

12411/PD

30 April 2019

WDL
Stuart Quarry
Chapel Road
Aberdare CF44 9JY

For the attention of Mr John Butcher

Dear Sirs,

Borehole Soakaway Testing, Crabtree Walk, Trefechan

Further to your recent instruction, we have now completed the falling head permeability testing at the above site, and enclose for your attention a copy of the results. We can report the following findings.

The site was previously investigated by Ove Arup & Partners and their findings given within their Desk Study and Trial Pitting Report No. 123628 dated 27th November 2007.

Site Works

We attended the site between the 8th and 12th April 2019 in order to carry out falling head permeability testing. A total of six rotary boreholes were drilled across the site. The locations of the boreholes are shown on Figure 1.

The rotary boreholes were drilled to a maximum depth of 32m below existing ground level (bgl). Each borehole was cased, to rock head, to a depth of between 2.7m or 9.0m. For each permeability test, the borehole was filled with water using a pumped 50mm supply from a 250gallon water bowser, and the falling water levels recorded.

Ground Conditions

The identified ground conditions comprised typically of grass/topsoil over clay. Limestone was encountered from typically 2.4 to 6.0m.

No groundwater was encountered within any of the boreholes drilled.

Copies of the borehole logs are included in Appendix A and their locations are shown in Figure 1.

Falling Head Permeability Results

The falling head tests were variable and copies of the soakaway test results are included within Appendix B. Each borehole result is summarised below.

BH1

No groundwater was encountered within borehole BH1 which was drilled to an approximate depth of 32.0m bgl. During the soakaway test a head of water could not be raised above 1.0m bgl. The water level then fell to approximately 9.60m after 5 mins and subsequently fell to 15.39m in 30minutes.

An infiltration rate of 6.1×10^{-5} m/s has been calculated BH1.

BH2

Groundwater was not encountered within borehole BH2 which was drilled to an approximate depth of 24.0m bgl. During the soakaway test a head of water was raised to the surface. The water level then fell to 6.12m bgl after 10mins and subsequently fell to 8.72m after 35minutes. The approximate rate of pumping water into the borehole was 40 litres per minute.

An infiltration rate of 5.0×10^{-5} m/s has been calculated for BH2.

BH3

Groundwater was not encountered within borehole BH3 which was drilled to an approximate depth of 15.5m bgl. During the soakaway test the water level could not be raised above 10.8m bgl and subsequently fell to 15.50m after 5mins. The approximate rate of pumping water into the borehole was 40 litres per minute.

An infiltration rate of 2.09×10^{-3} m/s has been calculated for the infiltration at depths between 10.8 and 15.5m.

BH3A

Groundwater was not encountered within borehole BH3 which was drilled to an approximate depth of 24.0m bgl. During the soakaway test the water level could not be raised above 12.63m bgl and subsequently fell to 14.7m after 10mins. The approximate rate of pumping water into the borehole was 40 litres per minute.

An infiltration rate of 7.04×10^{-5} m/s has been calculated for the infiltration at depths between 12.63 and 16.6m.

BH4

No groundwater was encountered within borehole BH4 which was drilled to an approximate depth of 24.0m bgl. During the soakaway test a head of water was raised to the surface. The water level then fell to approximately 6.20m after 1mins and subsequently fell to 13.07m after 35minutes.

An infiltration rate of 1.02×10^{-4} m/s has been calculated BH4. The approximate rate of pumping water into the borehole was 40 litres per minute.

BH5

Groundwater was not encountered within borehole BH5 which was drilled to an approximate depth of 24.0m bgl. During the soakaway test the water level could not be raised above 15.11m bgl and subsequently fell to 15.44m after 20mins. The approximate rate of pumping water into the borehole was 40 litres per minute.

The infiltration rate below 15.11m was negligible in BH5.

Conclusion

The ground conditions encountered on site typically consists of boulder clay grading into Limestone at typical depth of 2.4/6.0m. No groundwater was encountered within any of the boreholes.

The results of the borehole soakaways indicate that there is an area of potential fractured permeability within the Limestone strata typically between 10.8 and 15.11m bgl at boreholes BH3, BH3A and BH5. Each of these boreholes discharged water at a rate of 40 litres per minute. The soakaway results indicated that the Limestone fracturing is variable across the site is variable.

Based on the boreholes soakaways results, soakaways may be feasible within the fractured layers of the Limestone. The soakaways should be designed based on a worst case scenario. It is recommended that additional soakaway tests are undertaken following installation. During these installation works, consideration can be given to using a 75mm diameter pump with a discharge rate of 600 litres per minute.

The soil infiltration test results should be provided to a suitably qualified drainage engineer so that a soakaway design specific to the development can be completed and provided.

The detailed design of the borehole will need to robustly seal off the infiltration zone within the bedrock from the overlying boulder clay deposits. This is in order to avoid washout and collapse of the overlying clay deposits. All borehole soakaway chamber design details must include robust silt trap details. Moreover, a maintenance regime should be established for removal of silt from the silt traps. Once the borehole soakaways have been constructed it is essential that they are protected from uncontrolled flows of silt/clay or fine sand laden waters during the construction phase.

All sewers at the site must be adequately sealed and pressure tested to ensure that no leakage to pipe bedding occurs. This is of importance as the soils at the development may be susceptible to washout of fine materials leading to collapses within the deposits.

It is important that the design detail for the infiltration (soakaway) zone within the borehole is constructed to effectively prevent the ingress of fines from the surrounding bedrock. Typically, the borehole is constructed using a slotted/perforated well screen which allows the free flow of sediment free water. Normally it is advisable to flush the borehole of fines prior to installing the well screen.

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

Yours faithfully,



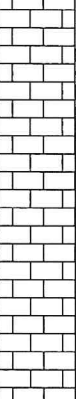
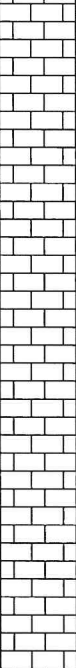
D P Davies
For
Intégral Géotechnique (Wales) Limited

Enc

Appendix A

Borehole Logs

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Crabtree Walk, Tefachan			Project No.: 12411		Borehole No.: BH1 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: WDL Homes			Coordinates:		Hole Type: RO	
Equipment: Rotary Drilling Rig		Diameter of Casing:			Level:		Scale 1:200	
Diameter of Boring:		Depth of Casing:			Dates 08/04/2019 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring					Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD	FI						
							2.40				Boulder Clay	1
											Limestone	2
							13.40					3
							14.00				Sandy bands	4
											Limestone	5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25
												26
												27
												28
												29
												30
												31
							32.00				End of Borehole at 32.00 m	32
												33
												34
												35
												36
												37
												38
												39
												40

Remarks: 1. Air flushing medium used. 2. Borehole dry. 3. Soakaway test carried out in borehole		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Crabtree Walk, Tefachan			Project No.: 12411		Borehole No.: BH2 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: WDL Homes			Coordinates:		Hole Type: RO	
Equipment: Rotary Drilling Rig		Diameter of Casing:			Level:		Scale 1:200	
Diameter of Boring:		Depth of Casing:			Dates 10/04/2019 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring				Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD						
										Boulder Clay	1
						2.70					2
										Sandy clayey gravel with limestone boulders	3
											4
						6.00					5
										Limestone	6
						7.20					7
										Clay and Limestone	8
											9
						9.50				Clay	10
											11
						11.20				Limestone	12
											13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
						24.00					24
										End of Borehole at 24.00 m	25
											26
											27
											28
											29
											30
											31
											32
											33
											34
											35
											36
											37
											38
											39
											40

Remarks: 1. Air flushing medium used. 2. Borehole dry. 3. Soakaway test carried out.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Crabtree Walk, Tefachan			Project No.: 12411		Borehole No.: BH3 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: WDL Homes			Coordinates:		Hole Type: RO	
Equipment: Rotary Drilling Rig		Diameter of Casing:			Level:		Scale 1:200	
Diameter of Boring:		Depth of Casing:			Dates 09/04/2019 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring				Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD						
										Clay	1
						3.20					2
										Weathered Limestone	3
						6.40					4
										Limestone with clay bands	5
											6
											7
											8
											9
											10
											11
						13.40					12
						14.20				Sand	13
						15.50				Limestone	14
										End of Borehole at 15.50 m	15
											16
											17
											18
											19
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											21
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											38
											39
											40

Remarks: 1. Air flushing medium used. 2. Borehole dry. 3. Soakaway test carried out.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Crabtree Walk, Tefachan				Project No.: 12411		Borehole No.: BH3A Sheet 1 of 1	
		Location: Merthyr Tydfil				Client: WDL Homes		Coordinates:	
Equipment: Rotary drilling rig		Diameter of Casing:				Level:		Hole Type: RO	
Diameter of Boring:		Depth of Casing:				Dates 09/04/2019 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring				Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD						
										Clay	1
						4.00					2
											3
										Boulder Clay	4
						6.00					5
										Limestone	6
											7
											8
											9
											10
						14.30					11
											12
											13
											14
						16.20				Sand Gravel and Clay	15
											16
										Limestone	17
						18.00					18
						18.60				Clay	19
										Limestone	20
											21
											22
											23
						24.00					24
										End of Borehole at 24.00 m	25
											26
											27
											28
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											31
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											38
											39
											40

Remarks: 1. Air flushing medium used. 2. Borehole dry. 3. Soakaway test carried out.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation					
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 Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Crabtree Walk, Tefachan			Project No.: 12411		Borehole No.: BH4 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: WDL Homes			Coordinates:		Hole Type: RO	
Equipment: Rotary Drilling Rig		Diameter of Casing:			Level:		Scale 1:200	
Diameter of Boring:		Depth of Casing:			Dates 10/04/2019 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring				Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD						
						1.20			  	Fill	1
						3.40				Clay	2
										Limestone	3
											4
											5
											6
											7
											8
											9
											10
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											12
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											14
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											21
											22
											23
						24.00				End of Borehole at 24.00 m	24
											25
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											32
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											39
											40

Remarks: 1. Air flushing medium used. 2. Borehole dry. 3. Soakaway test carried out.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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 Integral House, 7 Beddau Way Castle Gate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Crabtree Walk, Tefachan		Project No.: 12411		Borehole No.: BH5 Sheet 1 of 1	
Location: Merthyr Tydfil		Client: WDL Homes		Coordinates:		Hole Type: RO	
Equipment: Rotary Drilling Rig		Diameter of Casing:		Level:		Scale 1:200	
Diameter of Boring:		Depth of Casing:		Dates 11/04/2019 -		Logged By: Apex	

Well	Water Strikes	Rotary Coring				Depth (m)	Level (m AOD)	N Value	Legend	Stratum Description	
		Depth (m)	TCR	SCR	RQD						
						0.60				Fill	
										Clay and Gravel	1
						2.30				Limestone	2
											3
											4
											5
											6
											7
											8
											9
											10
											11
											12
											13
											14
											15
											16
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											18
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											20
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											23
						24.00				End of Borehole at 24.00 m	24
											25
											26
											27
											28
											29
											30
											31
											32
											33
											34
											35
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											38
											39
											40

Remarks: 1. Air flushing medium used. 2. Borehole dry. 3. Soakaway test carried out.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Appendix B

Falling Head Test Results

PERMEABILITY TEST DATA

PROJECT	Crabtree Walk, Trefechan		JOB No.	12411
TYPE	FALLING			
DATE		TIME		
BOREHOLE NUMBER	BH1	TEST No.	1	
Depth of borehole at start of test (mBGL) h_i	32.00	m	From top of casing	
Depth of borehole at end of test (mBGL) h_e	32.00	m	From top of casing	
Borehole diameter (m) D	0.110	m	OK	
Piezometer diameter (m) d		m		
Filter Backfill	No		Pea gravel	
Soil in casing (m) L	0.00			
L/D Ratio	263.6			
Hole in Soil below base of casing (m) L	29.00			
Depth of casing (mBGL) h_c	3.00	m	From top of casing	
Height of casing above ground level h_{ac}	0.10	m		
Ground water level (mBGL) H_0	32.00	m		
Water level at start of test below top of casing h_0	1.00	m		
	$H_{0\text{ TEST}}$	32.10	m	

Elapsed Time		Depth of water below top of casing	Head of Water	Ratio
t (mins)	t (s)	h (m)	H = ($H_0 - h$) (m)	H/H ₀
0	0	1.00	31.1	1.00
1	60	3.63	28.5	0.92
2	120	4.89	27.2	0.87
5	300	9.60	22.5	0.72
10	600	12.33	19.8	0.64
15	900	13.71	18.4	0.59
20	1200	14.36	17.7	0.57
25	1500	14.93	17.2	0.55
30	1800	15.39	16.7	0.54

TEST SECTION	
Length	L = 31.00 m
Area	A = 10.7223 m ²

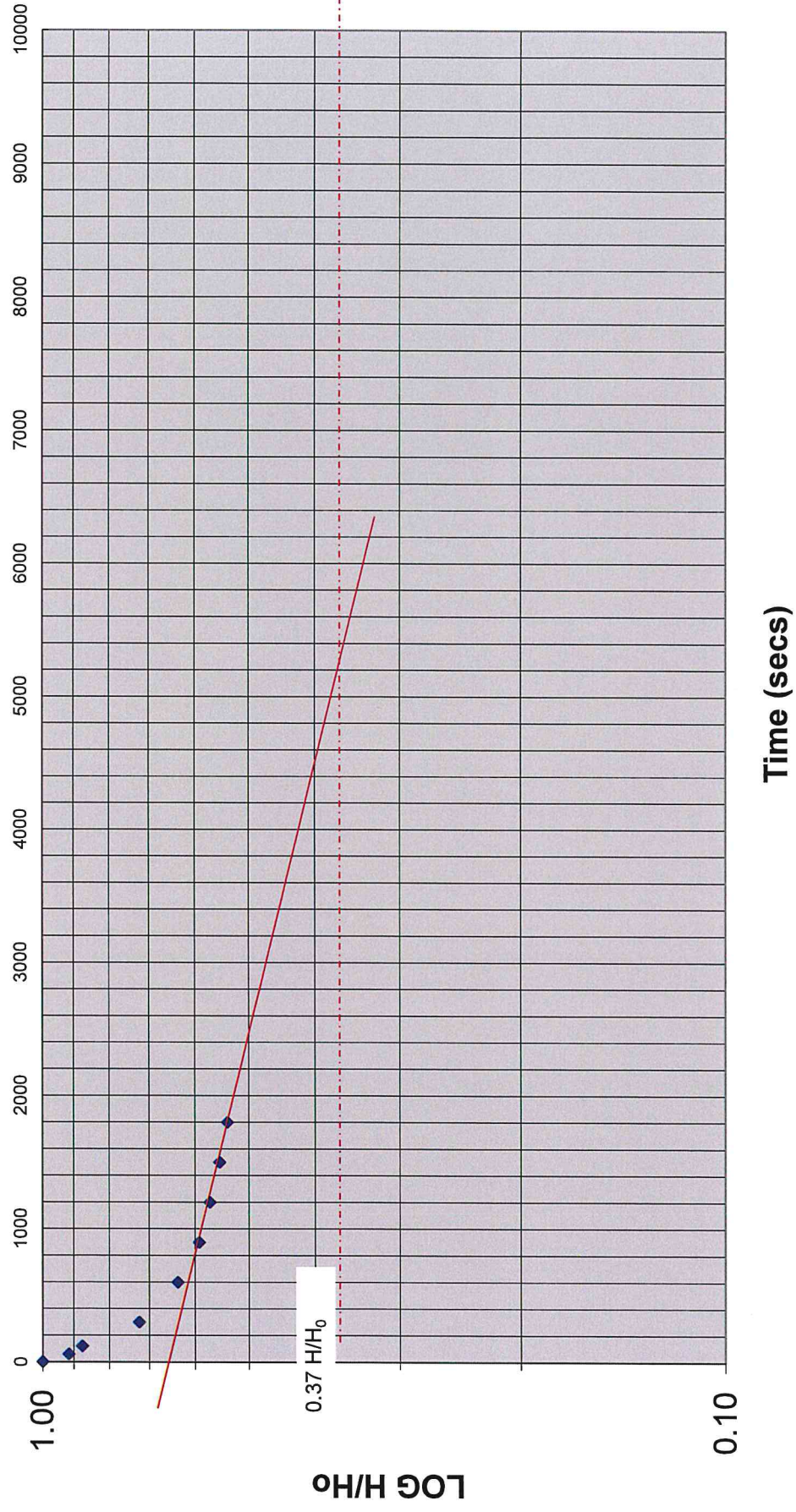
INTAKE FACTOR	Refer to BS 5930 Figure 7
Type	Special
F =	$D^2 \cdot 32 \cdot T \cdot (L/D)$
F =	33.34

TIME LAG	T = Time from start of test when $h = 0.37 h_0$
	See graph opposite
T =	5200 s

PERMEABILITY	
K = A / (F * T)	
K =	6.18E-05 m/s

COMMENTS	Water level rising during test period No Infiltration Observed, unable to calculate permeability
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Borehole BH1



PERMEABILITY TEST DATA

PROJECT **Crabtree Walk, Trefechan** JOB No. **12411**

TYPE **FALLING**

DATE TIME

BOREHOLE NUMBER **BH2** TEST No. **1**

Depth of borehole at start of test (mBGL) h_i **24.00** m From top of casing

Depth of borehole at end of test (mBGL) h_e **24.00** m From top of casing
OK

Borehole diameter (m) D **0.110** m

Piezometer diameter (m) d m

Filter Backfill **No** Pea gravel

Soil in casing (m) L m

L/D Ratio **163.6**

Hole in Soil below base of casing (m) L **18.00** m

Depth of casing (mBGL) h_c **6.00** m From top of casing

Height of casing above ground level h_{uc} **0.10** m

Ground water level (mBGL) H_0 **24.00** m

Water level at start of test below top of casing h_o **0.00** m

$H_{0\text{ TEST}}$ **24.10** m

Elapsed Time		Depth of water below top of casing	Head of Water	Ratio
t (mins)	t (s)	h (m)	$H = (H_0 - h)$ (m)	H/H_0
0	0	0.00	24.1	1.00
1	60	2.42	21.7	0.90
2	120	4.29	19.8	0.82
5	300	5.19	18.9	0.78
10	600	6.12	18.0	0.75
15	900	7.05	17.1	0.71
20	1200	7.45	16.7	0.69
25	1500	8.15	16.0	0.66
30	1800	8.64	15.5	0.64
35	2100	8.72	15.4	0.64

TEST SECTION
Length $L =$ **24.00** m
Area $A =$ **8.3033** m²

INTAKE FACTOR
Refer to BS 5930 Figure 7
Type **Special**
 $F =$ **$D \cdot 2.32 \cdot T \cdot (L/D)$**
 $F =$ **22.38**

TIME LAG
 $T =$ Time from start of test when $h = 0.37 h_o$

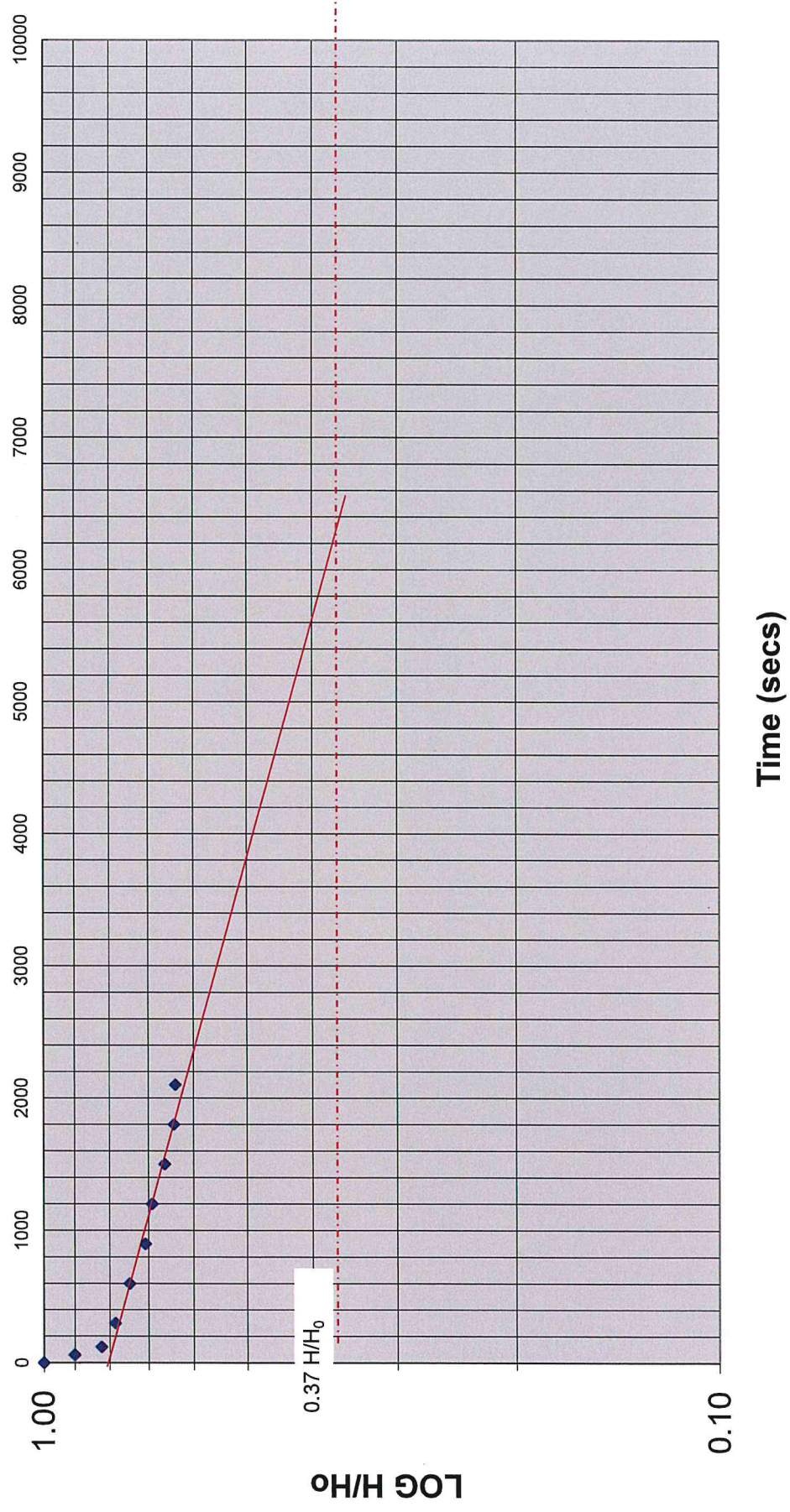
See graph opposite

$T =$ **6400** s

PERMEABILITY
 $K = A / (F \cdot T)$
 $K =$ **5.80E-05** m/s

COMMENTS

Borehole BH2



PERMEABILITY TEST DATA

PROJECT **Crabtree Walk, Trefechan** JOB No. **12411**

TYPE **FALLING**

DATE TIME hrs

BOREHOLE NUMBER **BH3** TEST No. **1**

Depth of borehole at start of test (mBGL) h_1 **15.50** m From top of casing

Depth of borehole at end of test (mBGL) h_2 **15.50** m From top of casing
OK

Borehole diameter (m) D **0.110** m

Piezometer diameter (m) d m

Filter Backfill **No** Pea gravel

Soil in casing (m) L m

L/D Ratio **59.1**

Hole in Soil below base of casing (m) L **6.50** m

Depth of casing (mBGL) h_c **9.00** m From top of casing

Height of casing above ground level h_{uc} **0.10** m

Ground water level (mBGL) H_0 **15.50** m

Water level at start of test below top of casing h_0 **10.80** m

H_0 TEST **15.60** m

Elapsed Time		Depth of water below top of casing h (m)	Head of Water $H = (H_0 - h)$ (m)	Ratio H/H_0
t (mins)	t (s)			
0	0	10.80	4.8	1.00
1	60	12.60	3.0	0.63
2	120	14.70	0.9	0.19
5	300	15.50	0.1	0.02

TEST SECTION

Length $L =$ **4.70** m
Area $A =$ **1.6337** m²

INTAKE FACTOR

Refer to BS 5930 Figure 7

Type **Special**

$F =$ **$D^2 \cdot 32 \cdot T^2 \cdot (L/D)$**

$F =$ **9.78**

TIME LAG

$T =$ Time from start of test when $h = 0.37 h_0$

See graph opposite

$T =$ **80** s

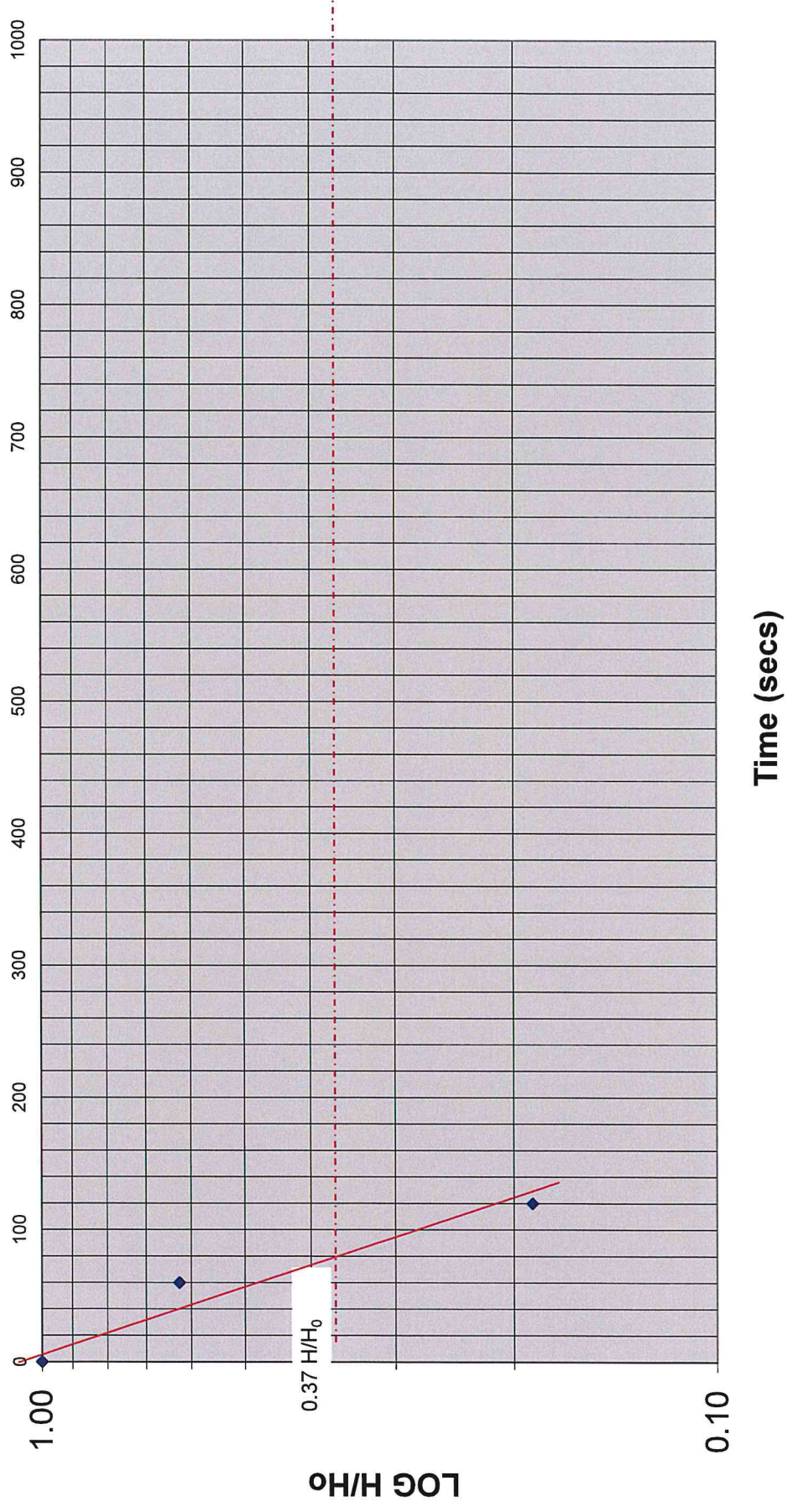
PERMEABILITY

$K = A / (F \cdot T)$

$K =$ **2.09E-03** m/s

COMMENTS

Borehole BH3



PERMEABILITY TEST DATA

PROJECT Crabtree Walk, Trefechan JOB No. 12411

TYPE FALLING

DATE TIME hrs

BOREHOLE NUMBER BH3A TEST No. 1

Depth of borehole at start of test (mBGL) h_i 24.00 m From top of casing

Depth of borehole at end of test (mBGL) h_e 24.00 m From top of casing
OK

Borehole diameter (m) D 0.110 m

Piezometer diameter (m) d m

Filter Backfill No Pea gravel

Soil in casing (m) L m

L/D Ratio 163.6

Hole in Soil below base of casing (m) L 18.00 m

Depth of casing (mBGL) h_c 6.00 m From top of casing

Height of casing above ground level h_{ac} 0.10 m

Ground water level (mBGL) H_0 24.00 m

Water level at start of test below top of casing h_o 12.63 m

H_0 TEST 24.10 m

Elapsed Time		Depth of water below top of casing	Head of Water	Ratio
t (mins)	t (s)	h (m)	H = ($H_0 - h$) (m)	H/ H_0
0	0	12.63	11.5	1.00
1	60	13.35	10.8	0.94
2	120	13.72	10.4	0.90
5	300	14.17	9.9	0.87
10	600	14.72	9.4	0.82
15	900	16.46	7.6	0.67
20	1200	16.60	7.5	0.65

TEST SECTION
Length L = 11.37 m
Area A = 3.9387 m²

INTAKE FACTOR
Refer to BS 5930 Figure 7
Type Special
 $F = \frac{D^2 \cdot 2.32 \cdot T \cdot (L/D)}{A}$
 $F = 22.38$

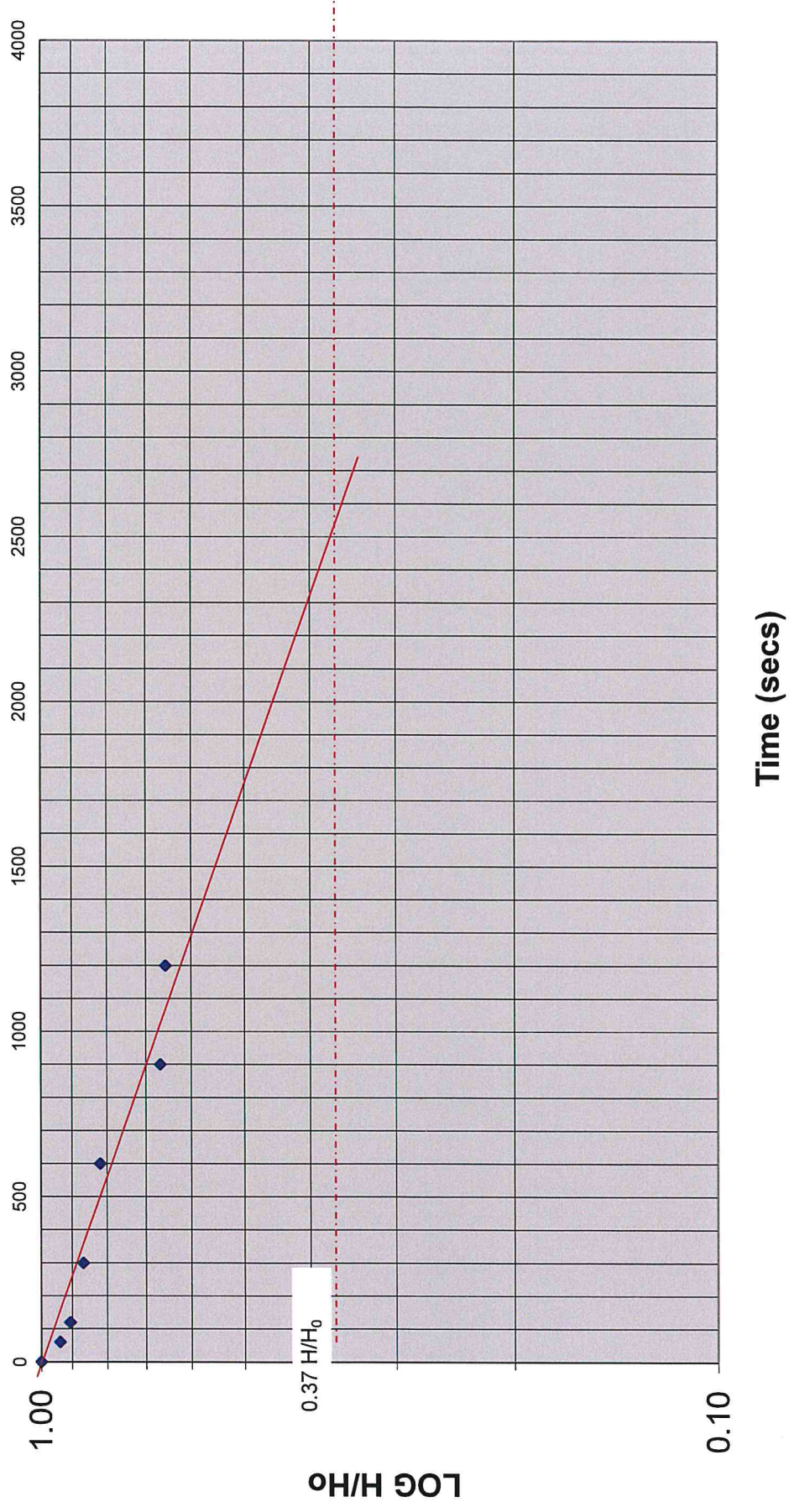
TIME LAG
 $T =$ Time from start of test when $h = 0.37 h_o$
See graph opposite

$T = 2500$ s

PERMEABILITY
 $K = A / (F \cdot T)$
 $K = 7.04E-05$ m/s

COMMENTS

Borehole BH3A



PERMEABILITY TEST DATA

PROJECT **Crabtree Walk, Trefechan** JOB No. **12411**

TYPE **FALLING**

DATE TIME

BOREHOLE NUMBER **BH4** TEST No. **1**

Depth of borehole at start of test (mBGL) h_i **24.00** m From top of casing

Depth of borehole at end of test (mBGL) h_e **24.00** m From top of casing
OK

Borehole diameter (m) D **0.110** m

Piezometer diameter (m) d m

Filter Backfill **No** Pea gravel

Soil in casing (m) L m

L/D Ratio **177.3**

Hole in Soil below base of casing (m) L **19.50** m

Depth of casing (mBGL) h_c **4.50** m From top of casing

Height of casing above ground level h_{ac} **0.10** m

Ground water level (mBGL) H_0 **24.00** m

Water level at start of test below top of casing h_o **0.00** m

H_0 TEST **24.10** m

Elapsed Time		Depth of water below top of casing	Head of Water	Ratio
t (mins)	t (s)	h (m)	$H = (H_0 - h)$ (m)	H/H_0
0	0	0.00	24.1	1.00
1	60	6.20	17.9	0.74
2	120	6.63	17.5	0.72
5	300	6.82	17.3	0.72
10	600	8.60	15.5	0.64
15	900	10.68	13.4	0.56
20	1200	11.57	12.5	0.52
25	1500	12.02	12.1	0.50
30	1800	12.57	11.5	0.48
35	2100	13.07	11.0	0.46

TEST SECTION

Length $L =$ **24.00** m
Area $A =$ **8.3033** m²

INTAKE FACTOR

Refer to BS 5930 Figure 7

Type **Special**

$F =$ **$D \cdot 2.32 \cdot T^* (L/D)$**

$F =$ **23.92**

TIME LAG

$T =$ Time from start of test when $h = 0.37 h_o$

See graph opposite

$T =$ **3400** s

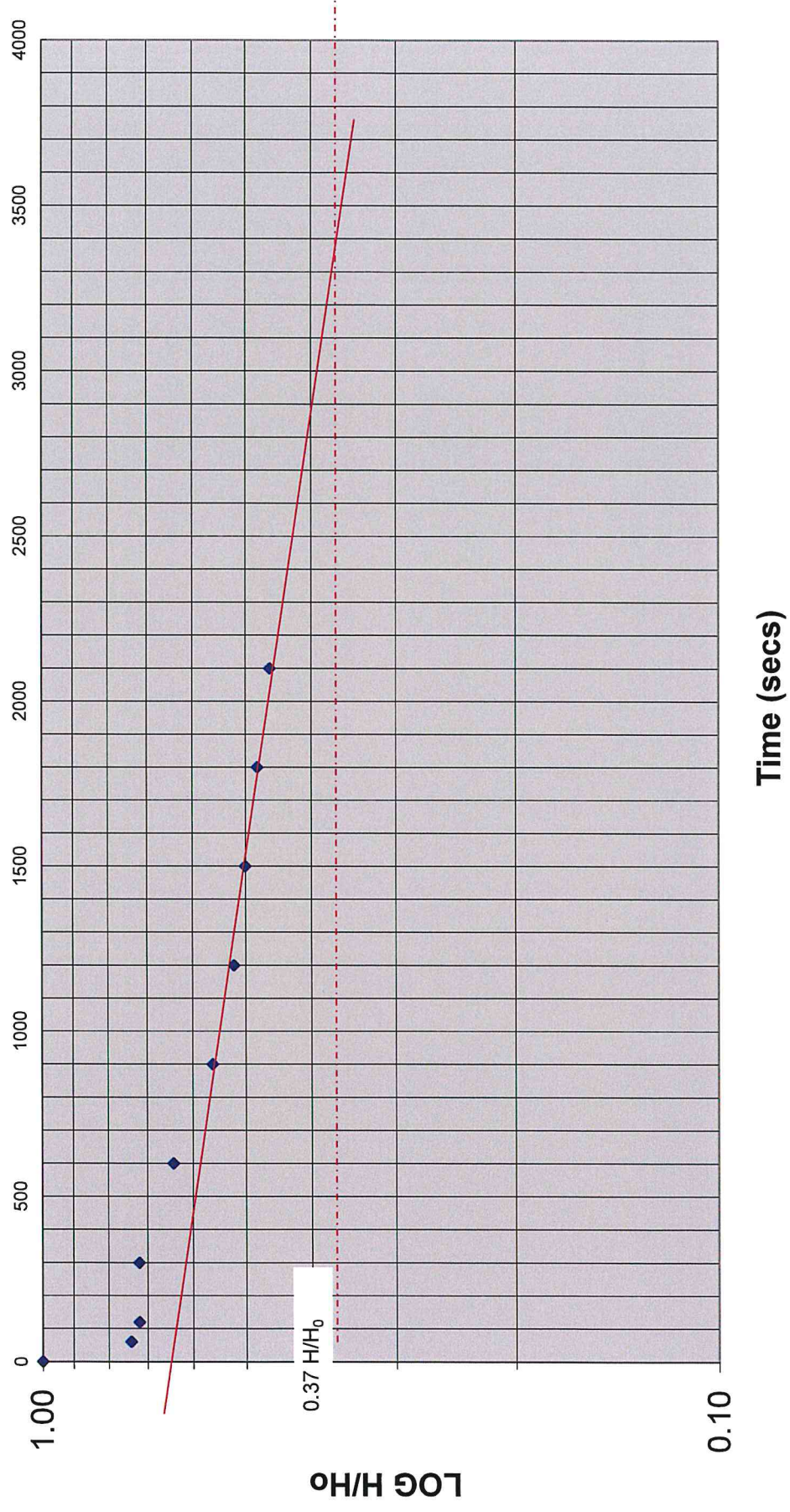
PERMEABILITY

$K = A / (F \cdot T)$

$K =$ **1.02E-04** m/s

COMMENTS

Borehole BH4



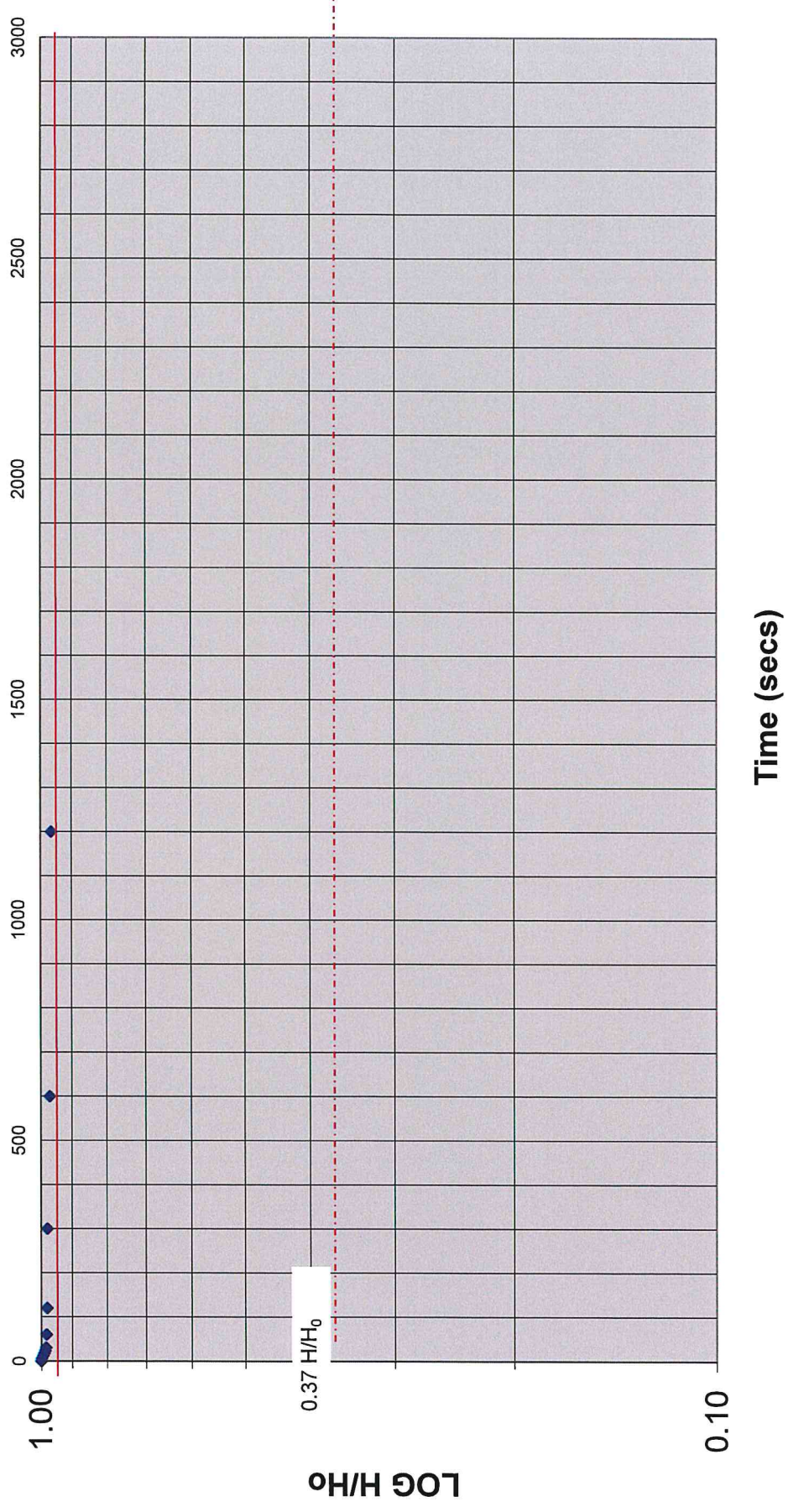
PERMEABILITY TEST DATA

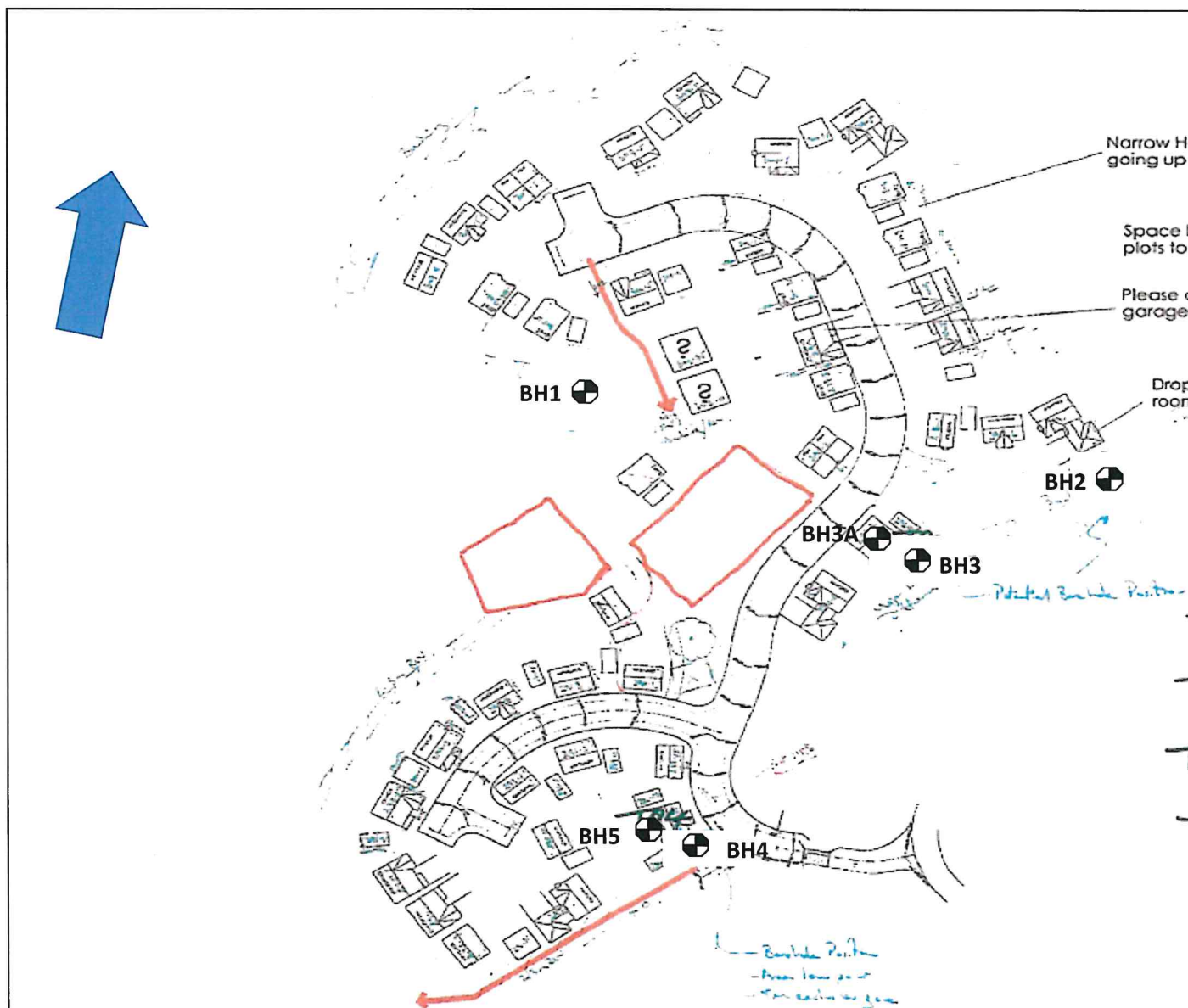
PROJECT	Crabtree Walk, Trefechan	JOB No.	12411
TYPE	FALLING		
DATE		TIME	hrs
BOREHOLE NUMBER	BH5	TEST No.	1
Depth of borehole at start of test (mBGL) h_i	24.00 m		From top of casing
Depth of borehole at end of test (mBGL) h_e	24.00 m		From top of casing
Borehole diameter (m) D	0.110 m		OK
Piezometer diameter (m) d	m		
Filter Backfill	No		Pea gravel
Soil in casing (m) L	m		
L/D Ratio	193.6		
Hole in Soil below base of casing (m) L	21.30 m		
Depth of casing (mBGL) h_c	2.70 m		From top of casing
Height of casing above ground level h_{gc}	0.10 m		
Ground water level (mBGL) H_0	24.00 m		
Water level at start of test below top of casing h_o	15.11 m		
	H_0 TEST	24.10 m	

Elapsed Time		Depth of water below top of casing	Head of Water	Ratio
t (mins)	t (s)	h (m)	H = (H_0 - h) (m)	H/ H_0
0	0	15.11	9.0	1.00
0.1	6	15.13	9.0	1.00
0.2	12	15.18	8.9	0.99
0.3	18	15.21	8.9	0.99
0.4	24	15.24	8.9	0.99
0.5	30	15.26	8.8	0.98
1	60	15.28	8.8	0.98
2	120	15.29	8.8	0.98
5	300	15.31	8.8	0.98
10	600	15.39	8.7	0.97
20	1200	15.44	8.7	0.96

TEST SECTION	
Length	L = 8.89 m
Area	A = 3.0817 m ²
INTAKE FACTOR	Refer to BS 5930 Figure 7
Type	Special
F =	$D^2 \cdot 32 \cdot \pi^2 / (L \cdot D)$
F =	25.74
TIME LAG	T = Time from start of test when h = 0.37 h_o
	See graph opposite
T =	N/A s
PERMEABILITY	
K = A / (F * T)	
K =	#VALUE! m/s
COMMENTS	Negligible infiltration recorded

Borehole BH5





Legend

BH1  Approximate Borehole Location

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FIGURE 1 - SITE LAYOUT

CRABTREE WALK TREFECHAN

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Géotechnique

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