Northumberland County Council

Private Water Supply Risk Assessment

Donkleywood Private Water Supply

Supply Reference:	P1156
Supply Type:	Regulation 9 supply (supply an average daily volume of water >10m^3/day or >50 persons) or supply a commercial or public activity
Sample Frequency:	Regulation 9 supply -Once per year for Group A and Group B parameters
Date of risk assessment:	21st January 2021
Officer Name:	Gillian Plaice Chartered Environmental Health Practitioner

Private Water Supply Risk Assessment

1. Purpose

Local Authorities are required under Regulation 6 of The Private Water Supplies (England) Regulations 2016 (as amended) to undertake a risk assessment of each private water supply within their area and to review and update the risk assessment every 5 years. Supplies serving a single domestic property are exempt. The purpose of the risk assessment is to ensure that water from private water supplies is safe and sufficient and does not pose a danger to human health. Local authorities must also use the risk assessment process to establish whether there is a risk of non-compliance with any of the water quality standards or parameter values outlined in the Regulations.

This report is based upon the infrastructure that was available to view at the time of the risk assessment, and the information provided to the officer, by individual(s) who have a knowledge of the supply. This information is taken in good faith.

2. Risk Assessment Risk Rating

The Drinking Water Inspectorate Risk Assessment Lite Tool has been used to risk assess the supply. Based upon the information provided the supply has been risk rated as follows:

Risk Rating	
Previous supply risk rating	Not applicable
Current supply risk rating 2021	**VERY HIGH**
Review of risk assessment	2026 *(or earlier if significant changes to the supply)*

3. Supply Information

3.1 Relevant Persons

A Relevant Person is defined in Section 80 (7) of the Water Industry Act 1991 as: The owner or occupier of the premises supplied, and, the owner or occupier of the premises where the source of the supply is situated even if the source lies outside the local authority's area, and, any person who exercises powers of management or control in relation to that source.

Table 1 Relevant Person Contact Details

Name & Position	Contact details
Mr Graham Varty	c/o Kielder Country Sports, c/o Donkleywood Hexham, Northumberland, NE48 1AQ

3.2 Properties Served by the Supply

All premises where the private supply of water is intended for human consumption; including: drinking, cooking, food preparation or other domestic purposes, or used in any food production undertaking.

Table 2 Property Address List

No	Property Address	Type/Use of Premises
1	c/o Kielder Country Sports, c/o Donkleywood Hexham, Northumberland, NE48 1AQ	Commercial

3.3 Supply Size *(daily volume of water supplied is based in 0.2m^2 per person per day)*

Residential population (temporary population maximum number in brackets):	1
ESTIMATED daily volume of water supplied (m^3 per day)	0.2 m^3 per day

3.4 Source Type & Location

Spring	NY74663 86997

3.5 Supply Description

This is a spring supply which arises 146 metres above sea level, on the hillside 600m to the North of Donkleywood in a small wooded area. There is a circular spring chamber with a wooden cover and a separate rectangular tank, a few metres away which, is covered by square stone slabs. It is not known if water flows directly from the spring chamber to Donkleywood, or if it first passes through this additional tank. The system was replaced in September 1986.

Previously 7 properties were supplied by this spring through a written agreement drawn up in 1986 including: 1. Donkleywood Farm, 2. Donkleywood House, 3. The Cottage, 4. Briar Cottage, 5. Glenesk, 6. Glenside and 7. Low Donkleywood Cottage (Railway Cottage). These properties have since made their own individual arrangements for provision of their domestic water supply and are no longer connected to this spring.

3.6 Treatment

There is no treatment on this supply.

3.8 Radon Risk

Maximum Radon Potential: (percentage of properties at risk of being above the action level of 200 Bq/m^3)	0-1 %
Radon Risk	**LOW**

4. Works Required to Improve the Supply

The Drinking Water Inspectorate Risk Assessment Lite Tool has been used to risk assess the supply. The table below details the remedial actions required to improve the supply and a deadline for completion of these actions.

Once the remedial works have been completed please confirm this in writing or by email and provide evidence e.g. photographs, invoices, certificates, etc. Progress on these actions will be checked by the inspecting Officer during the next site visit.

The following works should be completed by 31st August 2021

4.1 Water Quality

1. The water sample taken from the shed tap has failed to comply with the Regulations in that coliform and Enterococci bacteria were detected in the sample. Spring supplies are prone to contamination by faecal material from animals, wildlife, or sanitation systems such as septic tanks. To ensure that the water supplied to consumer taps is always wholesome, some form of water treatment must be installed to remove bacterial contamination before the water is used for domestic purposes. This is particularly important if young children (under 10 years old), the elderly or visitors are consuming the water. Pre-filtration followed by UV disinfection is often a suitable option. The appendix to the report includes a list of contractors for your information.

2. The water sample also failed to comply with the Regulations in that the levels of iron, manganese and turbidity exceeded the prescribed concentration. Iron and manganese are generally considered to be aesthetic parameters rather than health risk parameters and are known to cause cloudiness in water and discolouration of sanitary ware. If the water is turbid Ultraviolet light treatment to remove bacterial contamination may not be effective as the UV light cannot pass easily through the water in the treatment device. Treatment to reduce iron and manganese levels is required to reduce the concentrations to no greater than 200 and 50 µg/l respectively. I have previously sent guidance note WA23 by email which provides further guidance.

4.2 Management of the supply

1. **Water Management Plan:** I would recommend that you put in place a **water management plan** to include the following documents and procedures:

a. **Site plan** - this may be a simple site plan/schematic to show the location of the source, holding tank(s), distribution pipework, valves, and consumer premises on the supply.
b. **Written procedures** - simple written procedures for the operation of the water supply this will provide a reference and ensure a consistent approach.
c. **Maintenance, Servicing and Cleaning Records** - establish a servicing and maintenance schedule and keep records of all maintenance, servicing and cleaning carried out.
d. **Keep copies of manufacturer's instructions for treatment equipment on the supply**
e. **Prepare a simple emergency plan for the provision of an alternative water supply** – in the event that the supply becomes unusable from either a quality or quantity perspective. This could include the provision of bottled water or a water bowser. The DWI (Drinking Water Inspectorate) has provided guidance on the provision of alternative supplies, which can be obtained from their website (http://dwi.defra.gov.uk/stakeholders/guidance-and-codes-of-practice/pws-alt-supplies.pdf
f. **Basic schematic of the treatment system** - include a simple schematic of the treatment system which should identify the incoming water flow, direction of flow, bypass points, dosing points, treatment type and location, monitoring points and out flow.
   Preparation of appropriate procedures and the keeping of records to show the supply is being effectively operated will help reduce the risk rating of the supply.

2. Sediment and sludge build up is to be expected, but this should be minimised through the design and operation of the tank including maintenance activities. Appropriate cleaning means sufficient cleaning to prevent sediment or sludge build up before it causes microbiological growth or aesthetic risk (sediment or suspended particles in water at the consumer's tap). Prepare a tank cleaning plan which: identifies the tank(s) to be checked; how frequently this will be done; how cleaning will be carried out; includes a record of the work carried out, when it was done and who was it done by.

   Any vessel should be inspected on at least an annual basis and any debris removed as necessary and cleaned/disinfected as required. Include this in the water management plan described above.

4.3 Structural Improvements

1. The spring chamber is in a poor state of repair, requires cleaning internally and there is the potential for contamination of the supply from surface water due to the condition of

the wooden cover. There is a large build-up of debris and iron reducing bacteria inside the chamber.

Cut back vegetation from around the chamber and clean out the chamber internally. Carry out an inspection of the chamber and instigate repairs or replace the chamber to ensure that the lining is watertight. To prevent inflow of surface water during periods of high rainfall, the top of the spring chamber should be at least 150 mm above the surrounding ground. Fit a secure and lockable watertight cover to the chamber to prevent the risk of ingress of surface water into the spring chamber, potentially contaminating the supply. Figure 1 below depicts the typical construction of a spring collection chamber. Ideally a concrete apron should be constructed which slopes away from the cover to shed water away from the opening. The cover in its frame should ideally stand proud of the top surface of the chamber to reduce the likelihood of rainwater draining into the chamber.

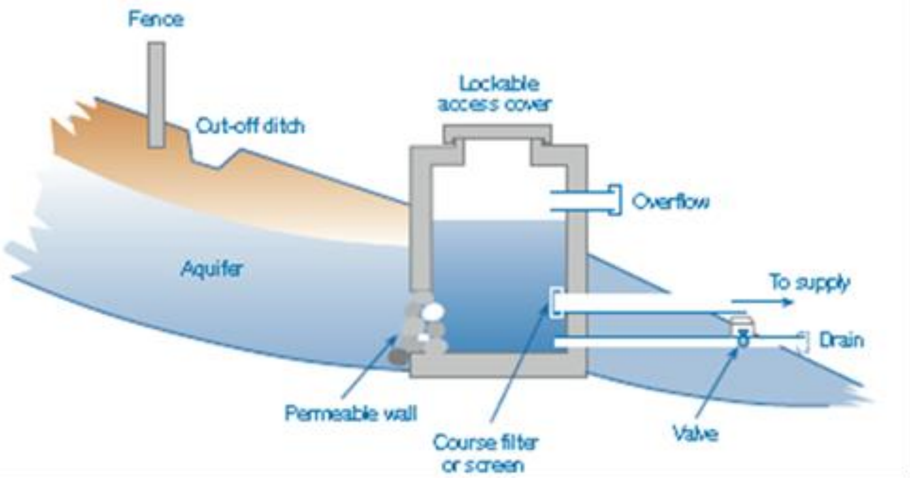

Figure 1: Schematic of spring collection chamber

2. Dig a ditch at least 450 mm deep on the uphill side of the well spring chamber so that any surface water running off the slope during heavy rain is diverted away from the chamber. The ditch should be in two lengths making an upside down 'V' shape if looked at from the chamber.

3. Determine if the tank located downhill from the spring is connected to the supply. If this tank is still connected to the water supply, then significant improvements are required to protect the tank from ingress of surface water and other sources of contamination. The tank either requires repair or it may be more efficient to replace it with a new tank.

Ensure that the lining of the tank is watertight and fit a secure and lockable watertight cover. The top of the tank around the cover should slope away from the opening to shed water away from it. The cover in its frame should ideally stand proud of the top surface of the chamber to reduce the likelihood of rainwater draining into the chamber.

4. Locate the overflow pipe to both the spring chamber and the tank and protect with metal mesh to prevent access by small animals.

5. Repair the fencing surrounding the spring chamber. Means of access, such as a stile, must be provided to ensure safe access for the operator when required.

6. Carry out regular inspections of the spring and control vegetation growth around the spring chamber.

4.4 Recommendations

1. The supply is not adequately protected against vandalism (deliberate contamination of source and unauthorised access). Once improvements are carried out it is recommended that you install appropriate protection from unauthorised access to the supply infrastructure, for example by fitting a lockable bar across the spring collection chamber and holding tank. Covers and access points must be securely locked when not in use and access to these points controlled. The owner and responsible person should keep records of all key owners.

2. If the supply provides water to animal watering troughs or other connections e.g. a permanently connected hosepipe, back-siphonage may occur. This creates the risk that the contents of the trough or container could enter the supply distribution main and contaminate the supply. Ensure that all animal watering troughs, standpipes, and other similar connections are fitted with appropriate backflow protection valves or equivalent device.

Checked by	

Please read the attached notes carefully:

Note 1: *The local authority must provide the Secretary of State (DEFRA) with a summary of the results of this risk assessment within 12 months from the date it is carried out.*

Note 2: *Under the Private Water Supply (England) Regulations 2016 (as amended) any product or substance used in a private supply from the 1st January 2010, must be approved under Regulation 5(1). Further information is available on the Drinking Water Inspectorate website* https://www.dwi.gov.uk/private-water-supplies/pws-installations/regulation-5/ *(Regulation 5) and* *http://www.dwi.gov.uk/private-water-supply/installations/treatment-guide.html* *(Treatment & Maintenance Manual).*

Note 3: *A list of approved products is available from the DWI at* https://cdn.dwi.gov.uk/wp-content/uploads/2020/11/25104646/soslistcurrent.pdf

Note 4: *Products used in water systems within properties are subject to approval by the Water Regulations Advisory Scheme (WRAS). Further information on these products and on WRAS can be found on their website at* *www.wras.co.uk*

If you require further information please contact this department or refer to the Drinking Water Inspectorate website where you will find information about private water supplies for owners, managers and consumers: *www.dwi.gov.uk/private-water-supply/index.htm*

APPENDIX A - PHOTOGRAPHS OF THE SUPPLY


Spring chamber and tank beyond


Lid of spring chamber


Spring chamber - internal


Stone covers across open tank

Tank - internal

APPENDIX B - WATER SAMPLING PARAMETERS

GROUP A PARAMETERS

Parameter	Maximum Concentration/Value	Likely cause in a private supply
Colony Counts (72 hrs @ 22 ºC)	No abnormal change per ml	-
E. coli	0 per 100ml	Faecal contamination
Total Coliforms	0 per 100ml	Evidence of bacterial contamination
Electrical Conductivity	2,500 µS/cm @ 20ºC	-
Hydrogen ion concentration (pH)	6.5 – 9.5 pH units	Acid or alkaline water
Turbidity	4 NTU	Inorganic matter in suspension, sediments and oxides or iron and manganese. Can impair the efficiency of disinfection.
Ammonium	0.50 mg/l NH_4	Naturally occurring in some surface and ground waters. Decay of organic material. Contamination from human or animal sources.
Nitrate	50 mg/l NO_3	Fertilisers, animal wastes or sewage effluents
Nitrite	0.5 mg/l NO_2	Contamination of raw waters. Use of chloramination as a residual disinfectant
Aluminium	200 µg/l Al	Naturally occurring in some surface and ground waters. Aluminium compounds used as a coagulant in treatment
Iron	200 µg/l Fe	Naturally occurring in some surface and ground waters. Use of iron compounds as coagulants. Corrosion of iron distribution pipes.
Manganese	50 µg/l Mn	Naturally occurring in some surface and ground waters. Present in some greensand filtration materials.
Copper	2.0 mg/l	Leaching from pipes and plumbing fittings.
Lead	10 µg/l	Leaching from lead pipes or from lead soldered copper pipes. Low pH increases lead leaching. Naturally occurring.

Nickel	20 µg/l	Leaching from some domestic plumbing fittings (e.g. plated taps).
Colour	20 mg/l Pt/Co scale	Humic and fulvic materials leaching from peat or other decaying vegetation. Contaminants causing high colour can impair disinfection processes.
Odour	Acceptable to consumers and no abnormal change	Decaying vegetation, algae, moulds. Chlorine and the by-products of chlorination.
Taste	Acceptable to consumers and no abnormal change	Decaying vegetation, algae, moulds. Chlorine and the by-products of chlorination. High concentrations of iron, manganese, and some other metals.

GROUP B PARAMETERS

Parameter	Maximum Concentration/Value	Likely cause in a private supply
Enterococci	0 Number/100ml	Contamination from sewage, sewage effluents and animal waste.
Clostridium perfringens	0 Number/100ml	Contamination from sewage, sewage effluents and animal waste.
Acrylamide	0.10 µg/l	Use of polyacrylamides as coagulant aids or grouts for borehole/well linings.
Antimony	5.0 µg/l	Domestic plumbing fittings.
Arsenic	10 µg/l	Present in some ground waters.
Benzene	1.0 µg/l	Petrol/diesel. Permeation of plastic distribution and domestic plumbing pipes.
Benzo(a)pyrene	0.010 µg/l	Leaching from internal coal tar lining of some distribution pipes.
Boron	1.0 mg/l	Contamination of surface waters with detergents mainly from sewage effluents.
Bromate	10 µg/l	Present in sodium hypochlorite used to disinfect water used to disinfect water, including electrolytically generated hypochlorite. Formed if ozone used and water contains bromide.
Cadmium	5.0 µg/l	Leaching from galvanised pipes and some domestic plumbing fittings.
Chloride	250 mg/l	Indicator of saline intrusion in coastal areas. From water softeners. Sewage pollution of surface waters.
Chromium	50 µg/l	Leaching from some domestic plumbing fittings. .
Copper	2.0 mg/l	Leaching from pipes and plumbing fittings. Low pH increases copper leaching.
Cyanide	50 µg/l	Possible contamination of raw waters from industry (e.g. metal finishing, wood preservatives).

1,2 dichloroethane	3.0 µg/l	Volatile solvent used in the manufacture of vinyl chloride.
Epichlorohydrin	0.10 µg/l	Use of polyamines as coagulant aides. Use of epoxy resins (e.g. to line pipes and tanks). Use to make some ion exchange resins.
Fluoride	1.5 mg/l	May be present in some groundwaters.
Lead	10 µg/l	Leaching from lead pipes or from lead soldered copper pipes. Low pH increases lead leaching. Naturally occurring.
Mercury	1.0 µg/l	Mercury thermometers, broken UV lamps and float valves.
Nickel	20 µg/l	Leaching from some domestic plumbing fittings (e.g. plated taps).
Pesticides -		
Aldrin	0.030 µg/l	From use in agriculture, forestry roads, railways, etc
Dieldrin	0.030 µg/l	From use in agriculture, forestry roads, railways, etc
Heptachlor	0.030 µg/l	From use in agriculture, forestry roads, railways, etc
Heptachlor epoxide	0.030 µg/l	From use in agriculture, forestry roads, railways, etc
Other pesticides	0.10 µg/l	From use in agriculture, forestry roads, railways, etc
Pesticides total	0.50 µg/l	The sum of the concentrations of the individual pesticides detected and quantified in the monitoring procedure.
Polycyclic aromatic hydrocarbons	0.10 µg/l	Leaching from internal coal tar lining of some distribution pipes.
Selenium	10 µg/l	May occur naturally in raw waters.
Sodium	200 mg/l	Water softeners and treatment chemicals (e.g. sodium hypochlorite for disinfection) or through saline intrusion of ground waters in coastal areas.
Sulphate	250 mg/l	Occurs in some raw waters.

Tetrachloroethene and Trichloroethene	10 µg/l	Volatile solvents in dry cleaning and metal finishing.
Total organic carbons	No abnormal change mgC/l	Decaying natural organic matter.
Trihalomethanes total	100 µg/l	Formed by reaction of organic matter in raw water with chlorine compounds used as disinfectants.
Vinyl Chloride	0.50 µg/l	Leaching from unplasticized PVC pipes used in distribution or domestic plumbing.

RADIOACTIVE SUBSTANCES

Parameter	**Maximum Concentration/Value**	**Likely cause in a private supply**
Indicative dose (for radioactivity)	0.10 mSv	Natural or manmade radioactive compounds.
Gross alpha	0.1 Bq/l	Natural or manmade radioactive compounds.
Gross beta	1.0 Bq/l	Natural or manmade radioactive compounds.
Radon	100 Bq/l	May be present in ground waters where the underlying geology contains elevated levels of radon,
Tritium (for radioactivity)	100 Bq/l	Cosmic production in upper atmosphere. By-product of nuclear explosions and nuclear industry.