STEVENSON ASSOCIATES

BARNSLEY ROAD, BRIERLEY

FLOOD RISK and DRAINAGE STATEMENT

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Telephone 01977 682824

CONTENTS

THREE HORSESHOES, BARNSLEY ROAD, BRIERLEY, S72 9JT

INTRODUCTION

1 Planning Permission is sought to develop land at Barnsley Road in Brierley and this report has been commissioned to determine how the site will be drained and whether the site will be affected by flooding or if the development will cause others to flood.

2 This report should be read in conjunction with the ground investigation and topographical survey prepared by Met Geo Environmental along with design proposals prepared by Mark Booth Design (drawing extracts are appended to this report for illustrative purposes).

THE SITE

3 Brierley is a village approximately six kilometres northeast of Barnsley. The site being considered is the car park of the former public house, 'The Three Horseshoes' positioned on the south side of Barnsley Road at its junction with Church Street; Barnsley Road being the main road passing through the village – the A628. Approximately the site is located at OS Grid Reference is 440705e, 411240n.

4 The site is regular is shape of about 0.14 ha in size, measuring approximately 32 metres in width along the frontage and around 44 metres in depth. There is a minor fall across the width of the site from east to west but predominantly the site falls from the rear towards Barnsley Road (south to north). Along a central line through the site, the boundary level at the rear is 102.2m and Barnsley Road is at 97.6m, this would produce a natural gradient of around 10% (1 in 14) however, the land is currently terraced and retained along the front.

5 The car park is traditional (tarmac and kerbs) laid out with two areas separated by a grassed central verge. To make the area more accessible it has been terraced to create a flatter surface: the site is cut-in at the rear and the front of the car park is raised above Barnsley Road retained by a wall, varying in height from zero at the entrance to 1.6m high at its maximum – but typically around 1 metre.

EXISTING GROUND CONDITIONS

6 A site investigation including bore holes and trial pits was undertaken by MET on the 14th June 2017. In summary, the car park sits upon approximately 1.5m of 'drift' (mixed sands, gravels, clays) over sandstone and mudstone. (See Appendix 3)

7 A percolation test in line with BRE Digest 365 was carried out by 'Sub Scan UDS' on 25 April 2017 which produced a worse case infiltration result of 0.2158 metres per hour (5.99^{-5} m/s). (See Appendix 4)

EXISTING DRAINAGE

Foul Water

8 There are no foul water facilities on this site, but the adjacent former public house has two drain connections to a 225mm combined public sewer in Church Street / Barnsley Road taking both foul and surface water.

Surface Water

9 Surface water from the entrance and area close to the public house drains towards the building and via 'Aco' type grated channels drains direct to the public combined sewer; this accounts for around 15 to 20%.

10 The main body of the car park is split into two areas, separated by a grassed verge. Surface water from the rear section drains towards the front, where some of it passes through the verge in a pipe to flow onto the front section and the remainder appears to overflow the kerb and either soaks into the verge or spills over it onto the front section of car park.

11 The front section of car park has only one gully and the outlet pipe from this discharges water through the retaining wall onto the footway of Barnsley Road; and from there surface water flows into road gullies and to the combined sewer. The gully probably drains around 50% of the area. Surface water from the remainder overflows the kerb and soaks into the verge adjacent the front boundary (retaining) wall or onto the drive of the adjacent property (Thorn Gap). The retaining wall has piped weep-holes allowing water immediately behind the wall to flow onto Barnsley Road.

Gully in car park adjacent to boundary wall	Barnsley Road side of boundary wall showing gully outlet pipe
	

Weep holes in boundary wall

12 It is difficult to quantify precisely but approximately 70 – 75% of the surface water falling on the car park drains to the public combined sewer either directly from Aco drains on site or via highway gullies on Barnsley Road. The rest soaks away.

PROPOSED DEVELOPMENT

13 It is proposed to build two residential dwellings served via the existing Barnsley Road access. All existing surfacing will be removed and gardens will be created using imported topsoil as necessary.

14 The site will be developed with separate foul and surface water drainage systems.

Foul water

15 Foul water from the new dwellings will drain to the public combined sewer in Barnsley Road.

Surface Water

16 Surface water from the two roofs will be drained to soakaways, designed and constructed in line with the latest edition of BRE Digest 365 to be adequately sized for storms up to 1 in 100-years (1% chance of annual occurrence) with additional allowances for climate change – currently regarded as a 30% increase in rainfall intensities.

17 Any soakaway towards the front of the site will be constructed below the level of Barnsley Road in order to prevent surface water in large volumes re-emerging through weep-holes onto the footway.

18 Drives and other hard-standing areas will be permeable allowing rainwater to soak directly into the ground.

FLOOD ZONES

19 The site is not within or close to an area designated Flood Zones 2 or 3 and is therefore identified as not being at risk to flooding from rivers or sea (less than a 0.1% risk of flooding annually – 1/1000).

20 Environment Agency's maps also show the site is not subject to surface water flooding.

SUMMARY

21 It is proposed to build two dwellings on land previously used as a car park for the Three Horseshoes (PH) in Brierley.

22 The development will be drained via separate foul and surface water sewers and foul water will be drained directly to the public combined sewer in Barnsley Road.

23 Surface water from the new dwellings will drain to soakaways and rainwater falling on drives and gardens will be allowed to soak away at source.

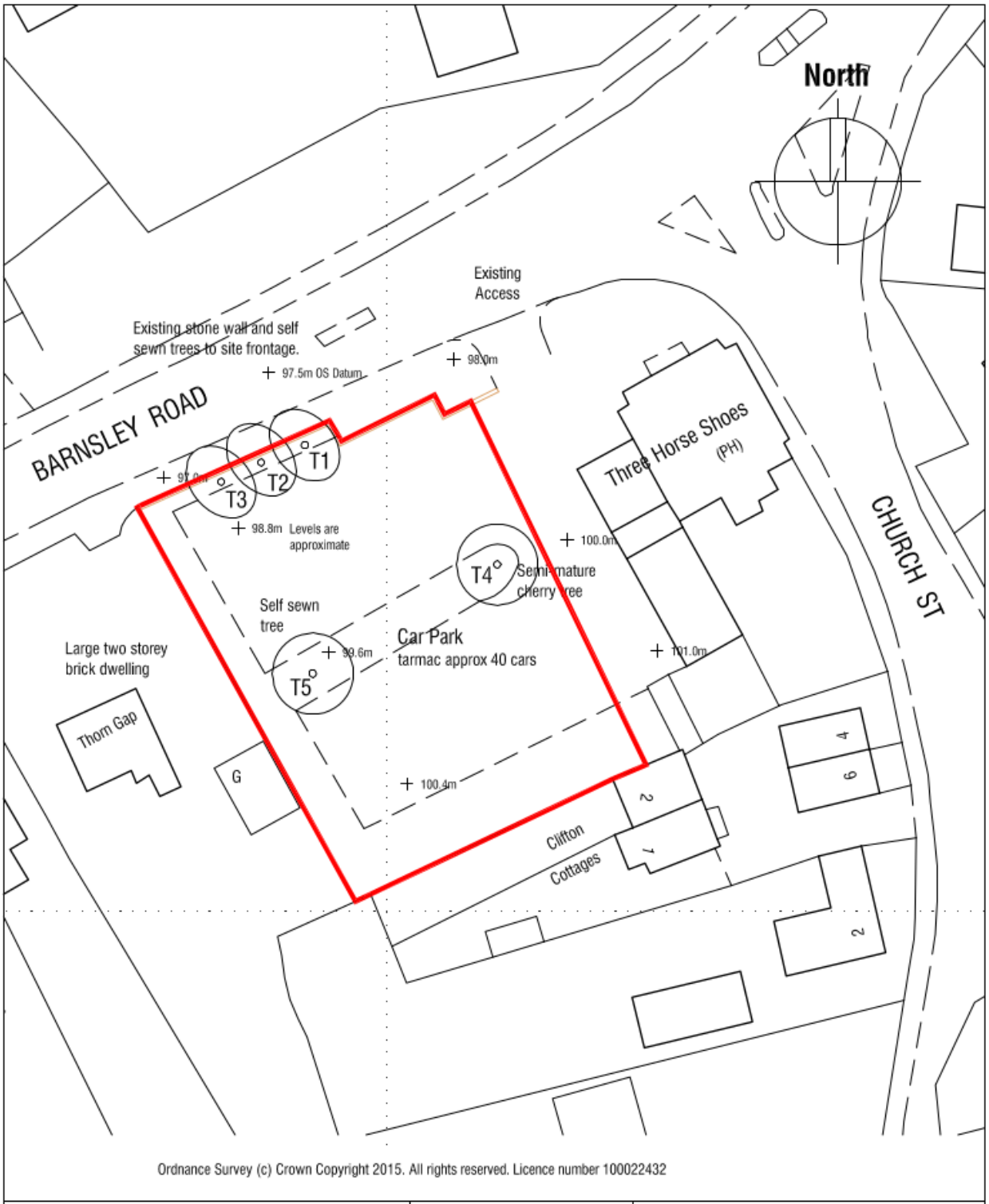
24 The site is not within a flood risk area (Flood Zone 2 or 3) or subject to surface water flooding.

M. Stevenson

Michael Stevenson

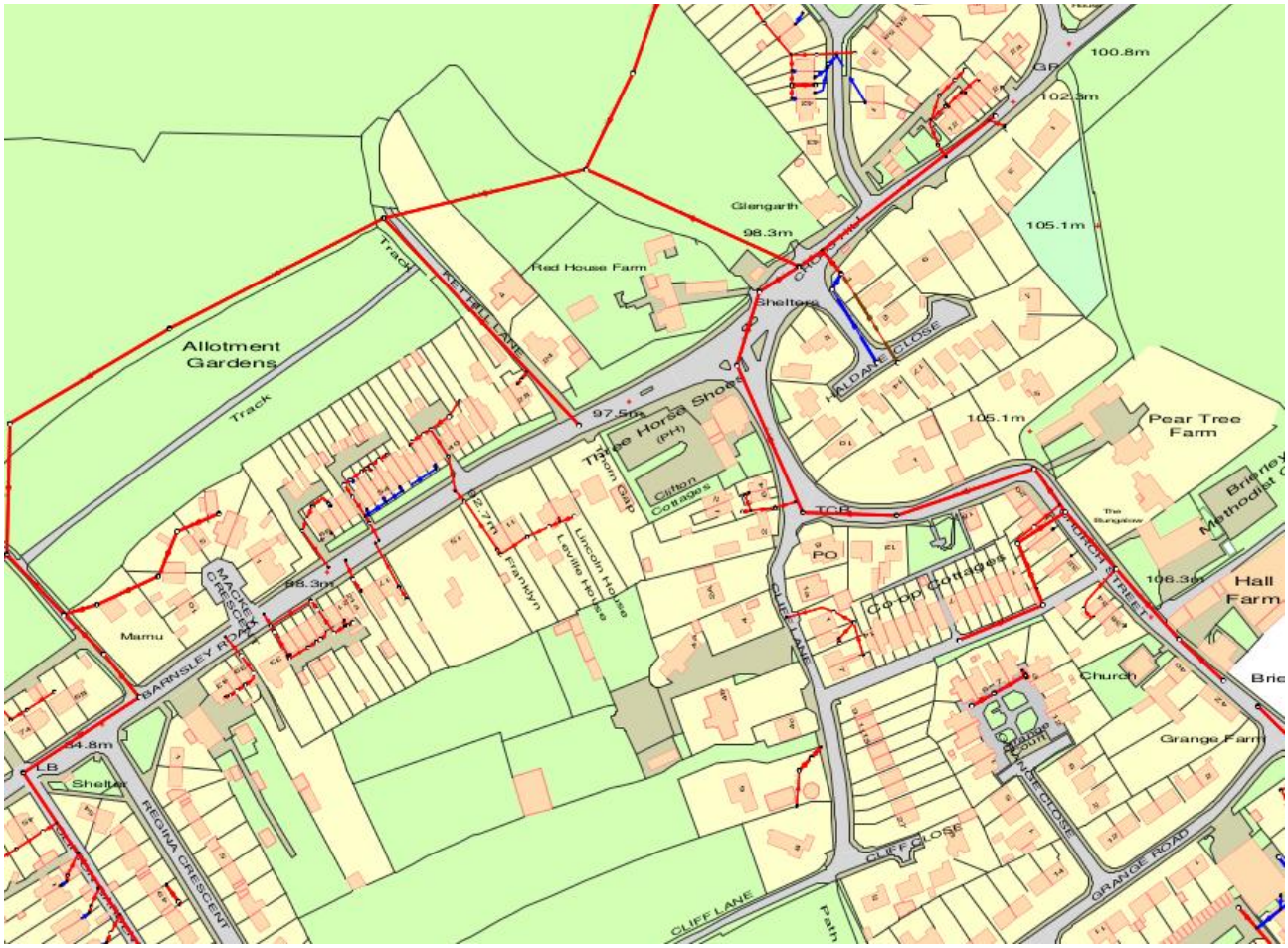
12th July 2017

APPENDIX 1 – LOCATION PLAN



THREE HORSE SHOES PH **BARNSLEY ROAD** **BRIERLEY** **BARNSLEY** **BLOCK PLAN AS EXISTING**	Scale 1:500 Date May 2017 Ref 17.13 Drwg No BP1	mboothdesign architectural design and building consultants Fairfield House Berneslai Close Barnsley S70 2FL T: 01226 286256 M: 07881898300 E: mark@mboothdesign.co.uk

APPENDIX 2 – EXISTING PUBLIC SEWERS



APPENDIX 3 – BORE HOLE AND TRIAL HOLE RECORDS

GEOINVESTIGATE Ltd.

Your Ref. 13187/5001 **Our Ref.** G17218 **RH No.1** **Sheet No. 1 of 2**
Location: Three Horse Shoes, Brierley S72 9JT **DATE:** 14/06/17

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
1.40	Light brown DRIFT	1400							
4.30	Orange SILTSTONE, SANDSTONE inclusions	2900					Lost flush at 3.70m		2.50
6.40	MUDSTONE	2100					Flush returned at 6.60m		5.00
18.4	Light grey MUDSTONE with occasional SANDSTONE inclusions	12000					Flush lost at 11.20m		7.50 10.00 12.50 15.00 17.50
19.9	Possible COLLAPSED WORKINGS	1500							
	MUDSTONE with occasional SANDSTONE inclusions	10100							20.00 22.50
	Rotary hole continued on page 2								25.00

Remarks: Casing to 1.00m
Microdrill rotary open hole borehole to 30.00m
No cores recovered from borehole
No gas detected from borehole on completion
Lost flush at 11.20m. No voids encountered.

Key:
Slotted Pipe
Plain Pipe
Bentonite
Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH1

GEOINVESTIGATE Ltd.

Your Ref. 13187/5001 **Our Ref.** G17218 **RH No.1** **Sheet No. 2 of 2**
Location: Three Horse Shoes, Brierley S72 9JT **DATE:** 14/06/17

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
	MUDSTONE with occasional SANDSTONE inclusions	10100							27.50
30.0									30.00
	Rotary hole terminated at 30.00m								

Remarks: Casing to 1.00m
Microdrill rotary open hole borehole to 30.00m
No cores recovered from borehole
No gas detected from borehole on completion
Flush lost at 11.20m. No voids encountered.

Key:

Slotted Pipe
Plain Pipe
Bentonite
Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH1

GEOINVESTIGATE Ltd.

Your Ref. 13187/5001 **Our Ref.** G17218 **RH No.2** **Sheet No. 1 of 2**
Location: Three Horse Shoes, Brierley S72 9JT **DATE:** 14/06/17

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
1.60	Dark brown DRIFT	1600							
6.80	Orange SILTSTONE with occasional SANDSTONE inclusions	5200					Lost return at 5.40m		2.50 5.00
19.3	MUDSTONE with occasional SANDSTONE inclusions	12500							7.50 10.00 12.50 15.00 17.50
20.4	Possible COLLAPSED WORKINGS	1100							20.00
	MUDSTONE with occasional SANDSTONE inclusions Rotary hole continued on page 2	9600							22.50 25.00

Remarks: Casing to 1.00m
Microdrill rotary open hole borehole to 30.00m
No cores recovered from borehole
No gas detected from borehole on completion
Lost flush at 5.40m. No voids encountered.

Key:
- Slotted Pipe
- Plain Pipe
- Bentonite
- Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH2

GEOINVESTIGATE Ltd.

Your Ref. 13187/5001 **Our Ref.** G17218 **RH No.2** **Sheet No. 2 of 2**
Location: Three Horse Shoes, Brierley S72 9JT **DATE:** 14/06/17

Depth (m)	Description of Strata	Thick -ness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
	MUDSTONE with occasional SANDSTONE inclusions	9600							27.50
30.0									30.00
	Rotarty hole terminated at 30.00m								

Remarks: Casing to 1.00m
Microdrill rotary open hole borehole to 30.00m
No cores recovered from borehole
No gas detected from borehole on completion
Flush lost at 5.40m. No voids encountered.

Key:

Slotted Pipe
Plain Pipe
Bentonite
Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH2

SW•WS
• GEOTECHNICAL
• ENVIRONMENTAL
• SITE INVESTIGATIONS

Cloverdale
Haugh Head
Wooler
NE71 6QS

CLIENT MLEI ENGINEERS
LOCATION THREE HORSE SHOE BRIERLEY
JOB No. 13187-S001
BOREHOLE No. 01
RIG TYPE DART
DATE WEDS 14TH JUNE 2017.
OPERATOR S. WOOD.

DAILY RECORD SHEET

STRATA DISCRIPTION	START DEPTH	STRATA BASE (m)
	G.L.	
TARMAC		0.050
COMPACT RED BROWN SANDY SINGLES BRICK BLASE MADE GROUND		0.360
SOFT BROWN/GREENY BROWN SLIGHTLY SILTY GRAVELLY CLAY, SOME FINE GRAVELS, SLIGHT ORGANIC ODOUR (DAMP). MADE GROUND.		0.775
STIFF LIGHT BROWN/ORANGE BROWN MOTTLED SILTY CLAY, SOME FINE SANDSTONE FRAGMENTS/ GRAVELS		1.200
STIFF BROWN VERY SANDY SILTY CLAY POSSIBLE COMPLETELY WEATHERED MUDSTONE/ SILTSTONE.		1.700
COMPLETELY/HIGHLY WEATHERED FINE SANDY BROWN/ LIGHT BROWN MUDSTONE/SILTSTONE		1.900
HIGHLY WEATHERED LIGHT BROWN/YELLOW BROWN FINE SANDSTONE.		
Borehole Complete / Incomplete		2.160

TESTING: SPT(s) CPT(c) U100(u) VANE TEST(v)

Type No.	m From	m To	Blows	0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	V Reading
S	1.00	1.45		1	2	3	3	3	4	
S	1.90	2.015		15	10	(115mm)				
S	2.015	2.160		23	27	(145mm)				

SAMPLES:- BULK (B) DISTURBED (D)

Type No.	m From	m To	Sampler Used (mm)	Recovery (mm)
D	0.40			
J	0.40			
V	0.40			
B	0.80	1.20		

CASING

Size (mm)	From	To
115	G.L.	1.00

INSTALLATION

Type	Size	Depth (m)	Seal Top (m)	Seal Bottom (m)
GAS/WATER	63mm	1.90	0500-0100	

CORING

Ground	From (m)	To (m)

WATER

Observation	Depth	Sealed	In Flow	Casing
DRY				1.00

REMARKS

ARISING DISPOSED ON SITE.

SIGNED
DRILLER

CLIENT

SW WS
- GEOTECHNICAL
- ENVIRONMENTAL
- SITE INVESTIGATIONS

Cloverdale
Haugh Head
Wooler
NE71 6QS

CLIENT MET ENGINEERS
LOCATION THREE HORSE SHOES · BOLEBURN
JOB No. 138157-5001
BOREHOLE No. 02
RIG TYPE DART
DATE WEDS 14TH JUNE 2017
OPERATOR S. WOOD

DAILY RECORD SHEET

STRATA DISCRIPTION	START DEPTH	STRATA BASE (m) G.L.
TARMAC		0.090
COMPACT DARK BROWN SANDY SUBANGULAR BRICK BASE · MADE GROUND.		0.265
COMPACT BLACK/DARK BROWN SANDY GRAVELLY BRICK RUBBLE, BRICK, COAL FRAGMENTS. MADE GROUND.		0.750
STIFF LIGHT GREY/ORANGE BROWN MOTTLED SILTY CLAY, SOME SANDSTONE GRAVELS/ FRAGMENTS.		1.400
COMPLETELY WEATHERED LIGHT BROWN/BROWN SANDY MUDSTONE/SILTSTONE.		2.375
HIGHLY WEATHERED LIGHT BROWN/YELLOW BROWN FINE SANDSTONE.		
Borehole Complete / ~~Incomplete~~		2.790

TESTING: SPT(s) CPT(c) U100(u) VANE TEST(v)

Type No.	m From	m To	Blows	0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	V Reading
S	1.00	1.45		2	2	3	3	3	3	
S	2.00	2.45		4	4	3	4	9	8	
S	2.50	2.610		10	15	(150mm)				
S	2.650	2.790		24	26	(140mm)				

SAMPLES:- BULK (B) DISTURBED (D)

Type No.	m From	m To	Sampler Used (mm)	Recovery (mm)
D	0.50			
J	0.50			

CASING

Size (mm)	From	To
115	G.L.	1.00

INSTALLATION

Type	Size	Depth (m)	Seal Top (m)	Seal Bottom (m)

CORING

Ground	From (m)	To (m)

WATER

Observation	Depth	Sealed	In Flow	Casing
DRY				1.00

REMARKS

BH BACKFILLED WITH ARISINGS.

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SW•WS

- GEOTECHNICAL
- ENVIRONMENTAL
- SITE INVESTIGATIONS

Cloverdale
Haugh Head
Wooler
NE71 6QS

DAILY RECORD SHEET

CLIENT: MET ENGINEERS
LOCATION: THREE HORSE SHOES BRIERLEY
JOB No.: 13187-SJD1
BOREHOLE No.: 03
RIG TYPE: DART
DATE: WEDS 14TH JUNE 2017
OPERATOR: S. WOOD.

STRATA DISCRIPTION	STRATA BASE (m)
START DEPTH	G.L.
TARMAC.	0.030
COMPACT BRICK CONCRETE RUBBLE MADE GROUND.	0.160
COMPACT BROWN YELLOW BROWN SANDY SANDSTONE FRAGMENTS. SOME BRICK, COAL FRAGMENTS. DAMP FROM 0.50 TO BASE. MADE GROUND.	0.700
FIRM ORANGE BROWN/LIGHT BROWN SILTY CLAY, WITH SOME FINE SANDSTONE GRAVELS/FRAGMENTS SANDSTONE COBBLE 0.850-1.00	1.00
STIFF LIGHT BROWN/LIGHT BROWN MOTTLED SILTY CLAY SOME FINE SANDSTONE GRAVEL/FRAGMENTS.	1.750
COMPLETELY/HIGHLY WEATHERED, BROWN/LIGHT BROWN/ORANGE BROWN SANDY FRIABLE MUDSTONE/SILTSTONE	
Borehole Complete / ~~Incomplete~~	3.170

TESTING: SPT(s) CPT(c) U100(u) VANE TEST(v)

Type No.	From (m)	To (m)	U Blows	0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	V Reading
S	1.00	1.45		3	3	3	2	2	3	
S	2.00	2.45		3	3	7	8	9	9	
S	2.90	3.045		10	15	(145mm)				
S	3.045	3.170		26	24	(125mm)				

SAMPLES:- BULK (B) DISTURBED (D)

Type No.	From (m)	To (m)	Sampler Used (mm)	Recovery (mm)
D	0.50			
J	0.50			
V	0.50			
B	1.00	1.30		

CASING

Size (mm)	From	To
115	G.L.	1.00

INSTALLATION

Type	Size	Depth (m)	Seal Top (m)	Seal Bottom (m)
GAS/WATER	63mm	2.900	0.500-0.100	

WATER

Observation	Depth	Sealed	In Flow	Casing
DRY				1.00

CORING

Ground	From (m)	To (m)

REMARKS

ARISINGS DISPOSED ON SITE.

SIGNED DRILLER [signature]

CLIENT

SW•WS

• GEOTECHNICAL
• ENVIRONMENTAL
• SITE INVESTIGATIONS

Cloverdale
Haugh Head
Wooler
NE71 6QS

DAILY RECORD SHEET

CLIENT: MET ENGINEERS
LOCATION: THREE HORSE SHOE BRIERLEY
JOB No.: 13187-SOOI
BOREHOLE No.: 04
RIG TYPE: DART
DATE: WEDS 14TH JUNE 2017
OPERATOR: S. WOOD

STRATA DISCRIPTION	STRATA BASE (m)
START DEPTH	G.L.
GRASS OVERLYING DARK BROWN SANDY GRAVEL OCCASIONALLY FIRM CLAYEY BANDS. BRICK COAL, ASH, POTTERY FRAGMENTS. MADE GROUND.	0.700
COMPACT YELLOW BROWN/BROWN SANDSTONE SANDSTONE GRAVELS DISTURBED	0.800
COMPACT BROWN SILTY SAND SOME FINE/ MEDIUM SANDSTONE GRAVELS.	1.00
STIFF LIGHT BROWN/LIGHT GREY ORANGE BROWN MOTTLED SILTY CLAY SOME FINE SANDSTONE GRAVELS/FRAGMENTS.	1.875
COMPLETELY/HIGHLY WEATHERED LIGHT BROWN/ BROWN SANDY FRIABLE MUDSTONE.	2.700
HIGHLY WEATHERED LIGHT BROWN/ORANGE BROWN FINE SANDSTONE.	
Borehole Complete / ~~Incomplete~~	2.940

TESTING: SPT(s) CPT(c) U100(u) VANE TEST(v)

Type No.	From (m)	To (m)	U Blows	0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	V Reading
S	1.00	1.45		2	1	2	2	3	3	
S	2.00	2.45		5	7	8	8	7	10	
S	2.75	2.825		25 (75mm)						
S	2.825	2.940		30	20 (115mm)					

SAMPLES:- BULK (B) DISTURBED (D)

Type No.	From (m)	To (m)	Sampler Used (mm)	Recovery (mm)
D	0.30			
J	0.30			

CASING

Size (mm)	From	To
115	G.L.	1.00

INSTALLATION

Type	Size	Depth (m)	Seal Top (m)	Seal Bottom (m)

WATER

Observation	Depth	Sealed	In Flow	Casing
DRY				1.00

CORING

Ground	From (m)	To (m)

REMARKS

BH BACKFILLED WITH ARISINGS.

SIGNED DRILLER [signature]

CLIENT

SW WS
- GEOTECHNICAL
- ENVIRONMENTAL
- SITE INVESTIGATIONS

Cloverdale
Haugh Head
Wooler
NE71 6QS

CLIENT MET ENGINEERS
LOCATION THREE HORSE SHOES BRIERLEY
JOB No. 13187 - SOO1
BOREHOLE No. 05
RIG TYPE DART
DATE WEDS 14TH JUNE 2017
OPERATOR S. WOOD.

DAILY RECORD SHEET

STRATA DISCRIPTION	START DEPTH	STRATA BASE (m)
	G.L.	
TARMAC		0.190
COMPACT LIGHT BROWN SANDY LIMESTONE GRAVELS - SUB-BASE.		0.285
COMPACT DARK BROWN/GREENY BROWN SANDY SILTY GRAVELLY CLAY. COAL FRAGMENTS. SLIGHT ORGANIC ODOUR. MADE GROUND.		0.450
COMPACT LIGHT BROWN/YELLOW BROWN FINE TO MEDIUM SAND WITH FINE/MEDIUM SANDSTONE GRAVELS/FRAGMENTS. POSSIBLE COMPLETELY WEATHERED SANDSTONE RECOVERED AS SANDY SAND GRAVELS.		1.100
STIFF LIGHT BROWN/LIGHT GREY FRIABLE SILTY CLAY. POSSIBLE COMPLETELY WEATHERED MUDSTONE.		1.700
HIGHLY WEATHERED LIGHT BROWN/BROWN/ ORANGE BROWN FINE SANDY MUDSTONE/ SILTSTONE.		
	Borehole Complete / Incomplete	2.420

TESTING: SPT(s) CPT(c) U100(u) VANE TEST(v)

Type No.	m From	m To	Blows	0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	V Reading
S	1.00	1.45		2	2	2	2	3	3	
S	2.00	2.420		5	8	13	15	15	7	(420mm)
S								50		(270mm)

SAMPLES:- BULK (B) DISTURBED (D)

Type No.	m From	m To	Sampler Used (mm)	Recovery (mm)
D	0.40			
J	0.40			
V	0.40			
B	1.10	1.40		

CASING

Size (mm)	From	To
115	G.L.	1.00

INSTALLATION

Type	Size	Depth (m)	Seal Top (m)	Seal Bottom (m)
GAS/WATER	63mm	2.00	0.50-2.00	

CORING

Ground	From (m)	To (m)

WATER

Observation	Depth	Sealed	In Flow	Casing
DRY				1.00

REMARKS

ARISINGS DISPOSED ON SITE.

SIGNED
DRILLER

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APPENDIX 4 – PERCOLATION TEST

Percolation Test Results

Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	**Job No:**	7851
Title	Calculation – Percolation Test	**Sheet:**	1 of 5
Name:	Brendan McHale	**Checked by:**	RSJ

Background:

These calculations have been undertaken to assess the viability of disposal of surface water from soft ground.

Percolation testing was undertaken by Subscan UDS Limited in accordance with the requirements set out within BRE Digest 365. Based upon the size of the development a single test pit was utilised to undertake the percolation test.

Date test undertaken:	25 April 2017			
Weather Conditions:	Dry, overcast			
Number of tests:	1			
Test pit dimensions:	**Length**	**Width**	**Depth**	**Plan Area**
	1.8m	1.2m	1.1m	2.16m^2

Summary of Results:

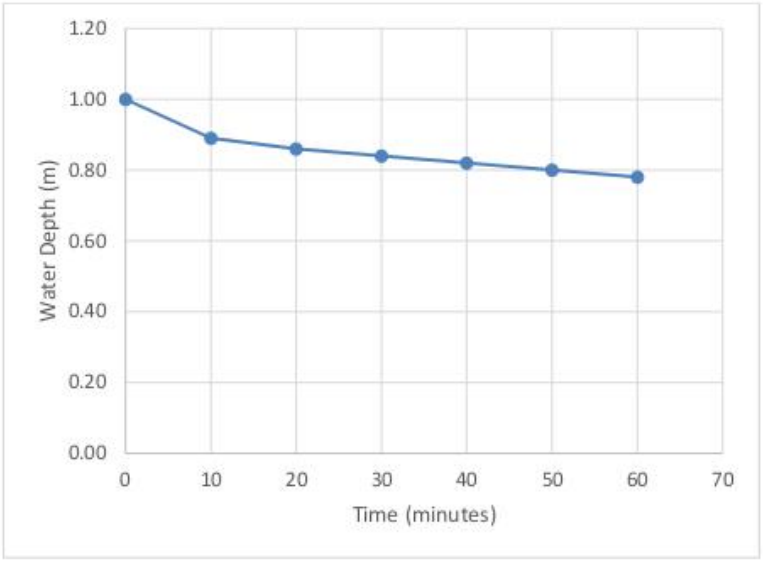
Average infiltration rate = 0.269736482 m/hr

Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	**Job No:**	7851
Title	Calculation – Percolation Test	**Sheet:**	2 of 5
Name:	Brendan McHale	**Checked by:**	RSJ

Percolation Test Results:

Test 1: Approximate time to discharge water into the test pit: 100 seconds. Depth of water after filling: 1000 mm

Time (mins)	Depth (m)	Notes
0	1.00	Start
10	0.89	
20	0.86	
30	0.84	
40	0.82	
50	0.80	
60	0.78	

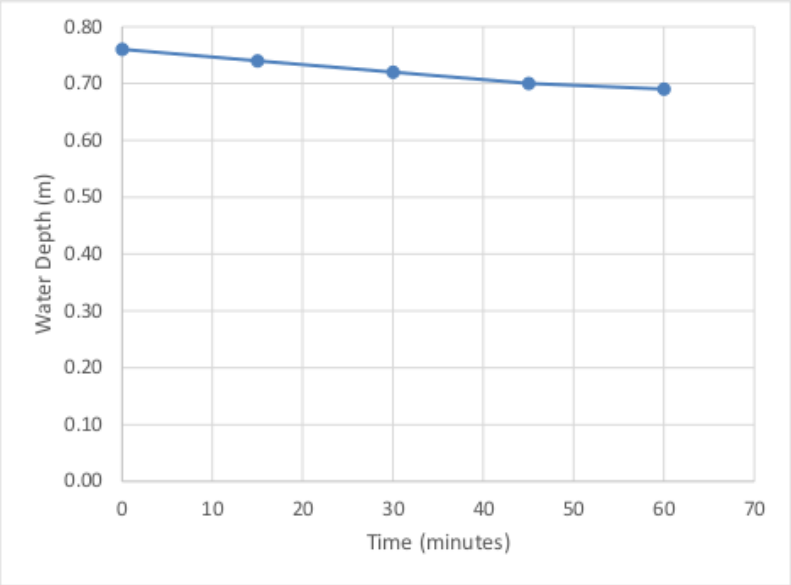


Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	**Job No:**	7851
Title	Calculation – Percolation Test	**Sheet:**	3 of 5
Name:	Brendan McHale	**Checked by:**	RSJ

Percolation Test Results:

Test 2: Approximate time to discharge water into the test pit: 100 seconds. Depth of water after filling: 1000 mm

Time (mins)	Depth (m)	Notes
0	0.76	Start
15	0.74	
30	0.72	
45	0.70	
60	0.69	



Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	**Job No:**	7851
Title	Calculation – Percolation Test	**Sheet:**	4 of 5
Name:	Brendan McHale	**Checked by:**	RSJ

Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	**Job No:**	7851
Title	Calculation – Percolation Test	**Sheet:**	5 of 5
Name:	Brendan McHale	**Checked by:**	RSJ

Infiltration Rate - Calculations:

Equation 1: $f = V_{p75-25} / (A_{p50} \times T_{p75-25})$

Where;

V_{p75-25} = effective storage volume of water in 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

Test pit dimensions:	**Length**	**Width**	**Depth**	**Plan Area**
	1m	1m	1m	$1m^2$

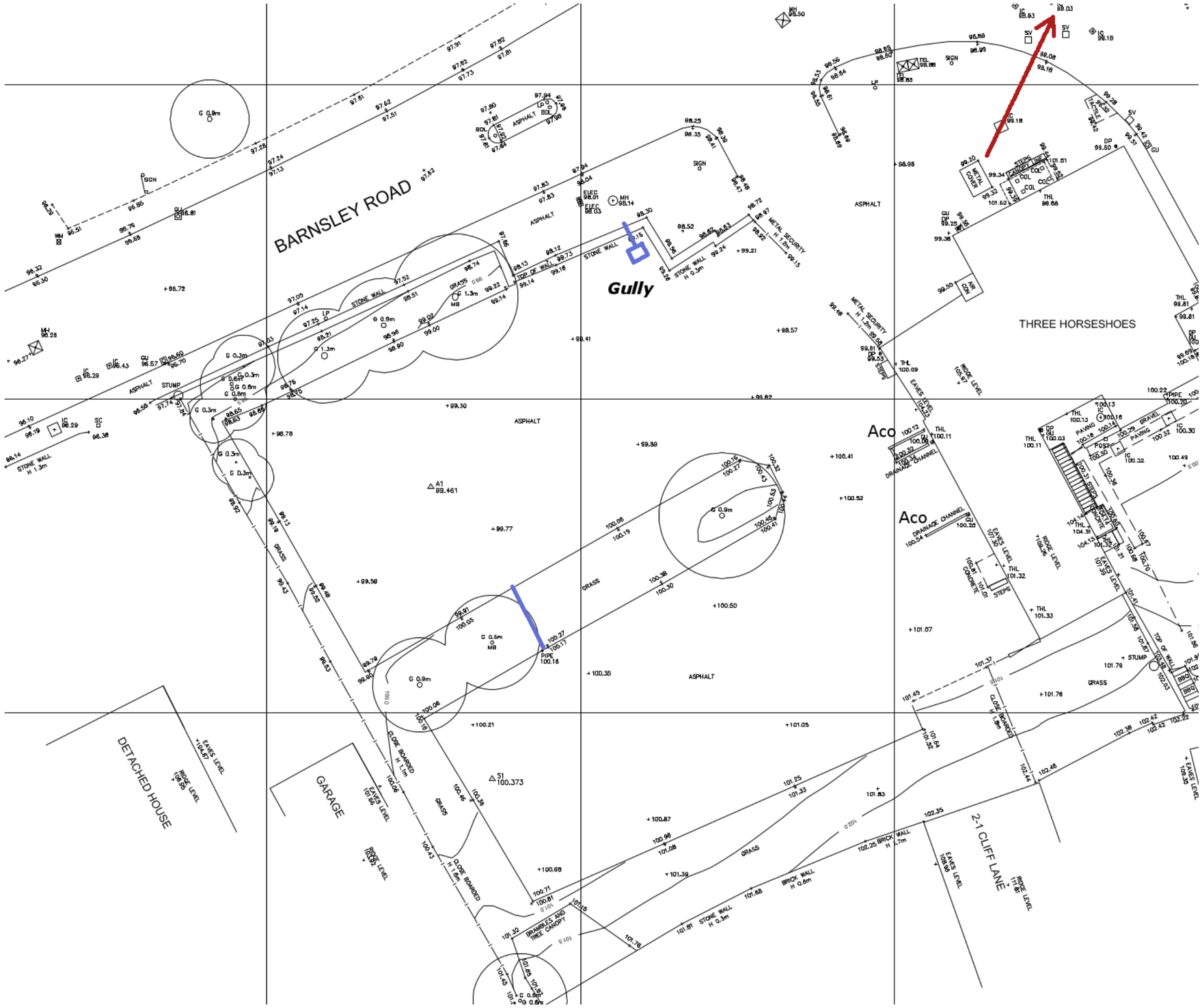
Test 1:

V_{p75-25}	0.738	m^3
A_{p50}	4.56	m^2
T_{p75-25}	0.5	hours
f	0.323684211	meters / per hour

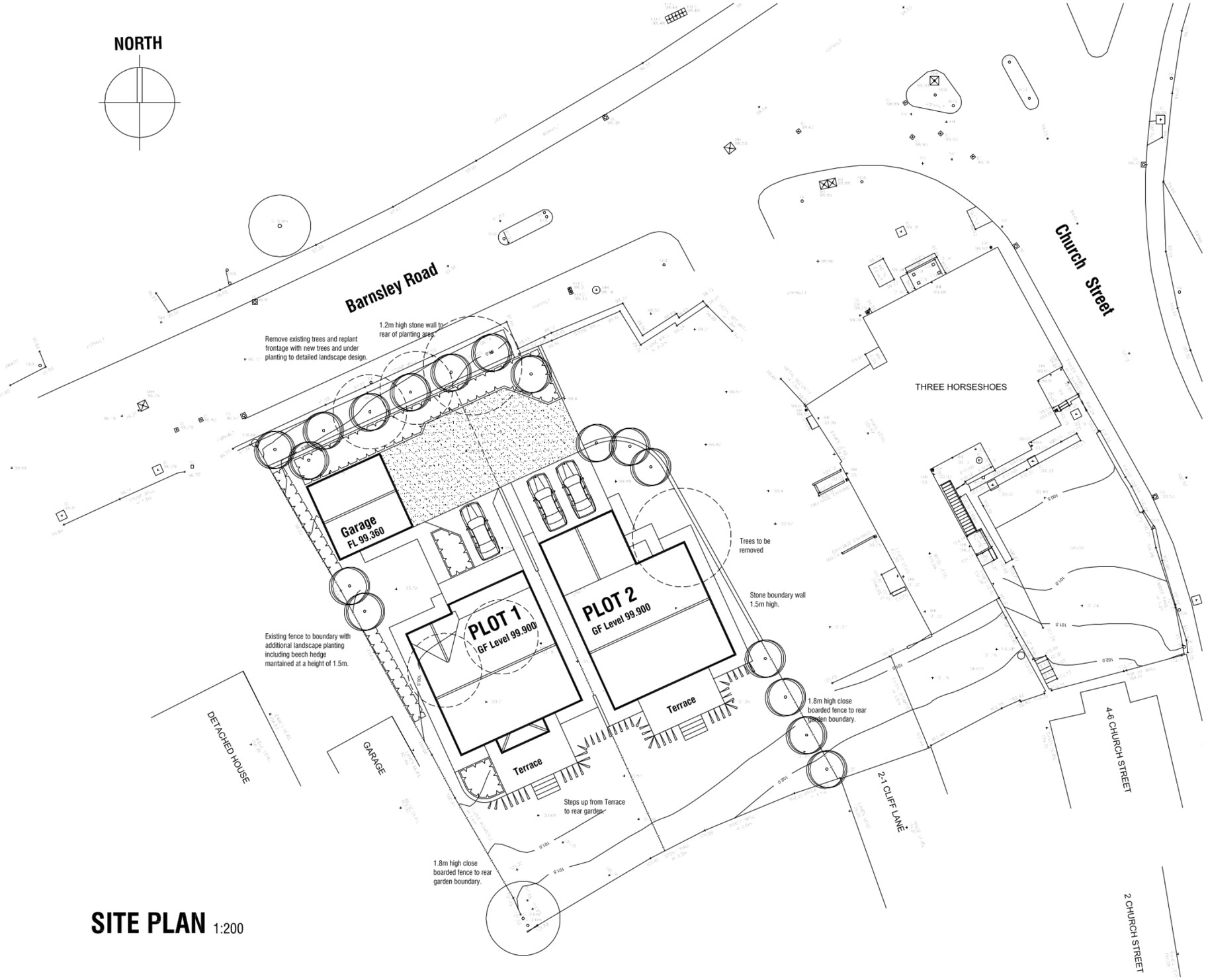
Test 2:

V_{p75-25}	0.738	m^3
A_{p50}	4.56	m^2
T_{p75-25}	0.75	hours
f	0.215789474	meters / per hour

APPENDIX 5– EXTRACT FROM TOPOGRAPHICAL SURVEY



APPENDIX 6– PROPOSED LAYOUT



SITE PLAN 1:200

LAND ADJ THREE HORSESHOES
BARNSLEY ROAD
BRIERLEY

PROPOSALS

SITE PLAN

mbooth design
architectural design and building consultants

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Scale	As shown @ A2	Drawn	MJB
Date	June 2017	Ref.	17.13
Dwg No.	P01	Rev.	

0cm 2cm 4cm 6cm