ID: 150598) groundwater body, which has an overall status of 'Good', as classed in 2023. The northeast of the Site is underlain by the Stirling (ID 150571) groundwater body, which has an overall status of 'Poor', as classed in 2023.

Superficial deposits are present surrounding the probable PWS spring location, with peat deposits present upslope, and till present underlying and on lower slopes. Peat is considered to be a low permeability deposit which does not act as an aquifer or groundwater resource. Till deposits present are not considered to be significant aquifers or hold material quantities of groundwater.

1.3.4 Hydrology

The Site is located within several SEPA catchments, with the east of the Site, including the Muirpark Farm supply and potential source, located within the Auchenbowie Burn (Loch Coulter Reservoir to River Carron). An upstream tributary of the Auchenbowie Burn, the Loch Coulter Burn, rises within the Site on the eastern slopes of Drummarnock.

SEPA's Water Classification Hub indicates the Water Framework Directive (WFD) status of the Auchenbowie Burn (Loch Coulter Reservoir to River Carron) (ID 4210) to be 'Moderate', as classed in 2023. In detailed water classification data, it is noted to have 'Poor' overall ecology status, 'Moderate' overall hydrology status, and 'High' water quality.

Following review of the Flood Estimation Handbook (FEH) Web Service and other available mapping to delineate the catchment of the potential PWS source location, shows the area is located within the Loch Coulter Burn catchment (Drawing PWS-001).

A hydrological summary and characteristics for the Loch Coulter Burn catchment are shown in Table 2 below, with the data taken from the FEH Web Service.

Table 2 Hydrological Summary

Catchment	Delineation Location (NGR)	Area (km^2)	BFI-HOST19	SAAR (mm)	SPR-Host (%)
Loch Coulter Burn	NS 76250 87200	1.24	0.378	1457	38.47

BFIHOST19 = Base Flow Index derived using the UK Hydrology of Soil Types (Host) classification (released 2019)
SAAR= Standard Annual Average Rainfall
SPR-HOST = Standard Percentage Runoff derived from UK Hydrology of Soil Types (Host) classification

BFIHOST is a measure of catchment responsiveness to rainfall. Each of the soil types in the UK have been delineated into 29 specific HOST (Hydrology of Soil Types) classification. A Baseflow Index (BFI) value is determined from the designated HOST value for the catchment. BFI values range between 0.170 and 1.0 in the UK. The BFI may be thought of as a measure of the proportion of the river runoff that derives from stored sources; the more permeable the rock, superficial deposits and soils in a catchment, the higher the BFI and the more sustained the river's flow during periods of dry weather. Thus, the BFI is an effective means of indexing catchment geology. The BFIHOST values for the catchments in Table 2 are in the low-mid range of values, suggesting relatively impermeable geology with watercourses dominated by surface water inputs rather than a significant baseflow component. This is consistent with the geological / hydrogeological setting at the Site reported by BGS.

SAAR is the annual average rainfall for the catchment. In Scotland, SAAR values can vary from ~600 mm in drier parts of the country (east coast / Moray) to ~ 3500 mm in the Highlands and Islands, west coast and northwest Highlands. The values shown in Table 2 of 1457 mm is therefore in the mid range of average annual rainfall amounts.

SPRHOST is a measure of catchment responsiveness to rainfall in terms of the Standard Percentage of Runoff (SPR). This represents an average value for the percentage of rainfall which would be expected to exceed the infiltration capacity of underlying soils and geology, leading to runoff. An SPR value is determined from the designated HOST value for the catchment. SPR values range between 2% and 60%. The SPRHOST values for the catchments in Table 2 are therefore in the mid-high range of values, indicating that the watercourses are dominated by surface water inputs rather than a significant baseflow component. The values of 38.47% also reflects the absence of superficial deposits which would encourage runoff during rainfall events rather than infiltration / absorption into the ground.

1.3.5 Public Water Supplies

Review of Scotland's Environment Map indicates that the Site is located within a Drinking Water Protected Area (Surface) of the Carron and Touch catchment. The Carron and Touch DWPA is a large catchment located across the Touch Hills and Lennox Hills. The DWPA is associated with the Carron Valley Reservoir, located in the centre of the DWPA, and Loch Coulter, located in the east of the DWPA.

1.3.6 Private Water Supplies

As outlined in Section 1.2.1, following 29 PWS being identified within the EIA Report 2024, as shown in Figure 8-6, only PWS Muirpark Farm was identified as requiring further assessment, based on its spring location potentially being within SEPA recommended infrastructure buffers from the Proposed Development.

As noted, following submission of the EIA Report in 2024, further information was requested by SEPA regarding the spring abstraction at Muirpark Farm. This has been brought forward for assessment as detailed in Section 2 below.

2. PWS Assessment

2.1 Site Based Assessment

In August 2025, Gondolin undertook a Site visit to determine hydrological conditions onsite and visited Muirpark Farm to gather information on the PWS source. A collection of selected Site survey photographs is included as Annex B: Site Photographs.

The property and farm of Muirpark Farm is supplied by the spring fed PWS, located on the slopes of Drummarnock. An open brick pool is located at the spring location, which is inset into the slope, with the water initially filtered through a stone wall. This is then piped under gravity downslope through a blue PVC pipe, which has replaced a previous cast iron pipe. Approximately 77 m downslope of the source, a header tank is situated to assist with flow. The plastic header tank is approximately 2 m

depth and 0.5 m diameter, enclosed with a sealed top and a ballcock valve present to control the water flow. From the header tank, the supply is piped downslope to the property, where there is a particulate filter, otherwise the supply is untreated.

As noted within the EIA Report 2024, Muirpark Farm has an additional surface water abstraction which is used as a water supply for livestock. This was also visited during the Gondolin Site visit. The artificial pond has been created immediately downslope of the existing track and watercourse crossing (WC3), along an unnamed tributary of the Loch Coulter Burn. The pipe is connected to a buoy in the pond, where it is then piped down to the farm directly to livestock water troughs. It is considered that this has been previously assessed within the EIA Report 2024, and no further assessment is required.

2.2 Risk Rating

A summary of the details collected during the survey and results of the PWS assessment are detailed in Table 2 below, with source location and catchments shown in Drawing PWS-004.

The 'Risk Rating' for PWS sources and associated properties has been assessed using the SEPA Guidance on Assessing the Impacts of Development on Groundwater Abstractions as outlined in Section 1.2 and based on professional judgement / experience. Risk Ratings are as follows:

- **No Risk** – No hydraulic connectivity / complete Source-Pathway-Receptor linkage to the Proposed Development onsite.
- **Low Risk** – PWS source intake is located outwith the SEPA advised 10 m, 100 m and 250 m buffers to Proposed Development for groundwater supplies, or Proposed Development infrastructure >1.5 km for surface water abstractions measured following the alignment of the receiving watercourse.
- **At Potential Risk** – PWS source intake is located within the 10 m, 100 m and 250 m SEPA buffers or identified catchment areas overlap Proposed Development infrastructure, or Proposed Development infrastructure <1.5 km to surface water abstractions measured following the alignment of the receiving watercourse.

Only where PWS identified as 'At Potential Risk' will they be assessed in further detail and bespoke mitigation proposed.

Table 3 PWS Assessment

Ref	Properties Supplied	PWS Status	Supply Easting Northing	Source Intake Easting Northing	Source Type	Comments	Source Intake Distance from Infrastructure	Source Pathway Receptor Assessment	Initial PWS Risk Rating
PWS Muirpark Farm	Muirpark Farm	Registered	275545, 687122	275098, 687248	Spring	The drinking and domestic potable supply at Muirpark Farm is confirmed to be supplied by the PWS spring. The PWS source is located approximately 465 m west of the supply.	Located 96 m from the proposed access track, and 93 m from associated earthworks.	As the PWS source intake is located within the 100 m infrastructure buffer (track excavation depth <1 m so 100 m buffer applies) the source is therefore considered to be At Potential Risk. Therefore, a bespoke risk assessment is required.	At Potential Risk

2.3 Detailed Qualitative Assessment

As outlined in Table 3, the spring for PWS Muirpark Farm is considered to be At Potential Risk from the Proposed Development due to it being sited marginally within the SEPA recommended 100 m infrastructure buffer. Therefore, a bespoke detailed qualitative assessment is outlined below.

The infrastructure associated with the PWS spring to connect to the supply at Muirpark Farm includes a header tank and connecting PVC pipework. As shown in Drawing PWS-004, the header tank and pipework will not be intersected by Proposed Development infrastructure and is located a minimum of approximately 62 m (upgradient) from the proposed access track. It is considered that the PWS infrastructure will not at all be affected by the Proposed Development.

As noted in Section 1.3, any near surface groundwater within the underlying low productivity bedrock aquifer, is expected to largely follow surface water catchments, as per the recognised BGS publication on Scotland's Aquifers. Catchment analysis has been undertaken in QGIS using the industry standard FEH software catchment data and topographic data to establish the PWS source catchment, illustrated in Drawing PWS-004 in Annex A of this report. As shown, there is no Proposed Development infrastructure located within the PWS source catchment, and all proposed infrastructure is downgradient of the source catchment.

This is further supported by water quality monitoring undertaken by Gondolin during the site visit at the PWS source, to understand the potential groundwater, surface water and rainwater inputs to the supply. In-situ water quality data readings were taken via an AQT500 sonde at the source intake, with parameters measured including pH, Electrical Conductivity (EC), Oxygen Reduction Potential (ORP) and Total Dissolved Solids (TDS). Following review of data collected, the measured water quality parameters are indicative of surface water and minimal groundwater input. This is consistent with the PWS being supplied by near surface groundwater with short flow path lengths which largely follows topography.

While the PWS source catchment is considered to be at negligible potential effects from the Proposed Development, the PWS source intake is located within SEPA recommended infrastructure buffers. Within these buffers there is potential for the Proposed Development to affect groundwater flow, levels and quality. The source is minimally located within the buffer, by approximately 7 m, however, it is upgradient / hydraulically remote to the adjacent access track.

The Proposed Development infrastructure sited within the 100 m buffer of the PWS source includes upgrades to an existing track and watercourse crossing, referenced in the EIA Report 2024 as WC3. As part of the embedded mitigation of the Proposed Development is to minimise the need for new watercourse crossings where practicable. Within the 100 m buffer, the existing track will be upgraded, facilitated by earthworks, with upgrades if required to the existing watercourse crossings at WC2 and WC3. This is considered to be preferential to the construction of new access track and watercourse crossings further downstream of the existing access.

Construction works associated with upgrading the existing access track, will include tracking of plant over bare ground, excavations and stockpiles, and use of potentially hazardous materials such as fuel and oils for machinery. These construction activities, although localised, without appropriate mitigation have the potential to result in deterioration in PWS water quality, through sedimentation from silt laden runoff, and chemical pollution from fuels or oil spills. The PWS is considered to be slightly or not at all affected by potential effects to groundwater quality, due to the PWS source being located upgradient and groundwater largely following surface water catchments. The hydrological regime will be largely unchanged due to the presence of the existing track, so there will be minimal impacts to groundwater flow. Dewatering is also unlikely to be required to facilitate these works so there is also considered to be minimal disturbance to groundwater level.

Due to no Proposed Development infrastructure being sited within the source catchment, and the presence of the existing track, the PWS is considered to be only slightly affected. The potential effects from the upgrade of the existing track are considered to be of low likelihood and frequency, of limited extent, magnitude and duration, and are likely to be reversible.

As the PWS Muirpark Farm is, however, located within the recommended SEPA infrastructure buffers, the following general and site-specific mitigation measures have been outlined below in Section 2.4. These outline mitigation, monitoring and emergency contingency measures during the construction, operation and decommissioning of the Proposed Development.

2.4 Mitigation

2.4.1 General Mitigation and Good Practice

For general mitigation measures, these measures are set out in the supporting Construction Environment Management Plan (CEMP) which accompanies the planning application in the EIA Report 2024 (see Appendix 15-1). In addition to the CEMP, it is recommended that a bespoke drainage strategy is adopted for the Proposed Development to ensure that runoff is managed and treated through construction SuDS, pollution prevention measures are implemented for the works and that Site operations are supervised by a suitably qualified Environmental Clerk of Works (EnvCoW). A Drainage Impact Assessment (DIA) will be undertaken to inform the preparation of the Drainage Management Plan (DMP). The DMP will provide specific details on how surface water runoff will be appropriately managed during the construction and operational phases of the Proposed Development. Further measures such as implementation of a pollution prevention plan for construction, operation and decommissioning phases of the Site, and a habitat management and restoration plan for disruption to the ground should also be implemented.

In the event of previously unidentified PWS being encountered during the construction phase of the Proposed Development, works by the Contractor will cease in the affected area and seek guidance from the Environmental Clerk of Works (EnvCoW). A site-specific risk assessment will be undertaken, with appropriate mitigation measures implemented as required.

2.4.2 Site Specific Mitigation

The following mitigation measures are recommended to further minimise the risk of any impacts on water quality and quantity of PWS Muirpark Farm during construction and in the unlikely event of a pollution incident during operation. The following will be outlined within the CEMP or associated PWS Protection Plan, as required:

- Construction works within 100 m of the PWS source will be overseen full time by a suitably qualified EnvCoW who will be appointed for the duration of construction works onsite. A record of regular visual inspections of the PWS source and its related infrastructure will be taken by the EnvCoW.
- No plant, vehicles, chemicals, fuels or pollutants will be located, stored or stationary within the PWS source catchment or within 100 m of the PWS source.
- No refuelling of plant, machinery and vehicles will take place within the PWS catchment or 100 m of the PWS source.
- All staff working within the PWS source catchment or 100 m of the PWS source will be made aware of the PWS sensitivity as part of the Site inductions and toolbox talks.
- A Drainage Management Plan (DMP) and preliminary drainage layout, as outlined within the Drainage Impact Assessment, specific to the Proposed Development will be implemented. This will include proposed surface water drainage measures to appropriately manage and control water runoff during and post construction in accordance with current industry guidelines / best practice. The drainage design will factor in all localised pathways, maintain hydrological connectivity, and provide separation of clean water and dirty water. As part of the DMP, particular focus will be paid to developing a robust drainage strategy with multiple SuDS treatment stages to ensure water quality and quantity is protected.
- An appropriate Water Quality Monitoring Plan (WQMP) will be designed for the Site, and in addition to monitored catchments, PWS Muirpark Farm will be included. The WQMP will include a programme of comprehensive monitoring and sampling programme pre, during and post construction works. As outlined within the EIA Report 2024, the WQMP will be undertaken in consultation with Marine Scotland Science, SEPA and NatureScot to also protect the water quality and fish populations present. An emergency response plan will also be prepared for incidents within the monitored catchments and within 100 m of the PWS source.
- Enhanced sampling frequency of PWS source for the duration of construction works located within 100 m of the PWS source, to include in situ testing via multiparameter probes which provide 'instantaneous' results.

- Frequent communication and liaison with supply owner, who is also the Site landowner, for the duration of time construction work is located within 100 m of the PWS source – principal contractor and Applicant to provide a nominated person as point of contact(s) or a dedicated contact line which should be available 24/7.
- In the extremely unlikely event that the PWS is affected by activities associated with the Proposed Development works, contingency supply arrangements will be ready for implementation. This will include ensuring that alternative sources of potable water and water for general use will be readily and rapidly available. Such measures will include rapid provision of potable water via bottles, containers or storage tanks. A mobile water tanker may be made available onsite if the affected PWS is likely to take more than a few days to investigate and remediate. Only when sampling of the PWS confirms the supply quality and quantity for a suitable minimum time period (typically 7 days) would the supply be reinstated and emergency measures cease. All mitigation and emergency supply measures, sampling and analysis would be sourced and funded by the Applicant.
- Should temporary alternative supplies be required for a longer period during construction and it is not deemed possible to reinstate or remediate the existing supply during construction works within the catchment, the existing supply would be fully reinstated following construction, and a water quality and quantity monitoring programme employed to ensure the water supply is reinstated to baseline conditions. If the existing PWS is damaged beyond repair or becomes unsuitable for continued use, a new permanent PWS source would be fully investigated and funded by the Applicant and registered with Stirling Council.

In addition to the site-specific mitigations in place, standard good practice measures to be outlined within the Pollution Prevention Plan for the Proposed Development will be in place and will limit effects on the PWS.

2.5 Residual Risk Rating

Following the assessment methodology outlined in Section 1.2, based on SEPA Guidance on Assessing the Impacts of Development on Groundwater Abstractions, the potential impacts to the spring supply for PWS Muirpark Farm has been assessed.

As outlined above, the PWS is only minimally located within the SEPA infrastructure buffers, by approximately 7 m. It is located upgradient / hydraulically remote from the adjacent infrastructure, within a bedrock aquifer where groundwater flow is considered to largely follow surface water catchments, and where the Proposed Development is not located within the PWS source catchment. Additionally, the Proposed Development located within the recommended 100 m infrastructure buffers includes upgrades to an existing track present, of which the upgrades will be of limited duration, extent and magnitude.

With the implementation of the above general and site-specific mitigation and contingency measures, it is considered the PWS will at most be 'Slightly' affected. Therefore, the PWS of 'Moderate Importance' **will be at risk of 'Low' potential impacts, which are Not Significant.**

Additionally, due to no other Proposed Development infrastructure or other development sites being located within the PWS source catchment or within recommended infrastructure buffers, there is no cumulative effects to PWS Muirpark Farm.

3. Conclusion

A PWS Assessment has been carried out to identify and confirm the source type and location of the registered PWS at Muirpark Farm, which may be at potential risk from the construction and operation of the Proposed Development. As outlined by SEPA, there may be potential risks due to the PWS potentially being located within SEPA recommended infrastructure buffers.

Following the field survey, it is confirmed that a spring source PWS is located within 100 m upgradient (and thus hydraulically remote) of the Proposed Development, where an existing track is proposed to be upgraded. Following detailed qualitative assessment, including QGIS catchment analysis, it is determined there is no Proposed Development infrastructure located within the PWS source catchment, and as such is not hydrologically connected.

Due to the PWS source being located within the recommended SEPA infrastructure buffer, however, appropriate considerations and specific mitigation have been outlined in Section 2.4. This includes a EnvCoW being present for the duration of the works, a DMP being implemented, and regular monitoring during construction being undertaken with a WQMP designed, and a contingency supply and emergency procedures in place. The mitigation and contingency measures have been communicated to the Property owner by the Applicant.

Following implementation of general and site-specific mitigation measures, the residual potential impacts to PWS Muirpark Farm are considered to be **'Low'**. These potential impacts, while adverse, are considered to be of limited duration, magnitude and extent, and **Not Significant**.

4. References

British Geological Survey (2015) *Scotland's aquifers and groundwater bodies*, available at: https://www2.bgs.ac.uk/groundwater/waterresources/ScotlandsAquifers.html (Accessed 2nd September 2025).

British Geological Survey (2025) *Natural Environment Research Council – online Geology of Britain Viewer,* available at: https://mapapps.bgs.ac.uk/geologyofbritain/home.html (Accessed 2nd September 2025).

Ó Dochartaigh, Doce, Rutter and MacDonald 2015. *User Guide: Aquifer Productivity (Scotland) GIS datasets*, Version 2. Revised Report. British Geological Survey Open Report, OR/15/003. 18pp.

Scotland's Soils (2016) Carbon and peatland 2016 map, available at https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ (Accessed 2nd September 2025).

SEPA (2024) *Guidance on Assessing the Impacts of Development on Groundwater Abstractions*, available at: https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/ (Accessed 9th September 2025).

SEPA (2025) *Water Classification Hub*, available at: https://informatics.sepa.org.uk/WaterClassificationHub/ (Accessed 2nd September 2025).

UK Centre for Ecology & Hydrology (2025) Flood Estimation Handbook Web Services, available at https://fehweb.ceh.ac.uk/Map (Accessed 3rd September 2025).

Annex A: Drawings

Annex B: Site Photographs

Figure 1 and Figure 2: PWS source tank (left) enclosed by brick and, left open. It is connected to the header tank by pipe. The header tank (right), which is covered and has a ballcock valve. The water is then piped to downslope to the supply at the property.

Figure 3: Exposed pipework where it crosses a watercourse, between header tank and supply.

Figure 4 and Figure 5: Surface water abstraction at artificial pond. Pipe is attached to buoy (right) and piped under gravity to troughs downslope for supply for livestock.

GONDOLIN
Land & Water

Civil Engineering and Environmental Solutions

Gondolin Land and Water Ltd is an established environmental and engineering consultancy business based in Scotland with coverage throughout the UK.

Registered Address:

26 Leith Walk, Edinburgh, EH5 6AA

Registered Company No.

SC706920

Sectors:

Onshore Renewables & Storage | Infrastructure | Mining and Minerals
Property & Urban Regeneration | Retail, Industrial & Manufacturing |
Waste Management