

REF: 1885/BG/RepLet/pbg

Mr Andy Tingle,
Wireframe Studio Ltd,
Studio One, Menzels Court
301 Ecclesham Road,
Sheffield, S11 8NX

11th October 2016

Dear Andy,

RE: KARINYA COTTAGE, BWLCHGWYN, WREXHAM – SOAKAWAY TESTING

1.0 Introduction

Mr & Mrs Price (PR) are proposing to build a single detached house on land adjacent to their property called Karinya Cottage in Wesley Road, Bwlchgwyn.

GroundSolve Ltd (GSL) have been appointed by Wireframe Studio Ltd (WSL) the architects for the scheme, on behalf of PR, to carry out a single trial pit and soakaway test to determine if soakaways are suitable for the development drainage.

This report presents the findings of the investigation, and presents the results of the soakaway testing.

2.0 Site Location and Description

The site lies to the south of Wesley Road, Bwlchgwyn at National Grid Reference SJ 261, 534.

The site is bounded to the north by Wesley Road, to the west by “Karinya Cottage”, to the south by open fields and to the east by a shared access drive, between Karinya Cottage and the land owner of the field to the south of the site, see Figure 1.

The site is currently covered with gravel to the south and grass with a number of coniferous trees to the north. A wooden shed and small residential oil tank is also located in the centre of the site.

Photographs of the site are presented in Appendix A.

3.0 Geology

The geology of the site has been studied on the 1:50,000 scale geology plan, Sheet 121. In addition the British Geological Survey (BGS) website Geology of Britain has been researched.

These show the site to be underlain by interbedded limestone and sandstone bedrock of the Minera Formation, formed during the Carboniferous Period.

There are no faults shown crossing the site.

4.0 Proposed Development

The proposed development comprises one, detached house immediately east of Karinya Cottage, with access off Wesley Road to the north of the site; the proposed layout is presented on Figure 1.

5.0 Site Investigation

The investigation was carried out on 7th October 2016 and comprised one machine excavated trial pit to a depth of 2.15m, with three soakaway tests undertaken within the pit. The trial pit was excavated at the position of the proposed soakaway to the rear of the property. It was not possible to access the position of the proposed soakaway at the front of the property.

The trial pit was excavated using a JCB 3CX under the full time supervision of an engineer from GSL, who logged the trial pits in general accordance with BS 5930. The trial pits were then filled quickly with water using a 2,000 gallon water bowser, the tests were carried out in accordance with BRE Digest 365, with three tests undertaken in the pit. No samples were taken from the trial pits.

The location of the trial pit is presented on Figure 1 and the logs presented in Appendix B.

6.0 Ground Conditions

The ground conditions encountered in the trial pit are presented below.

Made Ground

Made ground was encountered to a depth of 0.35m and comprised loose, grey, gravel hardcore, constituting the driveway surfacing to 0.05m over loose, brown, clayey, silty, sandy, angular to sub angular, fine to coarse, gravel with a little wood fragments and some to much brick and concrete cobble to a depth of 0.35m.

Previous Topsoil Layer

The previous topsoil layer comprised firm, dark brown, locally mottled orangish brown, slightly sandy, slightly gravelly, silty, clay/ clayey, silt, with some roots, rootlets and wood fragments to a depth of 0.80m.

Weathered Bedrock

The bedrock was weathered near surface to firm, dark grey, mottled yellowish brown, slightly sandy, slightly gravelly, silty clay, with some limestone cobble and a little rootlets to a depth of 1.90m.

Below 1.90m the bedrock comprised mudstone recovered as cobbles and gravel, within a clay matrix, with the excavator refusing at a depth of 2.15m.

Groundwater

Groundwater was not encountered within the pit.

7.0 Soakaway Testing

The results of the soakaway tests are summarised in the table below and presented in full in Appendix C.

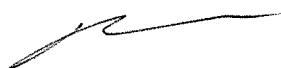
The test durations varied between 1h in test 1 and 3hr 20min in test 3.

Test No.	Depth (m)	Permeability m/sec
1	2.15	7.80×10^{-5}
2	2.15	4.007×10^{-5}
3	2.15	1.986×10^{-5}

The soakaway test results have revealed that the underlying weathered bedrock below 1.90m depth is suitable for soakaways. Based on the test results a design permeability of 1.0×10^{-5} m/sec is recommended for the design of the soakaway. However, it should be noted that only 0.25m of penetration into the underlying bedrock was possible using a JCB, and it may be necessary to deepen the soakaway excavation using a hydraulic/pneumatic breaker to achieve the required penetration

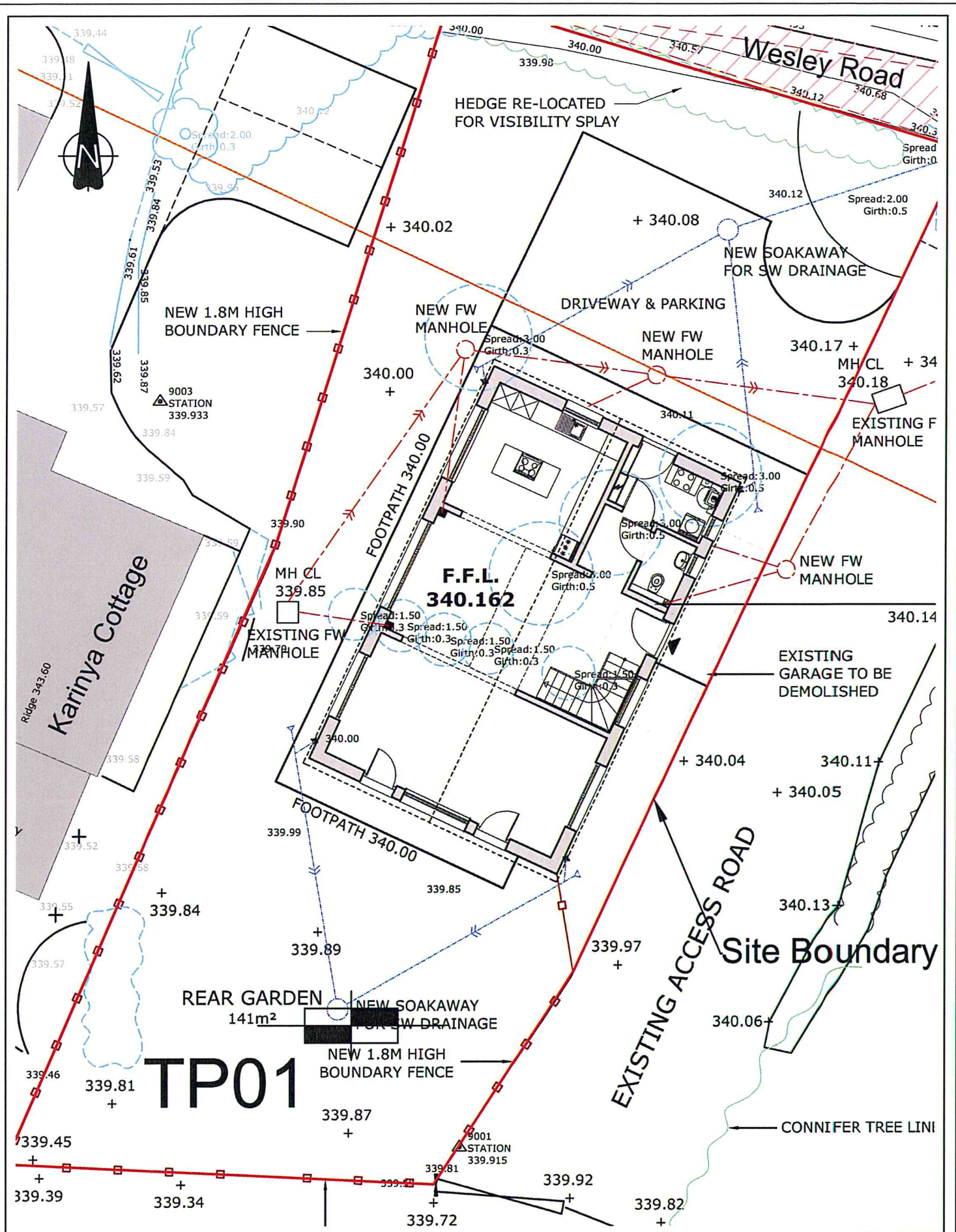
We trust this is satisfactory, should you have any queries please call Mike Scott on 01244 661361.

Yours sincerely



P B Green

FIGURES



SCALE 1:100 @ A4

Figure Title
**PROPOSED DEVELOPMENT &
TRIAL PIT LOCATION**

FIGURE 1

APPENDIX A
Site Photographs



Photograph 1 looking south along the shared drive from Wesley Road



Photograph 2 looking south west across the southern half of the site



Photograph 3 looking north east across the northern half of the site



Photograph 4 looking north west from the south east corner of the site

APPENDIX B

Trial Pit Logs

Depth (m)	Strata
0.00-0.05	Loose grey sub angular to sub rounded coarse gravel over very loose light grey silty sandy angular to sub angular coarse GRAVEL (MADE GROUND)
0.05-0.35	Loose brown clayey silty sandy angular to sub angular fine to coarse GRAVEL with a little wood fragments and some to much sub angular to sub rounded concrete and brick cobble (MADE GROUND)
0.35-0.80	Firm dark brown locally mottled orangish brown slightly sandy slightly gravelly silty CLAY/ clayey SILT with some roots and rootlets and wood fragments. Gravel is sub angular fine to medium (PREVIOUS TOPSOIL LAYER)
0.80-1.90	Firm dark grey mottled yellowish brown slightly sandy slightly gravelly silty CLAY with some sub angular to sub rounded limestone cobble and a little rootlets. Gravel is sub angular to sub rounded fine to coarse (WEATHERED BEDROCK)
1.90-2.15	Dense to very dense dark grey as sub angular COBBLE and sub angular fine to coarse GRAVEL in a silty clay matrix (WEATHERED BEDROCK)

Notes

1. Pit dimensions 0.70m x 1.90m x 2.15m,
2. Pit sides were stable,
3. Groundwater was not encountered,
4. Excavator refused at 2.15m.



Trial Pit 01



Trial Pit 01

Test 1				Test 2				Test 3			
Time (mins)	Depth of water (m)	Fall (cm)	Cumulative fall (cm)	Time (mins)	Depth of water (m)	Fall (cm)	Cumulative fall (cm)	Time (mins)	Depth of water (m)	Fall (cm)	Cumulative fall (cm)
0	1.03			0	0.87			0	0.82		
1	1.08	5	5	1	0.89	2	2	1	0.83	1	1
2	1.11	3	8	2	0.91	2	4	2	0.84	1	2
3	1.16	5	13	3	0.93	2	6	3	0.85	1	3
4	1.18	2	15	4	0.95	2	8	4	0.86	1	4
5	1.20	2	17	5	0.97	2	10	5	0.87	1	5
6	1.24	4	21	6	0.98	1	11	6	0.88	1	6
7	1.26	2	23	7	0.99	1	12	7	0.89	1	7
8	1.28	2	25	8	1.00	1	13	8	0.90	1	8
9	1.30	2	27	9	1.01	1	14	9	0.91	1	9
10	1.32	2	29	10	1.02	1	15	10	0.91	0	9
15	1.42	10	39	15	1.08	6	21	15	0.95	4	13
20	1.49	7	46	20	1.15	7	28	20	1.00	5	18
25	1.56	7	53	27	1.23	8	36	25	1.03	3	21
30	1.64	8	61	30	1.26	3	39	30	1.06	3	24
40	1.78	14	75	40	1.36	10	49	45	1.15	9	33
50	1.91	13	88	45	1.40	4	53	55	1.21	6	39
60	1.97	6	94	57	1.50	10	63	60	1.24	3	42
				70	1.61	11	74	70	1.28	4	46
				80	1.71	10	84	80	1.33	5	51
				90	1.75	4	88	90	1.38	5	56
				100	1.84	9	97	100	1.42	4	60
				110	1.89	5	102	110	1.48	6	66
				120	2.00	11	113	120	1.52	4	70
								140	1.60	8	78
								160	1.68	8	86
								200	1.83	15	101

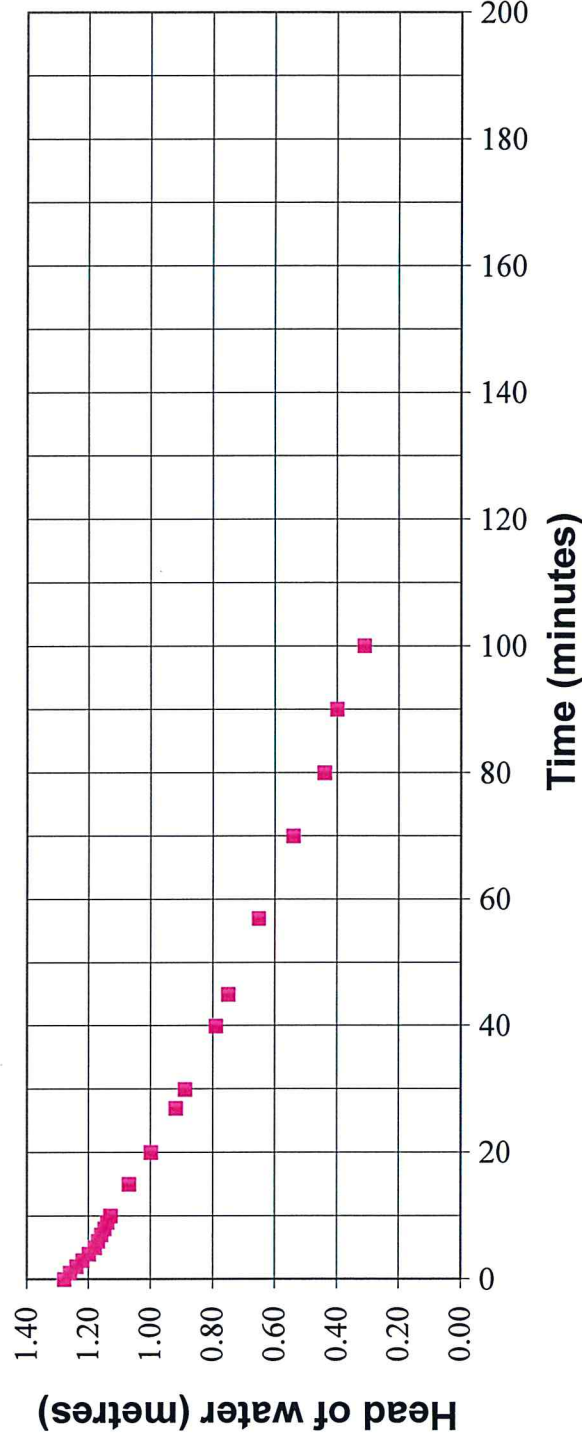
APPENDIX C

Soakaway Results

Time (Mins)	Depth of Water	Head of Water
0	0.87	1.28
1	0.89	1.26
2	0.91	1.24
3	0.93	1.22
4	0.95	1.20
5	0.97	1.18
6	0.98	1.17
7	0.99	1.16
8	1.00	1.15
9	1.01	1.14
10	1.02	1.13
15	1.08	1.07
20	1.15	1.00
27	1.23	0.92
30	1.26	0.89
40	1.36	0.79
45	1.40	0.75
57	1.50	0.65
70	1.61	0.54
80	1.71	0.44
90	1.75	0.40
100	1.84	0.31

GroundSolve Ltd

Bwlchgwyn, Wrexham
TP01 Test 2
07/10/2016



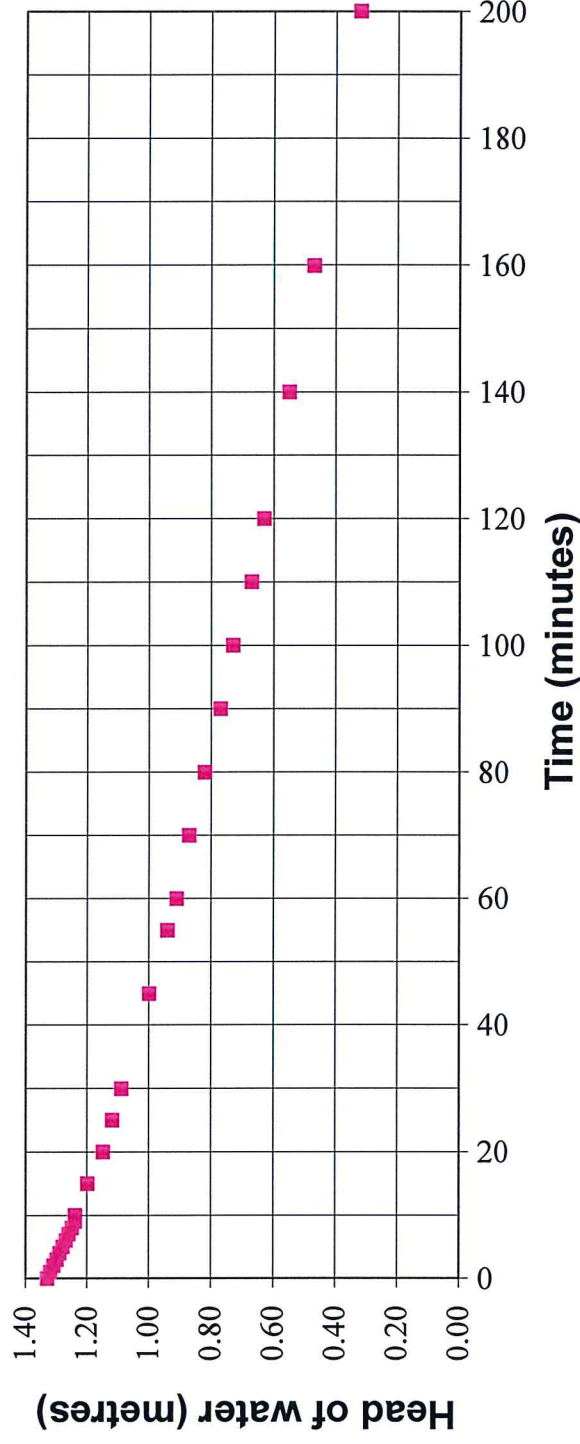
Depth (m)	Length (m)	Width (m)	Head at 75% Vol (m)	Head at 25% Vol (m)	Water depth(t=0) (m)	Effective Area Ap50 m2	Vp75-Vp25 Volume of water m3	Adjustment Factor *	t75 (mins)	t25 (mins)	Infiltration rate m/s
2.15	1.90	0.70	0.960	0.32	1.28	4.658	0.851	1.00	24	100	4.007E-05

* with gravel filter adjustment factor = 0.30, with no filter = 1.0

Time (Mins)	Depth of Water	Head of Water
0	0.82	1.33
1	0.83	1.32
2	0.84	1.31
3	0.85	1.30
4	0.86	1.29
5	0.87	1.28
6	0.88	1.27
7	0.89	1.26
8	0.90	1.25
9	0.91	1.24
10	0.91	1.24
15	0.95	1.20
20	1.00	1.15
25	1.03	1.12
30	1.06	1.09
45	1.15	1.00
55	1.21	0.94
60	1.24	0.91
70	1.28	0.87
80	1.33	0.82
90	1.38	0.77
100	1.42	0.73
110	1.48	0.67
120	1.52	0.63
140	1.60	0.55
160	1.68	0.47
200	1.83	0.32

GroundSolve Ltd

Bwlchgwyn, Wrexham
TP01 Test 3
07/10/2016



Depth (m)	Length (m)	Width (m)	Head at 75% Vol (m)	Head at 25% Vol (m)	Water depth(t=0) (m)	Effective Area Ap50 m2	Vp75-Vp25 Volume of water m3	Adjustment Factor *	t75 (mins)	t25 (mins)	Infiltration rate m/s
2.15	1.90	0.70	0.998	0.33	1.33	4.788	0.884	1.00	45	200	1.986E-05

* with gravel filter adjustment factor = 0.30, with no filter = 1.0