



E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

Manchester / London / Edinburgh

info@E3P.co.uk
<http://www.E3P.co.uk>

Ref: 10-610-1c
Date: 17th February 2016

Russell's Construction Ltd
13 Westpoint Enterprise Park
Clarence Avenue
Trafford Park
Manchester
M17 1QS

BY Email (info@russells-construction.co.uk)

Dear Sirs,

BRE365 Soakaway Tests
Land at Elm Point, Wrexham LL13 9UE

Background & Objectives

E3P was instructed by Russell's Construction to undertake BRE365 Soakaway Tests across the above mentioned site at outside of the proposed development platform in order to determine whether SUDS infrastructure would be suitable for the proposed development at Elm Point Wrexham.

General

Four mechanically excavated trial pits were advanced to a maximum depth of 2.20m bgl (as specified by Bre365 COP the locations of which were specified by E3P and are included on the attached exploratory hole location plan. Four positions were designated for the percolation test for SA101 - SA104. The ground conditions encountered are included on the E3P Exploratory Hole Logs attached to this letter.

BRE365 Soakaway Tests

BRE365 Soakaway Tests were undertaken within each of the trial pits. However groundwater was encountered within location SA102 during the advancement of the pit. Perched water was recorded within the granular strata within the reworked material replaced during the remedial works, therefore the tests were undertaken within the unsaturated zone.

The results are summarised in Table 1.0 (overleaf) and the test certificates are attached to this letter.



Table 1.0 **Summary of BRE 365 Soakaway Test Results**

LOCATION	DEPTH (M BGL)	MATERIAL	TEST NO.	SOIL INFILTRATION RATE (M/S)
SA101	1.80	Silty CLAY	1	244E-07
SA102	1.90	Sandy clayey Gravel	1	1.83E-07
SA103	1.85	Silty Clay	1	2.77E-07
SA104	2.20	Silty Clay	1	N/A

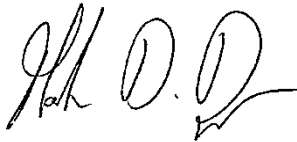
The results included in Table 1.0 above show that the test pits have very poor soakage potential, with permeability coefficients only able to be calculated for the first tests for All locations, although these were only calculated using data extrapolation due to absence of any percolation over a significant time period.

The infiltration rates calculated indicate the ground conditions at the site to offer a poor degree of soakage potential, therefore it may not be suitable to install soakaway drainage systems within the proposed development.

The application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365 – *Soakaway Design*.

I trust the above is acceptable and if you require anything further please do not hesitate to contact me.

Yours sincerely,
For and on behalf of E3P Ltd



Martin Dyer

Director



Key:

Location Symbols

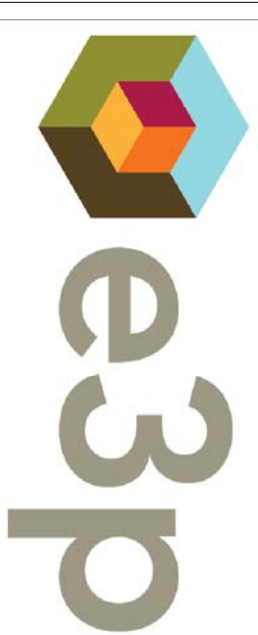
-  Approximate Window Sample Probehole Location
-  Approximate Window Sample Probehole Location with Install
-  Approximate Trial Pit Location
-  Approximate Soakaway Location

Notes:					

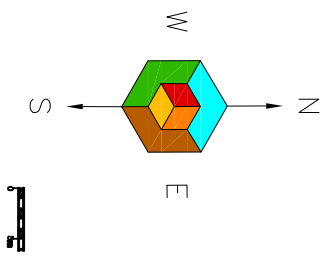
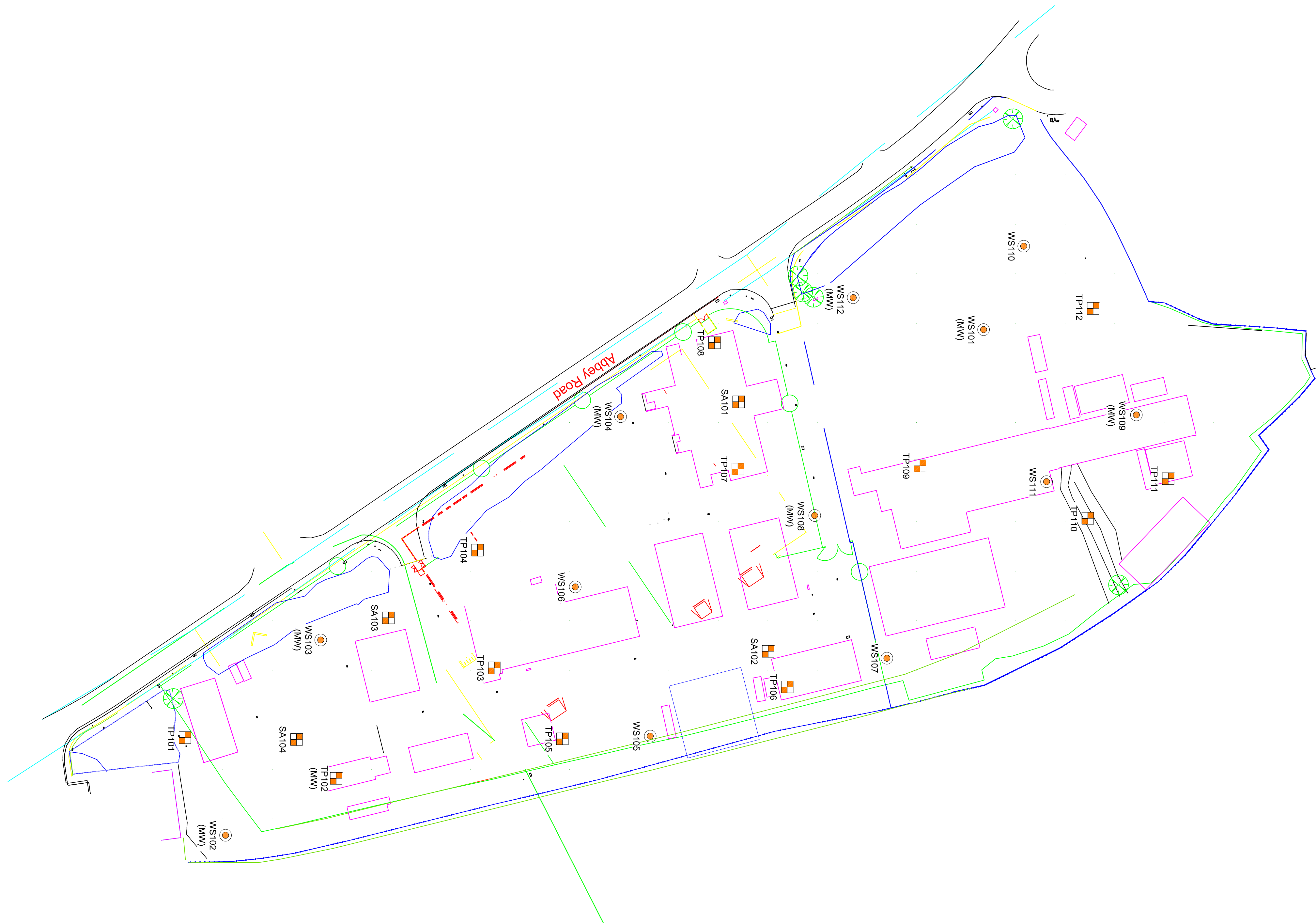
P1	R1	17-02-2016	REVISION	CB	MD
P1	-	03-06-2015	DRAFT	CB	MD
Phase	Revision	Date	Issue	Drawn	Authorised

Client:	Job No:	Date:
Russells Construction	10610	17-02-2016
Drawing No:	Scale:	
005	1:750 @ A1	

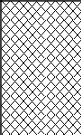
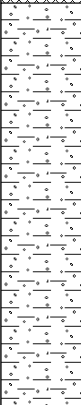
Job Title:	Drawing Title:
Elm Point, Wrexham	Exploratory Hole Location Plan



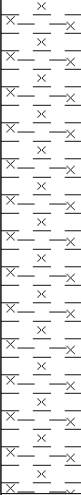
Environmental Energy Engineering Partnerships Ltd
City Heliport & Business Centre
Eccles, Manchester, M30 7RU
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

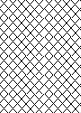
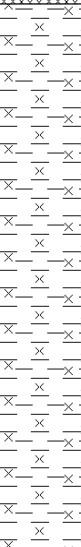


The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.

				Trial Pit Log			TrialPit No SA101 Sheet 1 of 1	
Project Name: Elm Point				Project No. 10610		Co-ords: - Level:		Date 16/02/2016
Location: Wrexham						Dimensions (m): 0.35 1.60		Scale 1:25
Client: Russells Construction						Depth 1.80		Logged M.Whittaker
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼				0.45			MADE GROUND: Grey red slightly sandy gravel with cobbles. Gravel is fine to coarse angular to sub-angular of concrete, brick, rebar, plastic, felt and wire cable (Demolition rubble). Cobbles are concrete.	
				1.80			Firm to stiff brown silty slightly gravelly CLAY. Gravel is fine to coarse angular to sub-rounded of mudstone and sandstone.	
						End of Pit at 1.80m		
1 2 3 4 5								
Remarks: Complete.								
Stability:								

				Trial Pit Log			TrialPit No SA102 Sheet 1 of 1	
Project Name: Elm Point				Project No. 10610		Co-ords: - Level:		Date 16/02/2016
Location: Wrexham						Dimensions (m): 0.40 1.70		Scale 1:25
Client: Russells Construction						Depth 1.90		Logged M.Whittaker
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼				0.40			MADE GROUND: Grey red slightly sandy gravel with cobbles. Gravel is fine to coarse angular to sub-angular of brick, concrete, ash and sandstone.	
							MADE GROUND: Firm to stiff brown red gravelly clay (Reworked). Gravel is fine to coarse angular to sub-angular of brick and concrete.	1
	▼				1.55			Firm to stiff brown silty slightly gravelly CLAY. Gravel is fine to coarse angular to sub-angular of mudstone and sandstone.
				1.90			End of Pit at 1.90m	2
								3
								4
								5
Remarks: Complete.								
Stability:								

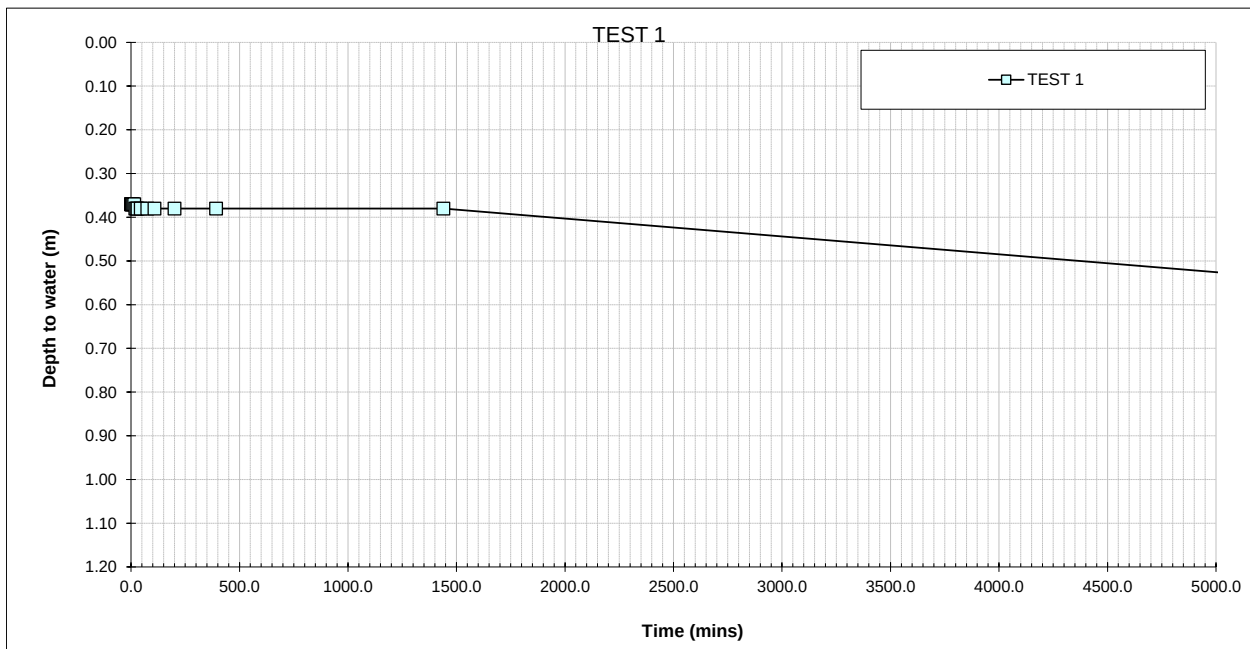
				Trial Pit Log			TrialPit No SA103 Sheet 1 of 1	
Project Name: Elm Point				Project No. 10610		Co-ords: - Level:		Date 16/02/2016
Location: Wrexham						Dimensions (m): 0.40 1.80		Scale 1:25
Client: Russells Construction						Depth 1.85		Logged M.Whittaker
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼				0.20			MADE GROUND: Grey slightly sandy gravel. Gravel is fine to coarse angular to sub-angular of limestone (Sub-base).	1
				1.85			Firm to stiff brown grey mottled silty gravelly CLAY. Gravel is fine to coarse angular to sub-angular of mudstone and sandstone.	
						End of Pit at 1.85m		2
								3
								4
								5
Remarks: Complete.								
Stability:								

				Trial Pit Log			TrialPit No SA104 Sheet 1 of 1	
Project Name: Elm Point				Project No. 10610		Co-ords: - Level:		Date 16/02/2016
Location: Wrexham						Dimensions (m): 0.40 1.60		Scale 1:25
Client: Russells Construction						Depth 2.20		Logged M.Whittaker
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.40			MADE GROUND: Grey red slightly sandy gravel with cobbles. Gravel is fine to coarse angular to sub-angular of concrete, brick, rebar, plastic, felt and wire cable (Demolition rubble). Cobbles are concrete.	
							Firm to stiff brown silty gravelly CLAY. Gravel is fine to coarse angular to sub-rounded of mudstone and sandstone.	1
				2.20			End of Pit at 2.20m	2
								3
								4
								5
Remarks: Complete.								
Stability:								

		Site: Elm Point, Wrexham Job Number: 10-610 Date of Test: 16/02/2016	Trial Pit Number: SA101 Length: 1.60 m Width: 0.35 m Depth: 1.80 m Groundwater Level: N/A m
Remarks - Test 1 did not achieve the 25% or 75% effective permeability, however a soil infiltration rate has been calculated by extrapolating the dataset.	TEST 1 Time(min) Depth to Water (m)		TEST 2 Time(min) Depth to Water (m)
	0.0 0.37 1.0 0.37 2.0 0.37 3.0 0.37 4.0 0.37 5.0 0.37 10.0 0.37 15.0 0.37 20.0 0.38 25.0 0.38 30.0 0.38 45.0 0.38 75.0 0.38 108.0 0.38 200.0 0.38 392.0 0.38 1440.0 0.38		TEST 3 Time(min) Depth to Water (m)

Effective Storage Depth	m	1.43		
75% Effective Storage Depth	m	1.07		
(i.e. depth below GL)	m	0.73		
25% Effective Storage Depth	m	0.36		
(i.e. depth below GL)	m	1.44		
Effective Storage Depth 75%-25%	m	0.72		
Time to fall to 75% effective depth	mins	10000.00		
Time to fall to 25% effective depth	mins	20000.00		
V (75%-25%)	m3	0.40		
a (50%)	m2	3.35		
t (75%-25%)	mins	10000.00		
SOIL INFILTRATION RATE	m/s	2.44E-07		

DESIGN SOIL INFILTRATION RATE, f	2.44E-07
---	-----------------





Site: Elm Point, Wrexham
Job Number: 10-610
Date of Test: 16/02/2016

Trial Pit Number: SA102
Length: 1.70 m
Width: 0.40 m
Depth: 1.90 m
Groundwater Level: N/A m

Remarks -

Test 1 was not fully completed due to site constraints however a soil infiltration rate has been calculated by extrapolating the dataset.

TEST 1

Time(min)	Depth to Water (m)
0.0	0.35
1.0	0.37
2.0	0.39
3.0	0.42
4.0	0.44
5.0	0.48
10.0	0.53
15.0	0.58
20.0	0.64
25.0	0.69
30.0	0.73
60.0	0.77
165.0	0.91
255.0	0.91
1440.0	0.91

TEST 2

Time(min)	Depth to Water (m)
-----------	--------------------

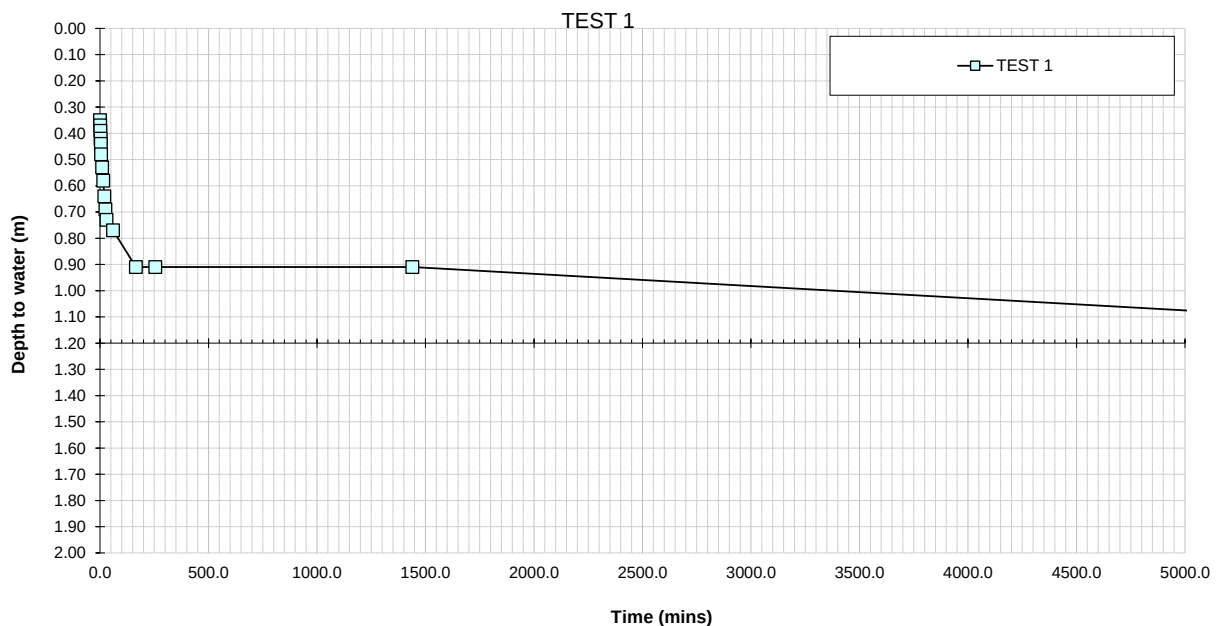
TEST 3

Time(min)	Depth to Water (m)
-----------	--------------------

Effective Storage Depth	m	1.55		
75% Effective Storage Depth	m	1.16		
(i.e. depth below GL)	m	0.74		
25% Effective Storage Depth	m	0.39		
(i.e. depth below GL)	m	1.51		
Effective Storage Depth 75%-25%	m	0.78		
Time to fall to 75% effective depth	mins	31.00		
Time to fall to 25% effective depth	mins	15000.00		
V (75%-25%)	m3	0.53		
a (50%)	m2	3.94		
t (75%-25%)	mins	14969.00		

SOIL INFILTRATION RATE m/s 1.83E-07

DESIGN SOIL INFILTRATION RATE, f 1.83E-07





Site: Elm Point, Wrexham
 Job Number: 10-610
 Date of Test: 16/02/2016

Trial Pit Number: SA103
 Length: 1.80 m
 Width: 0.40 m
 Depth: 1.85 m
 Groundwater Level: N/A m

Remarks -

Test 1 did not achieve the 25% or 75% effective permeability, however a soil infiltration rate has been calculated by extrapolating the dataset.

TEST 1

Time(min)	Depth to Water (m)
0.0	0.25
1.0	0.25
2.0	0.25
3.0	0.26
4.0	0.27
5.0	0.28
10.0	0.34
15.0	0.36
20.0	0.36
25.0	0.36
30.0	0.36
45.0	0.36
69.0	0.36
120.0	0.36
255.0	0.36
1295.0	0.36
1440.0	0.40

TEST 2

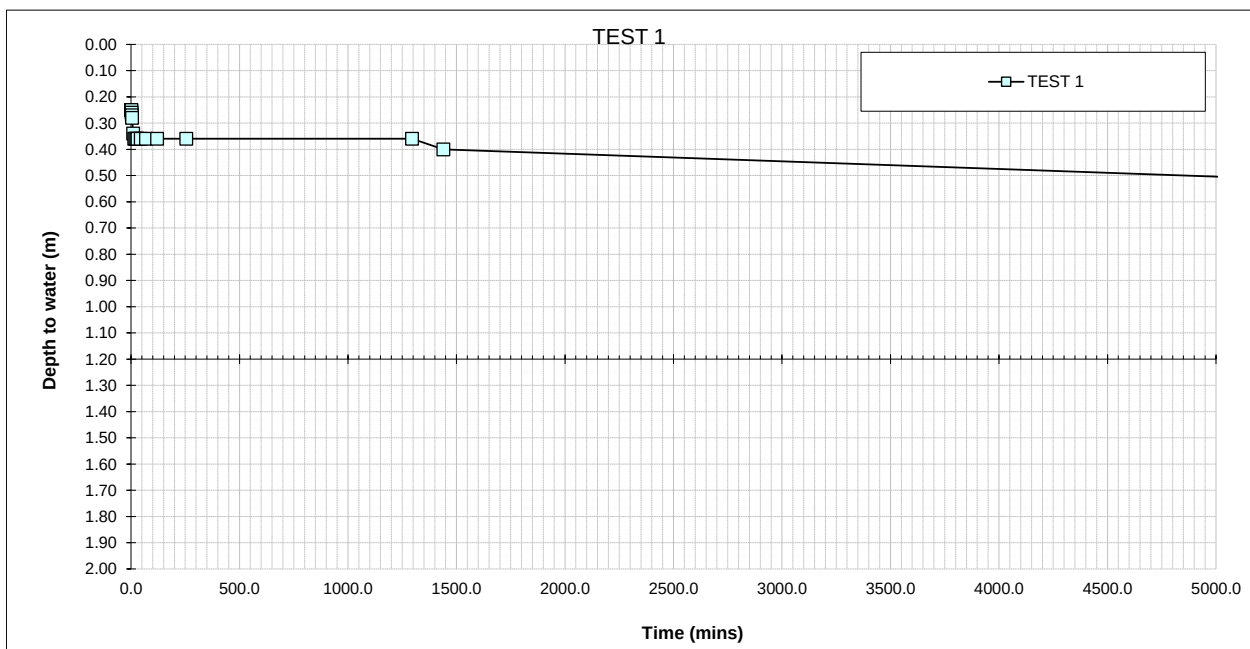
Time(min)	Depth to Water (m)
-----------	--------------------

TEST 3

Time(min)	Depth to Water (m)
-----------	--------------------

Effective Storage Depth	m	1.60		
75% Effective Storage Depth	m	1.20		
(i.e. depth below GL)	m	0.65		
25% Effective Storage Depth	m	0.40		
(i.e. depth below GL)	m	1.45		
Effective Storage Depth 75%-25%	m	0.80		
Time to fall to 75% effective depth	mins	10000.00		
Time to fall to 25% effective depth	mins	20000.00		
V (75%-25%)	m3	0.58		
a (50%)	m2	4.24		
t (75%-25%)	mins	10000.00		
SOIL INFILTRATION RATE	m/s	2.77E-07		

DESIGN SOIL INFILTRATION RATE, f 2.77E-07





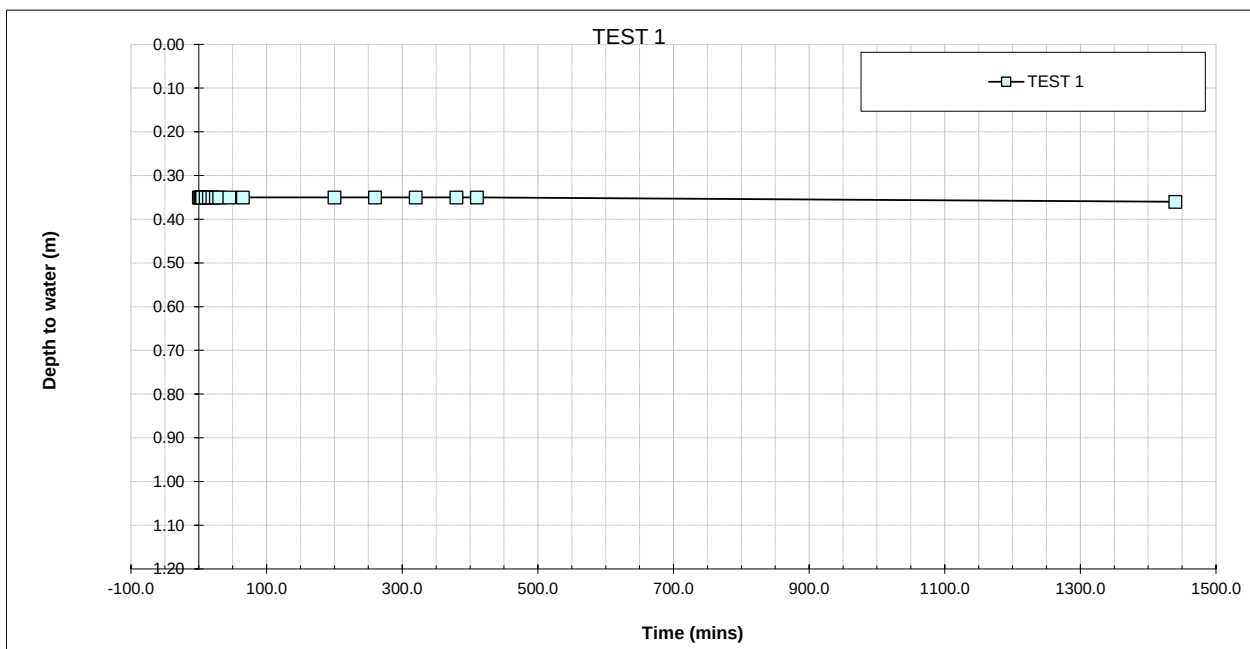
Site: Elm Point, Wrexham
 Job Number: 10-610
 Date of Test: 16/02/2016

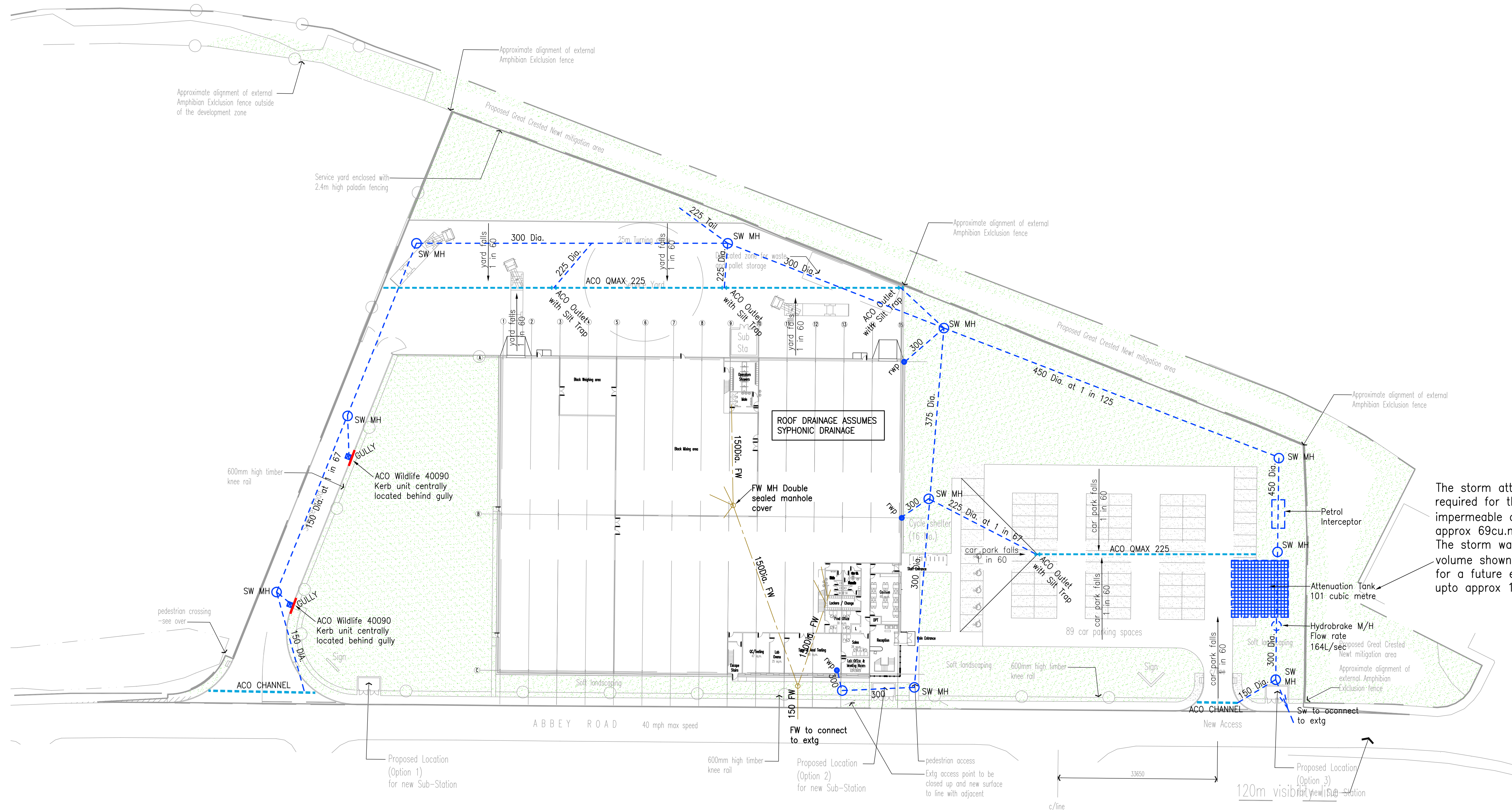
Trial Pit Number: SA104
 Length: 1.60 m
 Width: 0.40 m
 Depth: 2.20 m
 Groundwater Level: N/A m

Remarks -	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
Test 1 failed to soakaway in 24 hours and was therefore unsuccessful.	0.0	0.35				
	2.0	0.35				
	3.0	0.35				
	4.0	0.35				
	5.0	0.35				
	10.0	0.35				
	15.0	0.35				
	20.0	0.35				
	25.0	0.35				
	30.0	0.35				
	45.0	0.35				
	65.0	0.35				
	200.0	0.35				
	260.0	0.35				
	320.0	0.35				
	380.0	0.35				
	410.0	0.35				
	1440.0	0.36				

Effective Storage Depth	m	1.85		
75% Effective Storage Depth	m	1.39		
(i.e. depth below GL)	m	0.81		
25% Effective Storage Depth	m	0.46		
(i.e. depth below GL)	m	1.74		
Effective Storage Depth 75%-25%	m	0.93		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	N/A		
a (50%)	m2	N/A		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s	N/A		

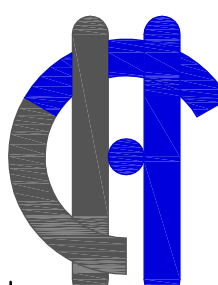
DESIGN SOIL INFILTRATION RATE, f N/A





The storm attenuation tank size required for the current site impermeable area (11,992Sq.m) is approx 69cu.m.
The storm water attenuation tank volume shown here (101Cu.m) caters for a future expansion of the site upto approx 13998Sq.m

THIS DRAWING TO BE READ IN CONJUNCTION WITH THE SITES DRAINAGE STRATEGY AND FLOOD CONSEQUENCE ASSESSMENT PRODUCED BY BETTS HYDRO

C	17.02.16	M.B.	Gullies removed in favour of channel drains. Attenuation tank volume increased
B	09.02.16	M.B.	Site layout updated
A	08.02.16	M.B.	Amendments in line with Drainage strategy documents
REV	DATE	BY	DETAILS OF REVISION
ARCHITECT / CLIENT			
RUSSELLS CONSTRUCTION LTD			
PROJECT			
CLWYD COMPOUNDERS			
WREXHAM			
TITLE			DRAWN BY
PROPOSED SITE DRAINAGE			M.B.
PRELIMINARY ISSUE FOR			DATE
COSTING PURPOSES			25.08.15
DRAWING NO.			SCALE
HC-15142-(30)-001			1:500
			REVISION
			C
HEALEY CONSULTING			
Brunel House			
63 Dale Street			
Milton			
Rochdale			
OL16 3NU			
Tel: 01706 343961			
Fax: 01706 343981			
email: office@healeyconsulting.co.uk			
copyright: Healey Consulting			
			
HEALEY consulting			
structural engineering consultants			