Eastwood & Partners
CONSULTING ENGINEERS

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GMS/CAT/33774-001

By Email Only

For the Attention of Steve Plunkett

16 May 2011

Dear Steve,

Quarry Street, Barnsley

We are pleased to report on the soakaway testing carried out on 20 April 2011.

The site is located at the top of a westward facing hill, where it is proposed to create a new road junction from Old Road onto Carlton Road. The geology is shown as Woolley Edge Rock (Sandstone).

We have reviewed a previous *'Site Investigation Factual Report'*, prepared by Abbeydale Building Environment Consultants in 2007, reference 151015SFa. This included ten cable percussion boreholes to between 0.97 m and 6.45 m below ground level (bgl). The most relevant boreholes are BH1 and BH4, as they were conducted on the grass verge nearest to where the soakaway tests were completed.

This report suggests that a sandstone quarry extended beneath the area of the proposed junction. There is a retaining wall to the west of the proposed junction and the terraced housing beyond this is at a lower level, with the area beneath the proposed junction having been in-filled. The ground conditions were expected to comprise grass covered topsoil, over a loose to medium dense sandy gravel to 0.8 m to 2.4 m bgl, with gravelly sand beneath this and sandstone bedrock around 2.45 m to 3 m bgl. Mudstone was recorded from 4.2 m bgl in one of the boreholes and the sandy gravel was also described as clayey in places.

We completed two soakaway tests, referenced SA1 and SA2, at the approximate positions shown on the attached *'Soakaway Location Plan'*, drawing number 33744/001A. Some photographs of the soakaways are also attached. These were taken to depths of 3.2 m and 1.9 m bgl, respectively. The general ground conditions were found to be topsoil (0.6 m to 0.7 m) over made ground, comprising predominantly orange clayey sand with sandstone cobbles. We did not clearly identify the base of the made ground, although in SA2, the ground conditions did

appear to grade into weathered sandstone bedrock (gravel to boulder sized fragments of sandstone in a sand matrix).

A copy of the soakaway test results and infiltration calculations are attached and summarised in the table below:

Soakaway	**Depth mbgl**	**Infiltration Rate m/sec**
SA1	2.6 to 3.2	5.7×10^{-6}
SA2	1.3 to 1.55	5.7×10^{-6}

Soakaways are therefore unlikely to be a suitable method of drainage.

We trust that this meets with your approval, however if you have any comments or queries please do not hesitate to contact us.

Yours sincerely



Catherine Topliss



Locations of SA2 (foreground) and SA1 (background) in grass verge

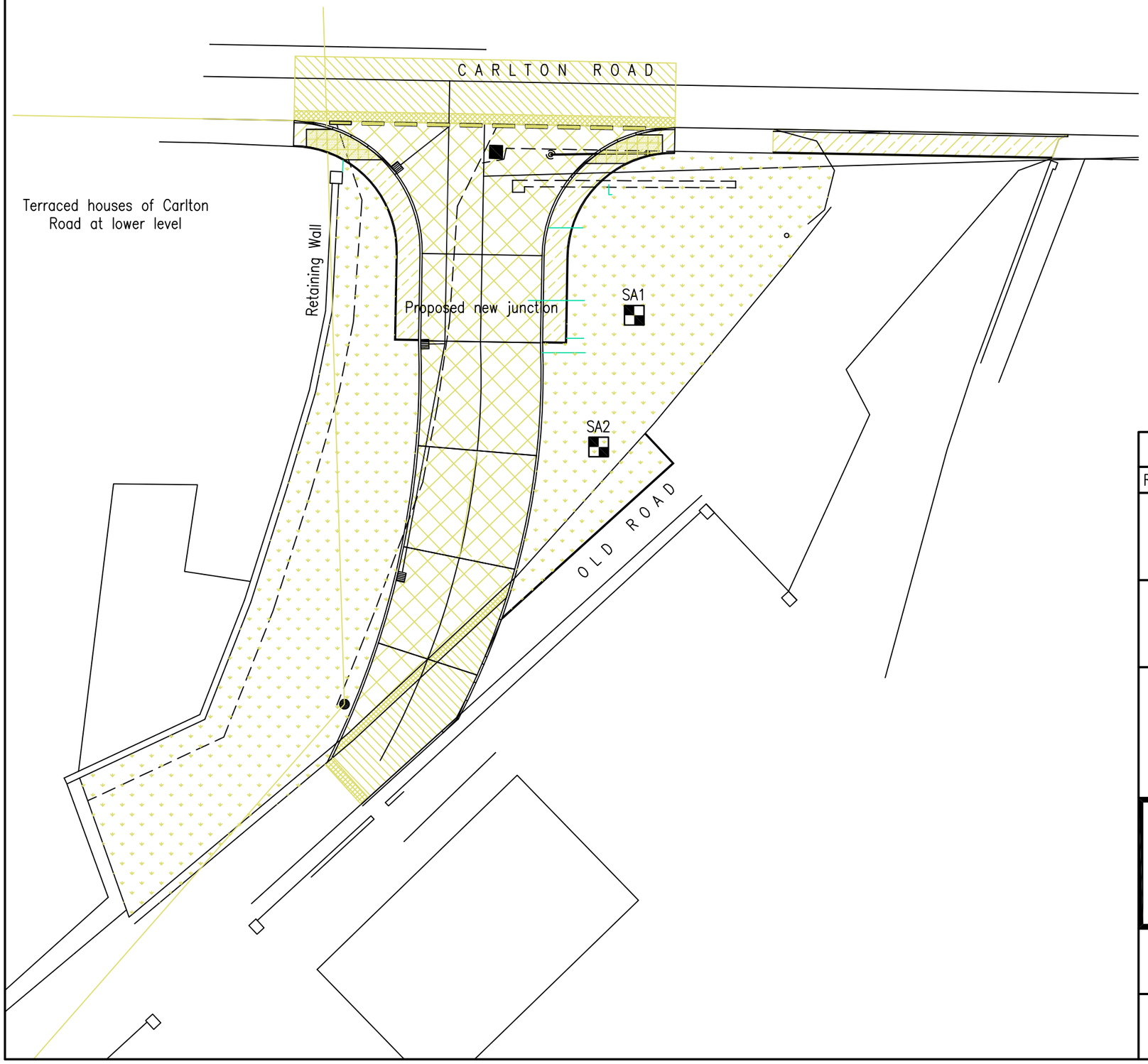


SA1

Information within this drawing is not necessarily produced to scale.
Always use figured dimensions and co-ordinates – if in doubt, ask.

Key:

Approximate location of soakaway test undertaken by Eastwood & Partners on 20 April 2011.



REV	DESCRIPTION	SIG	CHK	DATE
A	First Issue.			

STEVE PLUNKETT

QUARRY STREET, BARNSLEY

SOAKAWAY LOCATION PLAN

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SCALE WHEN PLOTTED AT A3	DRAWING STATUS
1:200	INFORMATION

DRAWN	CHECKED	DATE	DRAWING NUMBER	REV
JB	DES	16.05.11	33744/001	A

PROJECT:	Quarry Street, Barnsley	Job No. 33744	Date 20/04/2011
SUBJECT:	Soakage Test Results and Calculation of Infiltration Rates	Prepared DES	Checked CAT

Test No. **SA1**

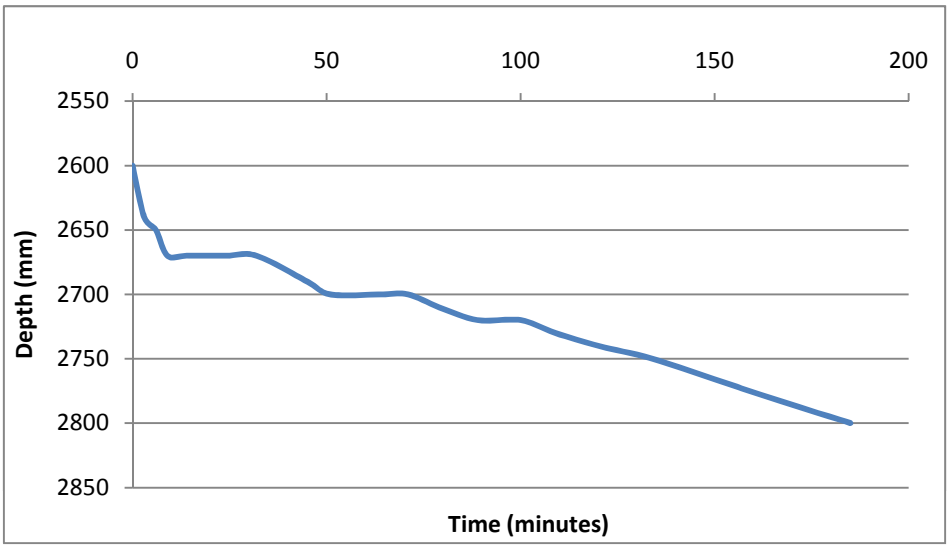
Test Pit Dimensions

Length = **2000** mm
Width = **600** mm
Depth = **3200** mm (Total depth)

Plan area = **1.2** m²

Approximate time to discharge water into the hole: **60** Seconds
Depth to water after completion of pumping: **2600** mm

Time (min)	Depth (mm)
0	**2600**
3	**2640**
6	**2650**
9	**2670**
14	**2670**
24	**2670**
32	**2670**
45	**2690**
51	**2700**
64	**2700**
71	**2700**
79	**2710**
89	**2720**
100	**2720**
109	**2730**
120	**2740**
134	**2750**
154	**2770**
164	**2780**
185	**2800**



PROJECT:	**Quarry Street, Barnsley**	**Job No. 33744**	**Date 20/04/2011**
SUBJECT:	**Soakage Test Results and Calculation of Infiltration Rates**	**Prepared DES**	**Checked CAT**

Test No. SA1

Soil Infiltration Rate in Accordance with BR365

$$f = \frac{V_{p75-25}}{a_{p50} x t_{p75-25}}$$

Where:

V_{p75-25} is the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} is the internal surface area of the trial pit up to 50% effective depth and including the base area

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

Initial parameters

Depth to water =	**2600**	mm	Average water depth:	**500**	mm
Start time =	**0**	min			
			Change in water depth:	**200**	mm
Final parameters					
Depth to water =	**2800**	mm	Time interval:	**185**	min
End time =	**185**	min			

Effective Storage Volume of Water in the Trial Pit	=	m³
75% Effective Depth	=	mm
25% Effective Depth	=	mm
Time at 75% Effective Depth	=	minutes
Time at 25% Effective Depth	=	minutes

V_{p75-25}	=	m³
a_{p50}	=	m²
t_{p75-25}	=	sec
f	=	**m/sec**

Average Soakaway Rate = **2.2E-05** m³/sec
Average soakaway area = **3.80** m² (sides + base)

BR365 Soil Infiltration Rate = N/A m/sec Water depth did not fall below 25% effective depth
Average Infiltration Rate = 5.7E-06 m/sec

PROJECT:	Quarry Street, Barnsley	Job No. 33744	Date 20/04/2011
SUBJECT:	Soakage Test Results and Calculation of Infiltration Rates	Prepared DES	Checked CAT

Test No. **SA2**

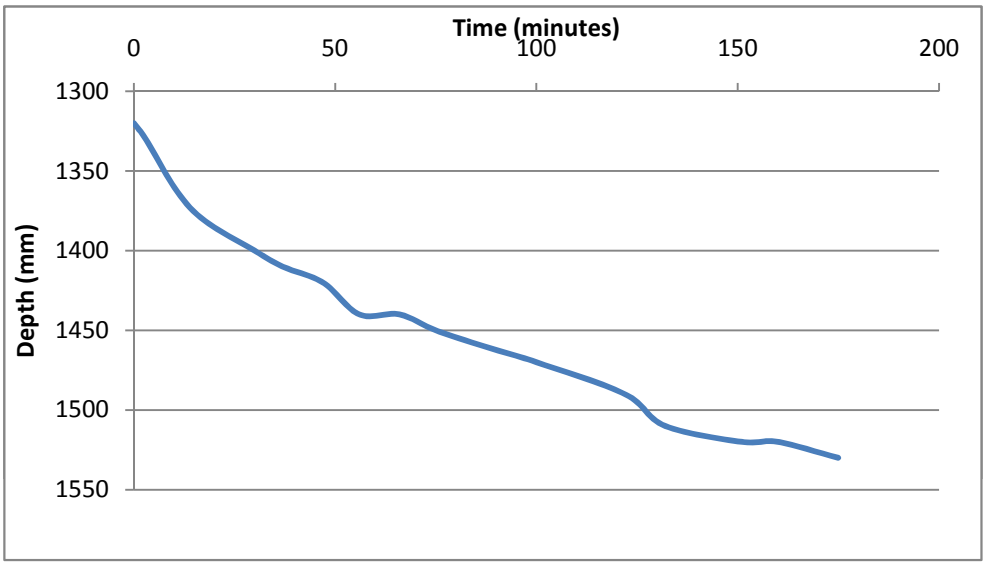
Test Pit Dimensions

Length = **2000** mm
Width = **600** mm
Depth = **1900** mm (Total depth)

Plan area = **1.2** m²

Approximate time to discharge water into the hole: **60** Seconds
Depth to water after completion of pumping: **1320** mm

Time (min)	Depth (mm)
0	**1320**
3	**1330**
10	**1360**
17	**1380**
30	**1400**
37	**1410**
47	**1420**
56	**1440**
66	**1440**
75	**1450**
87	**1460**
100	**1470**
122	**1490**
132	**1510**
151	**1520**
160	**1520**
175	**1530**



PROJECT:	Quarry Street, Barnsley	Job No. 33744	Date 20/04/2011
SUBJECT:	Soakage Test Results and Calculation of Infiltration Rates	Prepared DES	Checked CAT

Test No. **SA2**

Soil Infiltration Rate in Accordance with BR365

$$f = \frac{V_{p75-25}}{a_{p50} x t_{p75-25}}$$

Where:

V_{p75-25} is the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} is the internal surface area of the trial pit up to 50% effective depth and including the base area

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

Initial parameters

Depth to water =	**1320**	mm	Average water depth:	**580**	mm
Start time =	**0**	min			
			Change in water depth:	**210**	mm
Final parameters					
Depth to water =	**1530**	mm	Time interval:	**175**	min
End time =	**175**	min			

Effective Storage Volume of Water in the Trial Pit	=	m³
75% Effective Depth	=	mm
25% Effective Depth	=	mm
Time at 75% Effective Depth	=	minutes
Time at 25% Effective Depth	=	minutes

V_{p75-25}	=	m³
a_{p50}	=	m²
t_{p75-25}	=	sec
f	=	**m/sec**

Average Soakaway Rate = **2.4E-05** m³/sec
Average soakaway area = **4.22** m² (sides + base)

BR365 Soil Infiltration Rate = N/A m/sec Water depth did not fall below 25% effective depth
Average Infiltration Rate = 5.7E-06 m/sec