

Our Ref: BW/TF-25-587-CA/Soakaway Letter

Your Ref:

Contact: Ben Walder

27th April 2026

PHG Consulting
107 Cowbridge Road East
Cardiff
CF11 9AG

For the attn. of Mr Stephen Davis

Dear Sir,

FALLING HEAD TESTING: Pontrhydyfen RFC, Pontrhydyfen

1.0 Introduction

PHG Consulting (The Client) commissioned Terra Firma to undertake falling head testing at the rugby club in Pontrhydyfen.

1.1 Limitations and Exceptions of Investigation

The investigation was conducted, and this report has been prepared for the sole internal reliance of the Client and their design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. TFW Group Ltd (Terra Firma) does not provide legal advice and the advice of lawyers may be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

2.0 Site Works

A ground investigation comprising three window sample boreholes, including three falling head tests, was undertaken on the 10th of March 2026.

The fieldwork was supervised by TFW Group Limited, who logged the exploratory holes to the requirements of BS 5930:2015+A1:2020. The proposed locations of the exploratory holes were determined by the clients' design team and positioned on site by TFW Group in general accordance with BS 10175:2011+A2:2017 in order to assess the findings of the preliminary conceptual site model.

The boreholes referenced FH1 to FH3 were formed using a Archway Dart rig. Dynamic sampling techniques were employed from surface.

Standard penetration tests (SPT) were carried out at regular intervals in general accordance with BS1377: Part 9:1990:3.3. SPT results summarised as N values are presented on the borehole log. Boreholes were monitored for groundwater ingress as drilling proceeded. Representative disturbed samples were taken and retained in airtight containers for environmental and geotechnical testing.

The borehole logs are presented in **Annex A**

Falling head tests were carried out in FH1 to FH3 in general accordance with BS5930:2015. Rising head tests were carried out by lowering the water level in the borehole. Falling head tests were carried out by adding water to the borehole. Coefficients of permeability were calculated using the general approach/time lag method and the results are presented in **Annex B**.

On completion, boreholes were backfilled with arisings and left mounded to accommodate any future settlement that may occur.

Exploratory hole locations are shown on **Drawing 01**.

2.1 Summary of Ground Conditions

Table 2.1: Summary of Typical Ground Conditions

Depth (m)			Thickness (m)	Stratum
FH1				
0.0	-	0.40	0.40	Grass over topsoil of soft dark brown slightly sandy CLAY .
0.40	-	1.50	-	Soft to very stiff dark brown slightly sandy gravelly CLAY . Gravel is angular to subrounded fine to coarse sandstone.
FH2				
0.0	-	0.30	0.30	Grass over very soft to soft slightly sandy gravelly silty CLAY . Gravel is angular to subrounded fine and medium sandstone.
0.30	-	0.90	0.60	Dense light orangish brown very sandy clayey angular to subangular fine to coarse sandstone GRAVEL .
0.90	-	2.00	-	Very dense yellowish brown slightly clayey fine to coarse SAND .
FH3				
0.0	-	1.30	1.30	MADE GROUND . Black mottled brown sandy clayey angular to subrounded fine to coarse asphalt, brick, slag and ash GRAVEL .
1.30	-	1.50	-	Medium dense yellowish brown sandy angular to subrounded fine to coarse sandstone GRAVEL .

The borehole logs can be found within **Annex A** and their locations are shown in **Drawing 01**.

2.2 Stability and Obstructions

Boreholes encountered some instability and typically collapsed slightly at the base during falling head tests.

No significant obstructions were encountered.

2.3 Groundwater

Groundwater was not encountered within the boreholes.

3.0 Soakaway Testing

During the site investigation three borehole falling head tests were undertaken in FH01, FH02 and FH03 and carried out in accordance with BRE DG 365:2016. The soakaway test results are summarised below.

Table 2.1 Summary of Falling Head Results

Borehole	Depth Range of Test (m)	Infiltration Rate (ms^{-1})
FH01	0.11 - 1.50	8.19×10^{-7}
FH02	0.30 - 1.40	2.89×10^{-6}
FH02	0.25 - 1.40	3.18×10^{-6}
FH03	0.30 - 1.05	2.59×10^{-5}
FH03	0.30 - 1.05	1.72×10^{-5}

The falling head test calculation sheets can be found in **Annex B**.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information, please do not hesitate to contact us.

For TFW Group Ltd;



Mr Ben Walder

BSC (Hons), PGd, FGS

**Annex A
Borehole Logs**



Terra Firma

TFW Group Ltd, 5 Deryn Court, Wharfedale Road, Cardiff, CF23 7

Phone: 02920 735354

Geotechnical Log - WS

FH01

UTM	: 30U	Drill Rig	: Archway Dart	Job Number	: 25-587
Latitude	: 51.63023	Driller Supplier	: Terra Firma	Client	: Pontrhydyfen RFC
Longitude	: -3.74341	Logged By	: BW	Project	: Pontrhydyfen RFC
Ground Elevation	: 74.19 (m)	Reviewed By	: TM	Location	: 4 Oakwood Ave, Pontrhydyfen, Port Talbot SA12 9SD, UK
Total Depth	: 1.5 m BGL	Date	: 10/03/2026	Loc Comment	:

Test Results	Depth (m)	Legend	Stratum Description	Depth Scale
6-15-13-9-14-14 N = 50	0.4		Grass over soft dark brown slightly sandy CLAY.	1.0
			Soft to very stiff dark brown slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse sandstone.	
			FH01 Refusal at 1.5 m	



Terra Firma

TFW Group Ltd, 5 Deryn Court, Wharfedale Road, Cardiff, CF23 7

Phone: 02920 735354

Geotechnical Log - WS

FH02

UTM	: 30U	Drill Rig	: Archway Dart	Job Number	: 25-587
Latitude	: 51.62992	Driller Supplier	: Terra Firma	Client	: Pontrhydyfen RFC
Longitude	: -3.74364	Logged By	: BW	Project	: Pontrhydyfen RFC
Ground Elevation	: 73.59 (m)	Reviewed By	: TM	Location	: 4 Oakwood Ave, Pontrhydyfen, Port Talbot SA12 9SD, UK
Total Depth	: 2 m BGL	Date	: 10/03/2026	Loc Comment	:

Test Results	Depth (m)	Legend	Stratum Description	Depth Scale
5-5-6-7-8-14 N = 35	0.3		Grass over very soft to soft slightly sandy gravelly and silty CLAY. Gravel is fine to medium sandstone.	1.0
			Dense light orangish brown very sandy clayey GRAVEL. Gravel is angular to subangular fine to coarse sandstone. Sand is fine to coarse.	
	0.9		Very dense yellowish brown slightly clayey fine to coarse SAND.	
17-8-16-17-15-2 N = 50				
			FH02 Terminated at 2 m	



Terra Firma

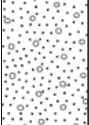
TFW Group Ltd, 5 Deryn Court, Wharfedale Road, Cardiff, CF23 7

Phone: 02920 735354

Geotechnical Log - WS

FH03

UTM	: 30U	Drill Rig	: Archway Dart	Job Number	: 25-587
Latitude	: 51.62971	Driller Supplier	: Terra Firma	Client	: Pontrhydyfen RFC
Longitude	: -3.74364	Logged By	: BW	Project	: Pontrhydyfen RFC
Ground Elevation	: 73.12 (m)	Reviewed By	: TM	Location	: 4 Oakwood Ave, Pontrhydyfen, Port Talbot SA12 9SD, UK
Total Depth	: 1.5 m BGL	Date	: 10/03/2026	Loc Comment	:

Test Results	Depth (m)	Legend	Stratum Description	Depth Scale
6-15-13-9-14-14 N = 21	1.3		MADE GROUND. Black mottled brown sandy clayey angular to subrounded fine to coarse GRAVEL of asphal, brick, slag and ash.	1.0
			Medium dense yellowish brown sandy angular to subrounded fine to coarse GRAVEL of sandstone.	
			FH03 Refusal at 1.5 m	

Annex B
Falling Head Calculation
Sheets

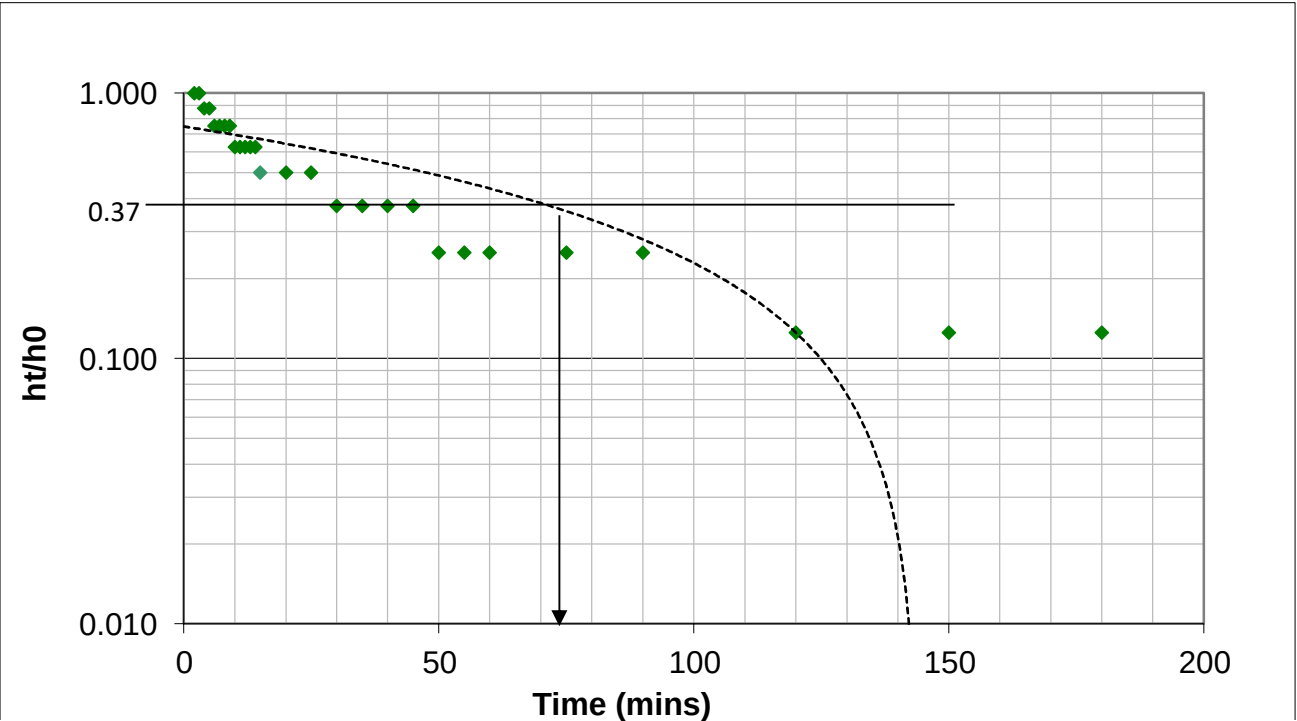
Site Name: Pontrhydyfen RFC
Position: FH01
Date Undertaken: 10.03.2026

Initial Measurement (m)	Time Elapsed (mins)	dt	Depth of Water bgl (m)	ht **	ht/h0
	0		0.11	0.090	1.125
	1		0.11	0.090	1.125
	2		0.12	0.080	1.000
	3		0.12	0.080	1.000
	4		0.13	0.070	0.875
	5		0.13	0.070	0.875
	6		0.14	0.060	0.750
	7		0.14	0.060	0.750
	8		0.14	0.060	0.750
	9		0.14	0.060	0.750
	10		0.15	0.050	0.625
	11		0.15	0.050	0.625
	12		0.15	0.050	0.625
	13		0.15	0.050	0.625
	14		0.15	0.050	0.625
	15		0.16	0.040	0.500
	20		0.16	0.040	0.500
	25		0.16	0.040	0.500
	30		0.17	0.030	0.375
	35		0.17	0.030	0.375
	40		0.17	0.030	0.375
	45		0.17	0.030	0.375
	50		0.18	0.020	0.250
	55		0.18	0.020	0.250
	60		0.18	0.020	0.250
	75		0.18	0.020	0.250
	90		0.18	0.020	0.250
Last Measurement (m)	120		0.19	0.010	0.125
	150		0.19	0.010	0.125
	180		0.19	0.010	0.125

Depth of Borehole (m)	1.50
Depth of Casing (m)	0.00
L Testing depth - casing depth (m)	1.5
D Diameter of Borehole (m)	0.115
Ground Water Level (m) at end of test	0.20
h0 Depth of water at end - depth of water at start (m)	0.080

F Intake Factor **	
2 π L	9.420
L/D	13.04
√(1+ L / D)²	14.04
logₑ [(L/D) + √(1+ L / D)²]	3.299
F	2.855

K Soil Infiltration Rate **	
A Cross-sectional Area (m2)	0.0104
F	2.86
T (read off graph at 0.37 ht/h0)	74.00



Soil infiltration rate (m/min)	4.91328E-05
Soil infiltration rate (m/sec)	0.000000819

Soil Infiltration Worksheet: This worksheet has been produced in combination with the document 'BS 5930:1999+A2:2010, Section 25.4'
This worksheet can be used to determine soil infiltration rates from borehole field measurements
Worksheet options are identified by a green background

** $F = \frac{2 \pi L}{\log_e [(L/D) + \sqrt{(1+ (L /D)^2)}]}$

** $K = \frac{A}{FT}$

** $h_t = \text{Level of water at end of test} - dt$

Site Name: Pontrhydyfen RFC
Position: FH02
Date Undertaken: 10.03.2026

	Time Elapsed (mins)	dt	Depth of Water bgl (m)	ht **	ht/h0
Initial Measurement (m)	0		0.3	0.500	1.020
	1		0.38	0.420	0.857
	2		0.44	0.360	0.735
	3		0.5	0.300	0.612
	4		0.52	0.280	0.571
	5		0.55	0.250	0.510
	6		0.57	0.230	0.469
	7		0.59	0.210	0.429
	8		0.61	0.190	0.388
	9		0.63	0.170	0.347
	10		0.64	0.160	0.327
	11		0.65	0.150	0.306
	12		0.65	0.150	0.306
	13		0.66	0.140	0.286
	14		0.67	0.130	0.265
	15		0.68	0.120	0.245
	20		0.69	0.110	0.224
	25		0.7	0.100	0.204
	30		0.71	0.090	0.184
	35		0.72	0.080	0.163
Last Measurement (m)	40		0.73	0.070	0.143
	45		0.74	0.060	0.122
	50		0.74	0.060	0.122
	55		0.75	0.050	0.102
	60		0.76	0.040	0.082
	90		0.77	0.030	0.061
	100		0.78	0.020	0.041
	120		0.79	0.010	0.020

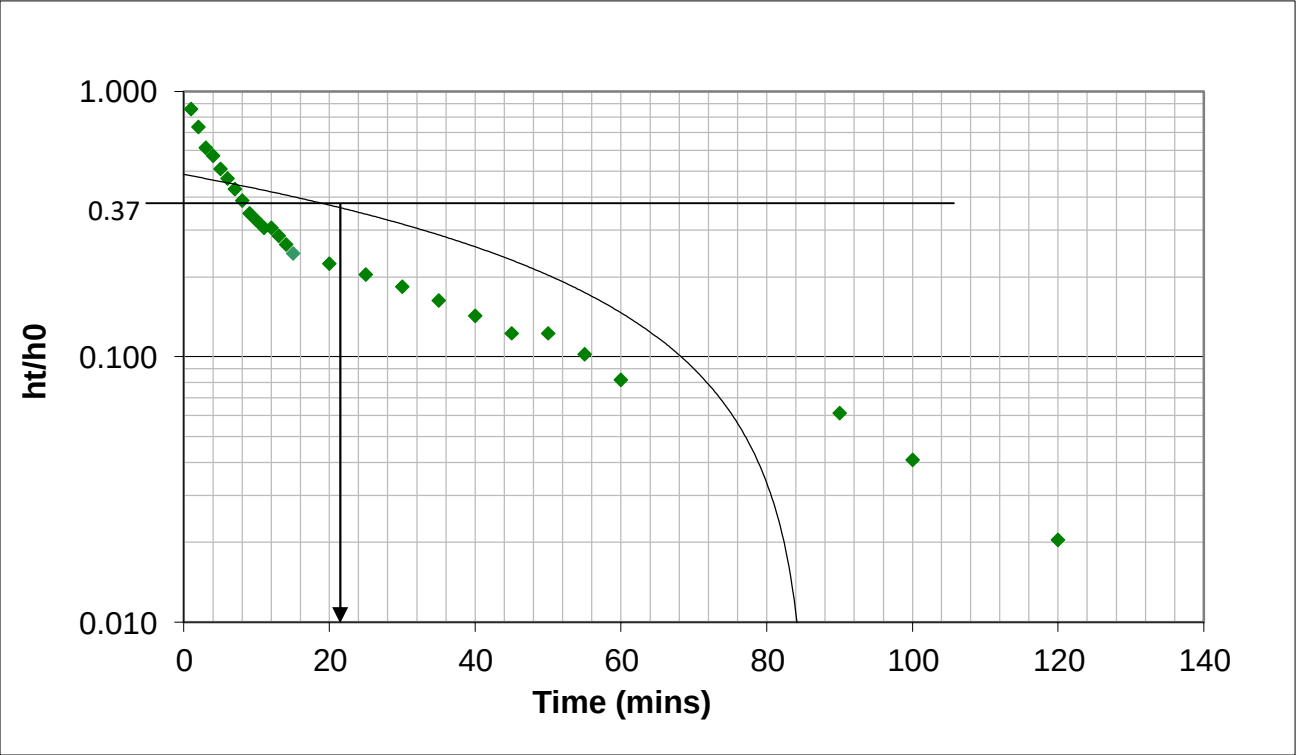
Depth of Borehole (m)	1.40
Depth of Casing (m)	0.00
L Testing depth - casing depth (m)	1.4
D Diameter of Borehole (m)	0.115
Ground Water Level (m) at end of test	0.80
h0 Depth of water at end - depth of water at start (m)	0.490

F Intake Factor **	
2 π L	8.792
L/D	12.17
√(1+ L / D)²	13.17
logₑ [(L/D) + √(1+ L / D)²]	3.233
F	2.720

K Soil Infiltration Rate **	
A Cross-sectional Area (m2)	0.0104
F	2.72
T (read off graph at 0.37 ht/h0)	22.00

Soil infiltration rate (m/min)	0.000173508
Soil infiltration rate (m/sec)	0.000002892

Soil Infiltration Worksheet: This worksheet has been produced in combination with the document 'BS 5930:1999+A2:2010, Section 25.4'
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**** F = $\frac{2 \pi L}{\log_e [(L/D) + \sqrt{(1+ (L /D)^2)}]}$**

**** K = $\frac{A}{FT}$**

**** ht = Level of water at end of test - dt**

Site Name: Pontrhydyfen RFC
Position: FH02
Date Undertaken: 10.03.2026

Initial Measurement (m)	Time Elapsed (mins)	dt	Depth of Water bgl (m)	ht **	ht/h0
	0		0.25	0.530	1.019
	1		0.28	0.500	0.962
	2		0.42	0.360	0.692
	3		0.48	0.300	0.577
	4		0.5	0.280	0.538
	5		0.54	0.240	0.462
	6		0.56	0.220	0.423
	7		0.58	0.200	0.385
	8		0.58	0.200	0.385
	9		0.59	0.190	0.365
	10		0.61	0.170	0.327
	11		0.62	0.160	0.308
	12		0.63	0.150	0.288
	13		0.64	0.140	0.269
	14		0.65	0.130	0.250
	15		0.66	0.120	0.231
	20		0.66	0.120	0.231
	25		0.67	0.110	0.212
	30		0.68	0.100	0.192
	35		0.69	0.090	0.173
Last Measurement (m)	40		0.7	0.080	0.154
	45		0.71	0.070	0.135
	50		0.71	0.070	0.135
	55		0.72	0.060	0.115
	60		0.73	0.050	0.096
	90		0.74	0.040	0.077
	100		0.75	0.030	0.058
	120		0.77	0.010	0.019

Depth of Borehole (m)	1.40
Depth of Casing (m)	0.00
L Testing depth - casing depth (m)	1.4
D Diameter of Borehole (m)	0.115
Ground Water Level (m) at end of test	0.78
h0 Depth of water at end - depth of water at start (m)	0.520

F Intake Factor **	
2 π L	8.792
L/D	12.17
√(1+ L / D) ²	13.17
log _e [(L/D) + √(1+ L / D) ²]	3.233
F	2.720

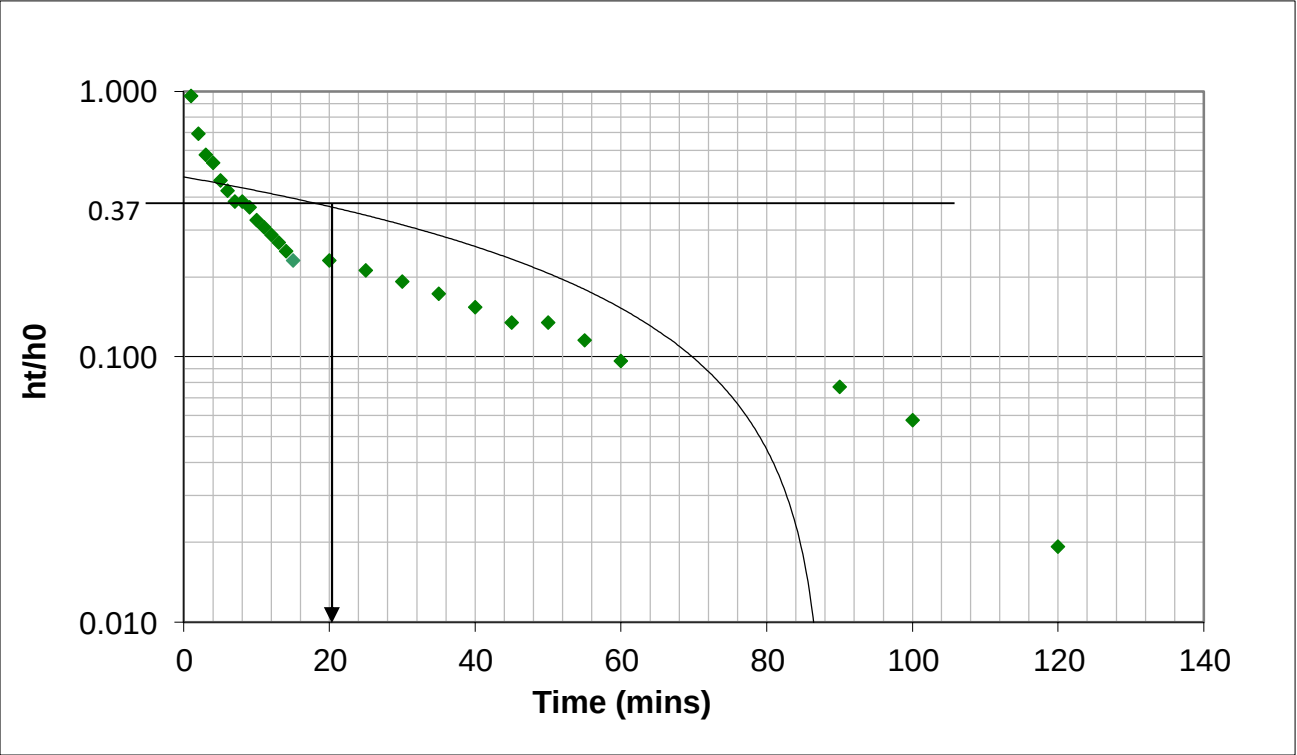
K Soil Infiltration Rate **	
A Cross-sectional Area (m2)	0.0104
F	2.72
T (read off graph at 0.37 ht/h0)	20.00

Soil infiltration rate (m/min)	0.000190859
Soil infiltration rate (m/sec)	0.000003181

Soil Infiltration Worksheet: This worksheet has been produced in combination with the document 'BS 5930:1999+A2:2010, Section 25.4'

This worksheet can be used to determine soil infiltration rates from borehole field measurements

Worksheet options are identified by a green background



**** F = $\frac{2 \pi L}{\log_e [(L/D) + \sqrt{(1+ (L /D)^2)}]}$**

**** K = $\frac{A}{FT}$**

**** ht = Level of water at end of test - dt**

Site Name: Pontrhydyfen RFC
Position: FH03
Date Undertaken: 10.03.2026

	Time Elapsed (mins)	dt	Depth of Water bgl (m)	ht **	ht/h0
Initial Measurement (m)	0		0.3	0.750	1.000
	1		0.55	0.500	0.667
	2		0.7	0.350	0.467
	3		0.8	0.250	0.333
	4		0.83	0.220	0.293
	5		0.85	0.200	0.267
	6		0.86	0.190	0.253
	7		0.86	0.190	0.253
	8		0.88	0.170	0.227
	9		0.89	0.160	0.213
	10		0.92	0.130	0.173
	11		0.94	0.110	0.147
	12		0.95	0.100	0.133
	13		0.97	0.080	0.107
	14		0.99	0.060	0.080
Last Measurement (m)	15		1	0.050	0.067
	20		1.05	0.000	0.000
	25		1.05	0.000	0.000
	30		1.05	0.000	0.000
	35		1.05	0.000	0.000
	40		1.05	0.000	0.000
	45		1.05	0.000	0.000
	50		1.05	0.000	0.000
	55		1.05	0.000	0.000
	60		1.05	0.000	0.000

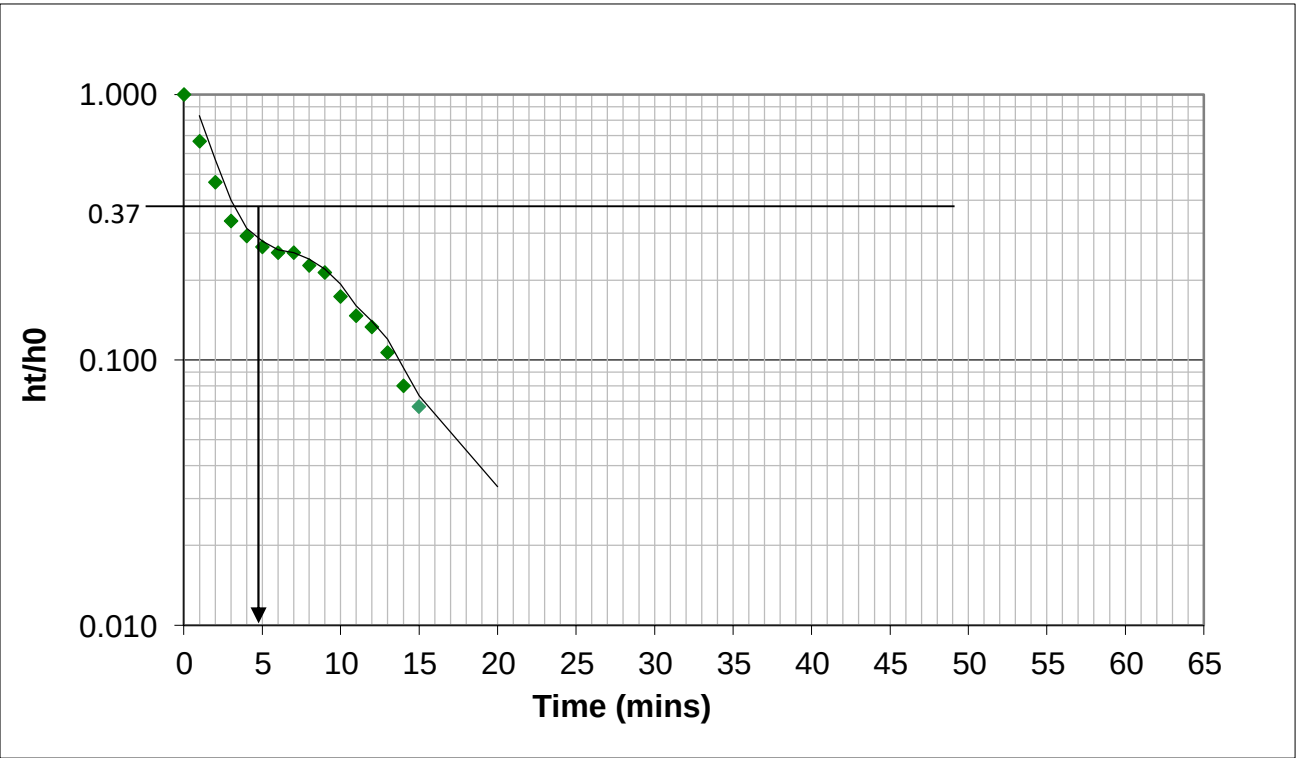
Depth of Borehole (m)	1.05
Depth of Casing (m)	0.00
L Testing depth - casing depth (m)	1.05
D Diameter of Borehole (m)	0.115
Ground Water Level (m) at end of test	1.05
h0 Depth of water at end - depth of water at start (m)	0.750

F Intake Factor **	
2 π L	6.594
L/D	9.13
√(1+ L / D)²	10.13
logₑ [(L/D) + √(1+ L / D)²]	2.958
F	2.229

K Soil Infiltration Rate **	
A Cross-sectional Area (m2)	0.0104
F	2.23
T (read off graph at 0.37 ht/h0)	3.00

Soil infiltration rate (m/min)	0.001552403
Soil infiltration rate (m/sec)	0.000025873

Soil Infiltration Worksheet: This worksheet has been produced in combination with the document 'BS 5930:1999+A2:2010, Section 25.4'
This worksheet can be used to determine soil infiltration rates from borehole field measurements
Worksheet options are identified by a green background



**** F = $\frac{2 \pi L}{\log_e [(L/D) + \sqrt{(1+ (L /D)^2)}]}$**

**** K = $\frac{A}{FT}$**

**** ht = Level of water at end of test - dt**

Site Name: Pontrhydyfen RFC
Position: FH03
Date Undertaken: 10.03.2026

	Time Elapsed (mins)	dt	Depth of Water bgl (m)	ht **	ht/h0
Initial Measurement (m)	0		0.3	0.750	1.000
	1		0.5	0.550	0.733
	2		0.65	0.400	0.533
	3		0.73	0.320	0.427
	4		0.78	0.270	0.360
	5		0.8	0.250	0.333
	6		0.82	0.230	0.307
	7		0.84	0.210	0.280
	8		0.86	0.190	0.253
	9		0.88	0.170	0.227
	10		0.9	0.150	0.200
	11		0.92	0.130	0.173
	12		0.93	0.120	0.160
	13		0.95	0.100	0.133
	14		0.96	0.090	0.120
	15		0.98	0.070	0.093
	20		1.01	0.040	0.053
	25		1.05	0.000	0.000
	30		1.05	0.000	0.000
	35		1.05	0.000	0.000
	40		1.05	0.000	0.000
	45		1.05	0.000	0.000
	50		1.05	0.000	0.000
	55		1.05	0.000	0.000
Last Measurement (m)	60		1.05	0.000	0.000

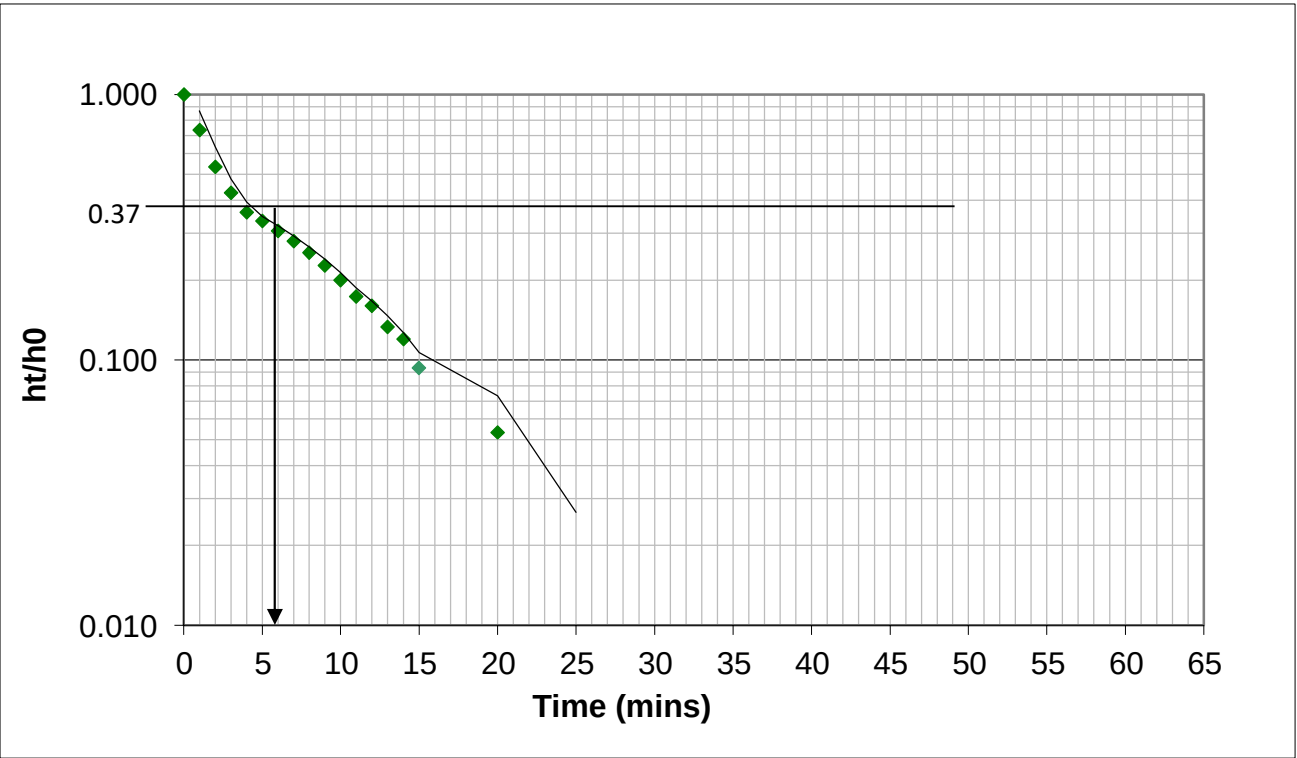
Depth of Borehole (m)	1.05
Depth of Casing (m)	0.00
L Testing depth - casing depth (m)	1.05
D Diameter of Borehole (m)	0.115
Ground Water Level (m) at end of test	1.05
h0 Depth of water at end - depth of water at start (m)	0.750

F Intake Factor **	
2 π L	6.594
L/D	9.13
√(1+ L / D)²	10.13
logₑ [(L/D) + √(1+ L / D)²]	2.958
F	2.229

K Soil Infiltration Rate **	
A Cross-sectional Area (m2)	0.0104
F	2.23
T (read off graph at 0.37 ht/h0)	4.50

Soil infiltration rate (m/min)	0.001034935
Soil infiltration rate (m/sec)	0.000017249

Soil Infiltration Worksheet: This worksheet has been produced in combination with the document 'BS 5930:1999+A2:2010, Section 25.4'
This worksheet can be used to determine soil infiltration rates from borehole field measurements
Worksheet options are identified by a green background



**** F = $\frac{2 \pi L}{\log_e [(L/D) + \sqrt{(1+ (L /D)^2)}]}$**

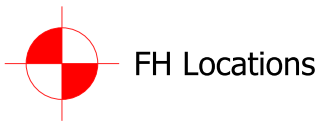
**** K = $\frac{A}{FT}$**

**** ht = Level of water at end of test - dt**

Drawing



Legend



PROJECT:

25-587 - Pontrhydyfen RFC

DRAWING 01:

Falling Head Test Locations

TFW Group Ltd
5 Deryn Court, Wharfedale Road, Cardiff,
CF23 7HA
Tel: 029 2073 5354
Email: cardiff@tfwgroup.co.uk