Kilcock, Co. Kildare – Ground Investigation

Client:	Paul Byrne Architects
Client's Representative:	CS Consulting
Report No.:	22-0852
Date:	August 2022
Status:	Final for Issue

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Document Control Sheet

Report No.:		22-0852			
Project Title:		Kilcock, Co. Kildare			
Client:		Paul Byrne Architects			
Client's Representative:		CS Consulting			
Revision:	A00	**Status:**	Final for Issue	**Issue Date:**	10th August 2022
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The works were conducted in accordance with:

British Standards Institute (2015) BS 5930:2015+A1:2020, Code of practice for ground investigations.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015+A1:2020, The Code of Practice for Ground Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of Nx5=Cu is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015+A1:2020	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

Kilcock, Co. Kildare

1 AUTHORITY

On the instructions of CS Consulting, ("the Client's Representative"), acting on the behalf of Paul Byrne Architects ("the Client"), a ground investigation was undertaken at the above location to provide geotechnical and environmental information for input to the design and construction of a proposed residential development.

This report details the work carried out on site; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results. A discussion on the recommendations for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the ground investigation works, and on the results of the field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client's Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client's Representative, included boreholes, trial pits, groundwater monitoring, in-situ testing, and the preparation of a report on the findings including recommendations for construction.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on a greenfield site, located in Kilcock, County Kildare. The site is bordered by the R148 Road to the west and north, Boycetown Court housing estate and agricultural land to the east and the M4 Motorway to the south. The site is flat within the area fields, with a slight loss in elevation sloping downwards to the south and to the north.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between the 27th July – 3rd August 2022, comprised:

- nine boreholes by dynamic (windowless) sampling
- a standpipe installation in nine boreholes
- twelve machine dug trial pits; and
- an infiltration test performed in twelve trial pits

The exploratory holes and in-situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix A.

4.2 Boreholes

Nine boreholes (BH01-BH09) were put down to completion by light percussion boring techniques using a Dando Terrier dynamic sampling rig. The boreholes were put down initially in 150mm diameter, reducing in diameter with depth as required, down to 50mm by use of the smallest sampler.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down clear of services or subsurface obstructions. The boreholes were taken to depths ranging between 2.00m and 4.90m where they were terminated on encountering virtual refusal.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The *N*-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. The SPT hammer energy measurement report is provided in Appendix F.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded. Details of the water strikes are presented on the individual borehole logs.

Appendix B presents the borehole logs.

4.3 Standpipe installations

A groundwater monitoring standpipe was installed in BH01-BH09.

Details of the installations, including the depth range of the response zone, are provided in Appendix B on the individual borehole logs.

4.4 Trial Pits

Twelve trial pits (SA01–SA12) were excavated using a 3t tracked excavator fitted with a 600mm wide bucket, to depths between 1.60m and 2.50m. All trial pits were excavated to allow completion of infiltration test.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix C presents the trial pit logs with photographs of the pits and arising provided in Appendix D.

4.5 Infiltration tests

An infiltration/soakaway test was carried out at twelve locations (SA01- SA12) in accordance with BRE Digest 365 - Soakaways (BRE, 2016). The tests were conducted in similarly numbered trial pits.

Appendix E presents the results and analysis of the infiltration test. The absence of the outflow from the pits precluded calculation of infiltration coefficients.

4.6 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R10 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish Transverse Mercator) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole location plan presented in Appendix A shows these as-built positions.

5 GROUND CONDITIONS

5.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise glacial till. These deposits are underlain by dark limestones and shales of the Lucan Formation.

5.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- **Topsoil:** encountered typically in 300mm thickness across the site.
- **Fluvioglacial deposits:** typically, medium dense sands and gravels interspersed with layers of sandy gravelly clay encountered in BH01-BH03, BH05, BH09, SA07, SA09, and SA11-SA12.
- **Glacial Till:** sandy gravelly clay, frequently with low cobble content, typically soft in upper horizons, becoming stiffer with increasing depth encountered in all exploratory holes.

5.3 Groundwater

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

Groundwater was encountered during boring and trial pitting through soil as water strikes seen in Table 1 below.

Table 1. Groundwater strikes encountered during the ground investigation.

Location	Depth (mbgl)
BH01	1.80
SA02	2.48
SA05	2.45
SA08	2.35 / 2.50
SA09	2.23 / 2.50

Groundwater was not noted during drilling at eight of the borehole locations. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out additional groundwater strikes and the possibility of encountering groundwater during excavation works should not be ruled out.

Groundwater was not noted at any of the other trial pit locations.

Subsequent groundwater monitoring of the standpipe installations recorded water levels as shown in Table 2 below.

Table 2: Groundwater monitoring

Date	Water level (mbgl)								
	BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09
04/08/2022	1.73	2.93	3.16	Dry	1.81	Dry	1.22	Dry	Dry

Seasonal variation in groundwater levels should also be factored into design considerations, and continued monitoring of the nine installed standpipes will give an indication of the seasonal variation in groundwater level which should be factored into design considerations.

6 DISCUSSION

6.1 Proposed construction

It is proposed to construct a new housing development on the site.

No further details were available to Causeway Geotech at the time of preparing this report and any designs based on the recommendations or conclusions within this report should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory holes. Causeway Geotech were commissioned to provide a geotechnical report, and it is outwith our remit to advise on structure design.

6.2 Recommendations for construction

6.2.1 Summary

Based on the presence of firm to stiff clay or medium dense sand or gravel at relatively shallow depths across the footprint of the proposed development, the implementation of traditional shallow (spread) foundations (strip/pad and trench fill) are considered suitable.

The thickness of soft glacial till/loose fluvioglacial deposits in some areas of the, coupled with the relatively shallow groundwater table will render the implementation of any shallow (spread) foundations problematic. The variation between fine- and coarse-grained soils across the site could also lead to the occurrence of differential settlements, which should be avoided. It follows that the most practicable solution for installing safe working foundations across the site will be by a "deep" foundation method, such as piling to transfer loadings to depth or by utilising a raft type foundation whereby the loadings are spread across a greater area.

6.2.2 Soil strength parameters

When estimating the shear strength of fine soils (silt/clay), reference is made to the results of Standard Penetration Tests (SPT's) carried out within the boreholes. The undrained shear strength of fine soils can be estimated using the correlation developed by Stroud & Butler:

$$C_u = f_1 \times N$$

where f_1 is typically in the range 4 to 6. A median f_1 value of 5 is adopted for this report.

For granular soils (sand/gravel), a graphical relationship between SPT "N" value and angle of shearing resistance, φ, has been developed by Peck, Hanson and Thorburn. This is published in *Foundation Design and Construction* (Tomlinson, 2001) and is referenced in this report when deriving angles of shearing resistance for the gravel soils.

6.2.3 Foundations and ground floor construction

Foundations should transfer loading to below any Made Ground or subsoil. The recommended foundation construction and allowable bearing pressure (ABP) at the borehole locations are presented in Table 3.

Table 3: Construction recommendations

Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
BH01	1.20m	70	Firm CLAY	Strip & pad	Ground bearing	Strike at 1.80m
	3.00m	230	Stiff CLAY	Trench fill (with trench support and possible sump pumping)		
BH02	1.20m	120	Firm CLAY	Strip & pad	Ground bearing	Not encountered
	4.00m	>250	Stiff CLAY	Trench fill/Piled		
BH03	1.20m	140	Medium dense SAND	Strip & pad	Ground bearing	Not encountered
BH04	1.20m	170	Stiff CLAY	Strip & pad	Ground bearing	Not encountered
BH05	1.20m	140	Medium dense SAND	Strip & pad	Ground bearing	Not encountered
BH06	3.00m	>250	Stiff CLAY	Trench fill (with trench support and possible sump pumping)	Ground bearing	Not encountered
BH07	1.20m	100	Firm CLAY	Strip & pad	Ground bearing	Not encountered
	2.00m	150	Stiff CLAY	Trench fill		
BH08	1.20m	120	Stiff CLAY	Strip & pad	Ground bearing	Not encountered
BH09	2.00m	>250	Stiff CLAY	Trench fill	Ground bearing	Not encountered

*Existing Ground Level

Based on the findings of the ground investigation, spread foundations (strip/pad and trench fill) are considered suitable with estimated allowable bearing pressures between 70kPa and >250kPa at depths between 1.20m and 3.00m on firm to stiff clay or medium dense sand.

It should be noted that in some locations, recommendations of ABP's at 1.20mbgl have been reduced to account for a softer or loose strata which seems to be present across the site at 2-3m. Any foundation solutions must take account of the effect of any proposed loadings on this stratum.

The base of foundation excavations should be thoroughly inspected in accordance with the Earthworks Specification; any soft or loose soils removed with the resultant void backfilled with ST1 concrete or engineered backfill. A consistent bearing stratum should be provided for any building unit to limit differential settlements.

Given the generally fine grained/cohesive nature of the soils throughout the proposed formation levels and findings of trial pit excavations, most of which were found to be stable, excavations for foundations are likely to be relatively stable. However, any instability can be minimised by battering the side slopes at 2 vertical to 1 horizontal and by limiting the duration that the excavation is open. Groundwater control, where required, will be possible by pumping from sumps formed in the base of excavations.

6.2.4 Floor slabs

Floor slabs should not bear directly onto Made Ground or soft soils. Consequently, the use of ground bearing floor slabs is considered appropriate following the removal of any surface Made Ground and soft clay layers and their replacement using well-graded well-compacted granular fill. However, a suspended floor slab should be adopted where the difference in levels of the proposed floor and the base of Made Ground/soft soils is greater than 600mm.

Therefore, given the depth to the base of Made Ground and relative low strength of upper soil layers, a suspended floor slab may be required over parts of the site. The use of intermediate lines of support stub walls would reduce the spans required for flooring units.

6.2.5 Excavations for services

For the installation of services ducts/trenches, it is suggested that open trenching will be the most practicable construction method. Generally speaking, the ground conditions should render the use of open trenching by backhoe excavator possible, with some trench support required should any localised extensive granular stratum be encountered.

Where working in open trenches, it is thought that trench support systems, by way of a trench box (or possibly sheet piles), will be required to maintain trench stability and safe working conditions. Groundwater control at these locations should be possible by means of sump pumping.

To preclude the eventuality of differential settlements in pipes, they should be laid on a consistent stratum of appropriate allowable bearing capacity and protected with appropriate fill cover.

Where ducts and chambers must be installed in areas where localised soft spots are encountered, the use of geogrid reinforcement along the base of the excavation is recommended. This will stiffen the base of the trench and help control longitudinal differential settlement.

Backfilling of trenches may be completed by using compacted Cl 804 granular fill and reinstated as appropriate.

6.3 Infiltration drainage

In infiltration tests carried out in trial pits SA01-SA12, the absence of the outflow from the pits precluded calculation of infiltration coefficients. In order to calculate infiltration coefficients in line with BRE specification the water in the pit must drop from 75% to 25% effective storage depth. As can be seen from the test results the water in the pits did not drop sufficiently to allow a calculation, with SA04 recording the most drop of 300mm over 60 minutes before stabilising.

The low-permeability fine-grained soils are therefore considered to be poor infiltration media and would be deemed unsuitable for the implementation of infiltration drainage systems. The results are typical of the highly impermeable soils of the greater Dublin Area and it follows that it will be necessary to discharge storm or surface water to an existing surface water system, using attenuation techniques to regulate the flow.

Reference should be made the Sustainable Drainage Systems (SuDS) design guidance, taking into account meteorological conditions and a hydrogeological assessment.

7 REFERENCES

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland.

IS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. National Standards Authority of Ireland.

BS 5930: 2015+A1:2020: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description.

BS EN ISO 14688-2:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS EN ISO 22476-3:2005+A1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test.

Building Research Establishment (2007), BRE Digest 365: Soakaways.

CAUSEWAY GEOTECH

APPENDIX A

SITE AND EXPLORATORY HOLE LOCATION PLANS



CAUSEWAY GEOTECH

Project No.:	22-0852	**Client:**	Paul Byrne Architects
Project Name:	Kilcock, Co. Kildare	**Client's Representative:**	CS Consulting

Legend Key



Title:

Site Location Plan

Last Revised:	**Scale:**
10/08/2022	1:8000

CAUSEWAY GEOTECH

Project No.:	22-0852	**Client:**	Paul Byrne Architects
Project Name:	Kilcock, Co. Kildare	**Client's Representative:**	CS Consulting

Legend Key

- Locations By Type - DS
- Locations By Type - TP



Title:
Exploratory Hole Location Plan

Last Revised:	**Scale:**
10/08/2022	1:3000

CAUSEWAY GEOTECH

APPENDIX B

BOREHOLE LOGS



CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH01
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 1
Dynamic Sampling	Dando Terrier	0.00	3.50	687561.78 E 740325.38 N	3.50 m	02/08/2022	JC	Scale: 1:50
					Elevation: 75.02 mOD	End Date: 02/08/2022	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
					74.52	0.50		TOPSOIL: with occasional rootlets
0.50 - 1.10	B3							Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is rounded fine to medium.
1.10 - 2.10	B4				73.92	1.10		
1.20 - 1.65	D1							Loose brown gravelly clayey fine to coarse SAND. Gravel is rounded fine to coarse.
1.20 - 1.65	SPT (S)	N=7 (2,2/2,2,2,1) Hammer SN = 0696	0.00	Dry				
2.00 - 2.45	SPT (C)	N=8 (2,5/3,2,2,1) Hammer SN = 0696	2.00	Dry	72.92	2.10		
2.10 - 3.75	B5							Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse.
3.00 - 3.45	D2				72.02	3.00		
3.00 - 3.45	SPT (S)	N=23 (4,5/5,6,6,6) Hammer SN = 0696	3.00	Dry				Stiff becoming very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse.
3.50 - 3.89	SPT (C)	N=50 (7,10/50 for 236mm) Hammer SN = 0696	3.00	Dry	71.52	3.50		End of Borehole at 3.50m

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
1.80	0.00	20	1.80

Casing Details

To (m)	Diameter
3.00	145

Remarks

Inspection pit hand dug to 1.20m.

Termination Reason

Terminated on refusal.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH02
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	5.35	687427.85 E 740259.18 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1 Scale: 1:50
4.90 m	02/08/2022	JC	
Elevation: 81.06 mOD	**End Date:** 02/08/2022	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
					80.66	0.40		TOPSOIL: with occasional rootlets
								Stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse.
1.20 - 1.65	D1							
1.20 - 1.65	SPT (S)	N=15 (4,3/3,4,4,4) Hammer SN = 0696	0.00	Dry				
					79.46	1.60		Medium dense brown gravelly clayey fine to coarse SAND. Gravel is rounded fine to coarse.
2.00 - 2.45	D2							
2.00 - 2.45	SPT (S)	N=12 (5,5/4,3,2,3) Hammer SN = 0696	0.00	Dry	78.86	2.20		Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse.
3.00 - 3.45	SPT (S)	N=8 (1,3/2,2,2,2) Hammer SN = 0696	0.00	Dry	78.06	3.00		Firm light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse.
					77.26	3.80		Very stiff dark grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is rounded fine to coarse.
4.00 - 4.45	D3							
4.00 - 4.45	SPT (S)	N=37 (5,5/8,8,9,12) Hammer SN = 0696	0.00	Dry				
4.90 - 5.35	D4				76.16	4.90		End of Borehole at 4.90m
4.90 - 5.35	SPT (S)	N=50 (8,9/9,11,13,17) Hammer SN = 0696	0.00	Dry				

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH03
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	3.65	687312.02 E 740237.98 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
3.65 m	02/08/2022	JC	Scale: 1:50
Elevation: 83.16 mOD	**End Date:** 02/08/2022	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
								TOPSOIL: with occasional rootlets.
0.40 - 1.10	B3				82.76	0.40		Stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.
1.10 - 2.50	B4				82.06	1.10		
1.20 - 1.65	D1							Medium dense locally dense brown gravelly clayey fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.
1.20 - 1.65	SPT (S)	N=37 (7,9/8,11,9,9) Hammer SN = 0696	0.00	Dry				
2.00 - 2.45	SPT (C)	N=14 (3,4/4,4,4,2) Hammer SN = 0696	0.00	Dry				
2.50 - 3.65	B5				80.66	2.50		Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.
3.00 - 3.45	D2							
3.00 - 3.45	SPT (S)	N=13 (3,1/2,4,3,4) Hammer SN = 0696	0.00	Dry				
3.65 - 4.04	SPT (C)	N=50 (25 for 130mm/50 for 255mm) Hammer SN = 0696	0.00	Dry	79.51	3.65		End of Borehole at 3.65m

Water | Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated due to refusal of sampler driving cobble.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH04
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	2.45	687344.28 E 740085.86 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
2.00 m	02/08/2022	JC	Scale: 1:50
Elevation: 81.53 mOD	**End Date:** 02/08/2022	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B3				81.43	0.10		TOPSOIL. Firm dark brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.		
1.20 - 1.65	D1				80.33	1.20		Stiff light brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.		
1.20 - 2.00	B4									
1.20 - 1.65	SPT (S)	N=17 (3,3/4,3,4,6) Hammer SN = 1367	0.00	Dry						
2.00 - 2.45	D2				79.53	2.00		End of Borehole at 2.00m		
2.00 - 2.33	SPT (S)	N=50 (2,4/50 for 180mm) Hammer SN = 1367	0.00	Dry						

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH05
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	4.00	687434.68 E 740090.91 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
4.00 m	02/08/2022	JC	Scale: 1:50
Elevation: 81.48 mOD	**End Date:** 02/08/2022	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B5				81.38	0.10		TOPSOIL. Firm light brown sandy gravelly CLAY with low cobble content and occasional rootlets. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subrounded.		
1.20 - 1.50	B6				80.28	1.20		Medium dense dark brown slightly silty gravelly fine coarse SAND with low cobble content. Gravel is angular fine to medium. Cobbles are subangular.		
1.20 - 1.65	D1									
1.20 - 1.65	SPT (S)	N=21 (6,4/6,5,6,4) Hammer SN = 1367	0.00	Dry	79.98	1.50		Stiff light brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.		
1.50 - 2.00	B7									
2.00 - 2.45	D2				79.48	2.00		Firm dark brownish black sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.		
2.00 - 3.00	B8									
2.00 - 2.45	SPT (S)	N=14 (2,1/3,3,4,4) Hammer SN = 1367	0.00	Dry						
3.00 - 3.45	D3				78.48	3.00		Stiff becoming very stiff greyish black sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.		
3.00 - 4.00	B9									
3.00 - 3.45	SPT (S)	N=29 (4,5/5,7,8,9) Hammer SN = 1367	0.00	Dry						
4.00 - 4.33	D4				77.48	4.00		End of Borehole at 4.00m		
4.00 - 4.36	SPT (S)	N=50 (8,10/50 for 205mm) Hammer SN = 1367	0.00	Dry						

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated at refusal of sampler.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH06
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	3.00	687578.04 E 740079.71 N

Final Depth: 3.00 m	**Start Date:** 03/08/2022	**Driller:** JC	Sheet 1 of 1	
Elevation: 81.12 mOD	**End Date:** 03/08/2022	**Logger:** SR	Scale: 1:50	
			FINAL	

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.10 - 1.20	B4				81.02	0.10		TOPSOIL.
								Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.
1.20 - 1.65	D1				79.92	1.20		
1.20 - 2.00	B5							Stiff dark brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subanguar.
1.20 - 1.65	SPT (S)	N=20 (5,5/5,5,5,5) Hammer SN = 1367	0.00	Dry				
2.00 - 2.45	D2				79.12	2.00		
2.00 - 3.00	B6							Soft light brown sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subangular.
2.00 - 2.45	SPT (S)	N=5 (3,3/2,1,1,1) Hammer SN = 1367	0.00	Dry				
3.00 - 3.45	D3				78.12	3.00		
3.00 - 3.45	SPT (S)	N=50 (7,11/14,10,11,15) Hammer SN = 1367	0.00	Dry				End of Borehole at 3.00m

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH07
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	3.80	687468.27 E 740009.26 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
3.80 m	02/08/2022	JC	Scale: 1:50
Elevation: 81.24 mOD	**End Date:** 02/08/2022	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B4				81.14	0.10		TOPSOIL.		
								Firm light brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subrounded.		
1.20 - 1.65	D1				80.04	1.20				
1.20 - 2.00	B5							Firm light brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
1.20 - 1.65	SPT (S)	N=10 (2,3/2,2,3,3) Hammer SN = 1367	0.00	Dry						
2.00 - 2.45	D2				79.24	2.00				
2.00 - 3.00	B6							Stiff becoming very stiff dark greyish black slightly sandy gravelly CLAY with low cobble content. Sand is fine to course. Gravel is angular fine to medium. Cobbles are subangular,		
2.00 - 2.45	SPT (S)	N=15 (3,3/3,4,4,4) Hammer SN = 1367	0.00	Dry						
3.00 - 3.45	D3									
3.00 - 3.80	B7									
3.00 - 3.45	SPT (S)	N=25 (6,5/5,6,7,7) Hammer SN = 1367	0.00	Dry						
3.80 - 4.25	SPT (C)	N=50 (25,15/10,12,13,15) Hammer SN = 1367	0.00	Dry	77.44	3.80		End of Borehole at 3.80m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH08
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	4.00	687479.62 E 739967.90 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
4.00 m	02/08/2022	JC	Scale: 1:50
Elevation: 81.25 mOD	**End Date:** 02/08/2022	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.10 - 1.20	B5				81.15	0.10		TOPSOIL.		
								Firm light brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subrounded.		
1.20 - 1.65	D1				80.05	1.20				
1.20 - 2.00	B6							Stiff dark brown sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is angular fine to medium. Cobbles are subrounded.		
1.20 - 1.65	SPT (S)	N=19 (5,5/6,4,5,4) Hammer SN = 1367	0.00	Dry						
2.00 - 2.45	D2				79.25	2.00				
2.00 - 3.00	B7							Firm dark greyish black sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is angular fine to medium. Cobbles are subangular.		
2.00 - 2.45	SPT (S)	N=12 (3,3/3,3,3,3) Hammer SN = 1367	0.00	Dry						
3.00 - 3.45	D3				78.25	3.00				
3.00 - 4.00	B8							Stiff becoming very stiff greyish black sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is angular fine to medium. Cobbles are subangular.		
3.00 - 3.45	SPT (S)	N=27 (4,4/6,7,7,7) Hammer SN = 1367	0.00	Dry						
4.00 - 4.45	SPT (S)	N=50 (14,13/10,13,13,14) Hammer SN = 1367	0.00	Dry	77.25	4.00		End of Borehole at 4.00m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated at refusal of sampler.

Last Updated

10/08/2022

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
22-0852	Kilcock, Co. Kildare	BH09
	Client: Paul Byrne Architects	
	Client's Rep: CS Consulting	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	2.00	687258.90 E 739925.66 N

Final Depth:	2.00 m	Start Date:	02/08/2022	Driller:	JC	Sheet 1 of 1 Scale: 1:50
Elevation:	78.08 mOD	End Date:	02/08/2022	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
0.10 - 1.20	B4				77.98	0.10		TOPSOIL. Firm dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular fine to medium. Cobbles are subrounded.
1.20 - 1.65	D1				76.88	1.20		Soft dark greyish black sandy gravelly CLAY with low cobble content. Sand is fine to medium. Gravel is angular fine to medium. Cobbles are subrounded.
1.20 - 2.00	B3							
1.20 - 1.65	SPT (S)	N=6 (1,2/1,2,1,2) Hammer SN = 1367	0.00	Dry				
2.00 - 2.45	D2				76.08	2.00		End of Borehole at 2.00m
2.00 - 2.45	SPT (S)	N=39 (6,6/6,10,10,13) Hammer SN = 1367	0.00	Dry				

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated at refusal of sampler.

Last Updated

10/08/2022

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CAUSEWAY GEOTECH

APPENDIX C

TRIAL PIT LOGS



CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA01
Coordinates 687533.76 E 740339.45 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 75.67 mOD	**Date:** 27/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.00 - 0.45	B1					TOPSOIL: Soft brown sandy gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse.	
0.45 - 1.10	B2		75.22	0.45		Firm dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
1.10 - 1.95	B3		74.57	1.10		Soft dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.	
1.95 - 2.30	B4		73.72	1.95		Soft greyish brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
			73.37	2.30		End of trial pit at 2.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.30
Width: 0.40
Length: 1.50

Remarks:
No groundwater encountered.

Stability:
Unstable

Termination Reason
Terminated due to pit wall collapse.

Last Updated
10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA02
Coordinates 687441.58 E 740286.62 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 79.52 mOD	**Date:** 27/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.45 - 1.30	B1		79.07	0.45		Soft dark brown sandy gravelly CLAY with low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Boulders are subrounded of various lithologies.	
1.30 - 2.50	B2		78.22	1.30		Soft to firm dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
		Water strike at 2.48m	77.02	2.50		End of trial pit at 2.50m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.48	Water strike at 2.48m

Depth: 2.50
Width: 0.40
Length: 2.65

Remarks:

Stability: Stable

Termination Reason: Terminated at scheduled depth.

Last Updated: 10/08/2022

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CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA03
Coordinates 687463.32 E 740236.74 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 80.22 mOD	**Date:** 27/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.00 - 0.60	B1					TOPSOIL: Soft light brown sandy gravelly silty CLAY with frequent rootlets. Sand is fine to coarse. Gravel is subangular fine to medium.	
0.60 - 1.50	B2		79.62	0.60		Soft dark brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
1.50 - 2.00	B3		78.72	1.50		Soft to firm dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
2.00 - 2.50	B4		78.22	2.00		Soft to firm dark brown sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
			77.72	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.40
Length: 2.50

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated at scheduled depth.	10/08/2022

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CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA04
Coordinates 687318.82 E 740250.06 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 83.21 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 0.85	B1		82.96	0.25		Soft light brown slightly clayey sandy gravelly SILT with frequent rootlets. Sand is fine to coarse. Gravel is subangular fine to medium.	
0.85 - 1.30	B2		82.36	0.85		Very soft brown sandy gravelly clayey SILT with occasional rootlets and low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
1.30 - 2.10	B3		81.91	1.30		Soft brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
			81.11	2.10		End of trial pit at 2.10m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.10
Width: 0.40
Length: 1.80

Remarks:
No groundwater encountered.

Stability:	Termination Reason	Last Updated
Stable	Terminated on refusal.	10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA05
Coordinates 687383.79 E 740204.78 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 82.56 mOD	**Date:** 27/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.00 - 0.45	B1					TOPSOIL: Soft light brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine to coarse. Gravel is subrounded to subangular fine to medium.	
0.45 - 0.90	B2		82.11	0.45		Soft dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
0.90 - 1.80	B3		81.66	0.90		Soft dark brown slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
1.80 - 2.50	B4		80.76	1.80		Soft to firm dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse.	
		Water strike at 2.45m	80.06	2.50		End of trial pit at 2.50m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
2.45	Water strike at 2.45m

Depth: 2.50
Width: 0.40
Length: 2.45

Remarks:

Stability: Stable

Termination Reason: Terminated at scheduled depth.

Last Updated: 10/08/2022

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CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA06
Coordinates 687326.29 E 740136.48 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 81.76 mOD	**Date:** 27/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.00 - 0.55	B1					TOPSOIL: Soft brown sandy gravelly CLAY with frequent rootlets and with low boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.	
0.55 - 0.90	B2		81.21	0.55		Soft dark brown sandy gravelly CLAY with rare rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
0.90 - 1.50	B3		80.86	0.90		Soft dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
1.50 - 2.50	B4		80.26	1.50		Soft to Firm dark brown sandy gravelly CLAY with medium cobble content and medium boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies. Boulders are subrounded of various lithologies.	
			79.26	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.30
Length: 1.90

Remarks:
No groundwater encountered.

Stability:
Moderately stable

Termination Reason
Terminated at scheduled depth.

Last Updated
10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA07
Coordinates 687430.79 E 740105.12 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 81.12 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.10 - 0.70	B1		81.02	0.10		Soft light greyish brown slightly sandy slightly clayey gravelly SILT with occasional rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
0.70 - 1.40	B2		80.42	0.70		Soft greyish brown sandy clayey subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.	
1.40 - 2.50	B3		79.72	1.40		Firm dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
			78.62	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.40
Length: 1.80

Remarks:
No groundwater encountered.

Stability:
Unstable

Termination Reason
Terminated at scheduled depth.

Last Updated
10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA08
Coordinates 687501.32 E 740071.41 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 81.19 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.00 - 0.35	B1					TOPSOIL: Soft light brown slightly clayey sandy gravelly SILT with occasional rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.	
0.35 - 0.95	B2		80.84	0.35		Soft brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is ssubangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies.	
0.95 - 1.85	B3		80.24	0.95		Firm dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
1.85 - 2.50	B4		79.34	1.85		Firm dark brown sandy gravelly CLAY with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of various lithologies. Boulders are subrounded of various lithologies.	
		Water strike at 2.35m					▼
		Slow seepage at 2.50m	78.69	2.50		End of trial pit at 2.50m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.35	Water strike at 2.35m
2.50	Slow seepage at 2.50m

Depth: 2.50
Width: 0.40
Length: 1.80

Remarks:

Stability: Stable

Termination Reason: Terminated at scheduled depth.

Last Updated: 10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA09
Coordinates 687471.18 E 740024.17 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 81.08 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.25 - 0.40	B1		80.82	0.25		Soft brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
0.40 - 0.90	B2		80.68	0.40		Loose brown slightly clayey sandy silty subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.	
0.90 - 1.90	B3		80.18	0.90		Soft to firm dark brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse. Cobbles are subrounded of various lithologies.	
1.90 - 2.50	B4		79.18	1.90		Firm dark greyish brown sandy gravelly CLAY with medium cobble content and with low boulder content. Sand is fine to coarse. Cobbles are subrounded of various lithologies. Boulders are subrounded of various lithologies.	
		Water strike at 2.23m					▼
		Slow seepage at 2.50m	78.58	2.50		End of trial pit at 2.50m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.23	Water strike at 2.23m
2.50	Slow seepage at 2.50m

Depth: 2.50
Width: 0.40
Length: 2.00

Remarks:

Stability: Stable

Termination Reason: Terminated at scheduled depth.

Last Updated: 10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA10
Coordinates 687299.41 E 740012.82 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 80.43 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.50	B1		80.23	0.20		Soft light brown slightly sandy slightly clayey gravelly SILT with frequent rootlets. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.	
0.50 - 1.50	B3		79.93	0.50		Soft dark brown sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies.	
1.50 - 2.50	B2		78.93	1.50		Soft to firm dark brown sandy gravelly CLAY with medium cobble content and medium boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of various lithologies. Boulders are subrounded of various lithologies.	
			78.13	2.30		End of trial pit at 2.30m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.30
Width: 0.40
Length: 1.80

Remarks:
No groundwater encountered.

Stability:
Stable

Termination Reason
Terminated on refusal.

Last Updated
10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA11
Coordinates 687262.73 E 739954.76 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 78.47 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.20 - 0.80	B1		78.27	0.20		Soft greyish brown slightly clayey sandy silty subangular to subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular of various lithologies.	
0.80 - 1.60	B2		77.67	0.80		Soft greyish brown sandy gravelly CLAY with low cobble content and low boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies. Boulders are subrounded of various lithologies.	
1.60 - 2.50	B3		76.87	1.60		Soft dark greyish brown sandy gravelly CLAY with low cobble content and low boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies. Boulders are subrounded of various lithologies.	
			75.97	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.40
Length: 2.00

Remarks:
No groundwater encountered.

Stability:
Stable

Termination Reason
Terminated at scheduled depth.

Last Updated
10/08/2022

AGS

CAUSEWAY GEOTECH

Project No. 22-0852	**Project Name:** Kilcock, Co. Kildare		**Trial Pit ID** SA12
Coordinates 687261.28 E 739905.14 N	**Client:** Paul Byrne Architects		
Method: Soakaway Pit	**Client's Representative:** CS Consulting		Sheet 1 of 1 Scale: 1:25
Plant: 3t Tracked Excavator	**Elevation** 77.96 mOD	**Date:** 28/07/2022	**Logger:** DC	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						TOPSOIL	
0.17 - 1.00	B1		77.79	0.17		Soft greyish brown slightly clayey sandy silty subangular to subrounded fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subangular of various lithologies.	
1.00 - 1.60	B2		76.96	1.00		Soft dark greyish brown sandy gravelly clayey SILT with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of various lithologies. Boulders are subrounded of various lithologies.	
			76.36	1.60		End of trial pit at 1.60m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 1.60
Width: 0.40
Length: 2.00

Remarks:
No groundwater encountered.

Stability:
Stable

Termination Reason
Terminated on refusal.

Last Updated
10/08/2022

AGS

CAUSEWAY GEOTECH

APPENDIX D

TRIAL PIT PHOTOGRAPHS




CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA01
(m) 0.1 0.2 0.3 0.4 0.5

SA01


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA01
(m) 0.1 0.2 0.3 0.4 0.5

SA01


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA01

SA01



SA01


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA01
(m) 0.1 0.2 0.3 0.4 0.5

SA01


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA01
(m) 0.1 0.2 0.3 0.4 0.5

SA01


Specialists
028 2766 6640
CAUSEWAY
Kilcock
Kildare
22-0852
27/7/22
TP/SA02

SA02


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA02
(m) 0.1 0.2 0.3 0.4 0.5

SA02


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA02
(m) 0.1 0.2 0.3 0.4 0.5

SA02



SA02


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA02

SA02


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
Pit No.: TP/SA02

SA02



SA03 (Incorrect Number on Photo Board)



SA03 (Incorrect Number on Photo Board)



SA03 (Incorrect Number on Photo Board)



SA03 (Incorrect Number on Photo Board)


CAUSEWAY
Kilcock
Kildare
22-0852
27/7/22
TP/SA03
(m) 0.1 0.2 0.3 0.4 0.5

SA03



SA03



SA04


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA04
0.1
0.2
0.3
0.4
0.5

SA04


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA04

SA04


CAUSEWAY
Kilcock kildare
22-0852
27/7/22
TP/SA04

SA04


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA04
(m) 0.1 0.2 0.3 0.4 0.5

SA04


CAUSEWAY
GEOTECH
Project No.: 22-0852
Exp No.: TP/SA04
Project: Kilcock Kildare
Date: 28/7/22

SA04


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
TP/SA04

SA04


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA05

SA05



SA05



SA05


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA05

SA05


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA05

SA05



SA05


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA05

SA05



SA06


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA03

SA06


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA03

SA06



SA06


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA06
(m) 0.1 0.2 0.3 0.4 0.5

SA06


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 27/7/22
EH No.: TP/SA03
(m) 0.1 0.2 0.3 0.4 0.5

SA06


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA07

SA07


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA07

SA07


CAUSEWAY
GEOTECH
Project:
Kilcock
kildare
Project No.:
22-0852
Date:
28/7/22
EH No.:
TP/SA07

SA07


CAUSEWAY
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA08
(m) 0.1 0.2 0.3 0.4

SA07



SA07


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA07

SA07


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852

SA08


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA08

SA08


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA08

SA08


CAUSEWAY
Project: Kilcock kildare
Project No: 22-0852
Date: 28/7/22
TP/SA08
(m) 0.1 0.2 0.3 0.4 0.5

SA08


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA08
(m) 0.1 0.2 0.3 0.4 0.5

SA08


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No: 22-0852
Date: 28/7/22
EH No: TP/SA08
(m) 0.1 0.2 0.3 0.4 0.5

SA08


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA09

SA09


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA09

SA09



SA09



SA09


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA09
(m) 0.1 0.2 0.3 0.4 0.5

SA09


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
Exp No.: TP/SA09

SA09


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA10
(m) 0.1 0.2 0.3 0.4 0.5

SA10


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA10
(m) 0.1 0.2 0.3 0.4 0.5

SA10


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA10
(m) 0.1 0.2 0.3 0.4 0.5

SA10



SA10



SA10


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA10

SA10


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA11
(m) 0.1 0.2 0.3 0.4

SA11


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA11
(m) 0.1 0.2 0.3 0.4 0.5

SA11


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA11

SA11



SA11


CAUSEWAY
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA11
(m) 0.1 0.2 0.3 0.4 0.5

SA11


CAUSEWAY
GEOTECH
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA11

SA11


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA12
(in) 0.1 0.2 0.3 0.4 0.5

SA12


CAUSEWAY
GEOTECH
Project:
Kilcock
Kildare
Date:
28/7/22
Project No.:
22-0852
EH No.:
TP/SA12

SA12


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
Pit No.: TP/SA12
(m) 0.1 0.2 0.3 0.4 0.5

SA12


CAUSEWAY
GEOTECH
Project: Kilcock kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA12
(m) 0.1 0.2 0.3 0.4

SA12


CAUSEWAY
Project: Kilcock Kildare
Project No.: 22-0852
Date: 28/7/22
EH No.: TP/SA12
(m) 0.1 0.2 0.3 0.4 0.5

SA12



SA12

CAUSEWAY GEOTECH

APPENDIX E

INFILTRATION TESTS



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA01
Test Date: 27 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	1.40
test pit base dimensions	0.70	1.30

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

test pit depth (m) 1.75

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.60	1.15
1	0.63	1.12
2	0.64	1.11
4	0.66	1.09
6	0.67	1.08
8	0.68	1.07
10	0.69	1.06
15	0.72	1.03
20	0.74	1.01
25	0.75	1.00
30	0.77	0.98
35	0.79	0.96
40	0.80	0.95
45	0.81	0.94
50	0.82	0.93
55	0.83	0.92
60	0.84	0.91

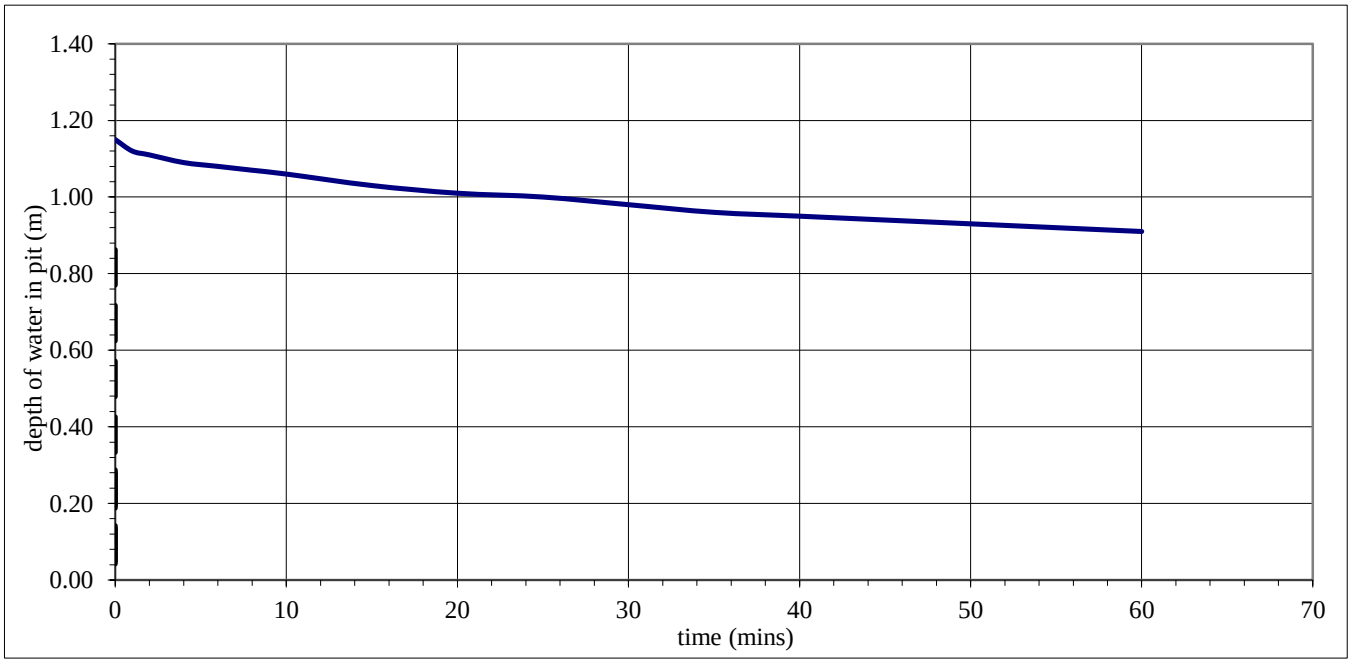
From graph below:

test start - 75% depth at
0.8625 m water depth
time is not determined

test end - 25% depth at
0.2875 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	0.89	0.8625					
	1.46	0.2875					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA02
Test Date: 27 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	2.65
test pit base dimensions	0.40	1.10

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

test pit depth (m) 2.50

depth to groundwater before adding water (m) = 2.48

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.85	1.65
1	0.85	1.65
2	0.86	1.64
4	0.87	1.63
6	0.88	1.62
8	0.89	1.61
10	0.90	1.60
30	0.91	1.59
35	0.93	1.57
40	0.95	1.55
45	0.96	1.54
50	0.97	1.53
55	0.99	1.51
60	0.99	1.51

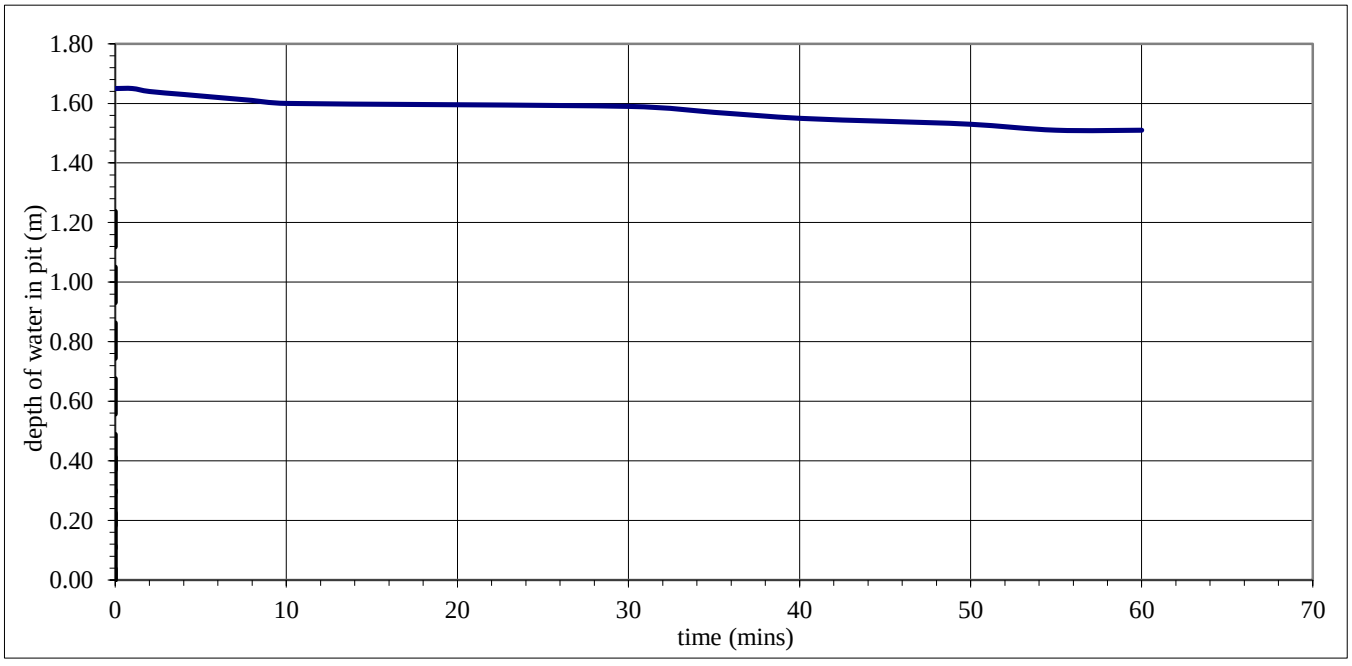
From graph below:

test start - 75% depth at
1.2375 m water depth
time is not determined

test end - 25% depth at
0.4125 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.26	1.2375					
	2.09	0.4125					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA03
Test Date: 27 July 2022

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

	width (m)	length (m)
test pit top dimensions	0.40	2.60
test pit base dimensions	0.40	1.10

test pit depth (m) 2.50

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.93	1.57
1	0.93	1.57
2	0.93	1.57
4	0.94	1.56
6	0.95	1.55
8	0.95	1.55
10	0.95	1.55
15	0.97	1.53
20	0.97	1.53
25	0.97	1.53
30	0.98	1.52
35	0.98	1.52
40	0.99	1.51
45	0.99	1.51
50	0.99	1.51
55	0.99	1.51
60	0.99	1.51

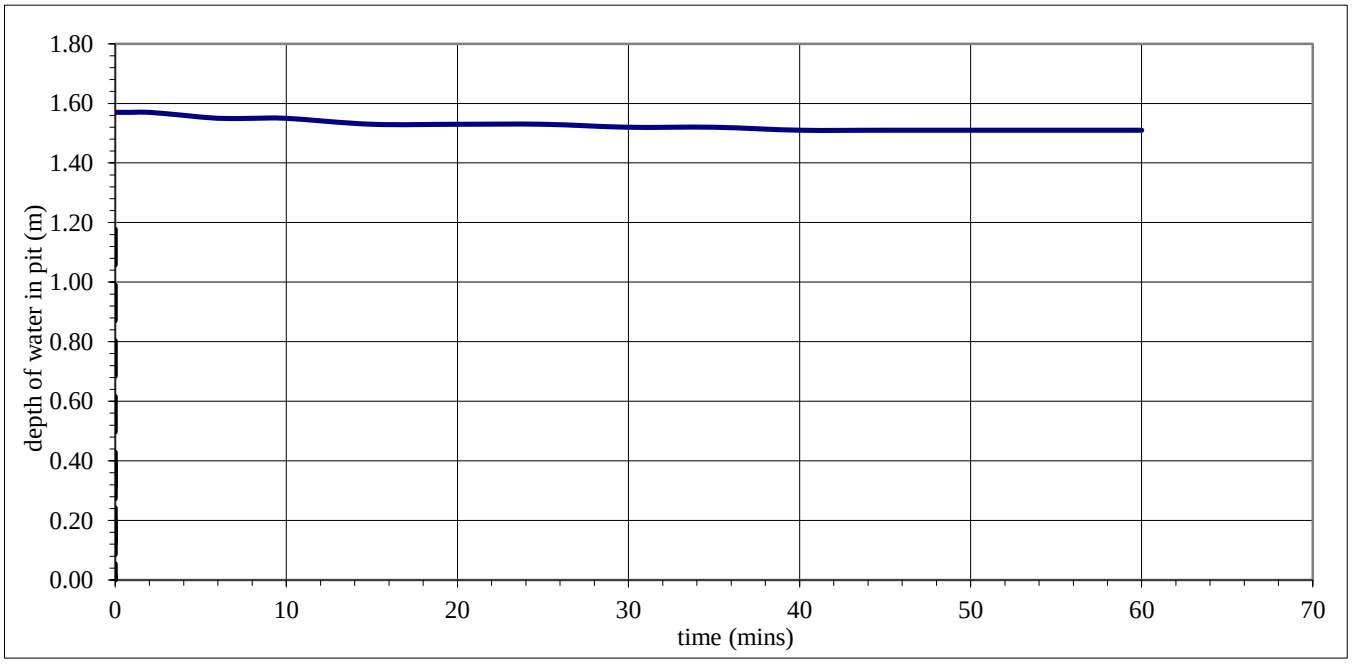
From graph below:

test start - 75% depth at
1.1775 m water depth
time is not determined

test end - 25% depth at
0.3925 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.32	1.1775					
	2.11	0.3925					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA04
Test Date: 27 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	1.80
test pit base dimensions	0.40	0.60
test pit depth (m)	2.10	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

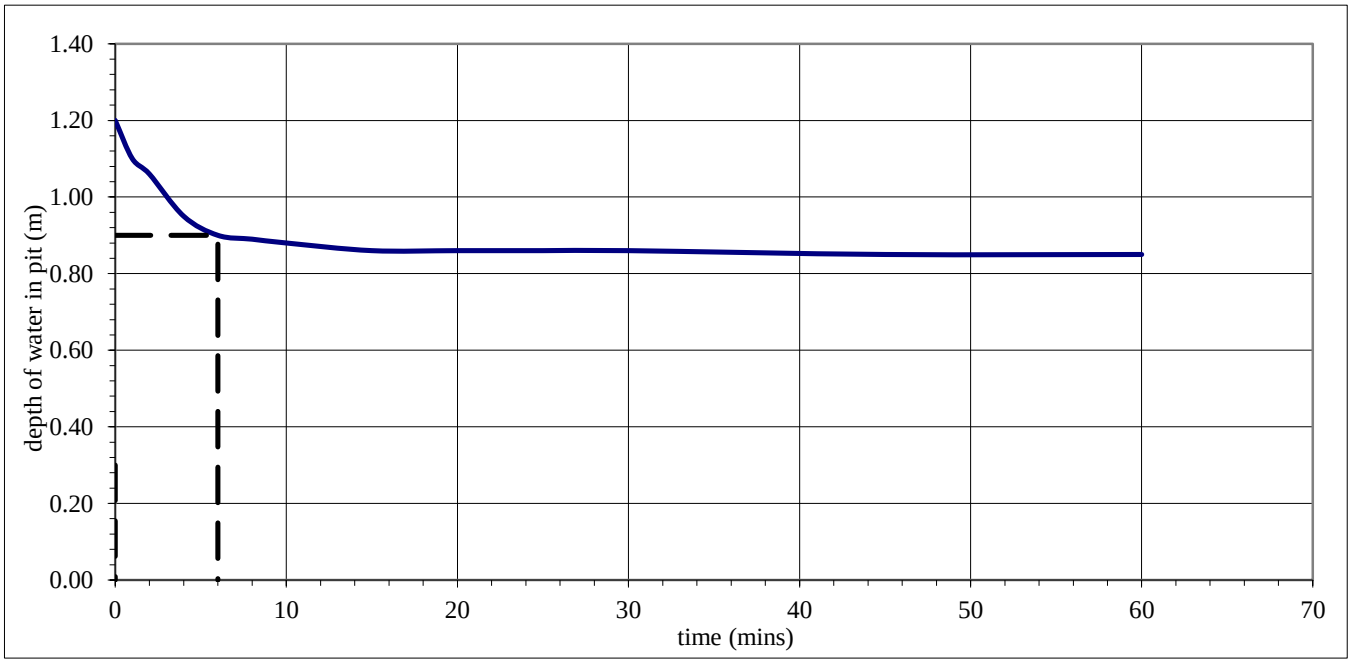
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.90	1.20
1	1.00	1.10
2	1.04	1.06
4	1.15	0.95
6	1.20	0.90
8	1.21	0.89
10	1.22	0.88
15	1.24	0.86
20	1.24	0.86
25	1.24	0.86
30	1.24	0.86
45	1.25	0.85
60	1.25	0.85

From graph below:
test start - 75% depth at
0.9 m water depth
time is 6.0 minutes

test end - 25% depth at
0.3 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
6	1.20	0.9					
	1.80	0.3					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA05
Test Date: 27 July 2022

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

	width (m)	length (m)
test pit top dimensions	0.40	2.45
test pit base dimensions	0.40	1.20

test pit depth (m) 2.50

depth to groundwater before adding water (m) = 2.45

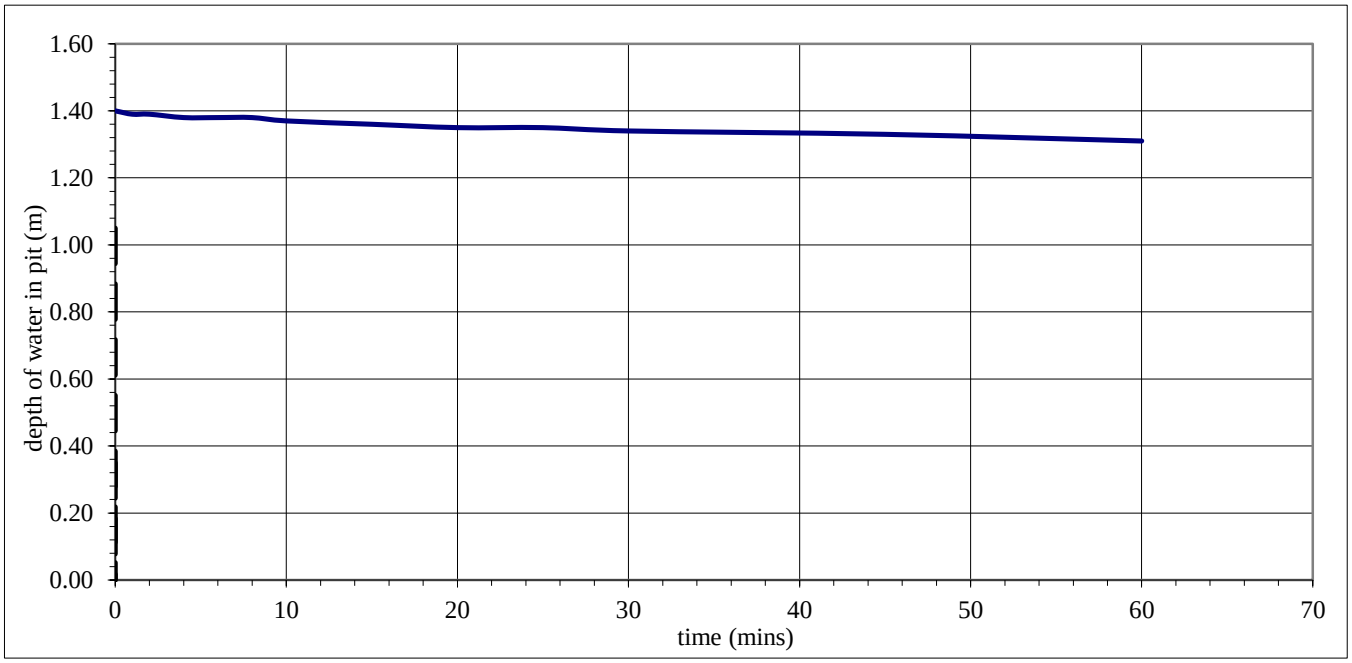
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	1.10	1.40
1	1.11	1.39
2	1.11	1.39
4	1.12	1.38
6	1.12	1.38
8	1.12	1.38
10	1.13	1.37
15	1.14	1.36
20	1.15	1.35
25	1.15	1.35
30	1.16	1.34
45	1.17	1.33
60	1.19	1.31

From graph below:
test start - 75% depth at
1.05 m water depth
time is not determined

test end - 25% depth at
0.35 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.45	1.05					
	2.15	0.35					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA06
Test Date: 27 July 2022

	width (m)	length (m)
test pit top dimensions	0.30	1.90
test pit base dimensions	0.30	0.90

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

test pit depth (m) 2.50

depth to groundwater before adding water (m) = Dry

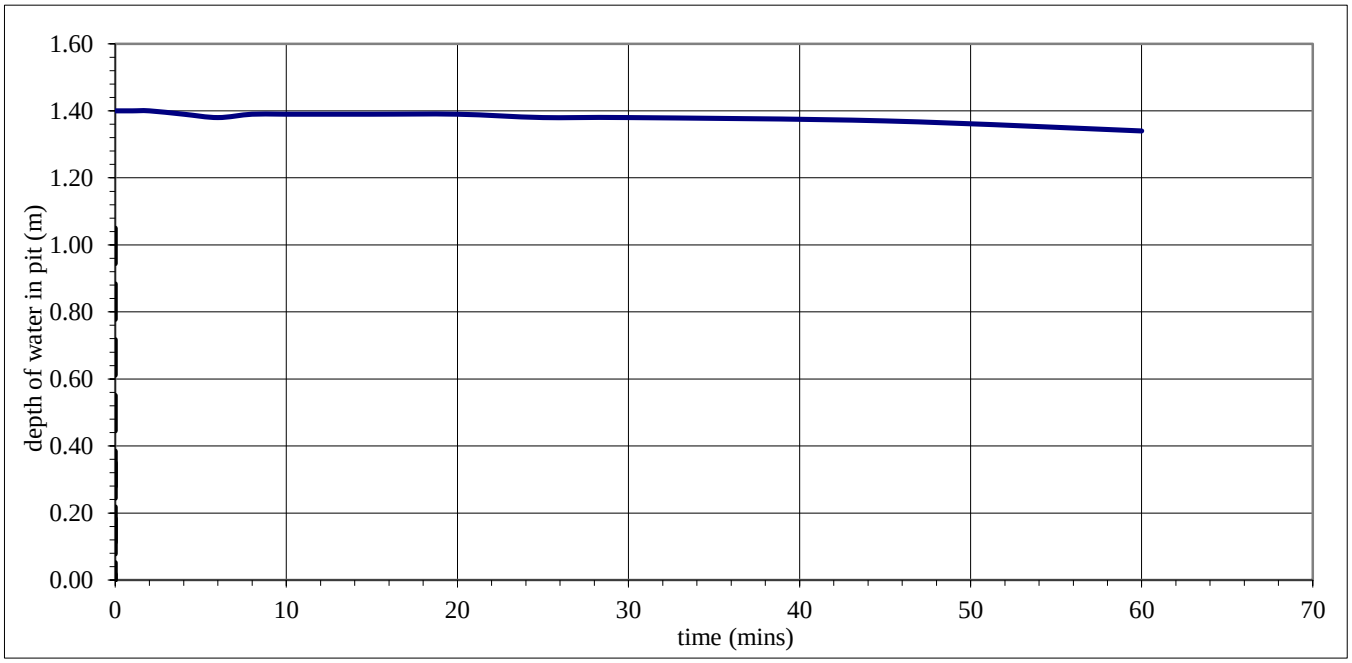
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	1.10	1.40
1	1.10	1.40
2	1.10	1.40
4	1.11	1.39
6	1.12	1.38
8	1.11	1.39
10	1.11	1.39
15	1.11	1.39
20	1.11	1.39
25	1.12	1.38
30	1.12	1.38
45	1.13	1.37
60	1.16	1.34

From graph below:
test start - 75% depth at
1.05 m water depth
time is not determined

test end - 25% depth at
0.35 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.45	1.05					
	2.15	0.35					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA07
Test Date: 28 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	1.80
test pit base dimensions	0.40	1.20
test pit depth (m)	2.30	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

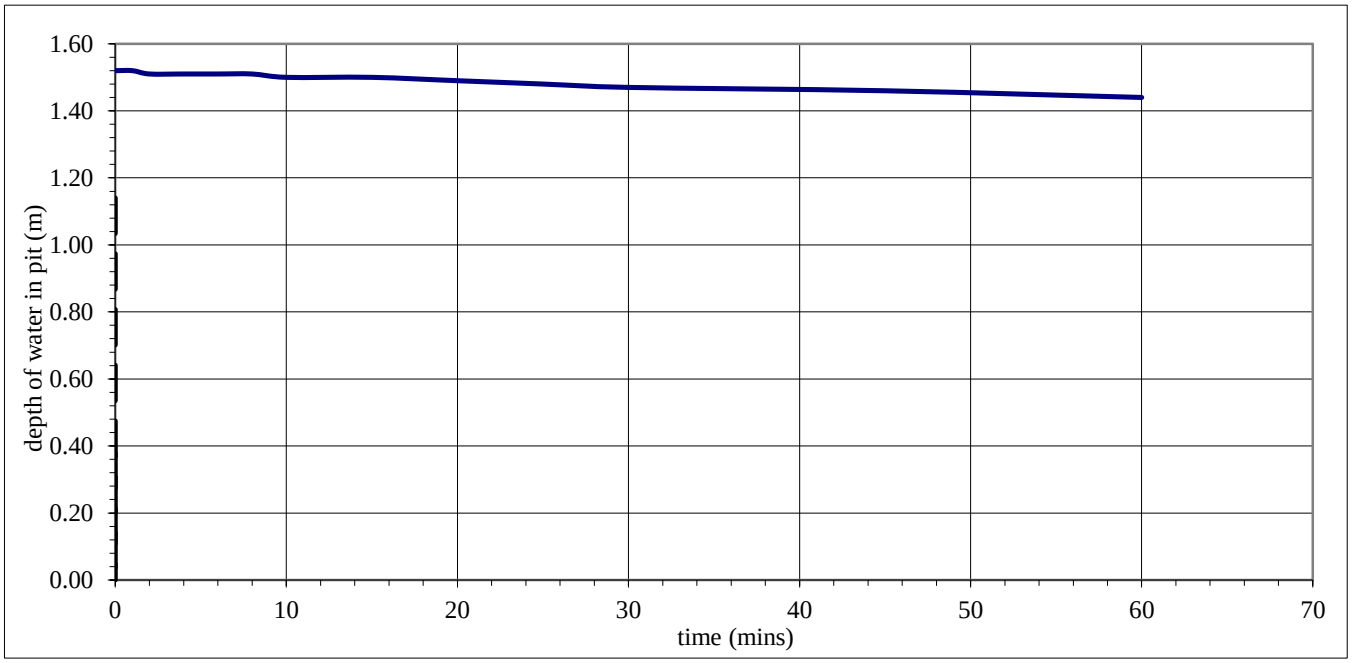
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.78	1.52
1	0.78	1.52
2	0.79	1.51
4	0.79	1.51
6	0.79	1.51
8	0.79	1.51
10	0.80	1.50
15	0.80	1.50
20	0.81	1.49
25	0.82	1.48
30	0.83	1.47
45	0.84	1.46
60	0.86	1.44

From graph below:
test start - 75% depth at
1.14 m water depth
time is not determined

test end - 25% depth at
0.38 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.16	1.14					
	1.92	0.38					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA08
Test Date: 28 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	1.80
test pit base dimensions	0.40	0.60
test pit depth (m)	2.50	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = 2.35

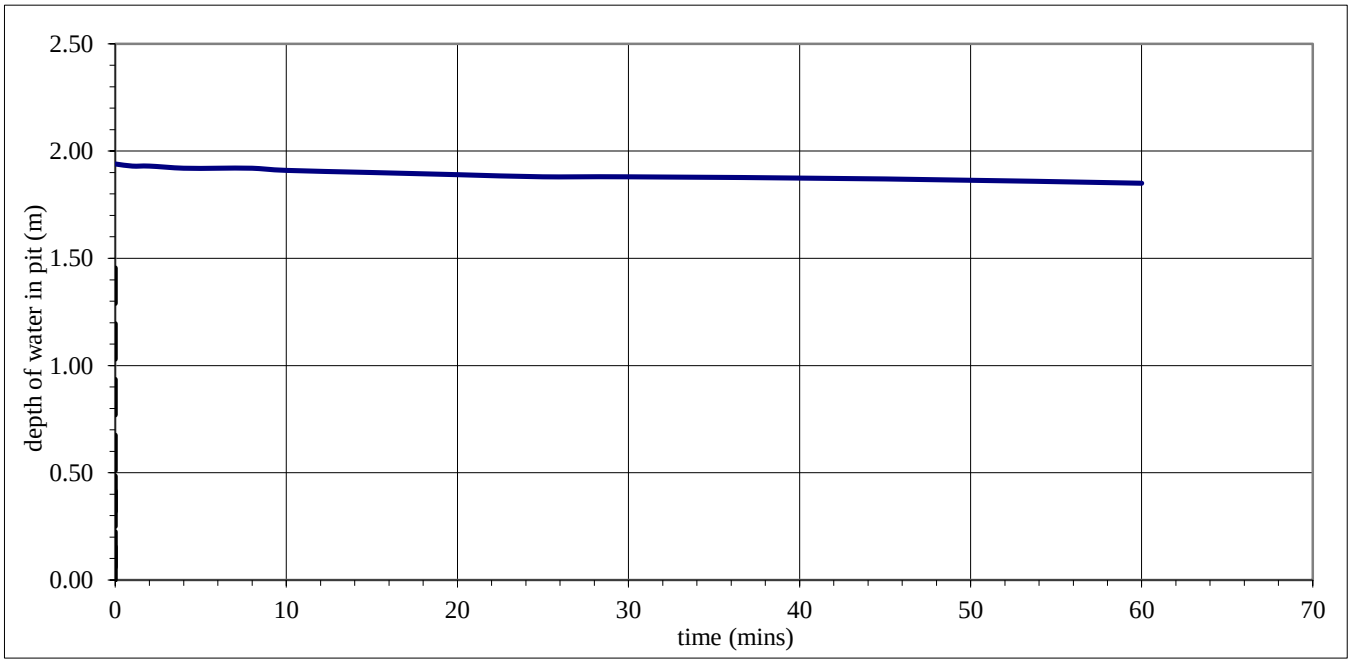
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.56	1.94
1	0.57	1.93
2	0.57	1.93
4	0.58	1.92
6	0.58	1.92
8	0.58	1.92
10	0.59	1.91
15	0.60	1.90
20	0.61	1.89
25	0.62	1.88
30	0.62	1.88
45	0.63	1.87
60	0.65	1.85

From graph below:
test start - 75% depth at
1.455 m water depth
time is not determined

test end - 25% depth at
0.485 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.05	1.455					
	2.02	0.485					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA09
Test Date: 28 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	2.00
test pit base dimensions	0.40	0.60
test pit depth (m)	2.50	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = 2.23

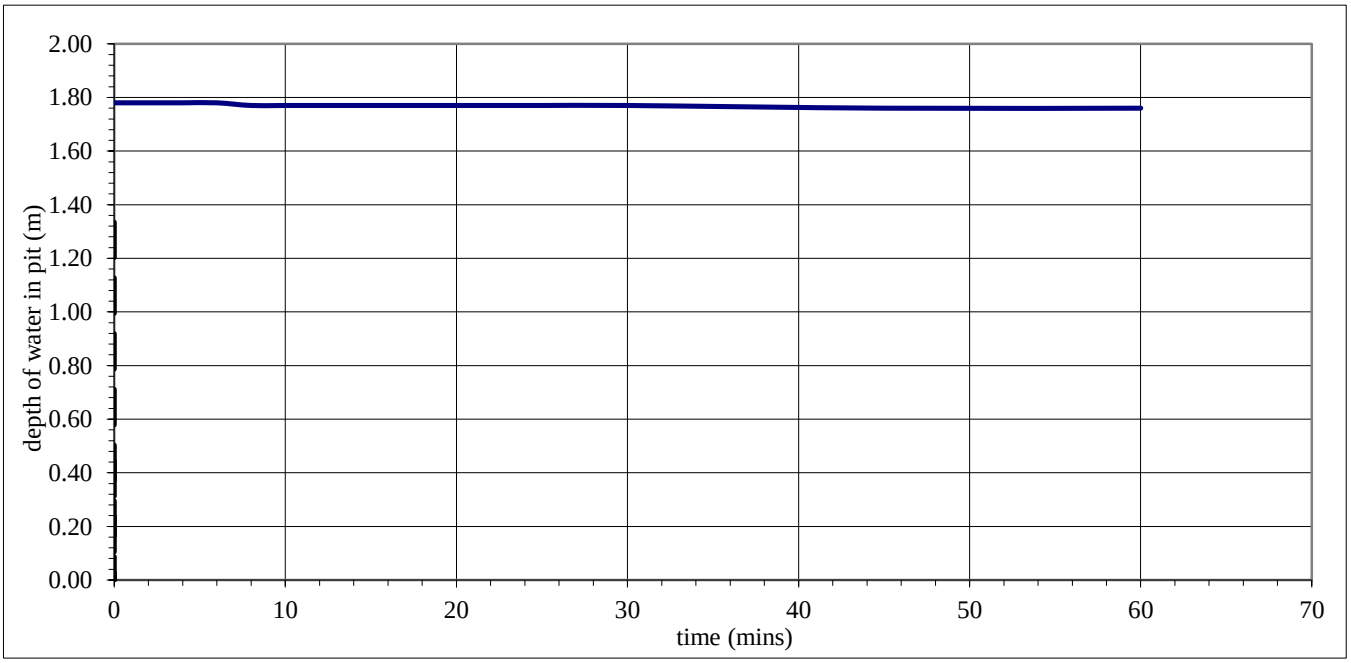
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.72	1.78
1	0.72	1.78
2	0.72	1.78
4	0.72	1.78
6	0.72	1.78
8	0.73	1.77
10	0.73	1.77
15	0.73	1.77
20	0.73	1.77
25	0.73	1.77
30	0.73	1.77
45	0.74	1.76
60	0.74	1.76

From graph below:
test start - 75% depth at
1.335 m water depth
time is not determined

test end - 25% depth at
0.445 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.17	1.335					
	2.06	0.445					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA10
Test Date: 28 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	1.80
test pit base dimensions	0.40	1.50
test pit depth (m)	2.30	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

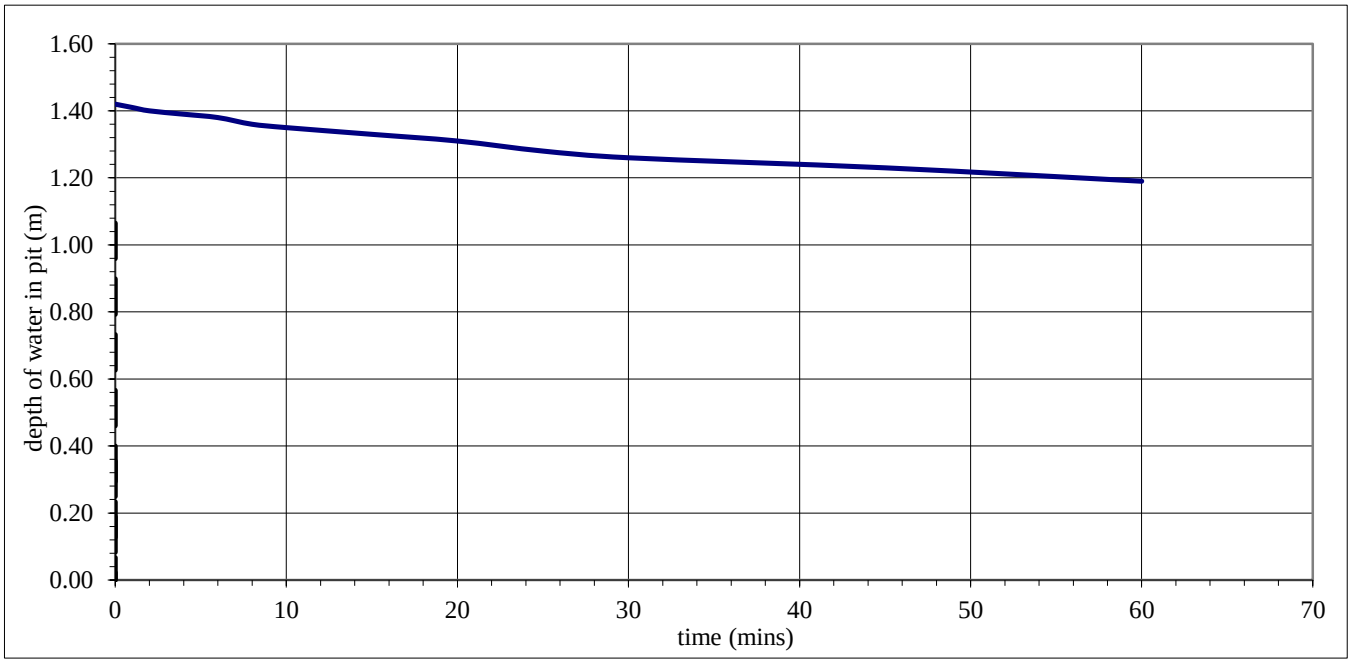
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.88	1.42
1	0.89	1.41
2	0.90	1.40
4	0.91	1.39
6	0.92	1.38
8	0.94	1.36
10	0.95	1.35
15	0.97	1.33
20	0.99	1.31
25	1.02	1.28
30	1.04	1.26
45	1.07	1.23
60	1.11	1.19

From graph below:
test start - 75% depth at
1.065 m water depth
time is not determined

test end - 25% depth at
0.355 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.24	1.065					
	1.95	0.355					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA11
Test Date: 28 July 2022

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

	width (m)	length (m)
test pit top dimensions	0.40	2.00
test pit base dimensions	0.40	0.80

test pit depth (m) 2.50

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.55	1.95
1	0.55	1.95
2	0.55	1.95
4	0.56	1.94
6	0.56	1.94
8	0.56	1.94
10	0.56	1.94
15	0.56	1.94
20	0.56	1.94
25	0.56	1.94
30	0.56	1.94
45	0.56	1.94
60	0.57	1.93

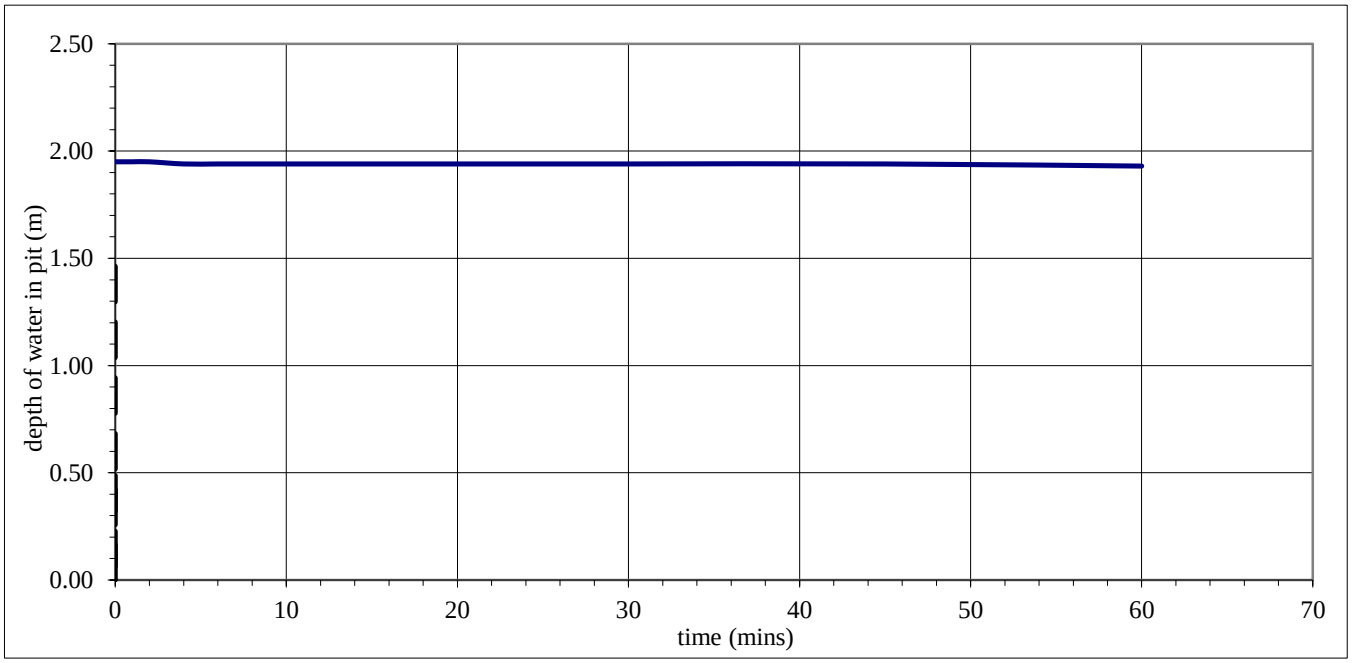
From graph below:

test start - 75% depth at
1.4625 m water depth
time is not determined

test end - 25% depth at
0.4875 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	1.04	1.4625					
	2.01	0.4875					



Soakaway Infiltration Test

Project No.: 22-0852
Site: Kilcock, Co. Kildare
Test Location: SA12
Test Date: 28 July 2022

	width (m)	length (m)
test pit top dimensions	0.40	1.75
test pit base dimensions	0.40	0.50
test pit depth (m)	1.60	

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

depth to groundwater before adding water (m) = Dry

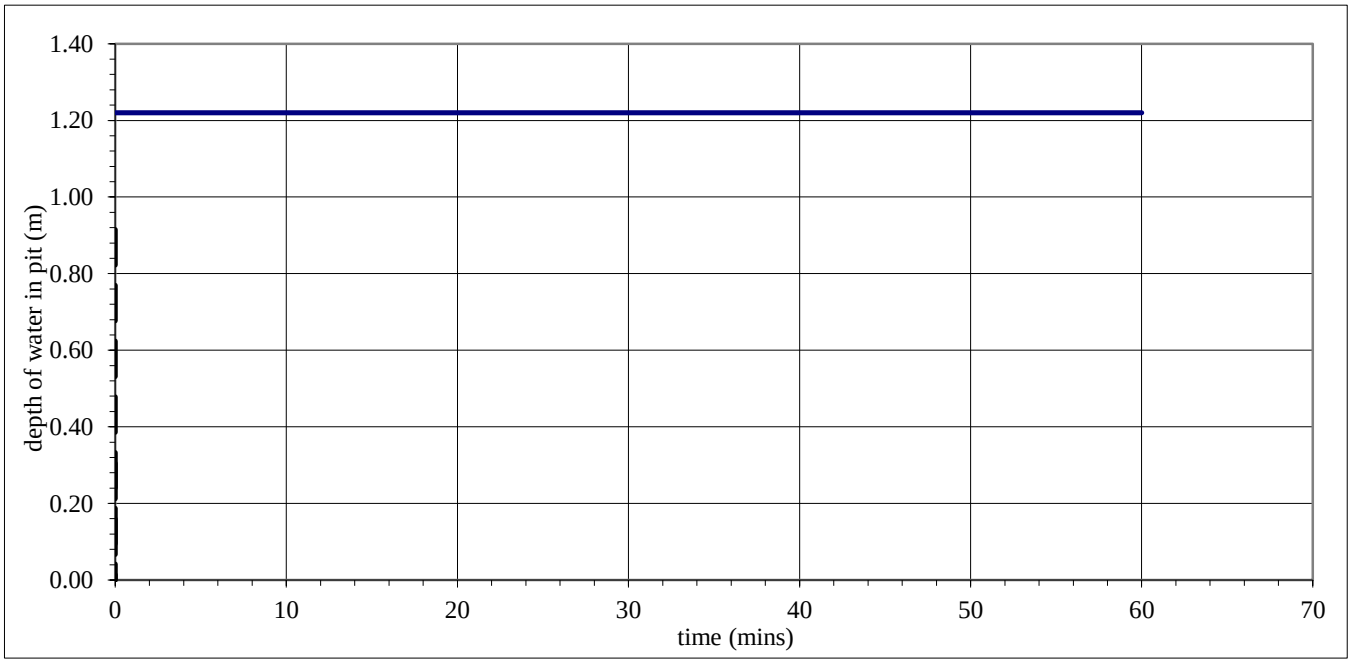
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.38	1.22
1	0.38	1.22
2	0.38	1.22
4	0.38	1.22
6	0.38	1.22
8	0.38	1.22
10	0.38	1.22
15	0.38	1.22
20	0.38	1.22
25	0.38	1.22
30	0.38	1.22
45	0.38	1.22
60	0.38	1.22

From graph below:
test start - 75% depth at
0.915 m water depth
time is not determined

test end - 25% depth at
0.305 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
	0.69	0.915					
	1.30	0.305					



CAUSEWAY GEOTECH

APPENDIX F

SPT HAMMER ENERGY MEASUREMENT REPORT



Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref: T7
Test Date: 12/02/2022
Report Date: 14/02/2022
File Name: T7.spt
Test Operator: NPB

Instrumented Rod Data

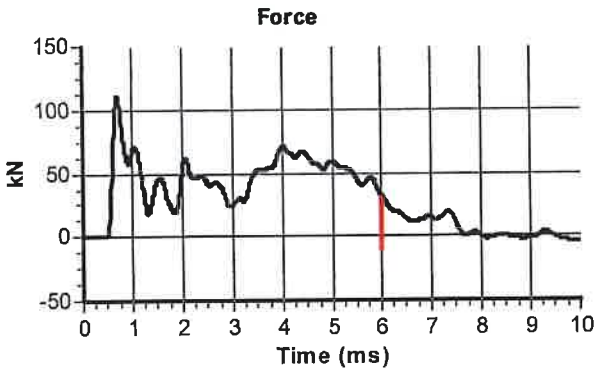
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 64786
Accelerometer No.2: 64789

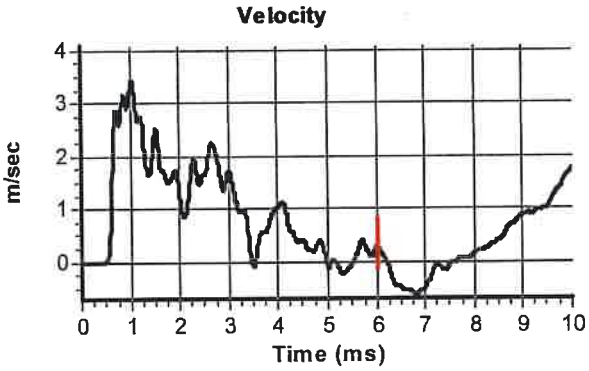
SPT Hammer Information

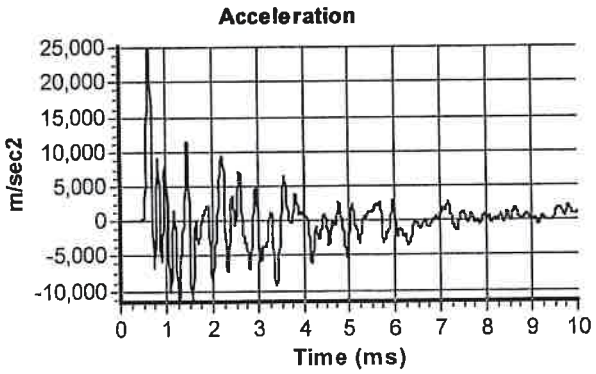
Hammer Mass m (kg): 63.0
Falling Height h (mm): 760
SPT String Length L (m): 12.0

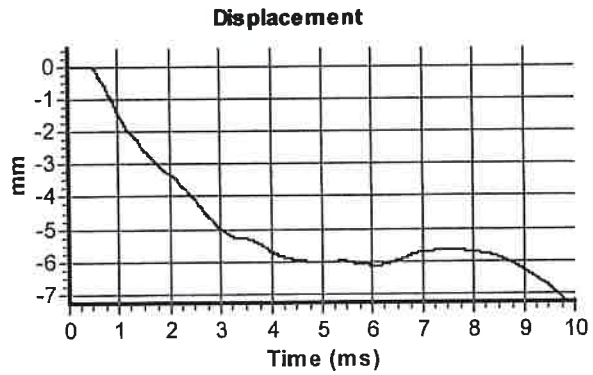
Comments / Location
CAUSEWAY

Asset No 0696.









Calculations

Area of Rod A (mm2): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 299

Energy Ratio E_r (%): 63

NPBurrows

Signed: N Burrows
Title: FOC Manager

The recommended calibration interval is 12 months

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Southern Testing
Environmental & Geotechnical

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	T8
Test Date:	12/02/2022
Report Date:	14/02/2022
File Name:	T8.spt
Test Operator:	NPB

Instrumented Rod Data

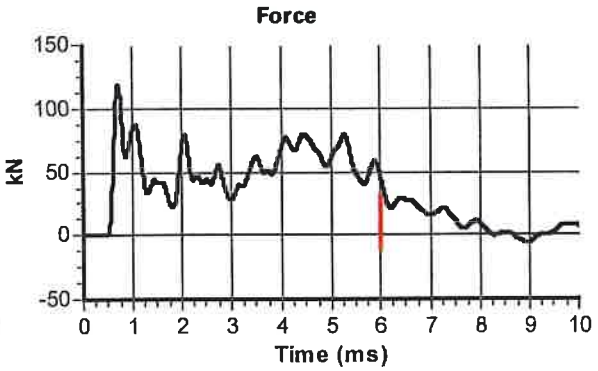
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	64786
Accelerometer No.2:	64789

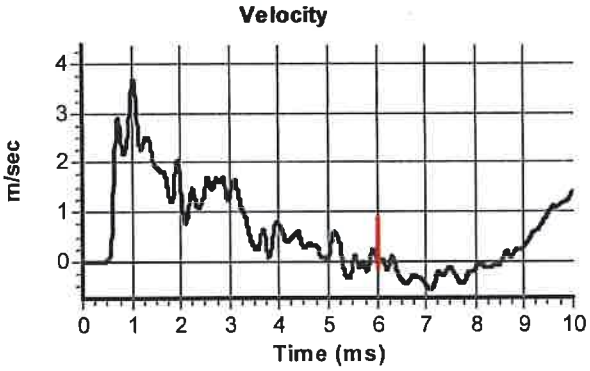
SPT Hammer Information

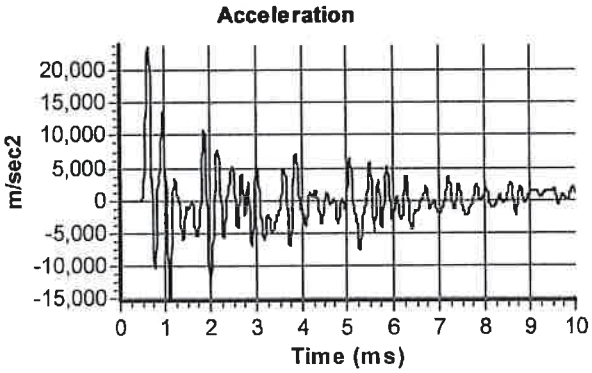
Hammer Mass m (kg):	63.0
Falling Height h (mm):	760
SPT String Length L (m):	12.0

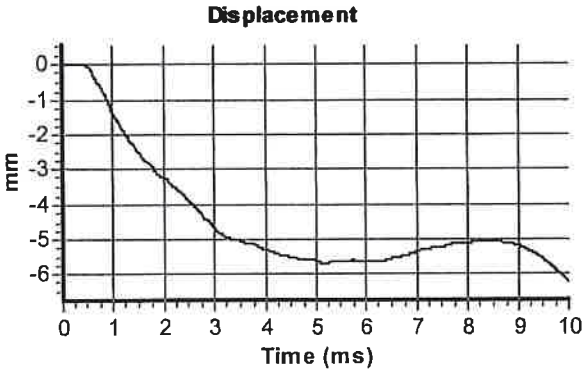
Comments / Location
CAUSEWAY

Asset No 1367.









Calculations

Area of Rod A (mm2):	905
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	336

Energy Ratio E_r (%): 71

The recommended calibration interval is 12 months

Signed: N Burrows
Title: FOC Manager

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