

Land off Holt Road, Rossett

Infiltration Test Report

October 2015



DOCUMENT VERIFICATION RECORD

**CLIENT:**

Bellis Brothers Ltd.

SCHEME:

Soil infiltration tests for a proposed residential development at land off Holt Road, Rossett, Wrexham, LL12 0ED. The purpose of this report is to support the Planning Application and to inform surface water drainage design.

INSTRUCTION:

The instruction to carry out the infiltration tests was received from the Mr Justin Paul of J10 Planning Ltd acting on behalf of the client.

ISSUE HISTORY:

Issue Date	Comment
14/10/2015	First issue

DOCUMENT REVIEW & APPROVAL

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1 Introduction & Methodology

- 1.1 Waterco Consultants have been instructed to carry out infiltration tests in support of a planning application for a proposed residential development at land off Holt Road, Rossett, Wrexham, LL12 0ED (grid reference 337350E 357371N). A location plan and an aerial image are included in Appendix A.
- 1.2 The infiltration tests were carried out in accordance with the BRE 365 specification. Twelve trial pits were dug across the site (see Appendix B for dimensions). The approximate trial pit locations are shown in Appendix A. The trial pits were filled with stone, resulting in a 30% void ratio.
- 1.3 The infiltration tests were carried out on 30th September 2015. The weather conditions on the day of the tests were dry.
- 1.4 The majority of the site is underlain by permeable gravel soils, with the exception of the eastern extent of the southern land parcel, which is underlain by clay. No groundwater was encountered in any of the trial pits.
- 1.5 The test procedure was repeated three times (where possible) to replicate soil moisture conditions typical of the site when the soakaways become operative.

2 Results

- 2.1 The infiltration test results (depth of water vs time) are included in Appendix B. The average infiltration rate for each trial pit is provided in Table 1 overleaf.
- 2.2 The infiltration rates were calculated in accordance with the following BRE 365 procedure:

$$\text{Soil infiltration rate} = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25} \times 60}$$

Where:

- V_{p75-25} = Effective storage volume of water in the trial pit between 75% and 25% effective depth
- a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = Time for the water level to fall from 75% to 25% effective depth

Table 1: Summary of Infiltration Rates

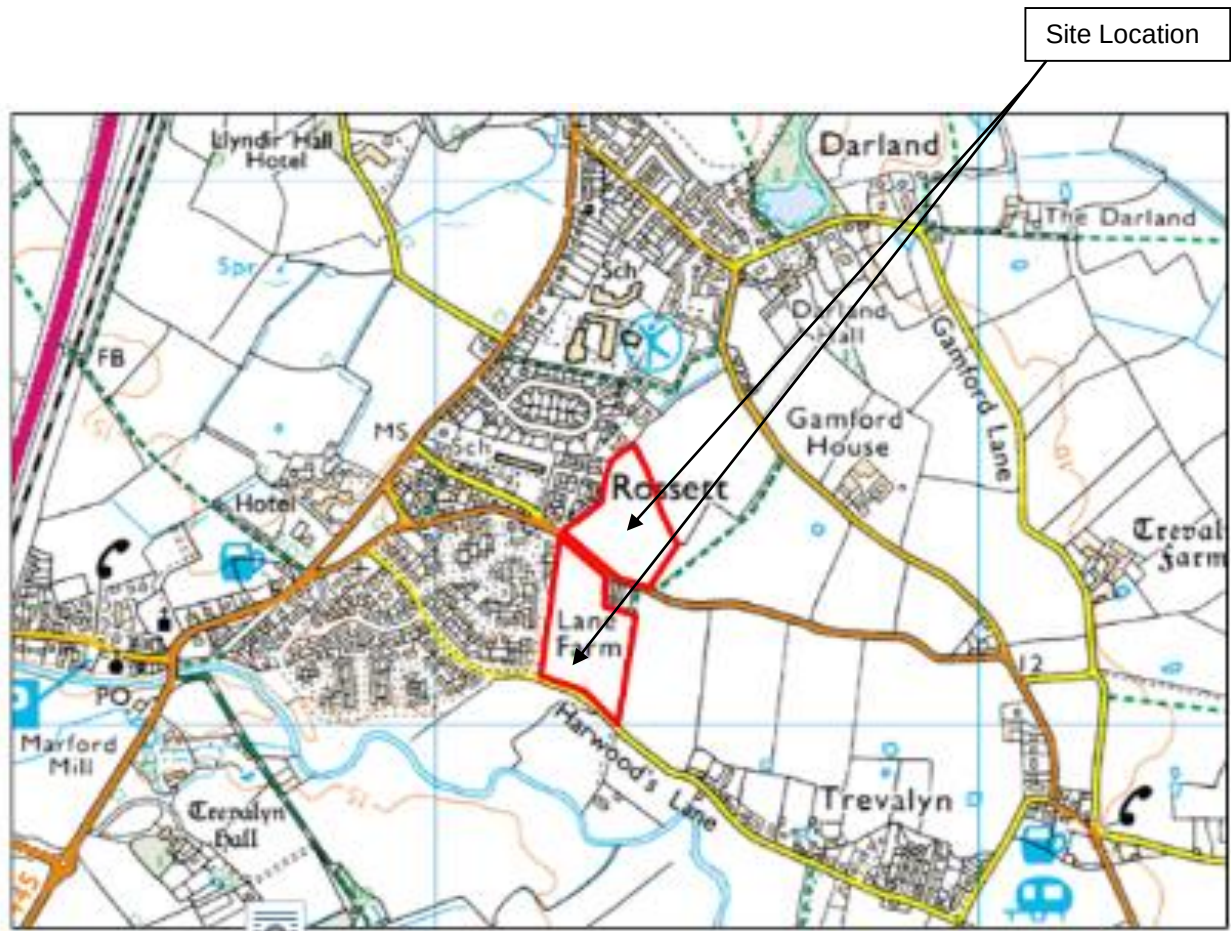
Trial Pit	Average Infiltration Rate (m/s)
1	1.28×10^{-4}
2	7.71×10^{-5}
3	4.67×10^{-5}
4	1.26×10^{-4}
5	No rate calculated*
6	No rate calculated*
7	7.83×10^{-5}
8	6.33×10^{-4}
9	1.42×10^{-5}
10	1.69×10^{-5}
11	4.66×10^{-5}
12	8.01×10^{-5}

*No infiltration rate calculated for trial pits 5 and 6. The test was abandoned at trial pits 5 and 6 due to the underlying clay and resulting slow infiltration. Soakaways are not suitable in the location of trial pits 5 and 6.

3 Conclusions

- 3.1 It can be concluded that soakaway drainage will be a feasible option for surface water disposal from the site. Properties near to trial pits 5 and 6 will need to be drained via a communal soakaway in public open space outside of a clay area.

Appendix A – Location Plan and Aerial Image



Site Location Plan
(Source: Streetmap)



Aerial Photograph

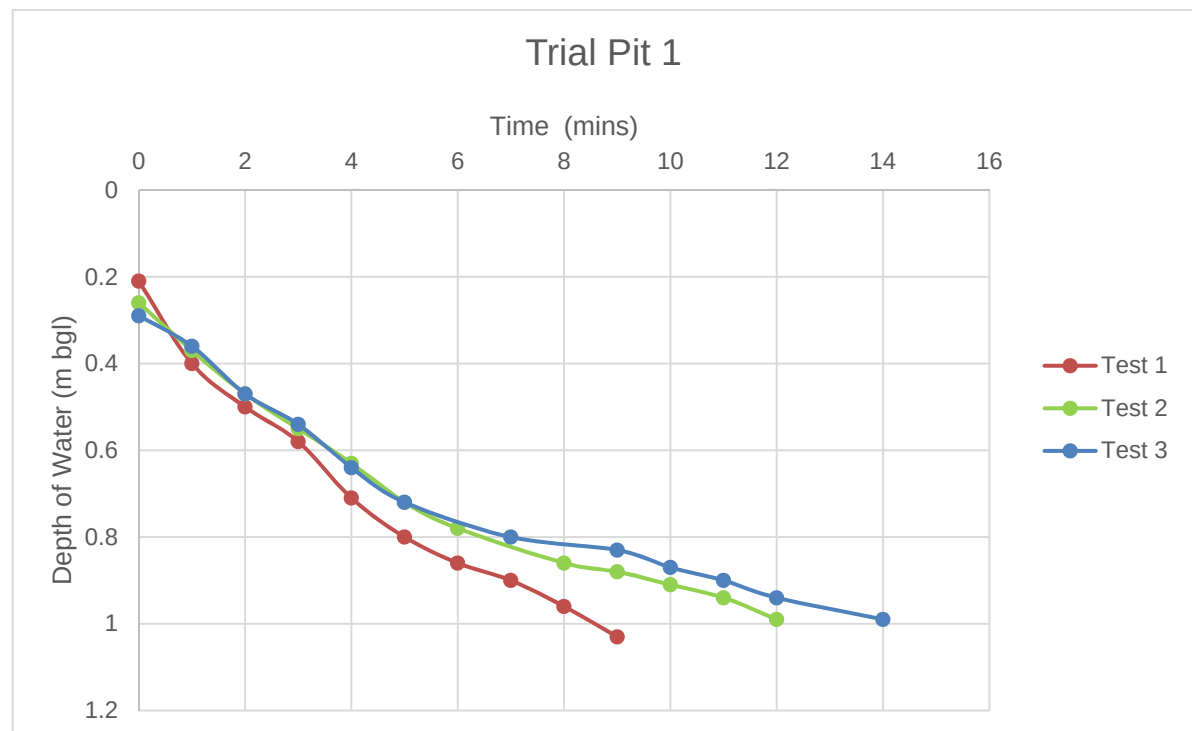
(Source: Google Maps)

Appendix B – Infiltration Test Results

Trial Pit 1

Trial Pit Dimensions (m)	Length	Width	Depth
	2.2	0.6	1.03

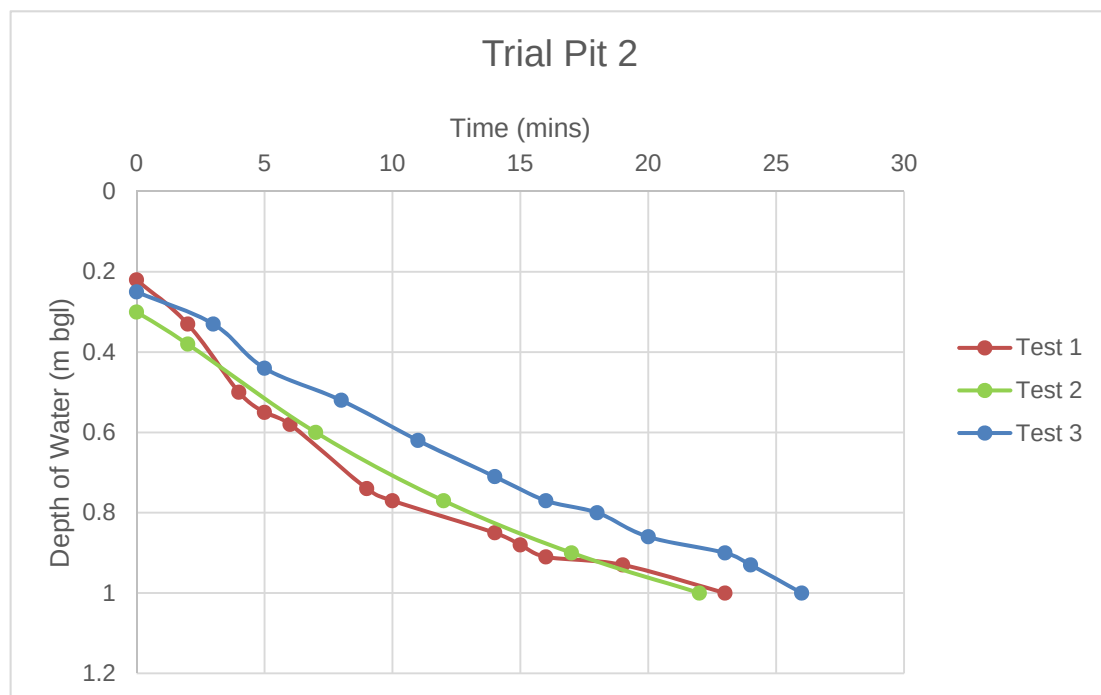
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.21	0	0.26	0	0.29
1	0.40	1	0.37	1	0.36
2	0.50	2	0.47	2	0.47
3	0.58	3	0.55	3	0.54
4	0.71	4	0.63	4	0.64
5	0.80	5	0.72	5	0.72
6	0.86	6	0.78	7	0.80
7	0.90	8	0.86	9	0.83
8	0.96	9	0.88	10	0.87
9	1.03	10	0.91	11	0.90
		11	0.94	12	0.94
		12	0.99	14	0.99
		13	1.03	15	1.03



Trial Pit 2

Trial Pit Dimensions (m)	Length	Width	Depth
	2.2	0.7	1.00

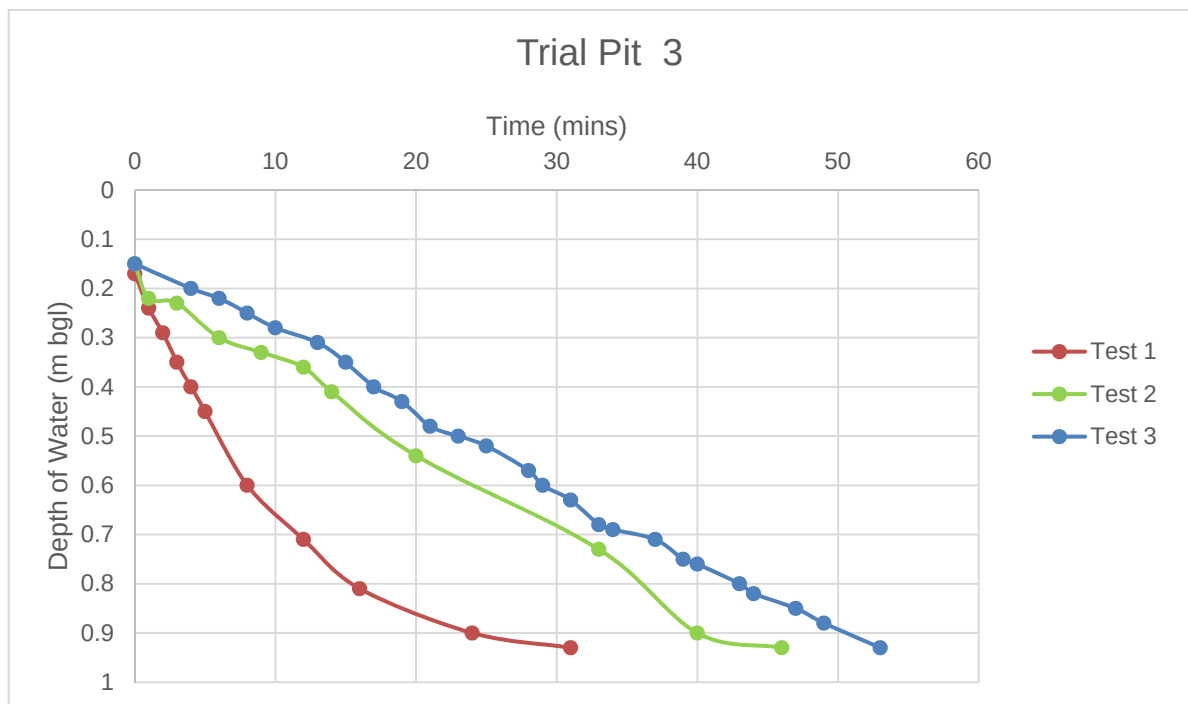
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.22	0	0.30	0	0.25
2	0.33	2	0.38	3	0.33
4	0.50	7	0.60	5	0.44
5	0.55	12	0.77	8	0.52
6	0.58	17	0.90	11	0.62
9	0.74	22	1.00	14	0.71
10	0.77			16	0.77
14	0.85			18	0.80
15	0.88			20	0.86
16	0.91			23	0.90
19	0.93			24	0.93
23	1.00			26	1.00



Trial Pit 3

Trial Pit Dimensions (m)	Length	Width	Depth
	1.75	0.7	0.93

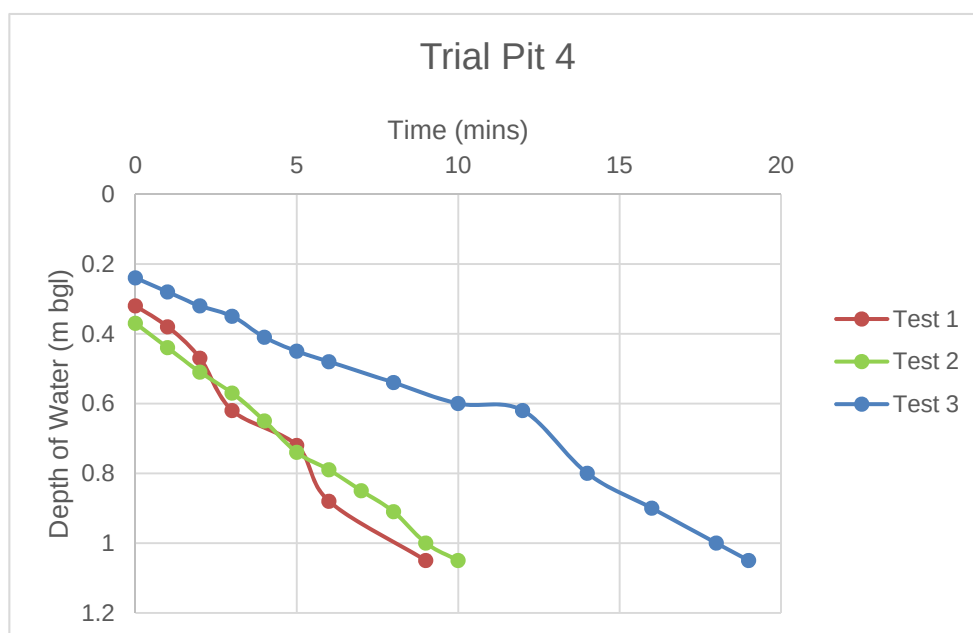
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.17	0	0.15	0	0.15
1	0.24	1	0.22	4	0.20
2	0.29	3	0.23	6	0.22
3	0.35	6	0.30	8	0.25
4	0.40	9	0.33	10	0.28
5	0.45	12	0.36	13	0.31
8	0.60	14	0.41	15	0.35
12	0.71	20	0.54	17	0.40
16	0.81	33	0.73	19	0.43
24	0.90	40	0.90	21	0.48
31	0.93	46	0.93	23	0.50
				25	0.52
				28	0.57
				29	0.60
				31	0.63
				33	0.68
				34	0.69
				37	0.71
				39	0.75
				40	0.76
				43	0.80
				44	0.82
				47	0.85
				49	0.88
				53	0.93



Trial Pit 4

Trial Pit Dimensions (m)	Length	Width	Depth
	1.2	0.70	1.05

Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.32	0	0.37	0	0.24
1	0.38	1	0.44	1	0.28
2	0.47	2	0.51	2	0.32
3	0.62	3	0.57	3	0.35
5	0.72	4	0.65	4	0.41
6	0.88	5	0.74	5	0.45
9	1.05	6	0.79	6	0.48
		7	0.85	8	0.54
		8	0.91	10	0.60
		9	1.00	12	0.62
		10	1.05	14	0.80
				16	0.90
				18	1.00
				19	1.05

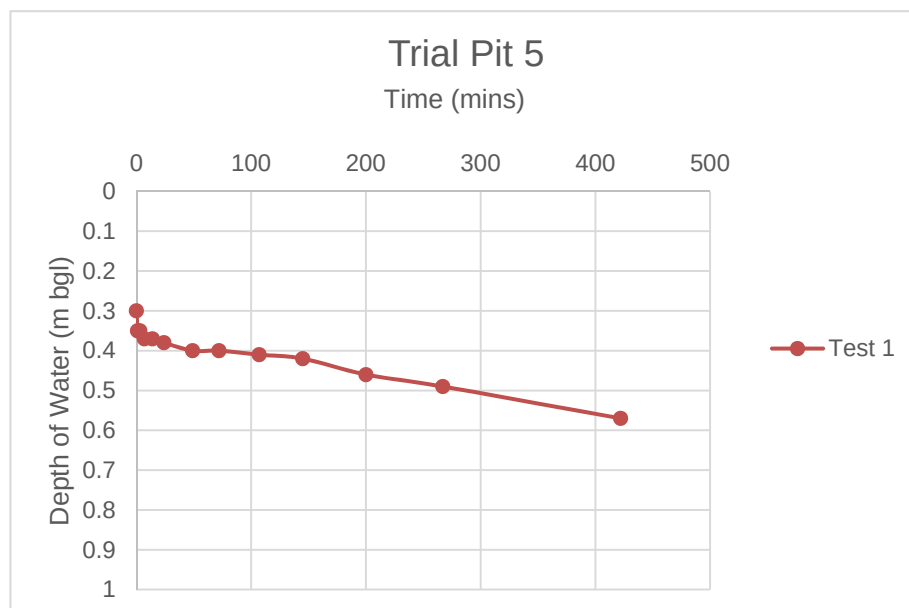


Trial Pit 5

Trial Pit Dimensions (m)	Length	Width	Depth
	1.70	0.70	1.00

Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.30				
1	0.35				
2	0.35				
3	0.35				
7	0.37				
14	0.37				
24	0.38				
49	0.40				
72	0.40				
107	0.41				
145	0.42				
200	0.46				
267	0.49				
422	0.57				

Test Abandoned – pit did not drain

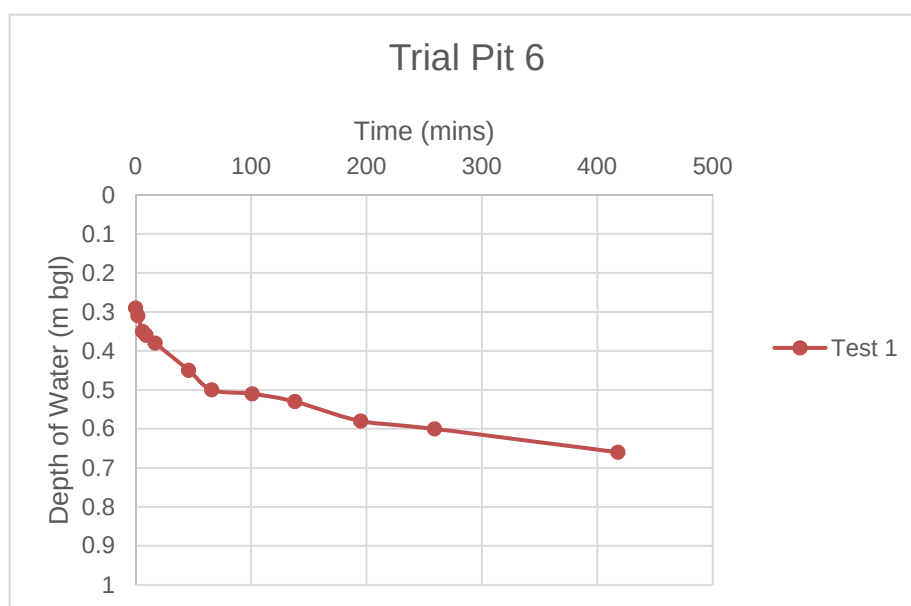


Trial Pit 6

Trial Pit Dimensions (m)	Length	Width	Depth
	1.80	0.70	1.00

Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.29				
2	0.31				
6	0.35				
9	0.36				
17	0.38				
46	0.45				
66	0.50				
101	0.51				
138	0.53				
195	0.58				
259	0.60				
418	0.66				

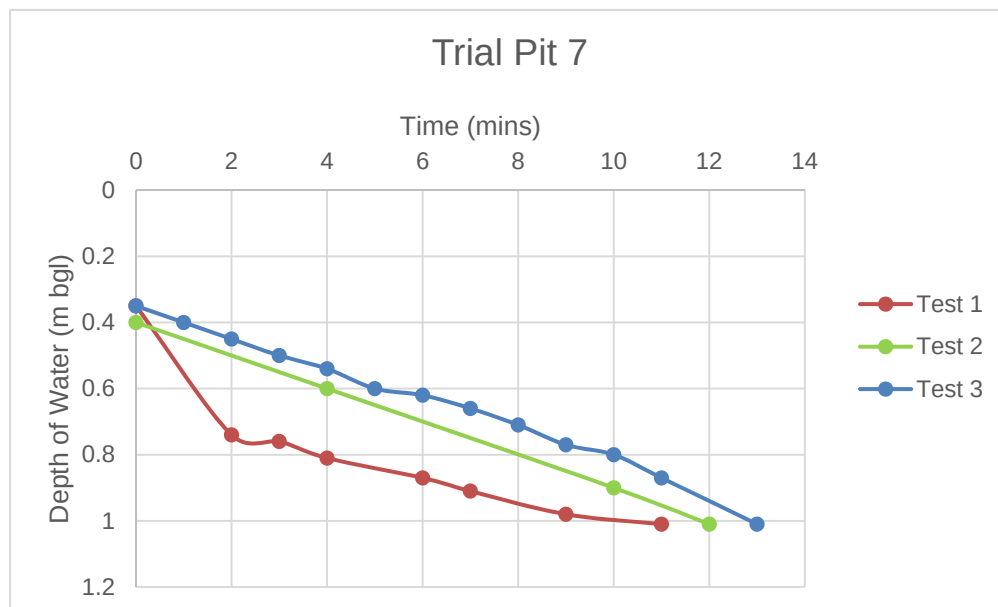
Test Abandoned – pit did not drain



Trial Pit 7

Trial Pit Dimensions (m)	Length	Width	Depth
	2.00	0.70	1.01

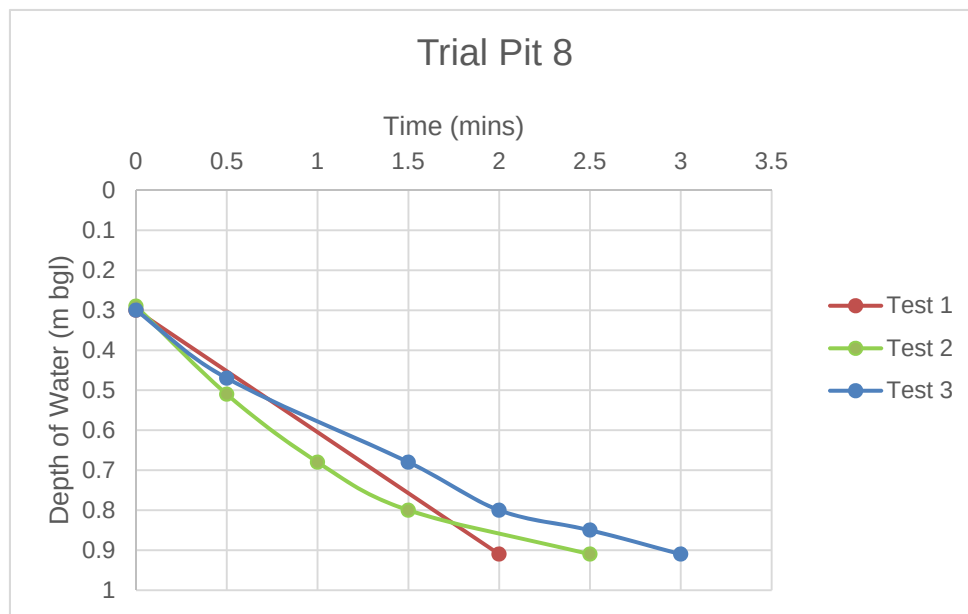
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.35	0	0.40	0	0.35
2	0.74	4	0.60	1	0.40
3	0.76	10	0.90	2	0.45
4	0.81	12	1.01	3	0.50
6	0.87			4	0.54
7	0.91			5	0.60
9	0.98			6	0.62
11	1.01			7	0.66
				8	0.71
				9	0.77
				10	0.80
				11	0.87
				13	1.01



Trial Pit 8

Trial Pit Dimensions (m)	Length	Width	Depth
	1.70	0.60	0.91

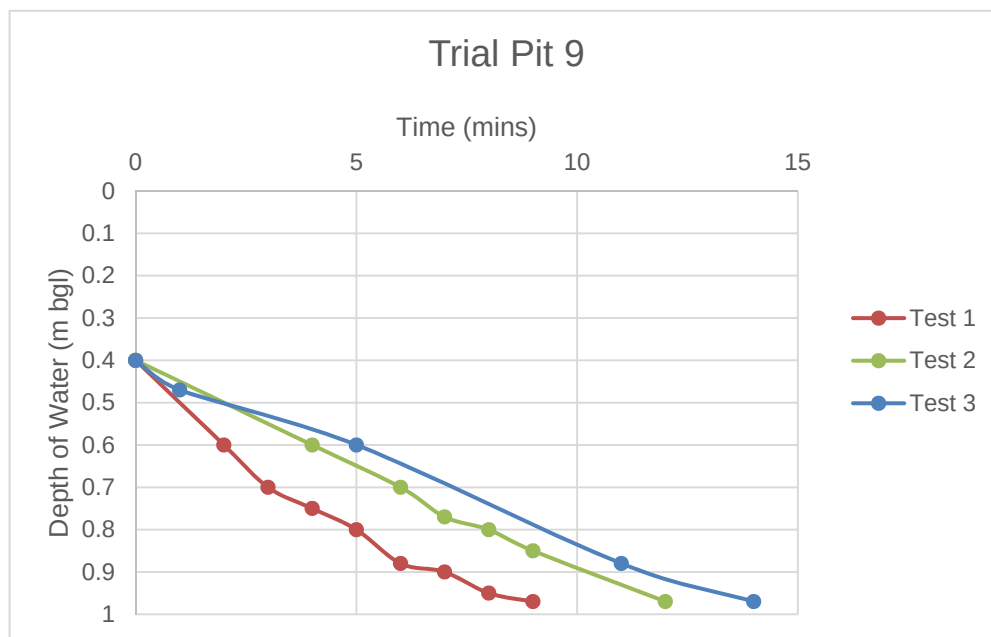
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.30	0	0.29	0	0.30
2	0.91	0.5	0.51	0.5	0.47
		1	0.68	1.5	0.68
		1.5	0.80	2	0.80
		2.5	0.91	2.5	0.85
				3	0.91



Trial Pit 9

Trial Pit Dimensions (m)	Length	Width	Depth
	1.80	0.90	0.97

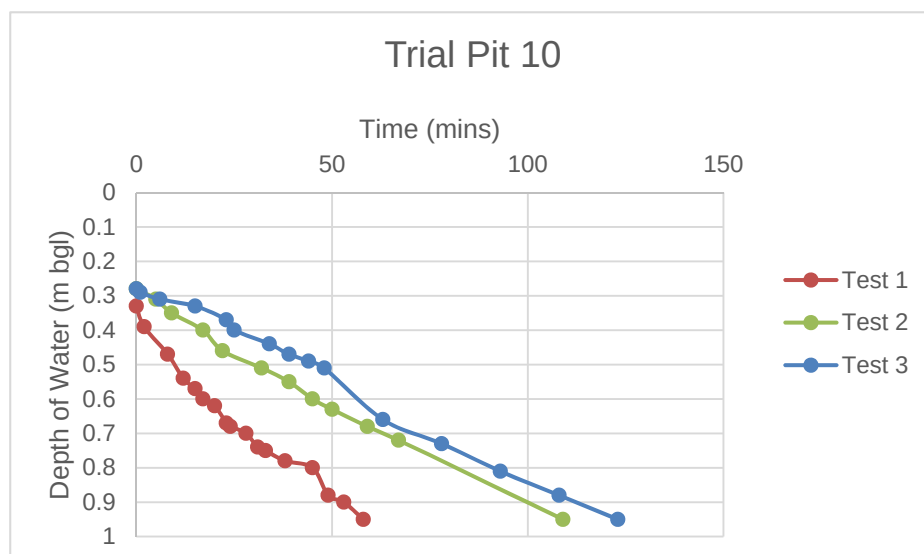
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.40	0	0.40	0	0.40
2	0.60	4	0.60	1	0.47
3	0.70	6	0.70	5	0.60
4	0.75	7	0.77	11	0.88
5	0.80	8	0.80	14	0.97
6	0.88	9	0.85		
7	0.90	12	0.97		
8	0.95				
9	0.97				



Trial Pit 10

Trial Pit Dimensions (m)	Length	Width	Depth
	1.80	0.90	0.95

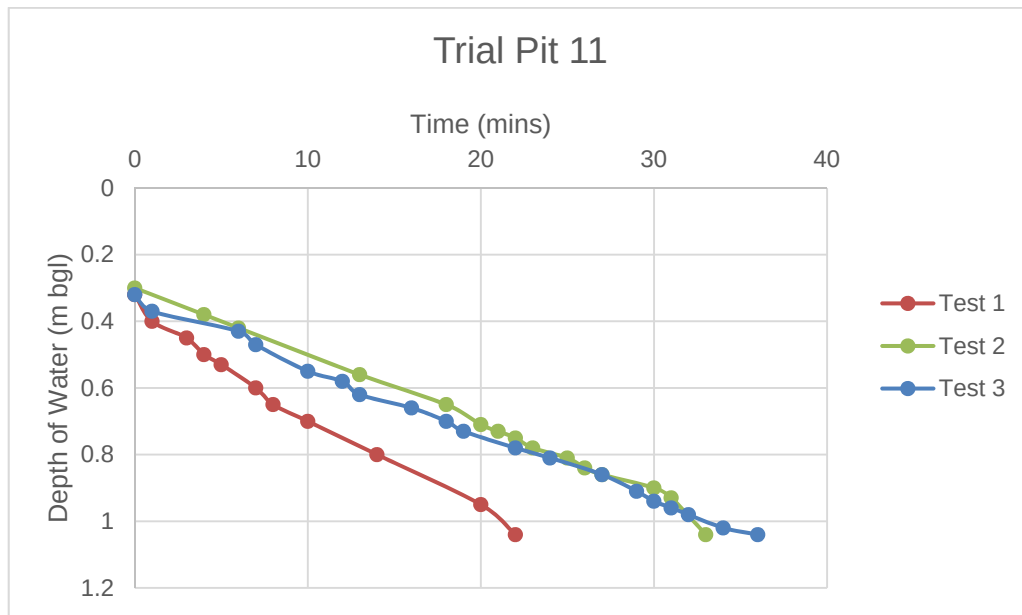
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.33	0	0.28	0	0.28
2	0.39	5	0.31	1	0.29
8	0.47	9	0.35	6	0.31
12	0.54	17	0.40	15	0.33
15	0.57	22	0.46	23	0.37
17	0.60	32	0.51	25	0.40
20	0.62	39	0.55	34	0.44
23	0.67	45	0.60	39	0.47
24	0.68	50	0.63	44	0.49
28	0.70	59	0.68	48	0.51
31	0.74	67	0.72	63	0.66
33	0.75	109	0.95	78	0.73
38	0.78			93	0.81
45	0.80			108	0.88
49	0.88			123	0.95
53	0.90				
58	0.95				



Trial Pit 11

Trial Pit Dimensions (m)	Length	Width	Depth
	1.70	0.70	1.04

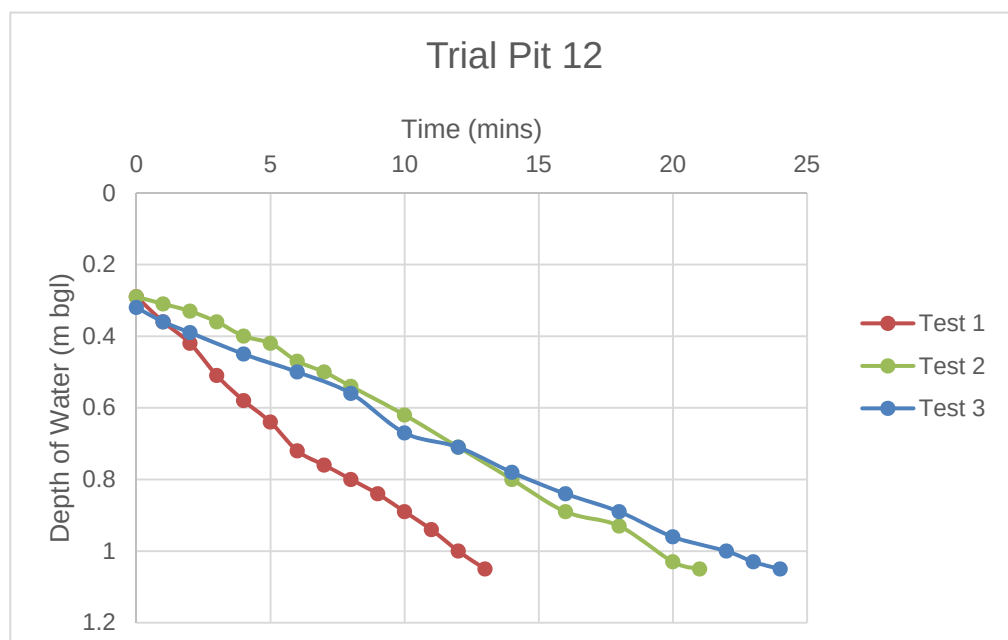
Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.32	0	0.30	0	0.32
1	0.40	4	0.38	1	0.37
3	0.45	6	0.42	6	0.43
4	0.50	13	0.56	7	0.47
5	0.53	18	0.65	10	0.55
7	0.60	20	0.71	12	0.58
8	0.65	21	0.73	13	0.62
10	0.70	22	0.75	16	0.66
14	0.80	23	0.78	18	0.70
20	0.95	25	0.81	19	0.73
22	1.04	26	0.84	22	0.78
		27	0.86	24	0.81
		30	0.90	27	0.86
		31	0.93	29	0.91
		33	1.04	30	0.94
				31	0.96
				32	0.98
				34	1.02
				36	1.04



Trial Pit 12

Trial Pit Dimensions (m)	Length	Width	Depth
	1.30	0.65	1.05

Test 1		Test 2		Test 3	
Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)	Time (mins)	Depth of water (m bgl)
0	0.29	0	0.29	0	0.32
1	0.36	1	0.31	1	0.36
2	0.42	2	0.33	2	0.39
3	0.51	3	0.36	4	0.45
4	0.58	4	0.40	6	0.50
5	0.64	5	0.42	8	0.56
6	0.72	6	0.47	10	0.67
7	0.76	7	0.50	12	0.71
8	0.80	8	0.54	14	0.78
9	0.84	10	0.62	16	0.84
10	0.89	12	0.71	18	0.89
11	0.94	14	0.80	20	0.96
12	1.00	16	0.89	22	1.00
13	1.05	18	0.93	23	1.03
		20	1.03	24	1.05
		21	1.05		



Appendix C – Photographs



Trial Pit 2



Trial Pit 9



Trial Pit 11