

PACKAGE TREATMENT PLANT FEASIBILITY REPORT

Conversion of vacant barn into its former use of cottage and garden. Works to include small side extension, construction of domestic stable block, stand alone bat house, and restoration of historic landscape to include restoration of field boundaries and orchard.

Land North of Rock Cottage,
Arcade Road,
Penhow



Introduction:

Percolation testing has been carried out on the site to ascertain if a package treatment plant is a viable solution for disposal of the foul water, in the absence of a nearby sewer.

Site Works

The trial holes were dug on 7th June 2024 and were formed using a one tonne tracked mechanical excavator with a wide toothed bucket. On completion all trial pits were backfilled with the materials that come out, compacted in layers using the excavator bucket.

The trial pits were excavated with the mini digger to the proposed invert level (0.7m), then continued by hand excavation to construct the 0.3m³ pit within which the percolation test was performed.

The trial holes have been located in the area of the proposed drainage field and are shown on Figure 1. Below:



Figure 1. Trial hole locations

Table 1: Summary of ground

Trial Pit	Depth (m)	Soil Type
TP1	0-0.4	Medium dense dark brown organic rich sandy slightly gravelly loam.
	0.4-0.6	Medium dense light brown sandy loam.
	0.6-1	Medium dense medium brown clayey loam with fine gravel.
TP2	0-0.4	Medium dense dark brown sandy loam with high organic content.
	0.4-0.6	Medium dense light brown sandy loam with moderate gravel.
	0.6-1	Medium dense light brown clayey loam with coarse gravel.
TP3	0-0.4	Medium dense dark brown sandy loam with high organic content and some silt.
	0.4-0.7	Medium dense light brown sandy loam with fine gravel.
	0.7-1	Firm medium brown sandy clay loam with moderate gravel.

Percolation testing

X3no. percolation tests have been carried out in line with British Standard BS6297:2007 (+A1:2008) Code of practice for the design and installation of drainage fields for use in wastewater treatment and the Building Regulations (Part H 2015)

The 300mm³ holes were filled with water on the day of digging and left to drain overnight. The following day the small holes were filled again and timed to drain from 75% full to 25% full. The test were then repeated 2 more times.

Water table

A trench graded down to 2.5 was excavated adjacent to the trial holes, and there was no evidence of the water table in the trench. No groundwater inflows appeared in any of the 3 holes.

Calculating the discharge rate for sewage: domestic properties

P value = 3 (1 Bed + 2 safety factor)

Multiply the P value by the current sewage generation rate per person per day – this is 150 litres per person per day in British Water’s code of practice – flows and loads 4

= 450

Divide this figure by 1,000 to get the rate in m³ per day

=0.45m³

Percolation test results

TP1	Time to drain between 75% and 25% (s)	V _p
Test 1	8100	54
Test 2	7500	50
Test 3	6600	44
TP2		
Test 1	7200	48
Test 2	7500	50
Test 3	8100	54
TP3		
Test 1	8100	54
Test 2	8400	56
Test 3	9000	60

Average V_p = 52

Calculating Drainage field size

Area of drainage trench (A_t) required = $P \times V_p \times 0.2$

no. people served (ρ) - 3 (1 bed +2)
Percolation value average (v_p) - 52

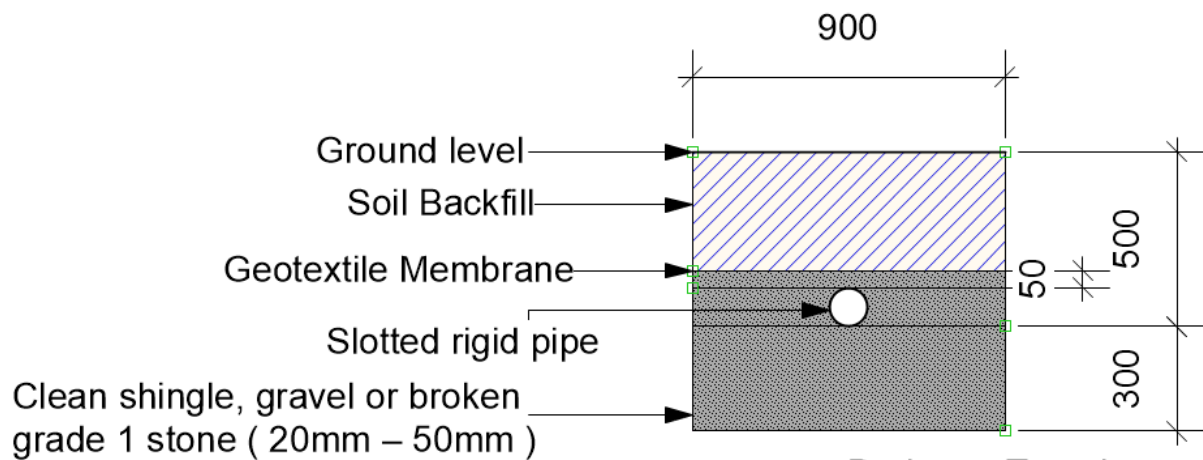
$A_t = 3 \times 52 \times 0.2$

$A_t = 31.2\text{m}^2$

Trench width 0.9m

Trench length 35m

Total area of trench 31.5m²



Drainage Trench
section - 1:25

Figure 2.

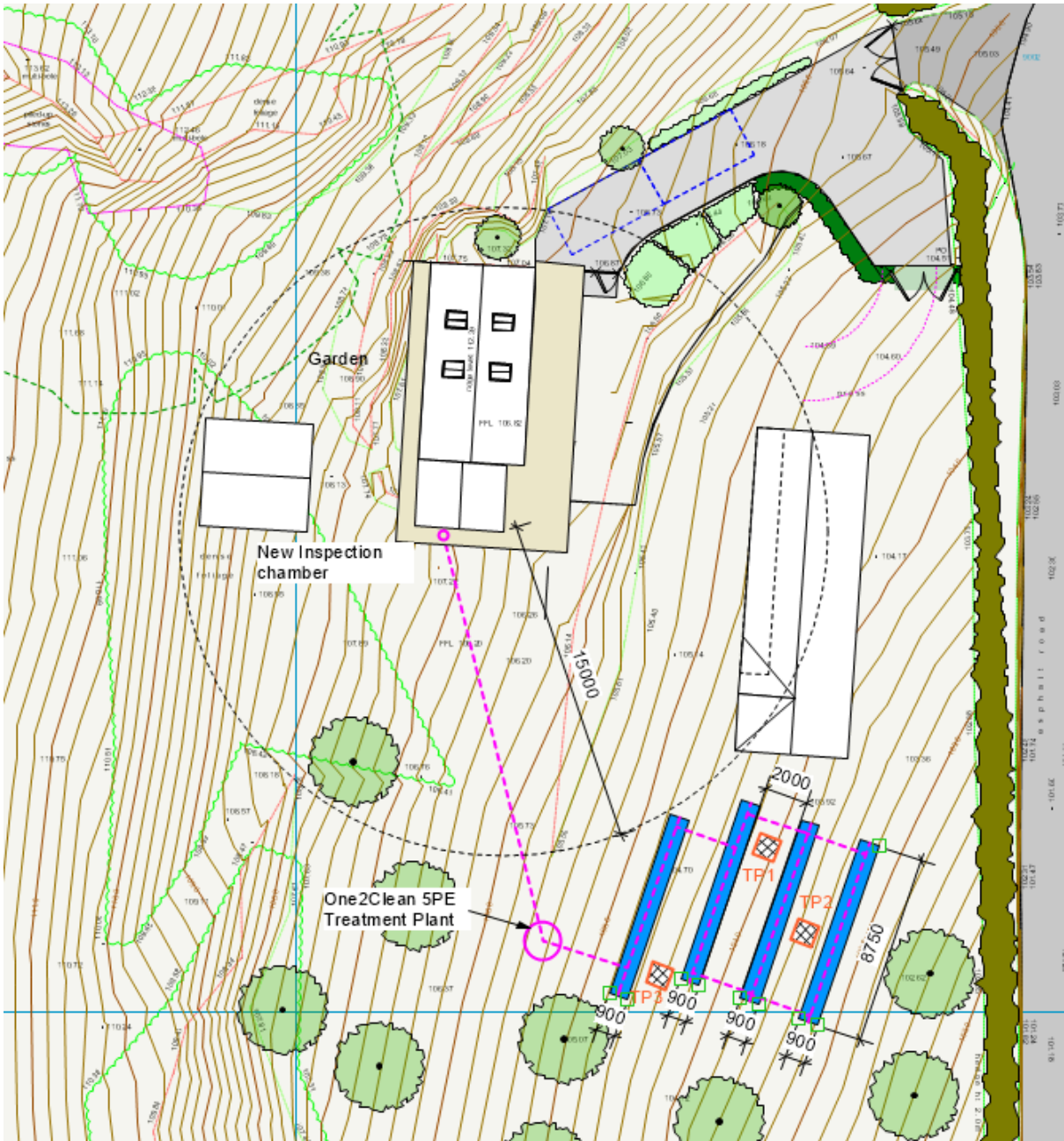


Figure 3. Location of drainage field.