

SOAKAWAY INFILTRATION REPORT
LAND OFF SPALDING ROAD, GOSBERTON
DELTA-SIMONS PROJECT NUMBER: 17-1076.01
DATED: 20TH NOVEMBER 2017

1.0 Authorisation, Context and Purpose

Delta-Simons Environmental Consultants Limited ('Delta-Simons') has been requested by Robert Doughty Consultancy on behalf of Executors of Queenie Dennis (the Client) to undertake three soakage tests (SA101 to SA103) to provide information for the suitability and design for soakaways as a drainage solution for the proposed residential development at land located off Spalding Road, Gosberton (hereafter referred to as the 'Site'). An Approximate Soakaway Test Location Plan is included as Figure 1.

2.0 Desktop Information

From the British Geological Survey (BGS) Geology of Britain Viewer the Site is indicated as being underlain by superficial Tidal Flat Deposits- Clay and Silt, which is in turn underlain by the Oxford Clay Formation- Mudstone. The nearest surface water feature is an agricultural drain located on Site and forms part of the western Site boundary.

3.0 Fieldworks

Soakage testing was undertaken in general accordance with BRE Digest 365: Soakaway Design ^[Ref. 1] on the 13th November 2017.

The soakage testing comprised excavating three trial pits to depths of between 1.50 and 2.10 m bgl. The geology at each trial pit location was logged by the Delta-Simons engineer. Approximately 1 tonne of gravel and monitoring pipes were then installed in the trial pit and the remaining void was backfilled with arisings. The remaining spoil was graded back to original ground level or on the adjacent soil mound.

The gravel pack in each test location was then filled with water from a water container and the depth to water from ground level recorded at intervals over a period up to 24 hours, if applicable.

The soakage test data was recorded and used to calculate the soil infiltration rate for each location.

3.1 Limitations

- ▲ Two of the proposed three fills were carried out in SA101 due to a slow infiltration rate; and
- ▲ The locations of each soakaway were positioned by the Client.

3.2 Identified Ground and Groundwater Conditions

Brown slightly sandy clay topsoil was identified in all test locations from the surface generally to depths between 0.50 m bgl in SA103 and to 0.40 m bgl in SA101 and SA102. The underlying natural soils comprised orangish brown slight clayey silty sand from a minimum depth of 0.40 m bgl to a maximum depth of 2.1 m bgl in all locations.

4.0 Soakage Tests

Test results are provided in Appendix I and summarised in Table 1 below. The approximate locations of the Soakage Tests are shown in Figure 1.

Table 1: Summary of Testing in General Accordance with BRE 365

Soakaway Test Reference Number	Test Depth Range (m bgl)	Soil Infiltration Rate (ms ⁻¹)	Geology	Number of Fills
SA101	1.10-2.05	1.2 x 10 ⁻⁶	Clayey Silty Sand	2
SA102	0.70-1.50	1.1 x 10 ⁻⁵	Clayey Silty Sand	3
SA103	0.92-1.80	6.2 x 10 ⁻⁶	Clayey Silty Sand	3

5.0 References

Ref 1: BRE Digest 365: Soakaway Design, BRE 1991

6.0 Project Contacts

Name	Signature	Position	Mobile	Email
Ben Bradford		Graduate	07974 187989	ben.bradford@deltasimons.com
Paul Huteson		Principal	07770 748792	paul.huteson@deltasimons.com

Encl.

Figure 1 Approximate Soakaway Location Plan

Appendix I Soakaway Test Results





Bing maps

Contains Data from, © 2017 Landmark Information Group Ltd

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Contains OS data (C), Crown Copyright and Database Right (2017)



	units	Infill 1	Infill 2	Infill 3
Length	m		1.50	
Width	m		0.50	
Depth	m		2.10	
Gravel type			20mm single size	
Voids ratio			0.40	
Resting groundwater level at time of testing	m		2.10	
Depth of first reading	m	1.10	1.10	0.00
Depth of final reading	m	2.05	2.05	0.00
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	No
Did soakage test reach near empty?		Yes	Yes	No
Depth at 75% full/effective depth	m	1.35	1.35	0.00
Depth at 25% full/effective depth	m	1.85	1.85	0.00
Time at 75% full/effective depth	mins	40.00	41.00	#N/A
Time at 25% full/effective depth	mins	754.44	816.97	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.15	0.15	0.00
Mean surface area for outflow (50% full/effective depth)	m ²	2.75	2.75	0.75
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	714.44	775.97	#N/A
Soil infiltration rate, f =	m/s	0.00000127	0.00000117	Failed Test
or	m/s	1.3E-06	1.2E-06	Failed Test

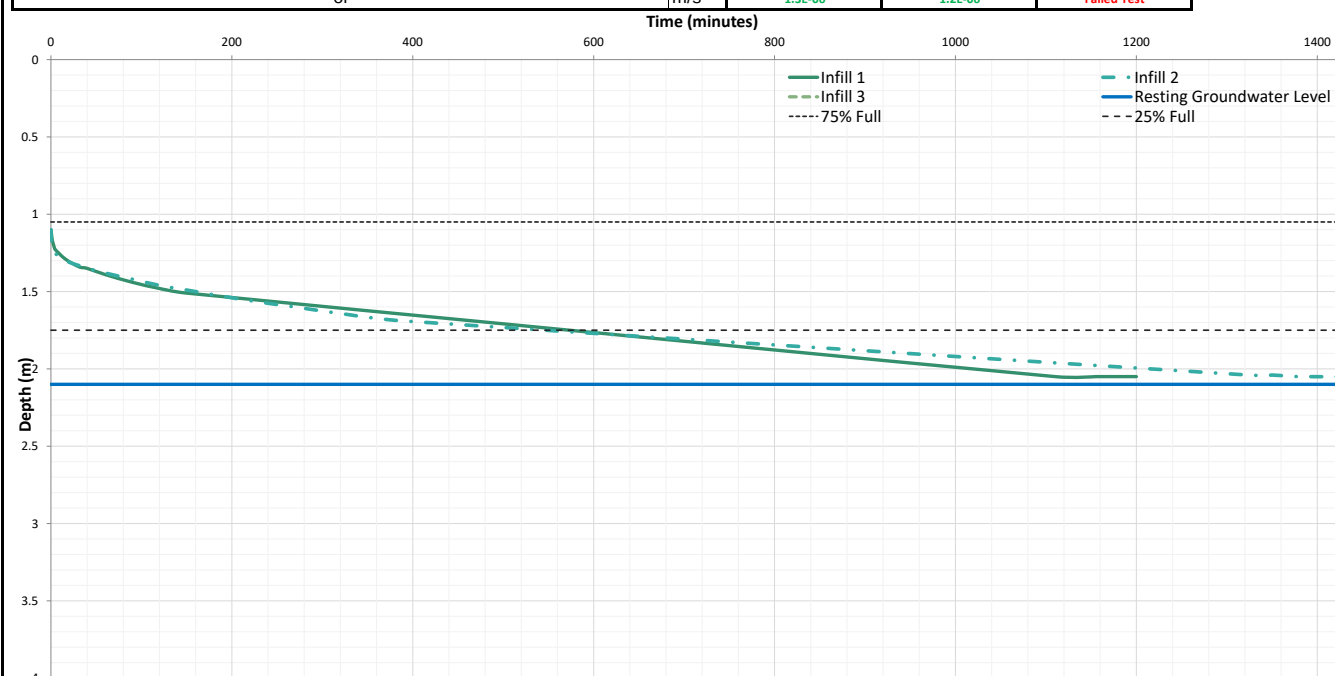
Recommended soil infiltration rate

Failed Test

m/s

Note:

Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.



LOG	DEPTH (m)	BACKFILL	DEPTH (m)
Brown, slightly sandy CLAY	0.0	Arisings	0.0
Orangish brown, slightly clayey silty SAND	0.4		
		Gravel	0.7
	2.1		2.1



TITLE: Soakaway Test Results
Land off Spalding Road, Gosberton
Mr I. Dennis

In accordance with BRE Digest 365 (2016)

DRAWN BY: CB
CHECKED BY: SS
DATE: 13/11/2017

SCALE: Not to Scale
REVISION: 1

PROJECT NUMBER:
17-1076.01
SOAKAWAY NUMBER:
SA101

	units	Infill 1	Infill 2	Infill 3
Length	m	1.50		
Width	m	0.50		
Depth	m	1.50		
Gravel type		20mm single size		
Voids ratio		0.40		
Resting groundwater level at time of testing	m	1.50		
Depth of first reading	m	0.70	0.71	0.71
Depth of final reading	m	1.50	1.35	1.49
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		Yes	No	Yes
Depth at 75% full/effective depth	m	0.90	0.87	0.91
Depth at 25% full/effective depth	m	1.30	1.19	1.30
Time at 75% full/effective depth	mins	9.52	8.00	20.63
Time at 25% full/effective depth	mins	58.57	56.00	97.50
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.12	0.10	0.12
Mean surface area for outflow (50% full/effective depth)	m ²	2.35	2.03	2.33
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	49.05	48.00	76.88
Soil infiltration rate, f =	m/s	0.00001735	0.00001642	0.00001103
or	m/s	1.7E-05	1.6E-05	1.1E-05

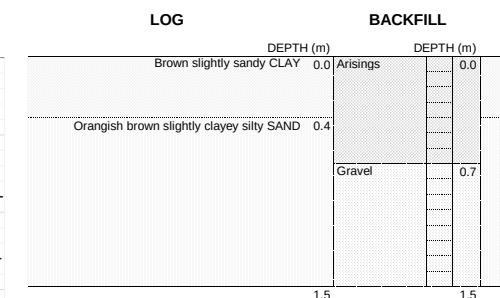
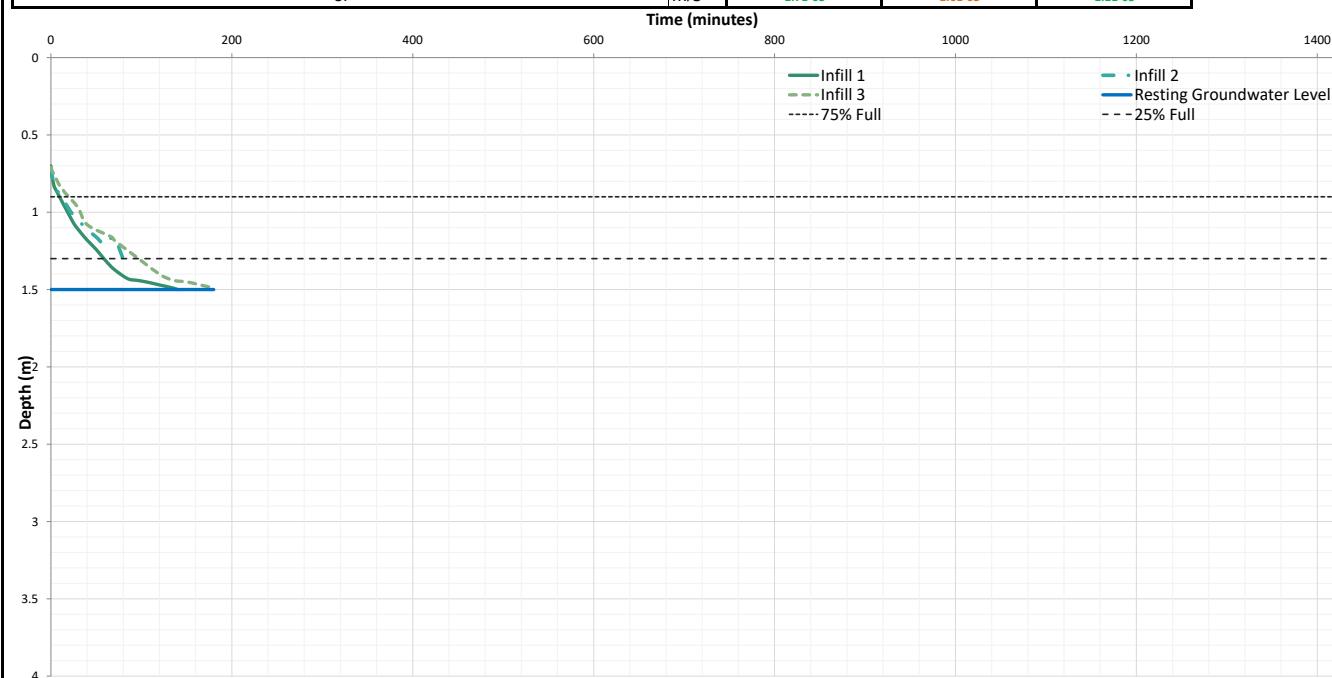
Recommended soil infiltration rate

1.1E-05

m/s

Note:

Where water level reaches nearly empty (5% full), soil infiltration based on '**Full**' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on '**Effective**' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a '**Failed**' test.



TITLE: Soakaway Test Results
Land off Spalding Road, Gosborton
Mr I. Dennis

In accordance with BRE Digest 365 (2016)

DRAWN BY: CB
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DATE: 13/11/2017

SCALE: Not to Scale
REVISION: 1

PROJECT NUMBER:
17-1076.01
SOAKAWAY NUMBER:
SA02

	units	Infill 1	Infill 2	Infill 3
Length	m	1.50		
Width	m	0.50		
Depth	m	1.80		
Gravel type		20mm single size		
Voids ratio		0.40		
Resting groundwater level at time of testing	m	1.80		
Depth of first reading	m	0.93	0.92	0.93
Depth of final reading	m	1.80	1.60	1.80
Did soakage test reach 25% of maximum fill depth?		Yes	Yes	Yes
Did soakage test reach near empty?		Yes	No	Yes
Depth at 75% full/effective depth	m	1.15	1.09	1.15
Depth at 25% full/effective depth	m	1.58	1.43	1.58
Time at 75% full/effective depth	mins	11.75	7.22	19.38
Time at 25% full/effective depth	mins	111.75	86.67	159.64
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.13	0.10	0.13
Mean surface area for outflow (50% full/effective depth)	m ²	2.49	2.11	2.49
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	100.00	79.44	140.27
Soil infiltration rate, f =	m/s	0.00000873	0.00001014	0.00000623
or	m/s	8.7E-06	1.0E-05	6.2E-06

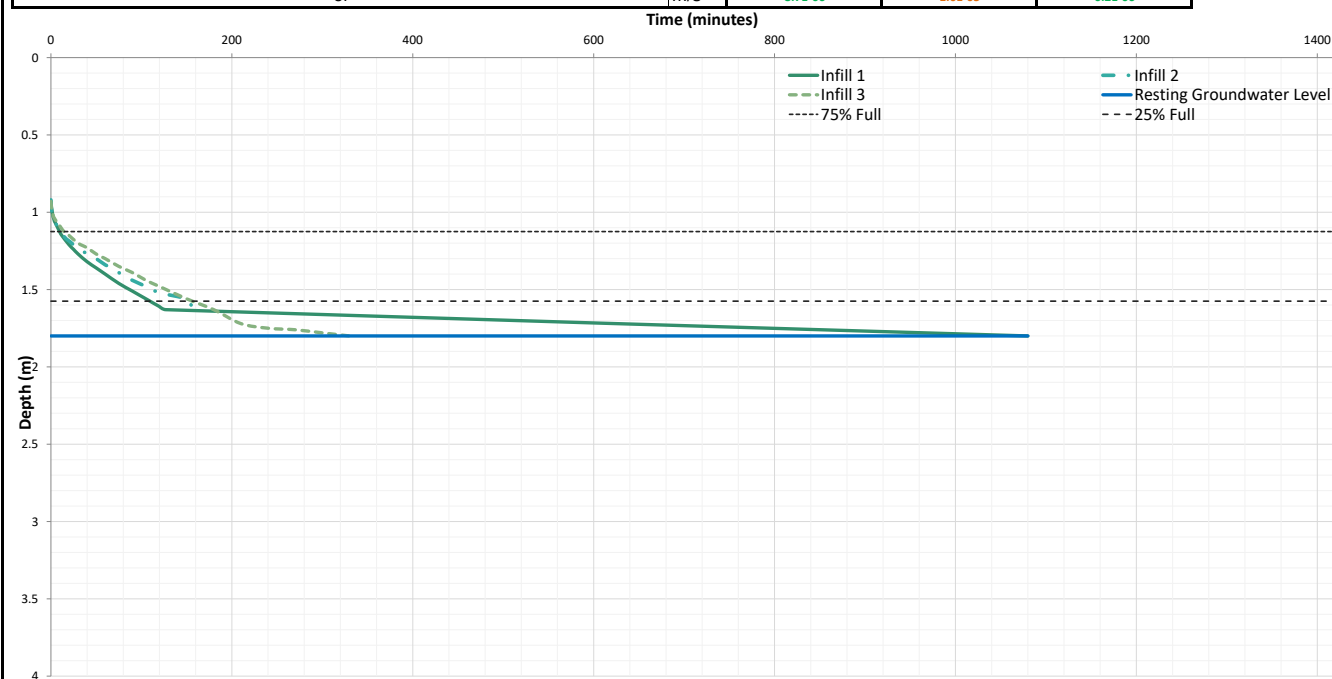
Recommended soil infiltration rate

6.2E-06

m/s

Note:

Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.



LOG	DEPTH (m)	BACKFILL	DEPTH (m)
Brown gravelly sandy CLAY	0.0	Arisings	0.0
Orange slightly clayey silty SAND	0.5		
		Gravel	0.9
	1.8		1.8



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17-1076.01
SOAKAWAY NUMBER:
SA03