

Technical Appendix 10.3: Private Water Supply Risk Assessment

Contents

1.0	Introduction	1
2.0	Private Water Supply Risk Assessment	1
3.0	Example Monitoring Protocol and Intervention Strategy.....	2
4.0	References.....	3

FIGURES

Figure 10.3.1: Private Water Supply Risk Assessment

1.0 Introduction

This Technical Appendix should be read in conjunction with Chapter 10 of the EIA Report which contains detailed description of the local hydrology and hydrogeology, flow mechanisms and hydraulic properties of the soils and geology, the embedded mitigation incorporated in the development design, and an assessment of impacts on groundwater and surface water flows and quality.

It considers the potential effects of the Proposed Development on the quality and quantity of water at the private water supply (PWS) sources within the study area. To complete the assessment, a conceptual site model is presented which uses a source-pathway-receptor linkage to assess the risk to each PWS. Where necessary, mitigation is proposed.

Following consultation with Scottish Borders Council (SBC) data was received for PWS sources within the study area. This data was then augmented with Ordnance Survey mapping and aerial photography. Additional properties, and potential water users, were also identified following a programme of site-specific field investigation that involved visiting the properties, enquiring about their water use and source, and mapping water abstraction locations.

The location of water sources (boreholes, springs, surface abstractions, etc.) and holding tanks etc. were recorded using a handheld GPS. When residents were unavailable on the day that the survey was conducted, questionnaires were left at properties requesting details of their water source or PWS.

The field investigation was completed in December 2023 by the author of this Technical Appendix. The results of the PWS survey and assessment are presented in Section 2 of this Technical Appendix.

The location of PWS sources is shown on Figure 10.3.1.

Section 3 of this Technical Appendix gives detail of an example water monitoring schedule and parameter list that could be used to monitor water quality at PWS sources that have a hydraulic linkage (e.g. pathway) to the Proposed Development. The monitoring frequency, parameter list and reporting programme would be subject to agreement with SBC and the Scottish Environment Protection Agency (SEPA) should planning permission be granted, and it is expected would be secured by an appropriately worded pre-commencement planning condition.

2.0 Private Water Supply Risk Assessment

Table 1 presents information collected from the PWS survey, returned questionnaires, public consultation events, SBC, and desk study. If a source is assessed to have a hydraulic connection (e.g. there is a pathway) to the Proposed Development, mitigation measures have been proposed.

The risk assessment has been completed with reference to SEPA's LUPS-31 guidance.

The findings from Table 1 can be summarised as follows:

- five PWS sources are not at risk from the Proposed Development (highlighted in green); and
- two properties are confirmed to be on mains water.

Table 1 – Private Water Supply Risk Assessment

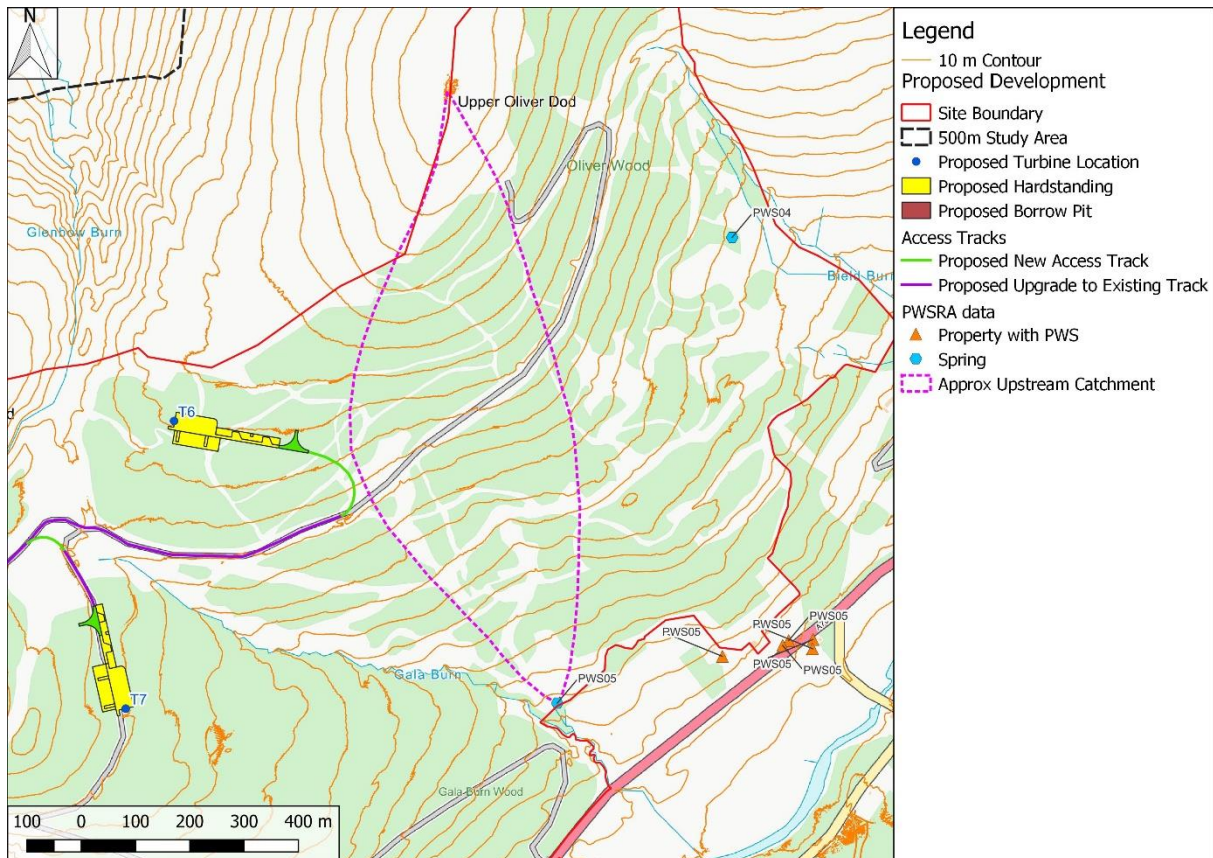
PWS ID (Figure 10.3.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and distance from the Proposed Development	Details	Potential Complete Source-Pathway-Receptor Linkage	Mitigation and Monitoring
PWS01	Carn Gorm	Site Visit Stream	E 310097 / N 625223 Approximately 360 m north-east of the site at its closest extent.	Residents have confirmed that the property is served by an abstraction from the Smithy Burn located approximately 320 m north of the property. No development is located within the same catchment as the PWS source. The development is unlikely to cross any distribution pipework from the PWS source to the property. Therefore, neither the source nor pipework is considered to be at risk from the Proposed Development.	x PWS source and pipework not considered to be at risk.	N/A
PWS02	Tweedholm Riverview	Site Visit Stream	E 309824 / N 625014 (unconfirmed location) Approximately 30 m south of the site at its closest extent.	Residents at Riverview confirmed that the properties are served by an abstraction from the Bield Burn, although the exact location of the abstraction could not be located during the site visit. No development is located within the same catchment as the PWS source. The development is unlikely to cross any distribution pipework from the PWS source to the properties. Therefore, neither the source or pipework is considered to be at risk from the Proposed Development.	x PWS source and pipework not considered to be at risk.	N/A
PWS03	The Bield	SBC Spring	E 309970 / N 624788 (SBC location) 270 m south of the site at its closest extent.	Residents did not wish to share information regarding their PWS source during the site visit. SBC data indicates that the property is supplied by a spring but the exact location of the spring is unknown.	x PWS source and pipework not considered to be at risk.	PWS source should be confirmed prior to construction and mitigation

PWS ID (Figure 10.3.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and distance from the Proposed Development	Details	Potential Complete Source-Pathway-Receptor Linkage	Mitigation and Monitoring
				No development is proposed upstream of the property. The development is unlikely to cross any distribution pipework from the PWS source to the property. Therefore, neither the source or pipework is considered to be at risk from the Proposed Development.		measures applied if required.
PWS04	Oliver House	Returned Questionnaire Spring	E 309490 / N 625194 Located within the north-eastern extent of the site.	Residents have confirmed that the property is served by a spring located approximately 460 m north-west of the property. No development is proposed upstream nor within 250 m of the spring. The development is unlikely to cross any distribution pipework from the PWS source to the property. Therefore, neither the source or pipework is considered to be at risk from the Proposed Development.	x PWS source and pipework not considered to be at risk.	N/A
PWS05	The Toll House The Old Post Office Oliver Bank East Oliver Bank West Tweedview Farm	Site Visit and Returned Questionnaires Spring	E 309168 / N 624338 Located within the Proposed Development.	Residents have confirmed that the properties are supplied from a spring located between 320 m and 490 m west of the properties. Analysis of the water catchment to the spring is given below – after this table. No development is proposed in the water catchment to the spring, but it is noted that Turbine 5 and Turbine 7 are in the headwaters of the Gala Burn, which the spring bounds. Whilst no effect on the PWS is anticipated, as a precaution, it is proposed confirmatory water quality monitoring of the spring source is undertaken before, during and after construction of the wind farm.	x PWS source and pipework not considered to be at risk.	PWS source confirmatory water quality monitoring (see Section 3).
M1	Menzion Farm	Mains	E 309122 / N 623576 (property location)	Residents confirmed that the property is supplied by Scottish Water mains.	N/A	N/A
M2	Menzion House	Mains	E 309151 / 623585 (property location)	Residents confirmed that the property is supplied by Scottish Water mains.	N/A	N/A

PWS05

The upstream catchment for the PWS05 spring source has been delineated using 0.5 m resolution Phase 3 LiDAR DTM data obtained from the Scottish Remote Sensing Portal and OS 10 m interval contours. The delineated catchment is shown on Plate 1. The catchment area is shown to extend northwards to Upper Oliver Dod. No element of the Proposed Development is shown within the catchment boundary.

Plate 1 – PWS05 Water Catchment Area



It is recognised that the PWS05 spring source is located at the base of the Gala Burn valley and at the junction of superficial glacial till and glaciofluvial deposits (Figure 10.3). Turbine 5 and Turbine 7 are proposed in the headwaters of the Gala Water catchment.

The Proposed Development in the headwaters of the Gala Water is more than 500 m from the PWS05 spring source. Furthermore, there is no direct connection from the Proposed Development to the spring. Whilst the spring is not considered at risk from the Proposed Development there is a theoretical (albeit improbable) linkage through the glaciofluvial deposits that bound the Gala Burn and spring, and it is therefore proposed that monitoring is undertaken of the spring water source before, during and following construction of the Proposed Development and used to confirm that the Proposed Development has no effect on the spring.

3.0 Example Monitoring Protocol and Intervention Strategy

As identified in Section 2, monitoring is proposed at PWS05. As detailed in the EIA Report, monitoring of the proposed tributaries of the River Tweed SSSI and SAC is also proposed.

Pre-development monitoring data can be used to establish baseline water levels and quality and assessment or trigger values to which routine monitoring data collected during construction can be compared against.

The monitoring suite, monitoring locations, monitoring frequency and intervention strategy would be agreed with SBC and SEPA prior to any works being undertaken. It is anticipated that this would be secured by an appropriately worded pre-commencement planning condition. Table 2 however, shows an example protocol which could be used as a basis to agree a water monitoring protocol with relevant consultees.

Table 2 – Example Monitoring Protocol

Location	Frequency	Determinand Suite
PWS05 Spring Rigg Burn Hallow Burn Gala Burn Kingledoors Burn	Monthly prior to and during construction	Field Sampling – pH – Redox – Conductivity – Dissolved Oxygen – Water Level Extractive Samples – pH – Alkalinity (total and bicarbonate) – Suspended solids – Colour – Organic carbon (total and dissolved) – Electrical conductivity – Chloride – Orthophosphate – Sulphate – Nitrate, nitrite and ammonium – Hydrocarbons – Aluminium (total + dissolved) – Calcium (total + dissolved) – Iron (total + dissolved) – Copper (total + dissolved) – Magnesium (total + dissolved) – Manganese (total + dissolved) – Potassium (total + dissolved) – Sodium (total + dissolved) – BOD – COD – TON – Bicarbonate – Ammoniacal nitrogen – Total Coliforms (PWS only) – E Coli (PWS only) – Enterococci (PWS only)

Monitoring and Reporting Personnel

The monitoring and reporting would be undertaken by appropriately experienced and trained staff.

Monitoring Methodology

Water samples would be collected following guidance within SEPA, July 2003, Guidance on Monitoring of Landfill Leachate, Groundwater, and Surface Water, v2 (specifically Section 9 thereof).

Prevailing weather conditions, qualitative flow conditions as well as other visual indicators would be recorded in order to aid the sample reporting.

The water samples would be placed directly into appropriate sterile bottles, which would be labelled and dispatched to a UKAS accredited laboratory, under chilled conditions and accompanied by the relevant chain of custody documentation.

Example Intervention Strategy

In the unlikely event that the routine monitoring data recorded potential pollution at a PWS, an investigation and intervention strategy would be agreed with SBC and SEPA. Again, the details of which would be agreed prior to any construction and be secured by an appropriately worded pre-commencement planning condition.

Alerting Potentially Affected Properties

Contact details (phone numbers / email addresses) for private water supply users would be maintained by site management at all times.

In the event that monitoring data collected at any private water supply is above the baseline monitoring record then property owners would be advised and repeat water sampling undertaken (if agreed with the property owners). Property owners would be advised within 24 hours of receipt of monitoring results. Repeat water sampling would be undertaken as soon as reasonably practicable and within 72 hours.

Details of any affected property would be reported to SBC within a timeframe agreed with SBC when the monitoring programme is agreed and finalised.

Provision of Alternative Water Supplies

The Applicant commits to maintaining the yield and wholesomeness of water supplies. The following measures may be deployed in the unlikely event a PWS is impaired by the works:

- provision of bottled potable water in the event of a short or transient derogation of a water supply (bottled water would be retained on site ready for quick dispatch to any effected property); and
- provision of an alternative water source (e.g. mains supply, spring, borehole, alternative surface water abstraction location) in the event of a permanent derogation of a water supply.

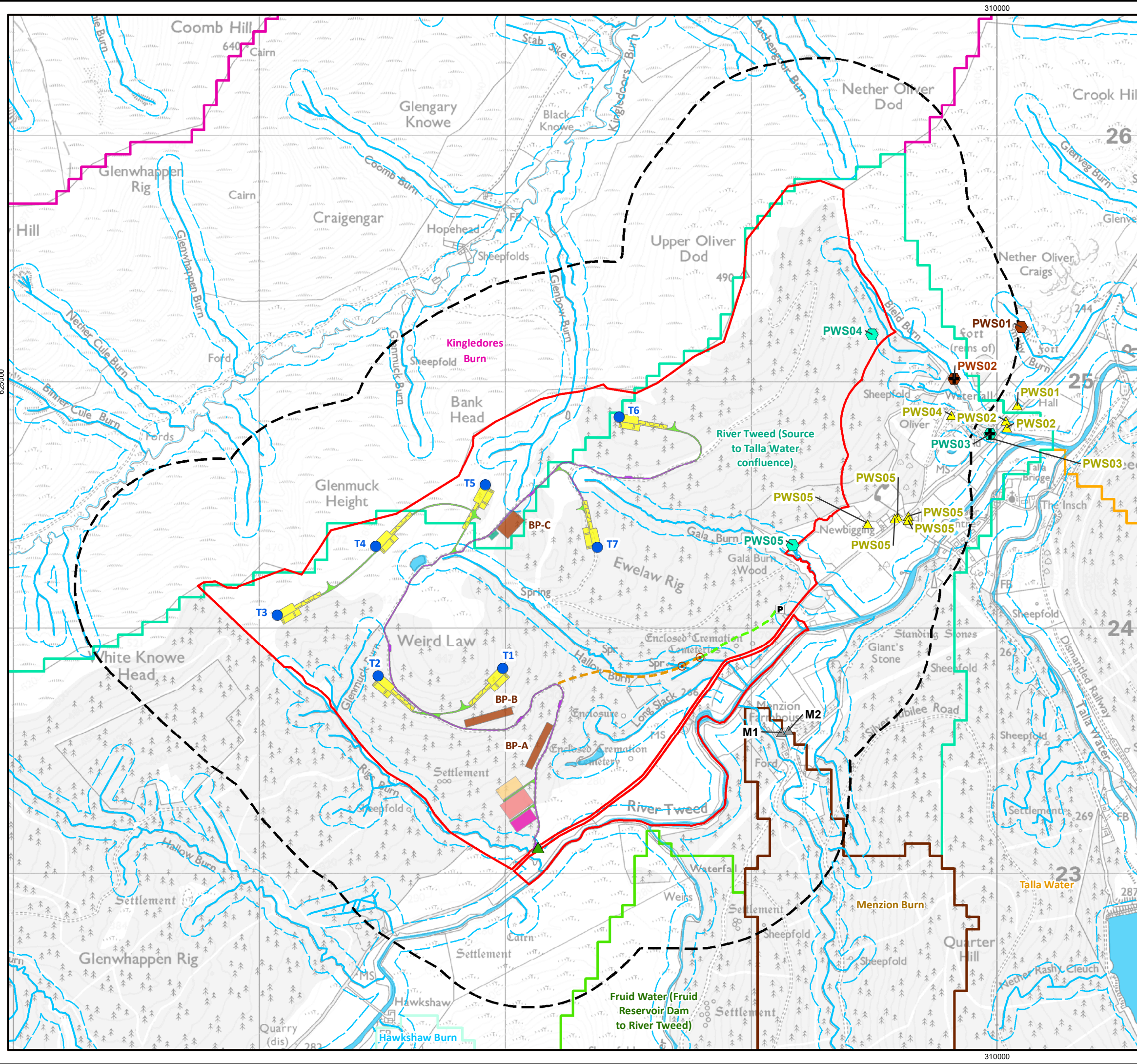
In the event of an alternative water source being implemented, SBC would be advised as soon as is practical.



4.0 References

SEPA (2017). Land Use Planning System SEPA Guidance Note 31 – Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (LUPS-GU31), Version 3.

Scottish Government. Scottish Remote Sensing Portal. Available online at <https://remotesensingdata.gov.scot/> [Accessed April 2024].

© Crown copyright and database rights 2024. Ordnance Survey 0100031673. © SEPA. Some features of this information are based on digital spatial data licensed from the Centre of Ecology and Hydrology © NERC (CEH). Contains SNH information licensed under the Open Government License v3.0



Site Boundary	Proposed Scottish Power Energy Network (SPEN) Compound and location for Battery Energy Storage System (BESS)	Passing Place
Study Area (Site Boundary 500 m Buffer)	Proposed New Access Track	Turning Head
Proposed Turbine Location	Proposed Upgrade to Existing Track	Proposed Borrow Pit Search Area
Proposed Access Location	Proposed Hardstanding	Proposed Recreational Heritage Trail
Proposed New Access Track	Proposed Temporary Wind Farm Construction Compound	New Path (Not Suitable for Wheelchairs)
Proposed Upgrade to Existing Track	Proposed Temporary Satellite Construction Compound	New Path (Wheelchair Accessible)
Proposed Hardstanding	Proposed Scottish Power Energy Network (SPEN) and Wind Farm Substation	Proposed Recreational Heritage Trail Car Park
Proposed Temporary Wind Farm Construction Compound		Proposed Watercourse Crossing
Proposed Temporary Satellite Construction Compound		
Proposed Scottish Power Energy Network (SPEN) and Wind Farm Substation		

Private Water Supply (PWS)


Mains	Property with PWS
Spring	Spring - Unconfirmed
Stream	Stream - Unconfirmed
Watercourse (OS Open Map Local)	
Waterbody (OS Open Map Local)	
Watercourse and Waterbody 50 m Buffer	

SEPA Nested Waterbody Catchment

Finland Burn (Source to River Tweed)
Fruid Water (Fruid Reservoir Dam to River Tweed)
Hawkshaw Burn
Kingledores Burn
Menzion Burn
River Tweed (Source to Talla Water confluence)
Talla Water

Note
Turbine and access symbols are not to scale

1:15,000 on A3



Produced By: MM	Version: 1
Checked By: JRS	Date: 17/06/2024

Figure 10.3.1

Private Water Supply Risk Assessment

Oliver Forest Wind Farm

Environmental Impact Assessment Report