

Appendix 10-8: Preliminary Private Water Supplies Assessment

Calderdale Energy Park

PEIR Volume 3

PINS Reference: EN0110023

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations
2009 – Reg 5 (2) (a).

7 April 2026



Appendix 10-8: Private Water Supply Assessment

Table of Contents

1	Introduction	1
1.1	Environmental Context	1
1.2	Scope of Works	2
1.3	Limitations	3
2	Legislation, Policy and Guidance	3
3	Private Water Supply Assessment Methodology	3
3.1	Desk Based Assessment	4
3.2	Consultations	4
3.3	Site Visits	5
4	Private Water Supply Assessment	5
4.1	Assessment Methodology	5
4.2	Receptors	6
4.3	Screening of Supplies	7
5	Risk Assessment of Private Water Supplies Potentially Connected to the Proposed Development	7
6	Conclusion	7

Annex

Annex I	Example of Private Water Supply Questionnaire
Annex II	List of Private Water Supplies

1 Introduction

This Private Water Supply Assessment is an Appendix to **Chapter 10: Hydrology, Hydrogeology, Geology and Peat** and has been prepared by Fluid Environmental Consulting (Fluid) on behalf of the Applicant to support the Preliminary Environmental Information Report (PEIR) for Calderdale Energy Park (the 'Proposed Development'). The PEIR Boundary is located to the north of Hebden Bridge and is illustrated within **Figure 10-2: Hydrological Setting** of the PEIR.

As set out in **Chapter 1: Introduction** of the PEIR, the Proposed Development includes a number of components and associated areas, as follows:

- Turbine Area, where the wind turbines and associated infrastructure will be located;
- Eastern Access Route and Western Access Route (collectively referred to as the 'Access Routes'), providing access to the Turbine Area; and
- Bradford West Cable Corridor, where the export cable will run from the Turbine Area to the Bradford West Substation to connect the wind turbines to the grid.

Altogether, these areas are termed the 'PEIR Boundary'. The extent of the PEIR Boundary is shown in **Figure 3-1** of the PEIR.

The Proposed Development will comprise 34 wind turbines, with associated infrastructure and ancillary development.

This assessment focuses on an area including the Turbine Area and the Western Access Route and a surrounding ~1 km buffer area where hydrological connectivity is possible. This is hereafter referred to as the 'Private Water Supply Study Area'. Further consideration of the Eastern Access Route and Bradford West Cable Corridor components of the Proposed Development and associated buffer areas will be undertaken for the ES.

1.1 Environmental Context

The majority of the Proposed Development is located on undulating upland moorland and farmland. Upland areas reach heights of 463m Above Ordnance Datum (AOD) at Heather Hill summit in the northwest of the Turbine Area and 452m AOD at Withins Heights in the north. Several moors are named within the Turbine Area including Widdop Moor which covers the western part of the Turbine Area and Wadsworth Moor covering the eastern part of the Turbine Area. Heather Hill and Withins Heights slope down to the Walshaw Dean Reservoirs which run north south across the centre of the Turbine Area and at levels of between 300m AOD and 335m AOD. Many of the watercourse draining the Turbine Area are connected to various manmade reservoirs. The hydrological features are presented in **Figure 10-9: Hydrological Features** of **Chapter 10: Hydrogeology, Hydrology, Geology and Peat** of the PEIR.

The geology across the Turbine Area comprises the Upper Kinderscout Grit, consisting of Sandstone, and the Millstone Grit Group, consisting of Mudstone, Siltstone and Sandstone. In the eastern part of the Turbine Area, these deposits are overlain by the Woodhouse Flags consisting of Sandstone and the Marsden Formation consisting of Mudstone and Siltstone. The Millstone Grit Group generally has low primary permeability due to the fine-grained nature of mudstones and siltstones; however, sandstone layers may allow limited groundwater movement where fractures are present. The coal seams and associated mining legacy within

the Coal Measures Formation may create secondary permeability, providing preferential flow pathways for groundwater via historic underground mine workings and fractures.

The Western Access Route is underlain by the Rossendale Formation of mudstone and siltstone from where it joins the A6068, and along the Two Lane Road and Millstone Grit Formation strata to the Turbine Area. The Eastern Access Route is underlain by siltstones, mudstones and sandstones of the Marsden Formation, the Rossendale Formation and the Millstone Grit Formation.

The Bradford West Cable Corridor is underlain by bedrock of the Millstone Grit Formation, and mudstones, siltstones and sandstones of the Rossendale Formation and the Pennine Lower Coal Measures Formation.

There is evidence of historic mining of the Pennine Coal Measures, with air shafts being present within 1km of the PIER Boundary. Quarrying has also occurred within the Turbine Area and Artificial Ground is found in areas near to the Bradford West Cable Corridor.

Online 1:50K British Geological Survey (BGS) superficial geology mapping shows the majority of the Turbine Area is underlain by superficial peat deposits and elsewhere superficial deposits are absent. Peat deposits are typically of low permeability in deeper, more humified layers, resulting in high surface water retention and limited recharge to the groundwater system. Where peat is shallower or more fibrous, higher permeability may occur locally. Glacial Till is present along some sections of the Bradford West Cable Corridor.

Overall, within the PIER Boundary, hydrogeological behaviour reflects a mix of low-permeability superficial cover and fractured sandstone bedrock, with locally enhanced groundwater flow potential where historical mining has created subsurface conduits.

The more isolated properties in close proximity to the PEIR Boundary are not likely to be on mains water supply, particularly where they are located at higher elevations or away from the main public roads and therefore are likely to be reliant on private water supplies.

1.2 Scope of Works

The purpose of this Private Water Supply Assessment is to:

- Identify any properties and their associated water supplies that could have a hydrological or hydrogeological link to the Proposed Development (with a focus on the Turbine Area and Western Access Route at this stage);
- Obtain specific information on water supply sources, conveyance and storage infrastructure that could potentially be connected to the PIER Boundary;
- Ascertain the risk to any of these Private Water Supplies as a result of construction, operation and maintenance and decommissioning phases 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 in this document is based on the list of properties with registered Private Water Supplies provided by the consulted councils (Pendle Council, Burnley Council, Bradford Council, North Yorkshire Council and Calderdale Council), a review of Ordnance Survey (OS) and aerial imagery mapping. This information has not yet been verified by site visits and these will be completed for the ES. The Applicant will also collate all available Private Water Supply information as far as possible and assess appropriately. This assessment is considered to be as accurate as possible at this stage.

2 Legislation, Policy and Guidance

The main legislative drivers relevant to the assessment are:

- **The Private Water Supplies (England) Regulations 2016¹:**

These regulations aim to ensure the provision of clean, safe drinking water, delivering significant health benefits to those using private water supplies.

Local authorities are responsible for enforcing and regulating private water supplies, including conducting risk assessments and regular monitoring.

- **The Water Supply (Water Quality) Regulations 2016²:**

These regulations set standards for water quality to ensure that water supplied for domestic or food production purposes is wholesome.

They apply to water companies and private suppliers, outlining requirements for sampling, testing, and maintaining water quality.

- **The Environment Agency's (EA) Approach to Groundwater Protection³:**

This guidance outlines the EA's position on protecting groundwater from pollution and over-abstraction.

It serves as a framework for assessing risks to groundwater and provides best practices for managing activities that may impact groundwater quality and quantity.

3 Private Water Supply Assessment Methodology

The Private Water Supply Assessment has been undertaken based on the following methodology:

- Completion of a high-level desktop assessment to put the hydrological and hydrogeological setting of the Proposed Development into context;
- Consultation with the local authorities (Pendle Council, Burnley Council, Bradford Council, North Yorkshire Council and Calderdale Council) and the Applicant to gather

¹ **The Private Water Supplies (England) Regulations 2016** – Available at: <https://www.legislation.gov.uk/ukxi/2016/618/contents> (Accessed April 2025).

² **The Water Supply (Water Quality) Regulations 2016** – Available at: <https://www.legislation.gov.uk/ukxi/2016/614/contents> (Accessed April 2025).

³ **Environment Agency (2018). The Environment Agency's Approach to Groundwater Protection** – Available at: <https://assets.publishing.service.gov.uk/media/5ab38864e5274a3dc898e29b/Environment-Agency-approach-to-groundwater-protection.pdf> (Accessed April 2025).

and review existing records of water supply sources within the vicinity of the proposed infrastructure;

- Completion of site visits of properties closest to the Proposed Development will be undertaken where data gaps are identified, where confirmation is required for locations of supply sources or where residents request a visit; and
- Conceptualisation of the potential surface or groundwater flow paths between the potential source (proposed infrastructure) and the receptor (the private water supply abstraction location).

3.1 Desk Based Assessment

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 Private Water Supply Study Area; and
- Mapping of surface water catchments and sub-catchments to determine potential hydrological connectivity to the Proposed Development.

3.2 Consultations

Consultations were undertaken with the Applicant, the EA and the local councils (Pendle Council, Burnley Council, Bradford Council, North Yorkshire Council and Calderdale Council).

Environment Agency (EA)

A Freedom of Information (FOI) request was submitted to the EA to obtain details of any registered water abstractions within the PIER Boundary and a 2km radius from it. The request specifically sought:

- Location of the source (surface water, groundwater, borehole, spring, etc.).
- Type of source.
- Abstraction volumes.
- Intended use.
- Properties or businesses utilising the abstraction.

The EA provided water abstraction licence data for a 6km radius around SD 96664 33968, in the centre of the PIER boundary under the EA Conditional Licence. However, this data is subject to usage restrictions, including limits on sharing public water supply abstraction locations (minimum 1km² resolution) and internal reporting constraints (maximum 100km² coverage per report). Additionally, the dataset may not capture all abstractions, as small abstractions (less than 20m³/day) are not licensed. The data reflects information available at the time of preparation (December 2025) but may not account for recent licence renewals or amendments.

The Local Councils

A FOI request was submitted to Pendle Council, Burnley Council, Bradford Council, North Yorkshire Council and Calderdale Council to obtain details of registered water abstractions within the PEIR Boundary and a 2km radius. The request sought information on source location, type, abstraction volumes, intended use, and associated properties or businesses.

A total of 194 potential Private Water Supply addresses were provided by the five councils and of these 53 were within 1km of the PEIR Boundary.

Desk Based Review

Information provided was reviewed, together with OS mapping and aerial imagery to identify properties potentially reliant on private water supplies within the potential catchments of the PEIR Boundary and any potential data gaps where further investigation was required.

3.3 Site Visits

A site visit will be conducted for the assessment to be reported in the ES. Questionnaires will be sent to the properties identified as being potentially connected prior to the site visit taking place. An example questionnaire is provided in Annex I.

4 Private Water Supply Assessment

4.1 Assessment Methodology

A methodology for risk assessment of private water supplies is contained within the Private Water Supplies Technical Manual⁴. 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 posed by the construction, operation and maintenance and decommissioning phases of the Proposed Development.

The methodology adopted is based on Fluid's extensive experience of assessing risks to Private Water Supplies from 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 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, operational and decommissioning activities. In this model:

⁴ **Scottish Executive. (2006)** Private Water Supplies: Technical Manual Available at: <https://www.daera-ni.gov.uk/publications/private-water-supplies-technical-manual>

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

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 where a Private Water Supply source is not within a catchment of a proposed development, there will be no associated risk. This screening allows the assessment to focus on supplies that are hydrologically or hydrogeologically connected to the Proposed Development.

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

The risks to the hydrological and hydrogeological environment during construction, operation and maintenance and decommissioning phases 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 risk of contamination to Private Water Supply due to activities associated with the construction, operation and maintenance and decommissioning 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, operation and maintenance and decommissioning phase activities / infrastructure associated with the Proposed Development; and
- Position of the source in relation to the construction, operation and maintenance and decommissioning activities in terms of topography and catchment influence zones.

The 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. This is consistent with the assessment of impacts as detailed within **Chapter 10: Hydrogeology, Hydrology, Geology and Peat** of the PIER.

4.2 Receptors

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

As a conservative approach, it is assumed that all identified Private Water Supplies are used for domestic potable supply (drinking water) as they have a right to access the water supply for this purpose and human consumption is the most sensitive receptor category.

4.3 Screening of Supplies

The initial desk-based review of potential properties reliant on Private Water Supplies identified 35 Private Water Supplies, listed in **Annex II**, that would require further assessment, linked to the Proposed Development within the Western Access Route and the Turbine Area. These are 26 supplies fed by springs, eight supplies from boreholes and one from surface water.

A screening assessment will be completed on the supplies following receipt of the information provided by the residents, both from questionnaires and site visits. The screening will be based on the source of the Private Water Supply in relation to the disturbed areas that would be associated with the Proposed Development in order to eliminate any sources that would not be hydrologically or hydrogeologically connected.

The screening exercise will exclude 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 use;
- Topographical considerations; and
- Proximity to infrastructure (100m where excavations will be less than 1m depth and 250m where excavations will be greater than 1m depth buffers for groundwater sources).

5 Risk Assessment of Private Water Supplies Potentially Connected to the Proposed Development

The risk assessment of the Private Water Supplies will be conducted following the site visit and responses to questionnaires that will be issued to residents.

6 Conclusion

Given the rural nature of the Proposed Development, it was anticipated that some of the surrounding properties would be reliant on Private Water Supplies, although the old mine and quarry workings and geological setting would indicate poor quality supplies would be likely. To assess this, Private Water Supply records were obtained from the local councils. **Figure 10-9** shows the locations of provided Private Water Supply locations.

These will be reviewed alongside OS mapping and aerial imagery to identify other properties potentially dependent on Private Water Supplies connected to the Proposed Development.

Where appropriate, properties will be contacted to obtain further information.

A site visit and subsequent assessments are required to determine whether any of the provided Private Water Supply locations or other identified properties have supplies that may be connected to the Proposed Development.

Annex I

Example of Private Water Supply Questionnaire

Private Water Supply Questionnaire

- 1 Do you receive water from a private water supply (PWS)? Yes / No
- 2 Is the location of this PWS on land owned or occupied by you? Yes / No

If you are a tenant, please give name and address of the owner:
- 3 What is the location of the PWS? (please supply a grid reference if you know it, or indicate on the attached map if preferred)
- 4 What sort of supply is it? (e.g., borehole/well, collection facility)
- 5 Is the source of the supply:
groundwater
surface water
a spring (please tick one)
- 6 If there is a borehole/well:
How deep is it and what is its diameter?

When was it installed?
- 7 If there is a collection facility please give details of any drains feeding the collection tank.
- 8 Please provide details of any pumps used.
- 9 Please provide any other information about the source of the water or nature of the collection facility not covered above.
- 10 Do you have facilities for storing water and to what capacity?
- 11 Does the supply have seasonal variation in flow and has it been known to dry up? Please provide details.
- 12 Does the water undergo any form of treatment? (e.g., filter, UV, ozone, chlorination)

- 13 Please provide details of any maintenance or inspection routines carried out on the supply?
- 14 Do you maintain any water quality records and have there ever been any problems with the quality or clarity of the water?
- 15 What is the water used for (e.g. drinking water, house supply, livestock, irrigation), and how much water is required for each different usage?
- 16 Please list any other properties, if any, which also use this PWS.
- 17 Please give any details you know of other PWS in the area.
- 18 Please give any further information not covered in this questionnaire that might help in this investigation (continue on a separate sheet if necessary).

Name:

Date:

Address:

Tel No:

The information provided in this questionnaire will be used solely for the purposes of the Calderdale Energy Park water supply assessment and will be treated with confidentiality.

Annex II

List of Private Water Supplies Collated to Date

Grid Ref	Reference Name	Source Type
SD 93529 33008	Widdop Lodge	Spring
SD 94536 32426	Clough Foot	Spring
SD 94896 32047	Well Hole	Spring
SD 95154 31659	Packhorse Inn	Borehole
SD 95581 31533	Ridge Nook	Spring
SD 96595 31666	New Laithe Farm	Borehole
SD 96764 31398	Overwood	Stream / Lake
SD 97592 31536	Horrodiddle	Spring
SE 00003 32707	White Hole	Spring
SD 99711 32924	Thurrish	Spring
SE 03345 31529	Halifax Sailing Club	Pond
SD 93711 39402	Height Laithe Farm	spring
SD 94100 39014	Fosters Leap Barn	spring
SD 94109 38957	Fosters Leap Farm	spring
SD 94212 38700	Parson Lee Farm	borehole
SD 95040 38793	Coombe House	spring
SD 94619 39065	Coombe Hill Cross	spring
SD 94762 38908	Higher Key Styles Farm	spring
SD 94700 38916	Lower Key Styles Farm	borehole
SD 93996 38563	Dene House Farm	spring
SE 04860 33907	Bull Hill	Spring
SE 03667 34350	Eagle House	Borehole
SE 03681 34117	Far Dean Fields Cottage	Spring
SE 03264 34566	Fishers Lodge	Spring
SE 03265 34210	Kanangra	Borehole
SE 03681 34117	Lower Croft House, Upper Haley	Spring
SE 04860 33907	Lower Naylor Hill Farm	Spring
SE 03681 34117	Lower Slack Farm	Spring
SE 02546 34480	Mount Pleasant Farm	Borehole
SE 04860 33907	Royd House	Spring
SE 04860 33907	Rush Isle Barn	Spring
SE 04860 33907	Swallow Barn	Spring
SE 04860 33907	Upper Flight Stack	Spring
SE 02970 34627	West Croft Head	Borehole
SE 04860 33907	White Hill Barn	Spring