



APPENDIX 4-4

**CAUSEWAY GEOTECH
LAURCLAVAGH WF – GROUND
INVESTIGATION REPORT**



CAUSEWAY
— GEOTECH

Laurclavagh WF – Ground Investigation

Client: Turnkey Developments

Client's Representative: Enerco Energy

Report No.: 23-0237

Date: May 2023

Status: Final for Issue

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Document Control Sheet




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Document Control Sheet

Report No.:		23-0237			
Project Title:		Laurclavagh WF; Ground Investigation			
Client:		Turnkey Developments			
Client's Representative:		Enerco Energy			
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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

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9

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 $N \times 5 = C_u$ 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.

Laurclavagh WF; Ground Investigation

1 AUTHORITY

On the instructions of Enerco Energy (“the Client’s Representative”), acting on the behalf of Turnkey Developments (“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 wind farm development including access roads and areas of hardstanding.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results.

All information given in this report is based upon the ground conditions encountered during the ground investigation works, and on the results of the laboratory and 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, soil and rock core sampling, in-situ and laboratory testing, and the preparation of a factual report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted over several sites, located in Laurclavagh, County Galway. The sites comprised 3rd Party Owned agricultural lands, within an area spanning approximately 5km located west of the N83 in Clough, County Galway. Elevations vary across the area of the ground investigation.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between the 20th of March and the 27th of April 2023, comprised:

- ten boreholes by rotary drilling
- seven machine dug trial pits
- an infiltration test performed in thirteen trial pits; and
- indirect CBR tests at forty-six locations.

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

4.2 Boreholes

Ten boreholes (RC01-RC09 and RC11) were put to their completion by rotary drilling techniques only. The boreholes were completed to a maximum depth of 10.50m using a Comacchio 602 drilling rig.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

Symmetrix-cased full hole rotary percussive drilling techniques were employed to advance the boreholes to bedrock, after which rotary coring was employed to recover core samples of the bedrock. SPTs were carried out at standard intervals throughout the overburden, with small and bulk disturbed samples obtained where possible through the soils strata.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals throughout the overburden 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 I.

Where coring was carried out within bedrock strata, Geobor S Coring was used. The core was extracted in up to 1.5m lengths using an SK6L core barrel, which produced core of nominal 102mm diameter, and was placed in single channel wooden core boxes.

The core was subsequently photographed and examined by a qualified and experienced Engineering Geologist, thus enabling the production of an engineering log in accordance with *BS 5930: 2015+A1:2020: Code of practice for ground investigations*.

Appendix B presents the borehole logs, with core photographs presented in Appendix C.

4.3 Trial Pits

Seven trial pits (TP01-TP03 and TP05-TP08) were excavated using a 13t tracked excavator fitted with a 600mm wide bucket, to depths ranging between 0.80m and 3.50m.

Disturbed (bulk bag) samples were taken at standard depth intervals and at change of strata.

No groundwater strikes were encountered during excavation. 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.

4.4 Infiltration tests

An infiltration/soakaway test was carried out at thirteen locations (ITP01-ITP13) in accordance with BRE Digest 365 - Soakaways (BRE, 2016). The tests were conducted in similarly numbered trial pits.

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

4.5 Indirect CBR tests (DCP)

An indirect CBR test was conducted at forty-six locations (DCP01-DCP40 and DCP13A, DCP15A, DCP16A, DCP24A, DCP26A, DCP32A and DCP38A) using a Dynamic Cone Penetrometer (DCP). The equipment was developed in conjunction with the UK Transport Research Laboratory, and is discussed in Highways England CS229 (2020) which refers to the methodology described in TRL Overseas Road Note 18 (1999).

The test results are presented in Appendix G in the form of plots of the variation with depth of the penetration per blow. Straight lines have been fitted to the plots and the CBR for each depth range estimated using the following relationship, which is taken from TRRL Overseas Road Note 8 (1990), *A user's manual for a program to analyse dynamic cone penetrometer data*.

$$\text{Log CBR} = 2.48 - 1.057 \text{ Log (mm/blow)}$$

The frequently elevated CBR values are a consequence of the coarse-grained content of the penetrated soils and are often not representative of the soil matrix.

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 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described, and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

- **soil classification:** moisture content measurement, Atterberg Limit tests and particle size distribution analysis.
- **soil chemistry:** pH and water soluble sulphate content

Laboratory testing of soils samples was carried out in accordance with British Standards Institute: *BS 1377, Methods of test for soils for civil engineering purposes; Part 1 (2016), and Parts 2-9 (1990)*.

The test results are presented in Appendix H.

5.2 Geotechnical laboratory testing of rock

Laboratory testing of rock sub-samples comprised:

- point load index
- unconfined compressive strength (UCS) tests

Test	Test carried out in accordance with
Point load index	ISRM Suggested Methods (1985) Suggested method for determining point-load strength. Int. J. Rock Mech. Min. Sci. Geomech. Abstr. 22, pp. 53–60
Uniaxial compression strength tests	ISRM Suggested Methods (1981) Suggested method for determining deformability of rock materials in uniaxial compression, Part 2 and

	ISRM (2007) Ulusay R, Hudson JA (eds) The complete ISRM suggested methods for rock characterization, testing and monitoring, 2007
--	---

The test results are presented in Appendix H.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise till derived from limestone and outcrop/subcrop. These deposits are underlain by pale grey clean skeletal limestone of the Burren Formation.

6.2 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 200mm thickness across the site.
- **Glacial Till:** sandy gravelly clay, frequently with low cobble content, typically firm or stiff in upper horizons, becoming very stiff with increasing depth, with occasional sand horizons.
- **Bedrock (Limestone):** Medium strong to strong grey limestone rockhead was encountered at depths ranging from 2.50m in RC02 to 5.85m in RC07. In addition, possible limestone rockhead recovered as gravel through rotary drilling was noted in RC02 at a depth of 1.75m

6.3 Groundwater

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

It should be noted that any groundwater strikes within bedrock may have been masked by the fluid used as the drilling flush medium.

Seasonal variation in groundwater levels should also be factored into design considerations.

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 14689-1:2018: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

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.



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— GEOTECH

APPENDIX A
SITE AND EXPLORATORY HOLE LOCATION PLANS





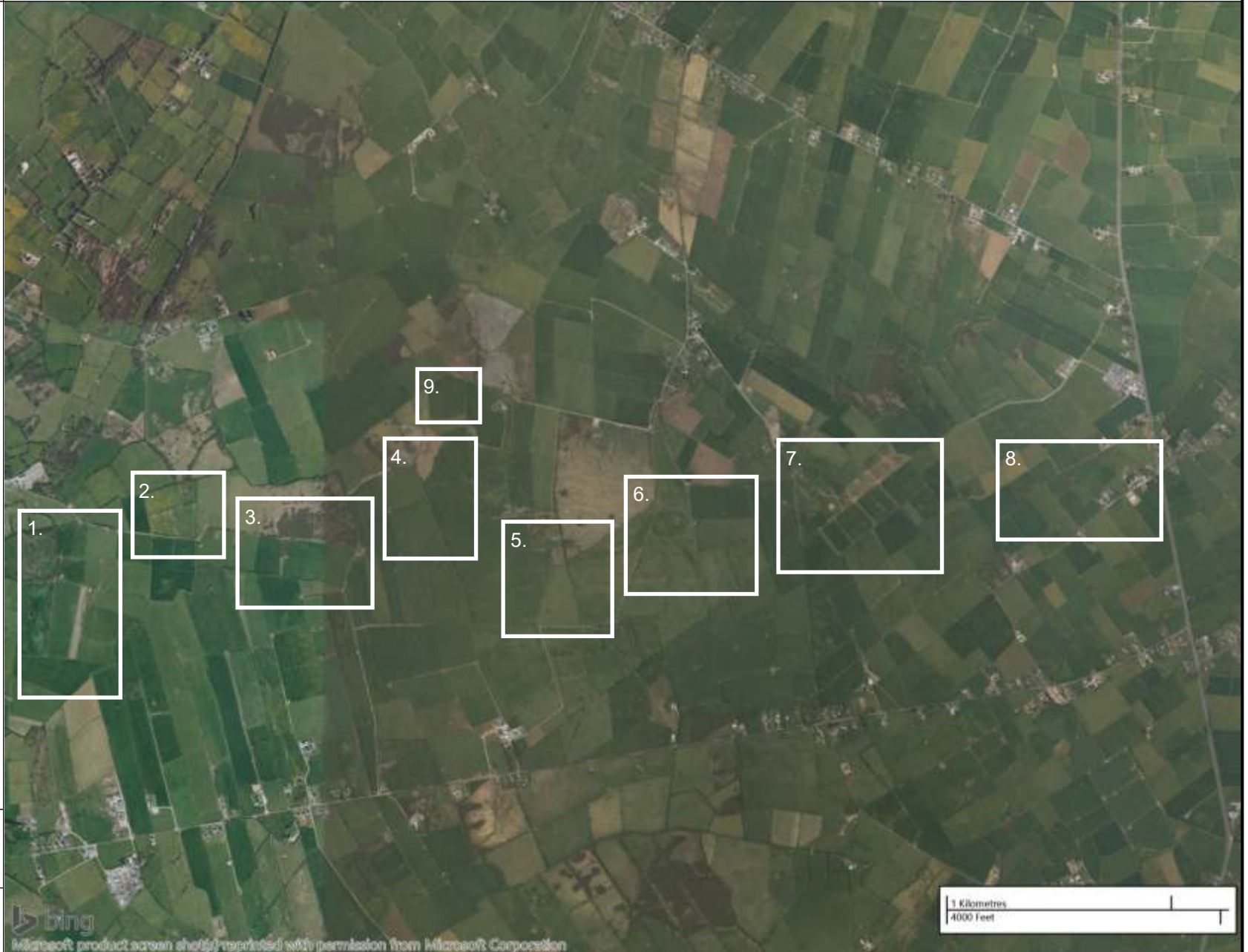
Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key



Title:
Site Location Plan

Last Revised:
10/05/2023

Scale:
1:25000

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Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

-  Locations By Type - DCP
-  Locations By Type - RC
-  Locations By Type - ITP



Title:
Exploratory Hole Location Plan -1

Last Revised:
23/05/2023

Scale:
1:3000






Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

-  Locations By Type - DCP
-  Locations By Type - RC
-  Locations By Type - TP



Title:

Exploratory Hole Location Plan - 2

Last Revised:

19/05/2023

Scale:

1:3000






Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

-  Locations By Type - DCP
-  Locations By Type - RC
-  Locations By Type - TP



Title:
Exploratory Hole Location Plan - 3

Last Revised:
23/05/2023

Scale:
1:3000



Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

- ◆ Locations By Type - DCP
- ⊕ Locations By Type - RC
- ⊕ Locations By Type - TP



Title:
Exploratory Hole Location Plan - 4

Last Revised:
22/05/2023

Scale:
1:3000



Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

- ◆ Locations By Type - DCP
- ◆ Locations By Type - RC
- ◆ Locations By Type - TP



Title:

Exploratory Hole Location Plan - 5

Last Revised:

22/05/2023

Scale:

1:3000






Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

-  Locations By Type - DCP
-  Locations By Type - RC
-  Locations By Type - TP



Title:
Exploratory Hole Location Plan - 6

Last Revised:
22/05/2023

Scale:
1:3000



Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

- ◆ Locations By Type - DCP
- ⊕ Locations By Type - RC
- ⊞ Locations By Type - TP



Title:

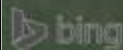
Exploratory Hole Location Plan - 7

Last Revised:

23/05/2023

Scale:

1:3500



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Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

-  Locations By Type - DCP
-  Locations By Type - RC
-  Locations By Type - TP



Title:
Exploratory Hole Location Plan - 8

Last Revised:
23/05/2023

Scale:
1:3500



Project No.: 23-0237

Client: Turnkey Developments

Project Name: Laurclavagh WF; Ground Investigation

Client's Representative: Enerco Energy

Legend Key

- ◆ Locations By Type - DCP
- ◆ Locations By Type - RC
- Locations By Type - TP



Title:
Exploratory Hole Location Plan - 9

Last Revised:
24/05/2023

Scale:
1:1000





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— GEOTECH

APPENDIX B
BOREHOLE LOGS





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC01

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.50	3.50 10.50	535359.65 E 743829.76 N	10.50 m	22/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					33.61 mOD	22/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 1.50 - 1.95	D1 SPT(S) N=9 (2,2/2,3,2,2)							32.41	1.20		Soft brown slightly sandy CLAY. Sand is fine to coarse.		
3.00 3.00 - 3.29	D2 SPT(S) 50 (10,15/50 for 136mm)							31.41	2.20		Soft brown CLAY (Driller's Description)		
3.00 3.00 - 3.29	D2 SPT(S) 50 (10,15/50 for 136mm)							30.11	3.50		Stiff to very stiff brownish grey sandy gravelly CLAY with low cobble and boulder content. (Driller's Description).		
5.00					NI			29.61	4.00		Dense light brownish grey sandy slightly clayey subangular to subrounded fine to medium GRAVEL. Sand is fine to coarse.		
5.00		95	50	10							Medium strong light grey LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, with common light brown discolouration on joint surfaces. Discontinuities: 1. 5-10 degree fractures medium spaced (35/220/475), undulating and rough with light brown staining on joint surfaces. 2. 45-50 degree fractures medium spaced (90/430/1170), undulating, rough with light brown staining on joint surfaces. 3. 80-90 degree joints from 5.65-5.80m, 7.70-7.85m and 9.20-9.30m, undulating, rough with light brown staining on joint surfaces.		
6.50 - 6.60 6.50	C1												
6.80 - 6.90 6.80 - 6.90	C2												
		97	60	35	11								
		97	80	20									
		TCR	SCR	RQD	FI								

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
10.50	200			
Flush Type		Termination Reason		
Water		Terminated at scheduled depth.		
			Last Updated	
			23/05/2023	



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC01

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth: 10.50 m	Start Date: 22/03/2023	Driller: GT	Sheet 2 of 2 Scale: 1:40
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.50	3.50 10.50	535359.65 E 743829.76 N	Elevation: 33.61 mOD	End Date: 22/03/2023	Logger: DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill	
8.00											Medium strong light grey LIMESTONE. Moderately weathered: reduced strength, closer fracture spacing, with common light brown discolouration on joint surfaces. Discontinuities: 1. 5-10 degree fractures medium spaced (35/220/475), undulating and rough with light brown staining on joint surfaces. 2. 45-50 degree fractures medium spaced (90/430/1170), undulating, rough with light brown staining on joint surfaces. 3. 80-90 degree joints from 5.65-5.80m, 7.70-7.85m and 9.20-9.30m, undulating, rough with light brown staining on joint surfaces.			
9.50		95	90	20	>20									
9.70 - 9.80	C3	75	70	30	8									
10.30 - 10.40	C4							23.11	10.50		End of Borehole at 10.50m			
10.50														

Water Strikes				Remarks									
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.									
Casing Details			Core Barrel										
To (m)	Diam (mm)		SK6L										
10.50	200												
Flush Type			Termination Reason							Last Updated			
Water			Terminated at scheduled depth.							23/05/2023			





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC02

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 2.50	2.50 10.00	536594.85 E 744400.04 N	10.00 m	20/04/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					54.18 mOD	20/04/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 - 1.50	SPT(C) 50 (25 for 0mm/50 for 0mm)										Firm brown CLAY.		
								52.98	1.20		Loose grey COBBLES and BOULDERS (Driller's Description).		
								52.43	1.75		Grey angular GRAVEL of limestone. (Possible bedrock) (Driller's Description).		
4.00		97	95	85				51.68	2.50		Strong dark grey LIMESTONE with white calcite veins up to 10mm thick. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, with rare orangish brown discolouration on fracture surfaces. Discontinuities: 1. 5-10 degree joints medium spaced (50/300/750), planar, smooth and clean. 2. 80-90 degree fractures from 8.50-8.60m and 9.60-9.75m, smooth and clean.		
					6								
5.50		97	95	90									
7.00		100	100	100	3								
		TCR	SCR	RQD	FI								

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
10.00	200			
Flush Type		Termination Reason		
Water		Terminated at scheduled depth.		
Last Updated			AGS	
23/05/2023				



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC02

Client: Turnkey Developments

Client's Rep Enerco Energy

Method Rotary Percussion Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 2.50	Base (m) 2.50 10.00	Coordinates 536594.85 E 744400.04 N	Final Depth: 10.00 m	Start Date: 20/04/2023	Driller: GT	Sheet 2 of 2 Scale: 1:40
					Elevation: 54.18 mOD	End Date: 20/04/2023	Logger: DM	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
8.50		97	97	95							Strong dark grey LIMESTONE with white calcite veins up to 10mm thick. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, with rare orangish brown discolouration on fracture surfaces. Discontinuities: 1. 5-10 degree joints medium spaced (50/300/750), planar, smooth and clean. 2. 80-90 degree fractures from 8.50-8.60m and 9.60-9.75m, smooth and clean.		
10.00		90	90	80	8			44.18	10.00		End of Borehole at 10.00m		

Water Strikes				Remarks									
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.									
Casing Details			Core Barrel										
To (m)	Diam (mm)		SK6L										
10.00	200												
Flush Type			Termination Reason							Last Updated			
Water			Terminated at scheduled depth.							23/05/2023			



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC03

Client: Turnkey Developments

Client's Rep: Enerco Energy

Method Rotary Drilling Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 3.00	Base (m) 3.00 10.00	Coordinates 534716.37 E 743130.35 N	Final Depth: 10.00 m	Start Date: 27/04/2023	Driller: GT	Sheet 1 of 2 Scale: 1:40
					Elevation: 24.52 mOD	End Date: 27/04/2023	Logger: AK	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 - 1.95	SPT(C) N=44 (6,8/8,10,12,14)							23.32	1.20		Brown CLAY with low cobble and boulder content. Cobbles are subrounded. Boulders are subrounded.		
								21.82	2.70		Dense grey GRAVEL (Driller's description)		
								21.52	3.00		LIMESTONE (Driller's description)		
4.50		100	98	88	3						Strong thickly laminated dark grey LIMESTONE. Slightly weathered; slightly reduced strength, closer fracture spacing with slight orange discolouration		
											Discontinuities: 1. 5-10° bedding fractures closely spaced (40/150/450) undulating, rough, with rare brown staining on fracture surfaces with clay infill on the fracture at 5.70m up to 1mm thick. 2. One 80-90° fracture from 5.45-5.70m, undulating and smooth with patch orange staining on fracture surface		
6.00		100	97	95	8								

Water Strikes				Remarks Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
		Flush Type	Termination Reason	
		Water	Terminated at scheduled depth.	
			Last Updated 23/05/2023	





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC03

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Rotary Drilling Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.00	3.00 10.00	534716.37 E 743130.35 N	10.00 m	27/04/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					24.52 mOD	27/04/2023	AK	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50										[Brick Pattern]	Strong thickly laminated dark grey LIMESTONE. Slightly weathered., slightly reduced strength, closer fracture spacing with slight orange discolouration Discontinuities: 1. 5-10° bedding fractures closely spaced (40/150/450) undulating, rough, with rare brown staining on fracture surfaces with clay infill on the fracture at 5.70m up to 1mm thick. 2. One 80-90° fracture from 5.45-5.70m, undulating and smooth with patch orange staining on fracture surface		
		100	100	95									
9.00													
		100	95	88									
10.00								14.52	10.00		End of Borehole at 10.00m		

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
Flush Type		Termination Reason		
Water		Terminated at scheduled depth.		
				Last Updated 23/05/2023





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC04

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.50	3.50 10.50	535363.88 E 743775.96 N	10.50 m	23/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					34.05 mOD	23/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50	D1 SPT(S) N=9 (2,2/2,3,2,2)							32.85	1.20		Firm brown slightly sandy CLAY. Sand is fine to coarse.		
1.50 - 1.95								32.25	1.80		Firm brown CLAY (Driller's Description)		
3.00 - 3.15	SPT(S) 50 (25 for 67mm/50 for 87mm)							30.55	3.50		Very stiff greyish brown slightly sandy slightly gravelly CLAY (Driller's Description).		
						NI		30.05	4.00		Dense greyish brown sandy clayey subangular to subrounded fine to medium GRAVEL. Sand is fine to coarse.		
5.00	C1	87	70	35							Medium strong to strong dark grey LIMESTONE with white calcite mineralisation throughout. Moderately weathered: reduced strength, closer fracture spacing, occasional light brown discolouration. Discontinuities: 1. 5-10 degree fractures medium spaced (40/210/450), planar, undulating, rough with light brown staining on joint surfaces. 2. 45-50 degree joints widely spaced (120/818/2670), undulating, rough with light brown staining on joint surfaces. 3. 80-90 degree joints from 5.20-5.30m, 5.90-6.00m and 6.20-6.30m, undulating, rough with light brown staining on joint surfaces.		
6.25 - 6.50						9							
6.50		90	80	10	13								
		TCR	SCR	RQD	FI								

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
10.50	200			
Flush Type		Termination Reason		
Water		Terminated at scheduled depth.		
				Last Updated 23/05/2023



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC04

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.50	3.50 10.50	535363.88 E 743775.96 N	10.50 m	23/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					34.05 mOD	23/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
8.00											Medium strong to strong dark grey LIMESTONE with white calcite mineralisation throughout. Moderately weathered: reduced strength, closer fracture spacing, occasional light brown discolouration. Discontinuities: 1. 5-10 degree fractures medium spaced (40/210/450), planar, undulating, rough with light brown staining on joint surfaces. 2. 45-50 degree joints widely spaced (120/818/2670), undulating, rough with light brown staining on joint surfaces. 3. 80-90 degree joints from 5.20-5.30m, 5.90-6.00m and 6.20-6.30m, undulating, rough with light brown staining on joint surfaces.		
9.30 - 9.50	C2	95	90	50	10								
9.50													
10.50 - 10.75	C3	75	75	70	4			23.55	10.50				
10.50											End of Borehole at 10.50m		

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
To (m)	Diam (mm)	SK6L		
10.50	200			
Flush Type		Termination Reason		Last Updated
Water		Terminated at scheduled depth.		23/05/2023





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC05

Client: Turnkey Developments

Client's Rep Enerco Energy

Method Rotary Drilling Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 3.00	Base (m) 3.00 10.00	Coordinates 536480.01 E 743783.20 N	Final Depth: 10.00 m	Start Date: 27/04/2023	Driller: GT	Sheet 1 of 2 Scale: 1:40
					Elevation: 43.53 mOD	End Date: 27/04/2023	Logger: AK	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 - 1.65	SPT(C) 50 (25 for 62mm/50 for 87mm)							42.33	1.20		Stiff brown CLAY with low cobble and boulder content. Cobbles are subangular. Boulders are subrounded.		
								41.23	2.30		Dense brownish grey GRAVEL (Driller's description)		
								40.53	3.00		LIMESTONE (Driller's description)		
4.50		100	97	93	4						Strong thickly laminated greyish brown LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, with slight yellowish brown discolouration on fracture surfaces. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (50/150/500), undulating, smooth, with brownish grey clay infill on joint surfaces up to 2mm thick. 2. Seven 50-60 degree joints at 3.15m, 3.30m, 3.65m, 5.00m, 8.20m and 9.80m, undulating, rough, with brownish grey clay infill on joint surfaces up to 2mm thick.		
6.00		100	85	80									
					9								
		100	96	93									
		TCR	SCR	RQD	FI								

Water Strikes				Remarks Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		Termination Reason Terminated at scheduled depth.
To (m)	Diam (mm)	SK6L		
Flush Type		Termination Reason		Last Updated
Water		Terminated at scheduled depth.		23/05/2023





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC05

Client: Turnkey Developments

Client's Rep Enerco Energy

Method Rotary Drilling Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 3.00	Base (m) 3.00 10.00	Coordinates 536480.01 E 743783.20 N	Final Depth: 10.00 m	Start Date: 27/04/2023	Driller: GT	Sheet 2 of 2 Scale: 1:40
					Elevation: 43.53 mOD	End Date: 27/04/2023	Logger: AK	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50											Strong thickly laminated greyish brown LIMESTONE. Slightly weathered: slightly reduced strength, closer fracture spacing, with slight yellowish brown discolouration on fracture surfaces. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (50/150/500), undulating, smooth, with brownish grey clay infill on joint surfaces up to 2mm thick. 2. Seven 50-60 degree joints at 3.15m, 3.30m, 3.65m, 5.00m, 8.20m and 9.80m, undulating, rough, with brownish grey clay infill on joint surfaces up to 2mm thick.		
		100	87	75	>20								
9.00					7								
		100	90	70	2								
10.00								33.53	10.00		End of Borehole at 10.00m		

Water Strikes				Remarks										
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.										
Casing Details			Core Barrel											
To (m)	Diam (mm)		SK6L											
			Flush Type		Termination Reason						Last Updated			
			Water		Terminated at scheduled depth.						23/05/2023			





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC06

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.00	3.00 10.00	537361.34 E 743494.58 N	10.00 m	30/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					38.01 mOD	30/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 1.50 - 1.95	D1 SPT(S) N=19 (2,3/4,4,5,6)							36.81	1.20		Soft brown slightly sandy CLAY. Sand is fine to coarse.		
3.10 - 3.40	C1				6			35.76	2.25		Stiff greyish brown sandy gravelly CLAY (Driller's Description).		
4.50		95	90	55	>20			35.01	3.00		Medium dense grey angular GRAVEL of limestone. (Possible weathered bedrock) (Driller's Description).		
6.00					7						Strong dark grey LIMESTONE with white calcite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, with occasional brown discolouration. Discontinuities:		
6.30 - 6.45	C2	85	80	75							1. 5-10 degree fractures medium spaced (40/212/470), planar, undulating, rough with light brown staining and clay infill on fracture surfaces. 2. 35-45 degree fractures widely spaced (100/700/1250), undulating, rough with light brown staining on joint surfaces. 3. One 90 degree fracture from 9.15-9.30m, undulating, rough, greyish brown staining on joint surface.		
		90	85	75									
		TCR	SCR	RQD	FI								

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		Terminated at scheduled depth.
To (m)	Diam (mm)	SK6L		
		Flush Type		
		Water		
				Termination Reason
				Terminated at scheduled depth.
				Last Updated
				23/05/2023



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC06

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.00	3.00 10.00	537361.34 E 743494.58 N	10.00 m	30/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					38.01 mOD	30/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50										[Brick Pattern]	Strong dark grey LIMESTONE with white calcite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, with occasional brown discolouration. Discontinuities: 1. 5-10 degree fractures medium spaced (40/212/470), planar, undulating, rough with light brown staining and clay infill on fracture surfaces. 2. 35-45 degree fractures widely spaced (100/700/1250), undulating, rough with light brown staining on joint surfaces. 3. One 90 degree fracture from 9.15-9.30m, undulating, rough, greyish brown staining on joint surface.		
		97	95	85									
9.00													
9.60 - 9.75	C3	80	65	20	10								
10.00								28.01	10.00		End of Borehole at 10.00m		

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
		Flush Type	Termination Reason	
		Water	Terminated at scheduled depth.	
			Last Updated 23/05/2023	





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC07

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.00	3.00 10.50	537370.78 E 743516.49 N	10.50 m	30/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					39.47 mOD	30/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 - 1.95	SPT(C) N=12 (2,3/2,3,4,3)							38.27	1.20		Soft brown CLAY.		
3.00 - 3.45	SPT(C) N=29 (4,7/7,8,7,7)							36.47	3.00		Firm to stiff greyish brown sandy gravelly CLAY (Driller's Description)		
4.50 - 4.64	SPT(C) 50 (25 for 67mm/50 for 78mm)				NI			35.77	3.70		Medium dense light brown slightly sandy clayey subrounded to subangular fine to medium GRAVEL. Sand is fine to coarse.		
5.00 - 5.15	C1	90						34.17	5.30		Dense light brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium.		
6.00		93	15	15				33.62	5.85		Dense light orangish brown slightly gravelly clayey slightly fine to coarse SAND. Gravel is subangular to subrounded fine to medium.		
		97	93	80							Strong dark grey LIMESTONE with white calcite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, rare light brown discolouration. Discontinuities: 1. 5-10 degree fractures medium spaced (90/270/440), planar, undulating and rough.		

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
		Flush Type	Termination Reason	
		Water	Terminated at scheduled depth.	
			Last Updated	
			23/05/2023	



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC07

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.00	3.00 10.50	537370.78 E 743516.49 N	10.50 m	30/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					39.47 mOD	30/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill	
7.50										[Brick Pattern Legend]	Strong dark grey LIMESTONE with white calcite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, rare light brown discolouration. Discontinuities: 1. 5-10 degree fractures medium spaced (90/270/440), planar, undulating and rough.			
8.20 - 8.40	C2	95	95	95										
9.00					6									
9.55 - 9.90	C3	83	80	75										
10.50								28.97	10.50		End of Borehole at 10.50m			

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
		Flush Type	Termination Reason	
		Water	Terminated at scheduled depth.	
			Last Updated	
			23/05/2023	





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC08

Client: Turnkey Developments

Client's Rep Enerco Energy

Method Rotary Drilling Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 3.50	Base (m) 3.50 10.00	Coordinates 536500.99 E 743805.31 N	Final Depth: 10.00 m	Start Date: 25/04/2023	Driller: GT	Sheet 1 of 2 Scale: 1:40
					Elevation: 43.75 mOD	End Date: 25/04/2023	Logger: AK	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 - 1.95	SPT(C) N=44 (4,7,10,12,12,10)							42.55	1.20		Brown CLAY with low boulder content. Boulders are angular.		
								41.25	2.50		Dense grey BOULDERS and COBBLES (Driller's description)		
								40.25	3.50		LIMESTONE (Driller's description)		
5.00		100	90	95	4						Strong very thinly laminated light grey dolomitised LIMESTONE, Moderately weathered: slightly reduced strength, closer fracture spacing with occasional yellowish brown discolouration on surfaces. Discontinuities: 1. 10-20° bedding fractures medium spaced (50/250/750). Undulating, rough with rare yellowish brown staining. Common yellowish brown clay infill up to 5mm thick. 2. One 45° joint at 8.55m planar, smooth with yellowish brown staining. 3. Three 80-90° joints at 4.5-4.6m, 5.0-5.7m, 9.35-9.5m undulating and rough, with occasional yellow, brown staining, clean.		
					>20								
					9								
6.50		97	90	86	6								
					>20								
		100	100	100									
		TCR	SCR	RQD	FI								

Water Strikes				Remarks Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
		Flush Type	Termination Reason	
		Water	Terminated at scheduled depth.	
			Last Updated 23/05/2023	



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC08

Client: Turnkey Developments

Client's Rep Enerco Energy

Method Rotary Drilling Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 3.50	Base (m) 3.50 10.00	Coordinates 536500.99 E 743805.31 N	Final Depth: 10.00 m	Start Date: 25/04/2023	Driller: GT	Sheet 2 of 2 Scale: 1:40
					Elevation: 43.75 mOD	End Date: 25/04/2023	Logger: AK	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill	
8.00					3						Strong very thinly laminated light grey dolomitised LIMESTONE, Moderately weathered: slightly reduced strength, closer fracture spacing with occasional yellowish brown discolouration on surfaces. Discontinuities: 1. 10-20° bedding fractures medium spaced (50/250/750). Undulating, rough with rare yellowish brown staining. Common yellowish brown clay infill up to 5mm thick. 2. One 45° joint at 8.55m planar, smooth with yellowish brown staining. 3. Three 80-90° joints at 4.5-4.6m, 5.0-5.7m, 9.35-9.5m undulating and rough, with occasional yellow, brown staining, clean.			
		97	80	76										
9.50					>20									
10.00		100	100	100	2			33.75	10.00		End of Borehole at 10.00m			

Water Strikes				Remarks									
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.									
Casing Details			Core Barrel										
To (m)	Diam (mm)		SK6L										
Flush Type			Termination Reason							Last Updated			
Water			Terminated at scheduled depth.							23/05/2023			





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC09

Client: Turnkey Developments

Client's Rep Enerco Energy

Method Rotary Percussion Rotary Coring	Plant Used Comacchio 602 Comacchio 602	Top (m) 0.00 3.00	Base (m) 3.00 10.00	Coordinates 536889.19 E 743548.39 N	Final Depth: 10.00 m	Start Date: 30/03/2023	Driller: GT	Sheet 1 of 2 Scale: 1:40
					Elevation: 36.62 mOD	End Date: 30/03/2023	Logger: DM	FINAL

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 1.50 - 1.95	D1 SPT(S) N=19 (4,4/4,5,5,5)							35.42	1.20		Soft brown slightly sandy CLAY. Sand is fine to coarse.		
4.50		90	80	50	8			33.62	3.00		Stiff brownish grey sandy gravelly CLAY. (Driller's Description).		
6.00					12						Strong dark grey LIMESTONE with white calcite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, rare light brown discolouration. Discontinuities: 1. 5-10 degree fractures closely spaced (20/115/340), planar, undulating, rough with light brown discolouration on joint surfaces. 2. 40-45 degree fractures widely spaced (110/777/1650), undulating and rough. 3. 90 degree fractures from 4.35-4.50m, 5.75-6.00m and 6.50-6.55m, undulating and rough.		
6.70 - 7.10	C1	99	95	87									
		TCR	SCR	RQD	FI								

Water Strikes				Remarks Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
		Flush Type	Termination Reason	
		Water	Terminated at scheduled depth.	
			Last Updated 23/05/2023	



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC09

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Rotary Percussion Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.00	3.00 10.00	536889.19 E 743548.39 N	10.00 m	30/03/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					36.62 mOD	30/03/2023	DM	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
7.50											Strong dark grey LIMESTONE with white calcite mineralisation throughout. Slightly weathered: slightly reduced strength, slightly closer fracture spacing, rare light brown discolouration. Discontinuities: 1. 5-10 degree fractures closely spaced (20/115/340), planar, undulating, rough with light brown discolouration on joint surfaces. 2. 40-45 degree fractures widely spaced (110/777/1650), undulating and rough. 3. 90 degree fractures from 4.35-4.50m, 5.75-6.00m and 6.50-6.55m, undulating and rough.		
8.60 - 8.80	C2	97	95	65	15								
9.00 9.20 - 9.30	C3	100	97	97	4								
10.00								26.62	10.00		End of Borehole at 10.00m		

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
Flush Type		Termination Reason		
Water		Terminated at scheduled depth.		
			Last Updated	
			23/05/2023	



Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC11

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 1 of 2
Rotary Drilling Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.50	3.50 10.00	536498.64 E 743790.15 N	10.00 m	25/04/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					43.37 mOD	25/04/2023	AK	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
1.50 - 1.58	SPT(C) N=50 (25 for 0mm/50 for 75mm)							42.17	1.20		Brown CLAY.		
											Grey GRAVEL and BOULDERS (Driller's description)		
5.00					4			39.87	3.50		Strong thickly laminated brownish grey LIMESTONE. Slightly weathered: Slightly reduced strength, slightly closer fracture spacing, occasional yellowish brown discolouration on fracture surfaces. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (20/95/500), undulating, smooth, with brownish grey staining on fracture surfaces. 2. Five 40-50 degree joints at 4.50m, 5.30m, 7.50m, 9.10m and 9.60m, undulating, rough, with brownish grey staining on fracture surfaces.		
		100	95	86									
					5								
					>20								
		100	95	88	6								
6.50													
		100	98	86									
		TCR	SCR	RQD	FI								

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Core Barrel		Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
To (m)	Diam (mm)	SK6L		
Flush Type		Termination Reason		Last Updated
Water		Terminated at scheduled depth.		23/05/2023





Project No.
23-0237

Project Name: Laurclavagh WF; Ground Investigation

Borehole ID
RC11

Client: Turnkey Developments

Client's Rep Enerco Energy

Method	Plant Used	Top (m)	Base (m)	Coordinates	Final Depth:	Start Date:	Driller:	Sheet 2 of 2
Rotary Drilling Rotary Coring	Comacchio 602 Comacchio 602	0.00 3.50	3.50 10.00	536498.64 E 743790.15 N	10.00 m	25/04/2023	GT	Scale: 1:40
					Elevation:	End Date:	Logger:	FINAL
					43.37 mOD	25/04/2023	AK	

Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
8.00					5						Strong thickly laminated brownish grey LIMESTONE. Slightly weathered: Slightly reduced strength, slightly closer fracture spacing, occasional yellowish brown discolouration on fracture surfaces. Discontinuities: 1. 10-20 degree bedding fractures, closely spaced (20/95/500), undulating, smooth, with brownish grey staining on fracture surfaces. 2. Five 40-50 degree joints at 4.50m, 5.30m, 7.50m, 9.10m and 9.60m, undulating, rough, with brownish grey staining on fracture surfaces.		
		100	83	83	7								
9.50		100	70	70	3								
10.00								33.37	10.00		End of Borehole at 10.00m		

Water Strikes				Remarks
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
				Inspection pit hand dug to 1.20m. No obvious groundwater strikes - water added during coring.
Casing Details		Core Barrel		
To (m)	Diam (mm)	SK6L		
Flush Type		Termination Reason		
Water		Terminated at scheduled depth.		
				Last Updated 23/05/2023





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APPENDIX C
CORE PHOTOGRAPHS





RC01 Box 1 (3.50-5.00m)



RC02 Box 2 (5.00-6.50m)



RC01 Box 3 (6.50-8.00m)



RC01 Box 4 (8.00-9.50m)



RC01 Box 5 (9.50-10.50m)



RC02 Box 1 (2.50-4.00m)



RC02 Box 2 (4.00-5.50m)



RC02 Box 3 (5.50-7.00m)



RC02 Box 4 (7.00-8.50m)



RC02 Box 5 (8.50-10.00m)



RC03 Box 1 (3.00-4.50m)



RC03 Box 2 (4.50-6.00m)



RC03 Box 3 (6.00-7.50m)



RC03 Box 4 (7.50-9.00m)



RC03 Box 5 (9.00-10.00m)



RC04 Box 1 (3.50-5.00m)



RC04 Box 2 (5.00-6.50m)



RC04 Box 3 (6.50-8.00m)



RC04 Box 4 (8.00-9.50m)



RC04 Box 5 (9.50-10.50m)



RC05 Box 1 (3.00-4.50m)



RC05 Box 2 (4.50-6.00m)



RC05 Box 3 (6.00-7.50m)



RC05 Box 4 (7.50-9.00m)



RC06 Box 1 (3.00-4.50m)



RC06 Box 2 (4.50-6.00m)



RC06 Box 3 (6.00-7.50m)



RC06 Box 4 (7.50-9.00m)



RC06 Box 5 (9.00-10.00m)



RC07 Box 1 (3.00-4.50m)



RC07 Box 2 (4.50-6.00m)



RC07 Box 3 (6.00-7.50m)



RC07 Box 4 (7.50-9.00m)



RC07 Box 5 (9.00-10.50m)



RC08 Box 1 (3.50-5.00m)



RC08 Box 2 (5.00-6.50m)



RC08 Box 3 (6.50-8.00m)



RC08 Box 4 (8.00-9.50m)



RC08 Box 5 (9.50-10.00m)



RC09 Box 1 (3.00-4.50m)



RC09 Box 2 (4.50-6.00m)



RC09 Box 3 (6.00-7.50m)



RC09 Box 4 (7.50-9.00m)



RC09 Box 5 (9.00-10.00m)



RC11 Box 1 (3.50-5.00m)



RC11 Box 2 (5.00-6.50m)



RC11 Box 3 (6.50-8.00m)



RC11 Box 4 (8.00-9.50m)









RC11 Box 5 (9.50-10.00m)












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APPENDIX D
TRIAL PIT LOGS












		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID TP01		
Method: Trial Pitting		Coordinates 535630.50 E 743583.82 N	Client: Turnkey Developments		Client's Representative: Enerco Energy		
Plant: 13T Tracked Excavator		Elevation 32.58 mOD	Date: 22/03/2023		Logger: MMC	Sheet 1 of 1 Scale: 1:25	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.40	B1		32.38	0.20		TOPSOIL: Firm greyish brown slightly sandy CLAY with rootlets. Sand is fine to coarse.	
						Firm light greyish brown slightly sandy CLAY. Sand is fine to coarse.	0.5
0.90	B2		31.98	0.60		Soft to firm light grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.	1.0
1.80	B3						1.5
							2.0
							2.5
3.00	B4		30.08	2.50		Firm to stiff light grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to medium of limestone.	3.0
							3.5
							4.0
							4.5
			29.08	3.50		End of trial pit at 3.50m	
Water Strikes Struck at (m) Remarks		Depth: 3.50 Width: 0.70 Length: 3.50 Stability: Unstable	Remarks: No groundwater encountered.		Termination Reason Terminated due to pit walls collapsing.		Last Updated 23/05/2023
							






		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID TP02			
Method: Trial Pitting		Coordinates 536512.78 E 743972.98 N	Client: Turnkey Developments		Client's Representative: Enerco Energy			
Plant: 13t Tracked Excavator		Elevation 47.46 mOD	Date: 17/04/2023		Logger: MMC	FINAL		
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water	
0.40	B1		47.26	0.20		TOPSOIL		
			46.96	0.50		Light grey very clayey fine to coarse SAND and angular to subangular fine to coarse GRAVEL of limestone.	0.5	
1.20	B2					Light grey very sandy silty angular to subangular GRAVEL of limestone with medium cobble and boulder content. Sand is fine to coarse. Cobbles are subangular of limestone. Boulders are subangular of limestone. (Possible weathered bedrock)	1.0	
			46.06	1.40		End of trial pit at 1.40m	1.5	
							2.0	
							2.5	
							3.0	
							3.5	
							4.0	
							4.5	
Water Strikes Struck at (m) Remarks		Depth: 1.40 Width: 1.00 Length: 2.50 Stability: Unstable	Remarks: No groundwater encountered.		Termination Reason Terminated on possible bedrock.		Last Updated 23/05/2023	

		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID TP03		
Method: Trial Pitting		Coordinates 538279.07 E 743808.34 N	Client: Turnkey Developments		Client's Representative: Enerco Energy		
Plant: 13T Tracked Excavator		Elevation 41.01 mOD	Date: 23/03/2023		Logger: MMC	Sheet 1 of 1 Scale: 1:25	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.60	B1		40.76	0.25		TOPSOIL	
1.30	B2					Firm light brownish grey sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of limestone.	0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
			39.21	1.80		End of trial pit at 1.80m	
Water Strikes Struck at (m) Remarks		Depth: 1.80 Width: 0.70 Length: 3.50 Stability: Unstable	Remarks: No groundwater encountered.		Termination Reason Terminated on possible bedrock.	Last Updated 23/05/2023	

			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID TP05		
Method: Trial Pitting			Coordinates 538493.40 E 743923.97 N		Client: Turnkey Developments Client's Representative: Enerco Energy			Sheet 1 of 1 Scale: 1:25		
Plant: 13T Tracked Excavator			Elevation 39.74 mOD		Date: 23/03/2023		Logger: MMC		FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water			
0.50	B1		39.44	0.30		TOPSOIL: Firm brown sandy CLAY with rootlets				
			38.84	0.90		Light brownish grey subangular COBBLES and BOULDERS of limestone with some sandy gravelly clay. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of limestone.		0.5		
						End of trial pit at 0.90m		1.0		
								1.5		
								2.0		
								2.5		
								3.0		
								3.5		
								4.0		
								4.5		
Water Strikes			Depth: 0.90 Width: 0.80 Length: 3.00		Remarks: No groundwater encountered.					
Struck at (m) Remarks				Stability: Stable			Termination Reason Terminated on possible bedrock.		Last Updated 23/05/2023	

		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID TP06		
Method: Trial Pitting		Coordinates 537723.12 E 743898.73 N	Client: Turnkey Developments		Sheet 1 of 1 Scale: 1:25		
Plant: 13T Tracked Excavator		Elevation 49.39 mOD	Date: 28/03/2023		Logger: MMC	FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.60	B1		49.09	0.30		TOPSOIL: Firm brown slightly sandy CLAY with rootlets. Sand is fine to coarse.	
1.50	B2					Firm light grey slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles and boulders are subrounded of limestone.	0.5 1.0 1.5 2.0
2.60	B3		46.89	2.50		Stiff light brownish grey slightly gravelly sandy CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	2.5 3.0
3.30	B4		45.79	3.60		End of trial pit at 3.60m	3.5 4.0 4.5
Water Strikes Struck at (m) Remarks		Depth: 3.60 Width: 0.60 Length: 3.00 Stability: Stable	Remarks: No groundwater encountered. Termination Reason Terminated on refusal in very stiff clay.		Last Updated 23/05/2023		

			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID TP07	
			Coordinates 537204.42 E 743569.80 N		Client: Turnkey Developments Client's Representative: Enerco Energy			Sheet 1 of 1 Scale: 1:25	
Method: Trial Pitting			Elevation 39.20 mOD		Date: 24/03/2023			Logger: MMC	
Plant: 13T Tracked Excavator								FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water		
0.50	B1		38.95	0.25		TOPSOIL: Firm brown slightly sandy CLAY with rootlets			0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
						Stiff grey slightly gravelly sandy SILT with medium cobble and boulder content. Sand is fine to coarse. Gravel is subangular to angular fine to medium of limestone. Cobbles are subangular of limestone. Boulders are subrounded of limestone.			
			38.40	0.80		End of trial pit at 0.80m			
Water Strikes			Depth: 0.80 Width: 0.70 Length: 3.00		Remarks: No groundwater encountered.				
Struck at (m) Remarks		Stability: Stable		Termination Reason Terminated on possible bedrock.			Last Updated 23/05/2023		

		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID TP08		
Method: Trial Pitting		Coordinates 537713.99 E 743859.60 N	Client: Turnkey Developments		Sheet 1 of 1 Scale: 1:25		
Plant: 13T Tracked Excavator		Elevation 48.82 mOD	Date: 28/03/2023		Logger: MMC	FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.80	B1		48.52	0.30		TOPSOIL: Firm brown slightly sandy CLAY with rootlets. Sand is fine to coarse.	
1.60	B2		46.72	2.10		Firm light brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	0.5 1.0 1.5 2.0
			46.32	2.50		Light grey subrounded COBBLES and BOULDERS of limestone.	2.5 3.0 3.5 4.0 4.5
						End of trial pit at 2.50m	
Water Strikes		Depth: 2.50		Remarks: No groundwater encountered.			
Struck at (m)	Remarks	Width: 0.60					
		Length: 3.00					
		Stability: Unstable	Termination Reason Terminated on possible bedrock.		Last Updated 23/05/2023		



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APPENDIX E
TRIAL PIT PHOTOGRAPHS





TP01



TP01



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APPENDIX F
INFILTRATION TEST LOGS AND
RESULTS












		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID ITP01		
Method: Trial Pitting		Coordinates 537788.42 E 743808.44 N	Client: Turnkey Developments		Client's Representative: Enerco Energy		
Plant: 13T Tracked Excavator		Elevation 48.39 mOD	Date: 28/03/2023	Logger: MMC	Sheet 1 of 1 Scale: 1:25		
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.40	B1		48.09	0.30		TOPSOIL: Firm brown slightly sandy CLAY with rootlets. Sand is fine to coarse.	
			47.89	0.50		Firm orangeish brown slightly sandy CLAY. Sand is fine to coarse.	
1.00	B2					Firm light brownish grey slightly gravelly sandy CLAY with low cobble content and one boulder. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular to subrounded of limestone. Boulder is subrounded of limestone.	0.5
2.00	B3		47.09	1.30		Firm to stiff light brownish grey slightly sandy slightly gravelly CLAY with low cobble and low boulder content and some pockets of orangish brown very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of limestone. Cobbles are subangular to subrounded of limestone. Boulders are subrounded of limestone.	1.0
2.70	B4		45.59	2.80		End of trial pit at 2.80m	1.5
							2.0
							2.5
							3.0
							3.5
							4.0
							4.5
Water Strikes Struck at (m) Remarks		Depth: 2.80 Width: 0.60 Length: 3.00 Stability: Stable	Remarks: No groundwater encountered. Soakaway completed. Termination Reason Terminated on possible bedrock.		Last Updated 23/05/2023		






			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP02	
Method: Trial Pitting			Coordinates 536599.98 E 744364.08 N		Client: Turnkey Developments			Client's Representative: Enerco Energy	
Plant: 13t Tracked Excavator			Elevation 54.29 mOD		Date: 17/04/2023		Logger: MMC		
Field Records			Level (mOD)		Depth (m)		Legend		
Depth (m)			Sample / Tests		Description		Water		
0.60			B1		54.09 0.20 53.29 1.00		TOPSOIL: Firm brown slightly sandy CLAY. Sand is fine to coarse. Firm to stiff light grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of limestone. End of trial pit at 1.00m		
Water Strikes			Depth: 1.00 Width: 0.50 Length: 2.00		Remarks: No groundwater encountered. Soakaway completed.			Stability: Stable	
Struck at (m) Remarks			Termination Reason Terminated on possible bedrock.			Last Updated 23/05/2023			






			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP03	
Method: Trial Pitting			Coordinates 537384.54 E 743552.95 N		Client: Turnkey Developments Client's Representative: Enerco Energy			Sheet 1 of 1 Scale: 1:25	
Plant: 13T Tracked Excavator			Elevation 39.80 mOD		Date: 24/03/2023		Logger: MMC		FINAL
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water		
0.50	B1		39.65	0.15		TOPSOIL: Firm brown slightly sandy CLAY with rootlets			
						Light grey subangular BOULDERS of limestone with high cobble content and some sandy slightly clayey gravel. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of limestone. Cobbles are subangular to angular of limestone.	0.5		
			38.80	1.00		End of trial pit at 1.00m	1.0		
							1.5		
							2.0		
							2.5		
							3.0		
							3.5		
							4.0		
							4.5		
Water Strikes			Depth: 1.00 Width: 0.70 Length: 1.80		Remarks: No groundwater encountered. Soakaway completed.			Termination Reason Terminated on possible bedrock.	
Struck at (m)		Remarks	Stability: Stable		Last Updated 23/05/2023				








		Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP04	
		Coordinates 538320.32 E 743811.54 N		Client: Turnkey Developments Client's Representative: Enerco Energy			Sheet 1 of 1 Scale: 1:25	
Method: Trial Pitting		Elevation 40.01 mOD		Date: 23/03/2023			Logger: MMC	
Plant: 13T Tracked Excavator							FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water	
			39.76	0.25		TOPSOIL: Firm brown slightly sandy CLAY with rootlets. Sand is fine to coarse.		
						Firm light grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.		0.5 1.0
			38.61	1.40		Firm light grey sandy gravelly CLAY with low boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Boulders are subrounded of limestone.		1.5 2.0 2.5
			37.21	2.80		End of trial pit at 2.80m		3.0 3.5 4.0 4.5
Water Strikes		Depth: 2.80		Remarks: No groundwater encountered. Soakaway completed.				
Struck at (m)	Remarks	Width: 0.80						
		Length: 3.50		Termination Reason Terminated on possible bedrock.				Last Updated 23/05/2023
		Stability: Unstable						
								






			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP05	
			Coordinates 534758.34 E 743142.61 N		Client: Turnkey Developments Client's Representative: Enerco Energy			Sheet 1 of 1 Scale: 1:25	
Method: Trial Pitting			Elevation 25.11 mOD		Date: 25/04/2023			Logger: MMC	
Plant: 13T Tracked Excavator								FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water		
			25.01	0.10		TOPSOIL			
						Light grey slightly gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded of limestone.	0.5 1.0		
			23.81	1.30		End of trial pit at 1.30m	1.5 2.0 2.5 3.0 3.5 4.0 4.5		
Water Strikes			Depth: 1.30 Width: 0.60 Length: 3.50		Remarks: No groundwater encountered. Soakaway carried out at 0.70m.				
Struck at (m)	Remarks		Stability: Stable		Termination Reason Terminated on possible bedrock.			Last Updated 23/05/2023	
									





			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP06	
			Coordinates 539457.42 E 743774.26 N		Client: Turnkey Developments			Client's Representative: Enerco Energy	
Method: Trial Pitting			Elevation 30.08 mOD		Date: 20/03/2023			Logger: MMC	
Plant: 13T Tracked Excavator								Sheet 1 of 1 Scale: 1:25	
								FINAL	
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water		
0.40	B1		29.88	0.20		TOPSOIL			
			29.58	0.50		Soft to firm light orangish brown slightly sandy CLAY. Sand is fine to coarse.		0.5	
1.20	B2					Stiff light grey slightly sandy slightly gravelly SILT with medium boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Boulders are subangular to angular of limestone.		1.0 1.5	
			28.28	1.80		End of trial pit at 1.80m		2.0 2.5 3.0 3.5 4.0 4.5	
Water Strikes			Depth: 1.80		Remarks: No groundwater encountered. Soakaway completed.				
Struck at (m)		Remarks	Width: 1.00						
			Length: 2.50		Termination Reason			Last Updated	
			Stability: Stable		Terminated on possible bedrock.			23/05/2023	
									

			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP07	
Method: Trial Pitting			Coordinates 538760.65 E 743743.99 N		Client: Turnkey Developments			Client's Representative: Enerco Energy	
Plant: 13T Tracked Excavator			Elevation 31.30 mOD		Date: 21/03/2023		Logger: MMC		Sheet 1 of 1 Scale: 1:25
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description			Water
0.80	B1		30.95	0.35		TOPSOIL: Brown slightly sandy CLAY with rootlets. Sand is fine to coarse.			
1.50	B2		30.10	1.20		Firm light grey mottled light brown gravelly very sandy CLAY with medium cobble and high boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone. Boulders are subangular of limestone.			0.5
			29.50	1.80		Stiff light grey sandy gravelly CLAY with medium cobble and boulder content and some light greyish brown sandy slightly gravelly clay. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular to angular of limestone. Boulders are angular to subangular of limestone.			1.0
						End of trial pit at 1.80m			1.5
									2.0
									2.5
									3.0
									3.5
									4.0
									4.5
Water Strikes		Depth: 1.80 Width: 1.00 Length: 3.00		Remarks: No groundwater encountered. Soakaway completed.					
Struck at (m)	Remarks	Stability: Stable	Termination Reason Terminated on possible bedrock.			Last Updated 23/05/2023			

			Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP08	
Method: Trial Pitting			Coordinates 534976.50 E 743777.84 N	Client: Turnkey Developments			Sheet 1 of 1 Scale: 1:25	
Plant: 13T Tracked Excavator			Elevation 30.15 mOD	Date: 22/03/2023			Logger: MMC	FINAL
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water	
0.60	B1		30.05	0.10		TOPSOIL: Firm brown sandy CLAY with rootlets. Sand is fine to coarse.		
						Brown subangular to subrounded COBBLES of limestone with much sandy gravelly clay. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone.		0.5 1.0
1.50	B2		28.85	1.30		Light grey very sandy clayey subrounded fine to coarse GRAVEL of limestone. Sand is fine to coarse.		1.5
			28.35	1.80		End of trial pit at 1.80m		2.0 2.5 3.0 3.5 4.0 4.5
Water Strikes Struck at (m) Remarks			Depth: 1.80 Width: 0.70 Length: 2.50 Stability: Stable	Remarks: No groundwater encountered. Soakaway completed. Termination Reason Terminated on possible bedrock.			Last Updated 23/05/2023	

		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID ITP09		
Method: Trial Pitting		Coordinates E N	Client: Turnkey Developments		Sheet 1 of 1 Scale: 1:25		
Plant: 13t Tracked Excavator			Client's Representative: Enerco Energy				
		Elevation mOD	Date: 17/04/2023	Logger: MMC	FINAL		
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.30	B1			0.20		TOPSOIL: Firm brown slightly sandy CLAY. Sand is fine to coarse.	
				0.40		Firm light brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	
1.00	B2			1.60		Firm light grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.	0.5 1.0 1.5
2.00	B3			2.30		Firm light brown mottled light grey sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.	2.0
3.00	B4			3.20		Light grey mottled light brown very sandy silty subangular fine to coarse GRAVEL with medium cobble and boulder content. Sand is fine to coarse. Cobbles are angular of limestone. Boulders are angular of limestone. (Possible weathered bedrock).	2.5 3.0
				3.20		End of trial pit at 3.20m	3.5 4.0 4.5
Water Strikes Struck at (m) Remarks		Depth: 3.20 Width: 1.20 Length: 3.50 Stability: Unstable	Remarks: No groundwater encountered. Soakaway completed. Termination Reason Terminated on possible bedrock.		Last Updated 23/05/2023		

		Project No. 23-0237	Project Name: Laurclavagh WF; Ground Investigation		Trial Pit ID ITP10		
Method: Trial Pitting		Coordinates 536926.62 E 743552.52 N	Client: Turnkey Developments		Client's Representative: Enerco Energy		
Plant: 13T Tracked Excavator		Elevation 36.35 mOD	Date: 28/03/2023	Logger: MMC	Sheet 1 of 1 Scale: 1:25		
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.70	B1		36.15	0.20		TOPSOIL: Firm brown slightly sandy CLAY with rootlets. Sand is fine to coarse.	
						Firm light brownish grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of limestone.	0.5 1.0
1.70	B2		35.05	1.30		Firm to stiff light brownish grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to medium of limestone.	1.5 2.0
2.50	B3		33.65	2.70		End of trial pit at 2.70m	2.5 3.0 3.5 4.0 4.5
Water Strikes Struck at (m) Remarks		Depth: 2.70 Width: 0.70 Length: 3.00 Stability: Stable	Remarks: No groundwater encountered. Soakaway completed. Termination Reason Terminated on possible bedrock.		Last Updated 23/05/2023		

			Project No. 23-0237		Project Name: Laurclavagh WF; Ground Investigation			Trial Pit ID ITP12	
Method: Trial Pitting			Coordinates 536503.17 E 743761.47 N		Client: Turnkey Developments			Client's Representative: Enerco Energy	
Plant: 13T Tracked Excavator			Elevation 42.48 mOD		Date: 21/03/2023			Logger: MMC	
Field Records			Level (mOD)		Depth (m)		Description		
			42.13	0.35			TOPSOIL.		
			41.78	0.70			Firm light grey slightly gravelly very sandy CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular to angular of limestone. Cobbles are angular of limestone.		0.5
							End of trial pit at 0.70m		1.0
									1.5
									2.0
									2.5
									3.0
									3.5
									4.0
									4.5
Water Strikes			Depth: 0.70 Width: 0.60 Length: 1.80		Remarks: No groundwater encountered. Soakaway completed.			Water	
Struck at (m) Remarks			Stability: Stable		Termination Reason Terminated on possible bedrock.			Last Updated 23/05/2023	
									

Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP01
Test Date: 28 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.50	2.00
test pit base dimensions	0.50	1.80
test pit depth (m)	1.30	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.45	0.85
1	0.46	0.84
2	0.46	0.84
3	0.46	0.84
4	0.47	0.83
5	0.47	0.83
6	0.47	0.83
7	0.47	0.83
8	0.47	0.83
9	0.47	0.83
10	0.47	0.83
15	0.48	0.82
20	0.48	0.82
25	0.49	0.81
30	0.49	0.81
40	0.50	0.80
50	0.50	0.80
60	0.51	0.79
90	0.52	0.78

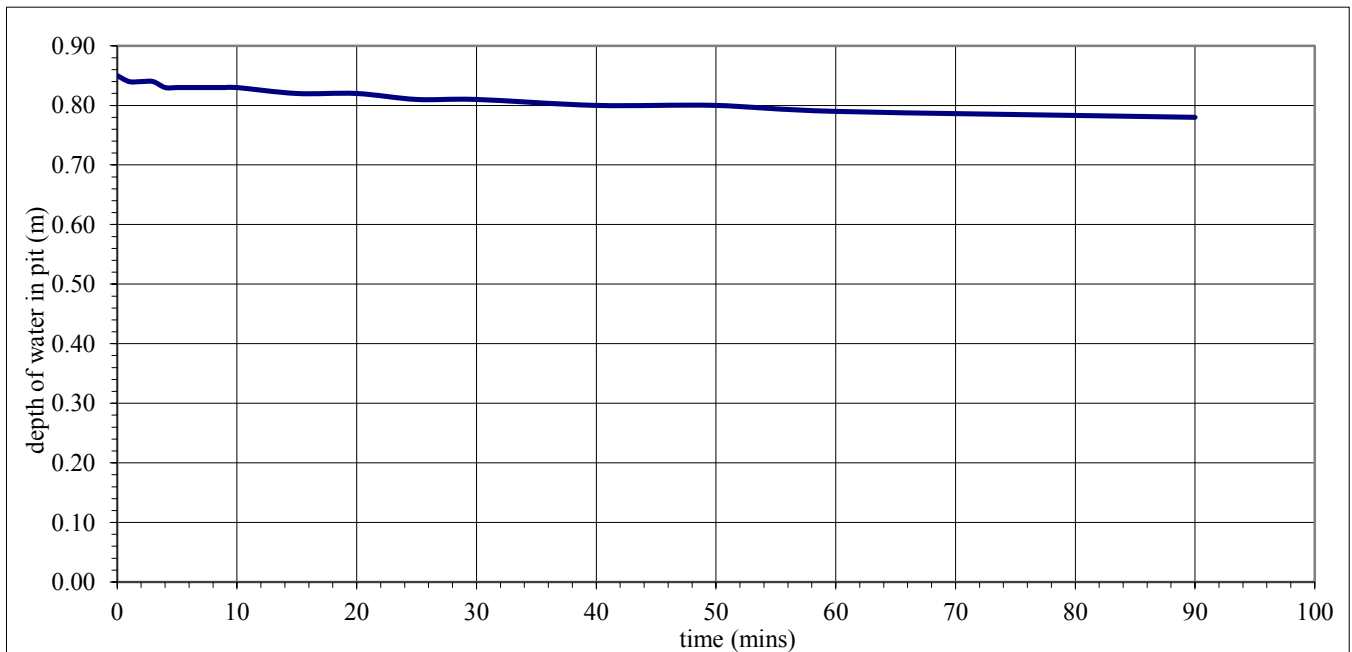
From graph below:

test start - 75% depth at
 0.6375 m water depth
 time is not determined

test end - 25% depth at
 0.2125 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)



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP02 - Test 2
Test Date: 17 April 2023



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

	width (m)	length (m)
test pit top dimensions	0.50	2.00
test pit base dimensions	0.50	1.80
test pit depth (m)	1.00	

depth to groundwater before adding water (m) = Dry

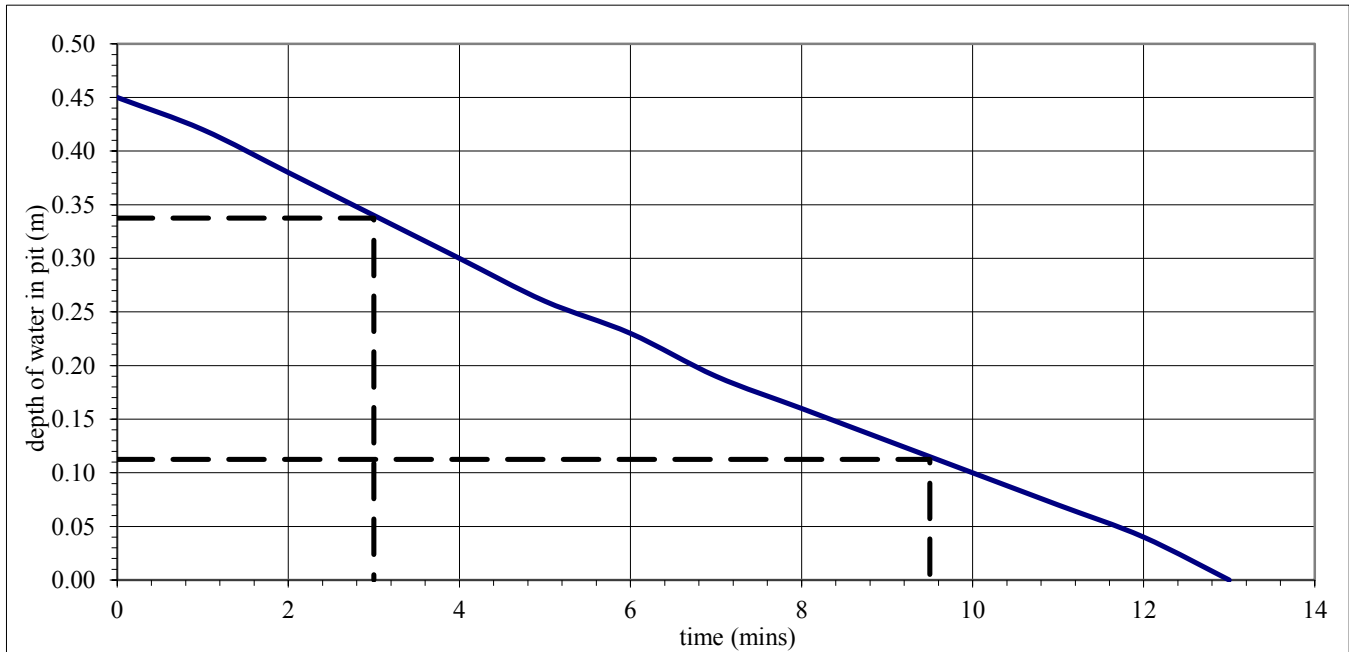
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.55	0.45
1	0.58	0.42
2	0.62	0.38
3	0.66	0.34
4	0.70	0.30
5	0.74	0.26
6	0.77	0.23
7	0.81	0.19
8	0.84	0.16
9	0.87	0.13
10	0.90	0.10
11	0.93	0.07
12	0.96	0.04
13	1.00	0.00

From graph below:
 test start - 75% depth at
 0.3375 m water depth
 time is 3.0 minutes

 test end - 25% depth at
 0.1125 m water depth
 time is 9.5 minutes

test infiltration rate (q) = 0.984 m/h

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)
3	0.66	0.3375	6.5	0.21	1.95	1.6E-02	0.984
9.5	0.89	0.1125					



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP04
Test Date: 23 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.55	2.20
test pit base dimensions	0.55	1.70
test pit depth (m)	1.40	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.52	0.88
1	0.53	0.87
2	0.54	0.86
3	0.55	0.85
4	0.56	0.84
5	0.57	0.83
6	0.58	0.82
8	0.60	0.80
10	0.62	0.78
15	0.65	0.75
20	0.68	0.72
25	0.71	0.69
30	0.74	0.66
40	0.81	0.59
60	0.93	0.47
75	0.99	0.41
90	1.10	0.30
100	1.20	0.20
110	1.28	0.12

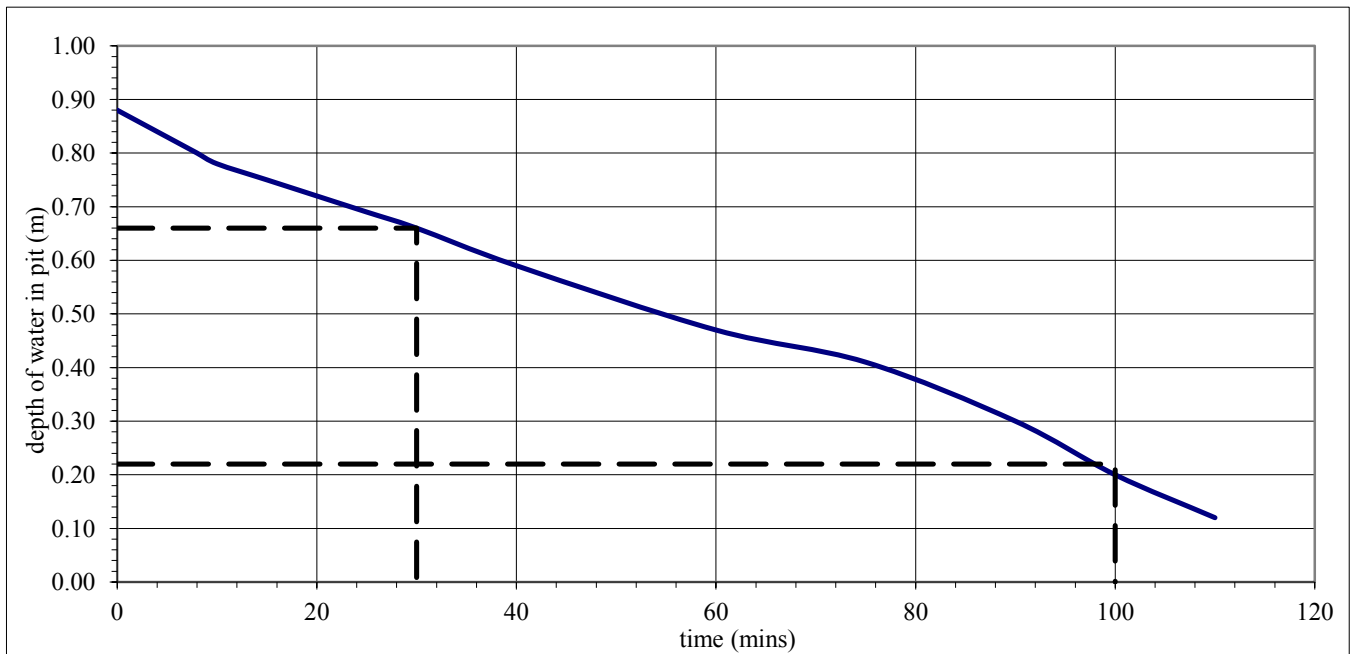
From graph below:

test start - 75% depth at
 0.66 m water depth
 time is 30.0 minutes

test end - 25% depth at
 0.22 m water depth
 time is 100.0 minutes

test infiltration rate (q) = 0.128 m/h

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)
30	0.74	0.66	70	0.45	3.00	2.1E-03	0.128
100	1.18	0.22					



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP05
Test Date: 25 April 2023



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

	width (m)	length (m)
test pit top dimensions	0.60	2.00
test pit base dimensions	0.60	1.80
test pit depth (m)	0.70	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.30	0.40
1	0.31	0.39
2	0.31	0.39
4	0.32	0.38
5	0.32	0.38
8	0.33	0.37
10	0.34	0.36
15	0.36	0.34
20	0.38	0.32
25	0.39	0.31
30	0.40	0.30
40	0.42	0.28
50	0.44	0.26
60	0.46	0.24
70	0.48	0.22
80	0.50	0.20
90	0.53	0.17
120	0.60	0.10
150	0.70	0.00

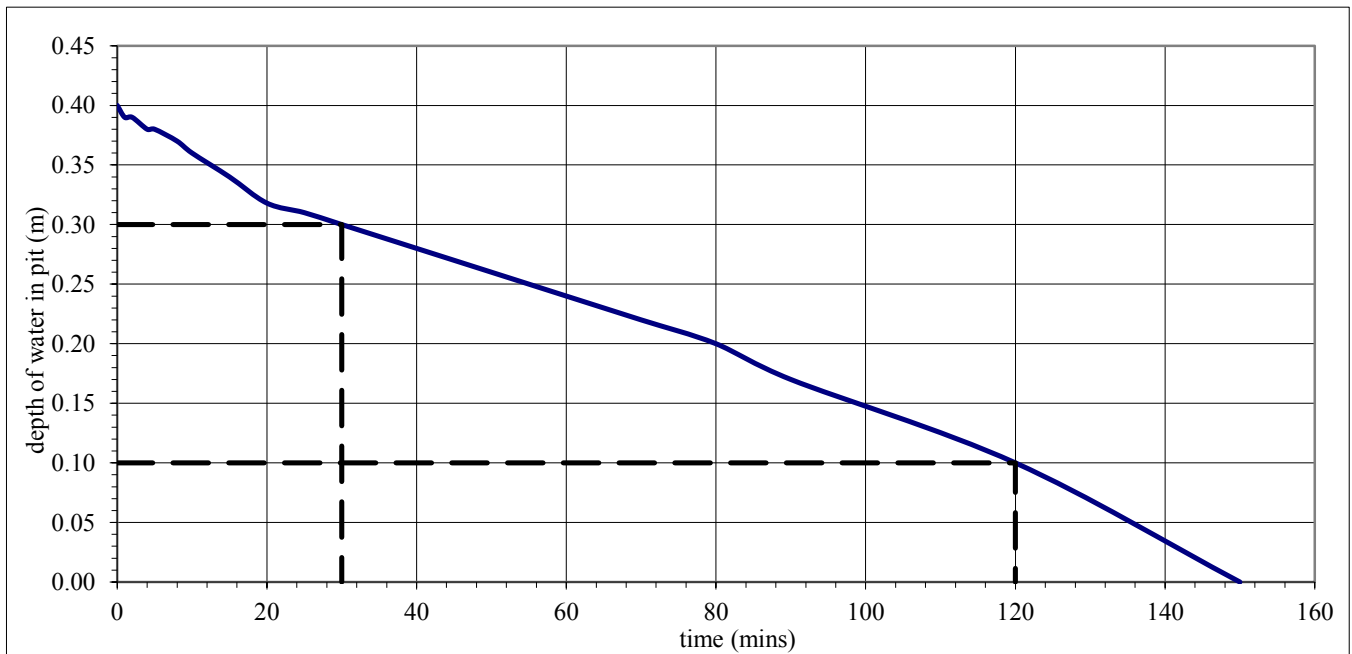
From graph below:

test start - 75% depth at
 0.3 m water depth
 time is 30.0 minutes

test end - 25% depth at
 0.1 m water depth
 time is 120.0 minutes

test infiltration rate (q) = 0.072 m/h

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)
30	0.40	0.3	90	0.22	2.05	1.2E-03	0.072
120	0.60	0.1					



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP06 Test 1
Test Date: 20 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.70	1.50
test pit base dimensions	0.70	1.00
test pit depth (m)	1.30	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.36	0.94
1	0.39	0.91
2	0.42	0.88
3	0.46	0.84
4	0.48	0.82
5	0.51	0.79
6	0.53	0.77
7	0.55	0.75
8	0.57	0.73
9	0.59	0.71
10	0.61	0.69
15	0.73	0.57
20	0.84	0.46
25	0.94	0.36
30	1.04	0.26
40	1.10	0.20

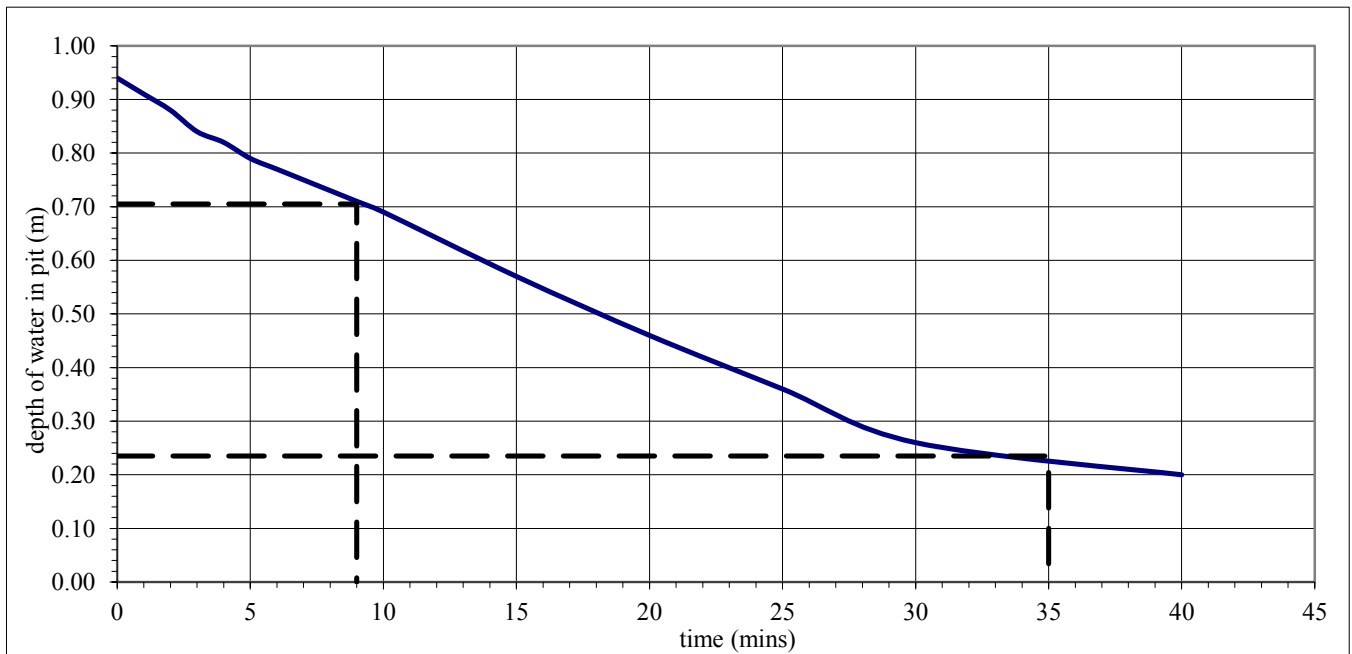
From graph below:

test start - 75% depth at
0.705 m water depth
time is 9.0 minutes

test end - 25% depth at
0.235 m water depth
time is 35.0 minutes

test infiltration rate (q) = 0.373 m/h

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)
9	0.60	0.705	26	0.39	2.40	6.2E-03	0.373
35	1.07	0.235					



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP06 Test 2
Test Date: 20 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.70	1.50
test pit base dimensions	0.70	1.00
test pit depth (m)	1.30	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.30	1.00
1	0.33	0.97
2	0.36	0.94
3	0.39	0.91
4	0.41	0.89
5	0.43	0.87
6	0.45	0.85
7	0.47	0.83
8	0.49	0.81
9	0.51	0.79
10	0.53	0.77
15	0.64	0.66
20	0.74	0.56
25	0.83	0.47
30	0.92	0.38
40	1.09	0.21
50	1.10	0.20

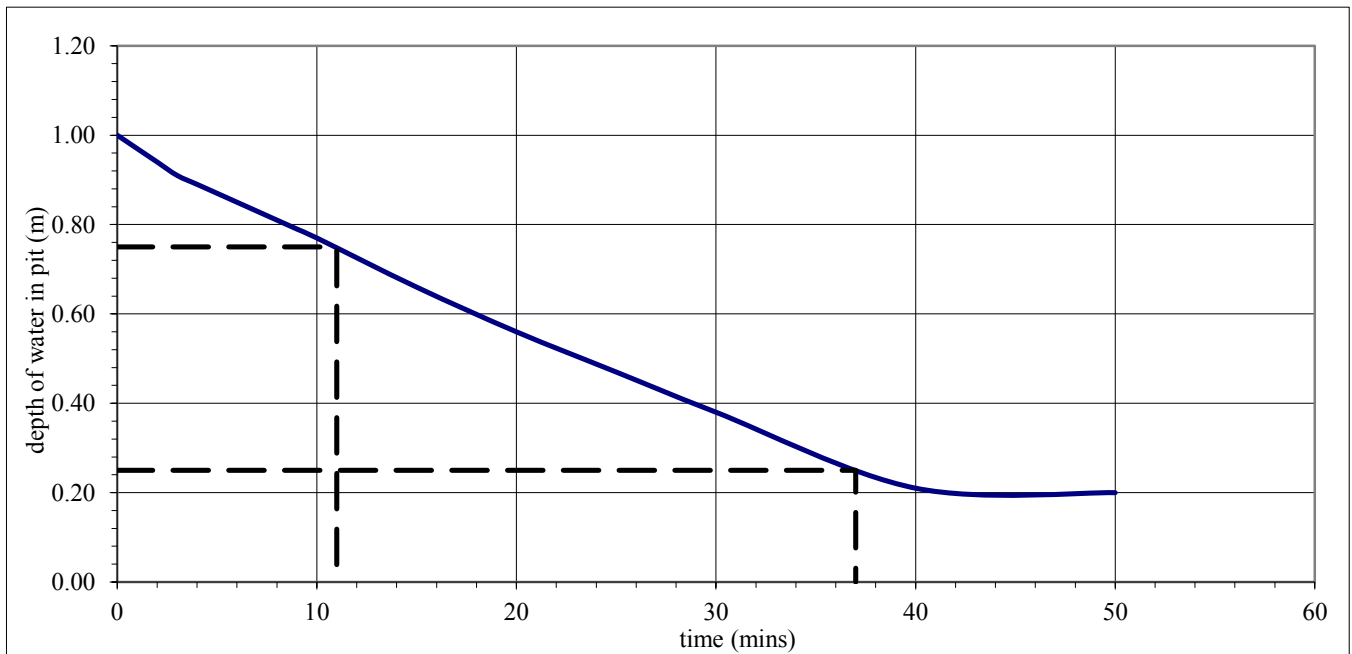
From graph below:

test start - 75% depth at
 0.75 m water depth
 time is 11.0 minutes

test end - 25% depth at
 0.25 m water depth
 time is 37.0 minutes

test infiltration rate (q) = 0.382 m/h

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)
11	0.55	0.75	26	0.42	2.52	6.4E-03	0.382
37	1.05	0.25					



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP09
Test Date: 17 April 2023



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

	width (m)	length (m)
test pit top dimensions	0.50	1.50
test pit base dimensions	0.50	1.30
test pit depth (m)	1.30	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.31	0.99
1	0.31	0.99
2	0.32	0.98
4	0.32	0.98
5	0.32	0.98
6	0.32	0.98
7	0.33	0.97
8	0.33	0.97
9	0.33	0.97
10	0.33	0.97
15	0.34	0.96
20	0.34	0.96
25	0.35	0.95
30	0.35	0.95
40	0.36	0.94
50	0.37	0.93
60	0.38	0.92
90	0.40	0.90
120	0.42	0.88

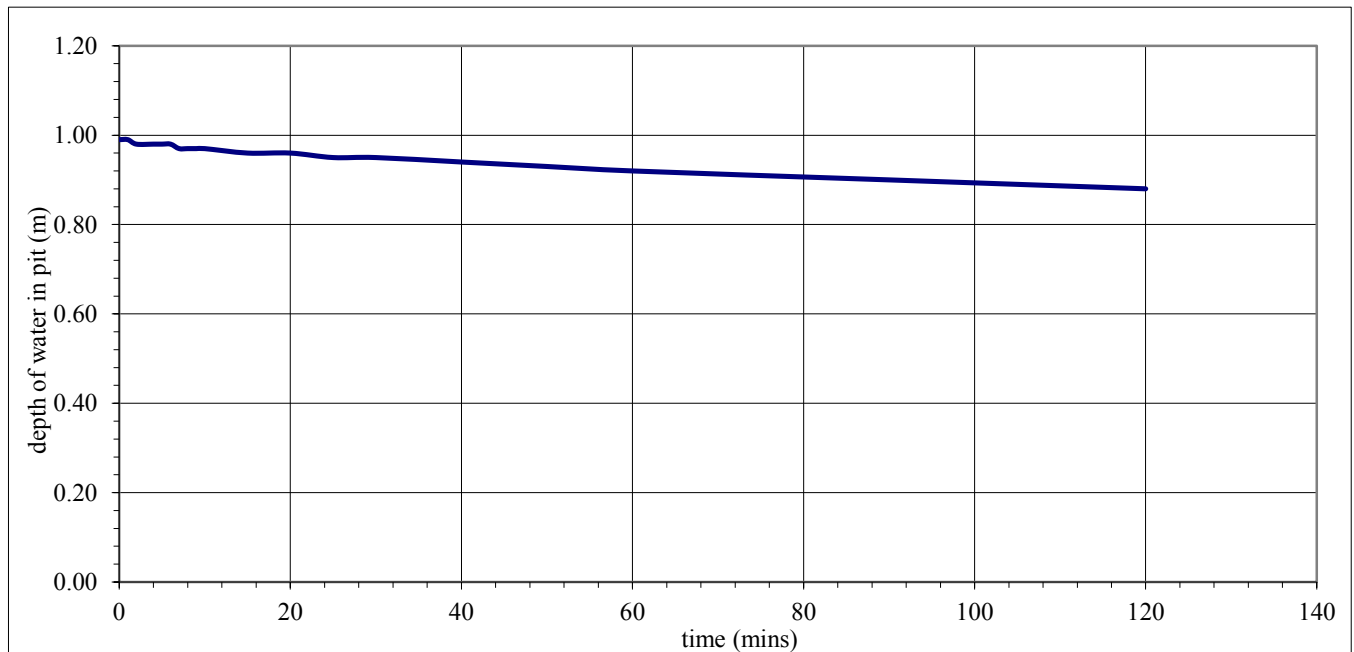
From graph below:

test start - 75% depth at
0.7425 m water depth
time is not determined

test end - 25% depth at
0.2475 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)



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP10
Test Date: 28 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.55	2.50
test pit base dimensions	0.55	2.00
test pit depth (m)	1.30	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.46	0.84
1	0.47	0.83
2	0.47	0.83
4	0.47	0.83
5	0.47	0.83
6	0.47	0.83
8	0.47	0.83
10	0.47	0.83
15	0.48	0.82
20	0.48	0.82
25	0.48	0.82
30	0.48	0.82
40	0.48	0.82
50	0.48	0.82
60	0.48	0.82
70	0.48	0.82
80	0.48	0.82
90	0.48	0.82
120	0.48	0.82

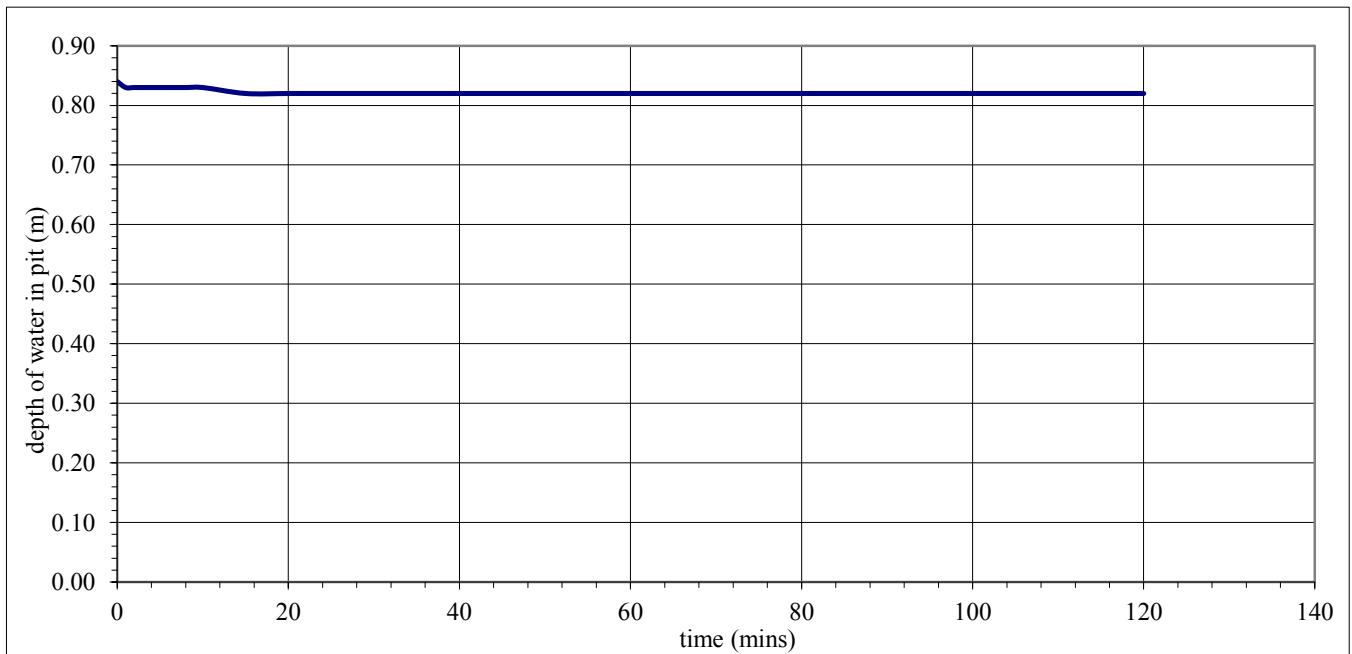
From graph below:

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

test end - 25% depth at
0.21 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)



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP11
Test Date: 22 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.55	2.10
test pit base dimensions	0.55	1.50
test pit depth (m)	1.40	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.41	0.99
1	0.41	0.99
2	0.41	0.99
3	0.41	0.99
4	0.41	0.99
5	0.42	0.98
6	0.42	0.98
7	0.42	0.98
8	0.42	0.98
10	0.42	0.98
15	0.42	0.98
20	0.43	0.97
25	0.43	0.97
30	0.43	0.97
40	0.44	0.96
50	0.44	0.96
60	0.44	0.96
70	0.45	0.95
90	0.46	0.94

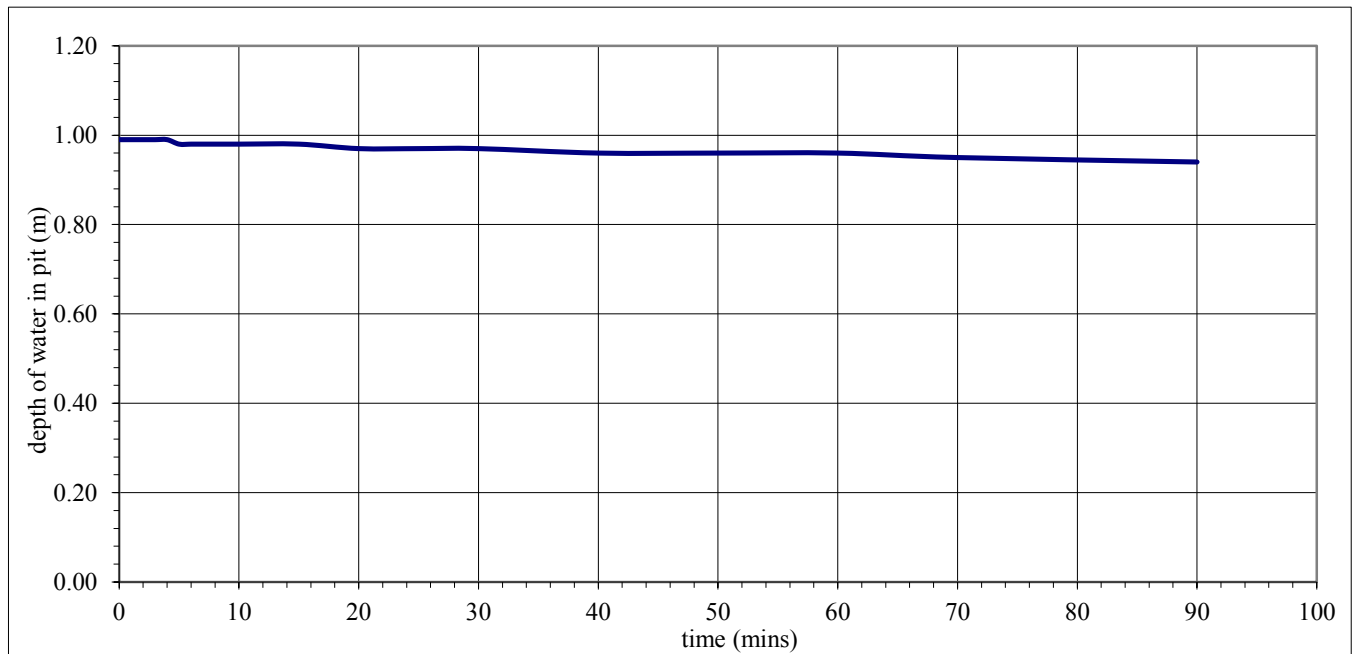
From graph below:

test start - 75% depth at
0.7425 m water depth
time is not determined

test end - 25% depth at
0.2475 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)



Soakaway Infiltration Test

Project No.: 23-0237
Site: Laurclavagh
Test Location: ITP13
Test Date: 24 March 2023



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

	width (m)	length (m)
test pit top dimensions	0.50	2.10
test pit base dimensions	0.50	2.00
test pit depth (m)	1.30	

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.40	0.90
1	0.40	0.90
2	0.41	0.89
3	0.41	0.89
4	0.42	0.88
5	0.42	0.88
6	0.42	0.88
7	0.43	0.87
8	0.43	0.87
9	0.43	0.87
10	0.44	0.86
15	0.45	0.85
20	0.46	0.84
25	0.47	0.83
30	0.48	0.82
40	0.50	0.80
50	0.51	0.79
60	0.52	0.78
90	0.54	0.76

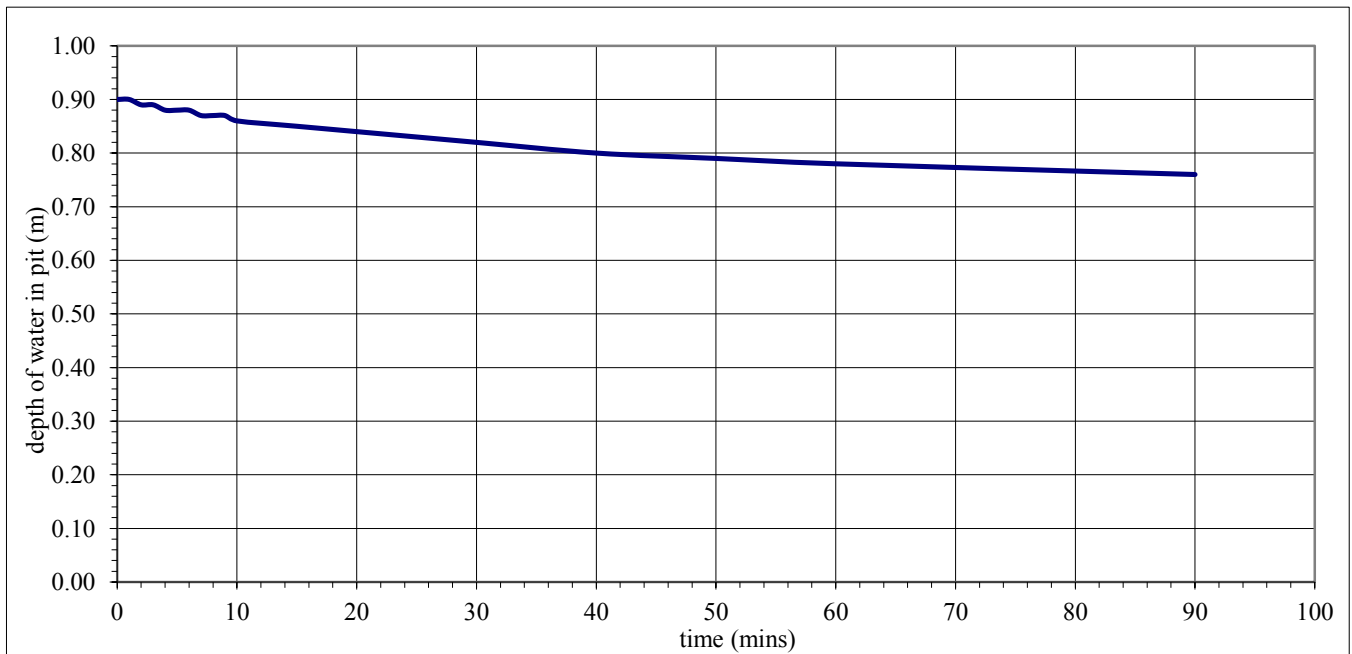
From graph below:

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

test end - 25% depth at
 0.225 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)





CAUSEWAY
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APPENDIX G

INDIRECT IN-SITU CBR TEST RESULTS



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

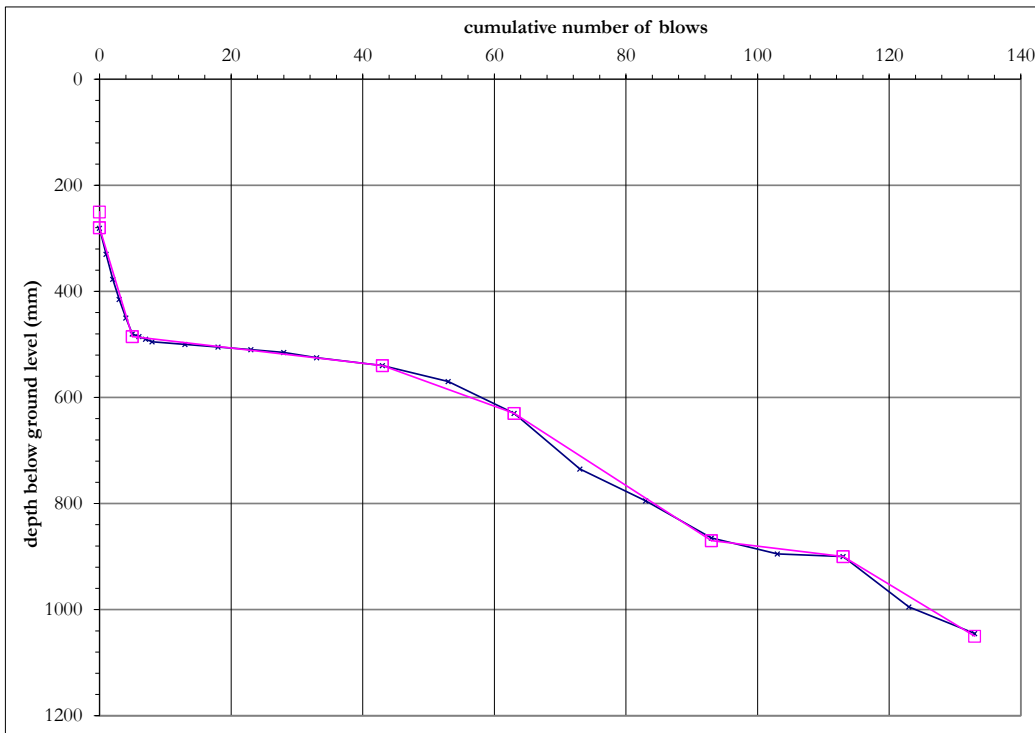


Test Number	DCP01
Depth bgl (m)	0.25

Date Tested	14/03/2023
Weather	Dry and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP-7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
280		
280	41	6
485		
485	1.4	>100
540		
540	4.5	62
630		
630	8	34
870		
870	1.5	>100
900		
900	7.5	36
1050		

CBR Range	Min: 6	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

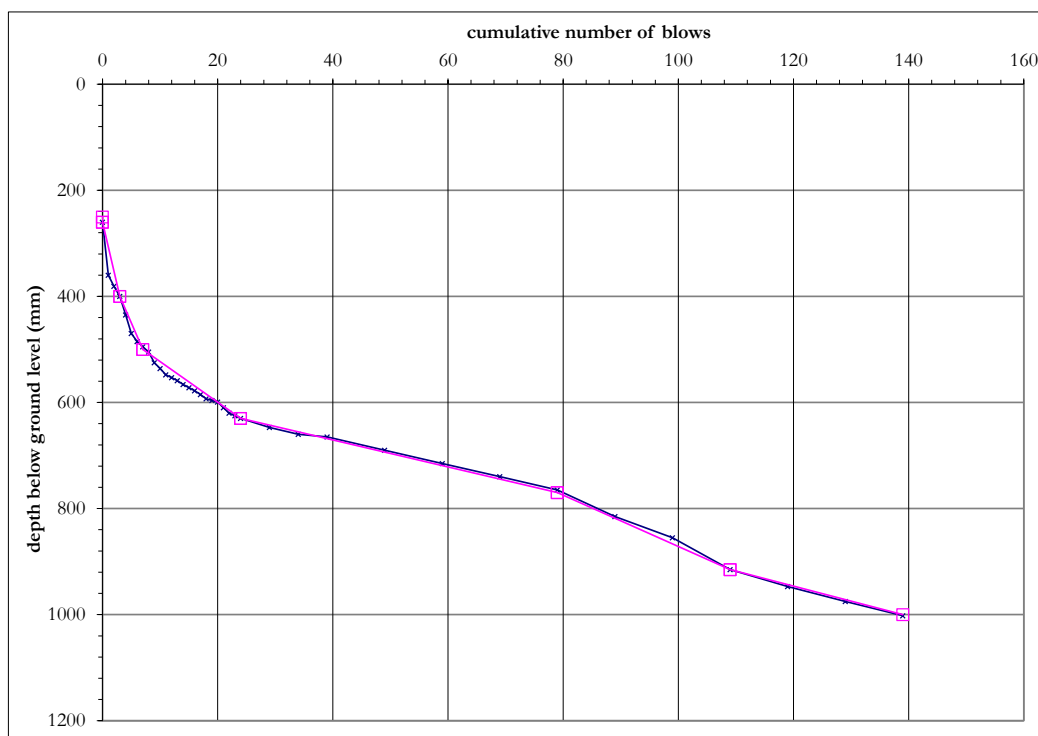


Test Number	DCP05
Depth bgl (m)	0.25

Date Tested	14/03/2023
Weather	Dry and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
260	N/A	N/A
260	47	5.2
400	25	10
500	7.6	35
630	2.5	>100
770	4.8	57
915	2.8	100

CBR Range	Min: 5.2	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

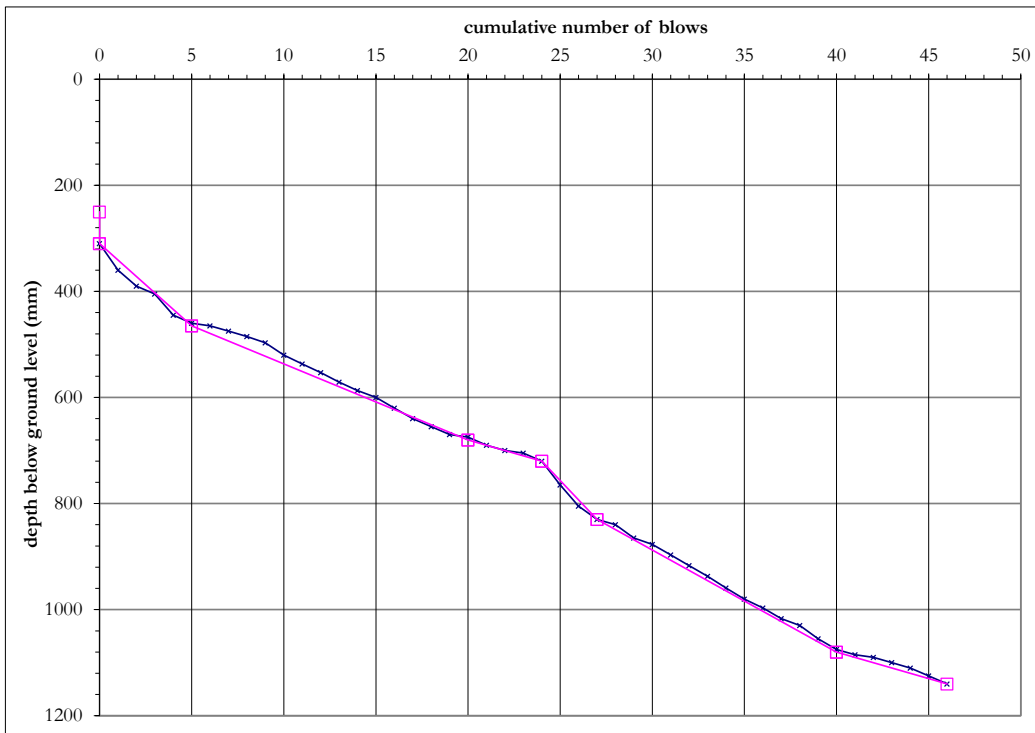


Test Number	DCP08
Depth bgl (m)	0.25

Date Tested	14/03/2023
Weather	Dry and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
310		
310	31	8
465		
465	14	18
680		
680	10	26
720		
720	37	6.7
830		
830	19	13
1080		
1080	10	26
1140		

CBR Range	Min: 6.7	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: 26	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

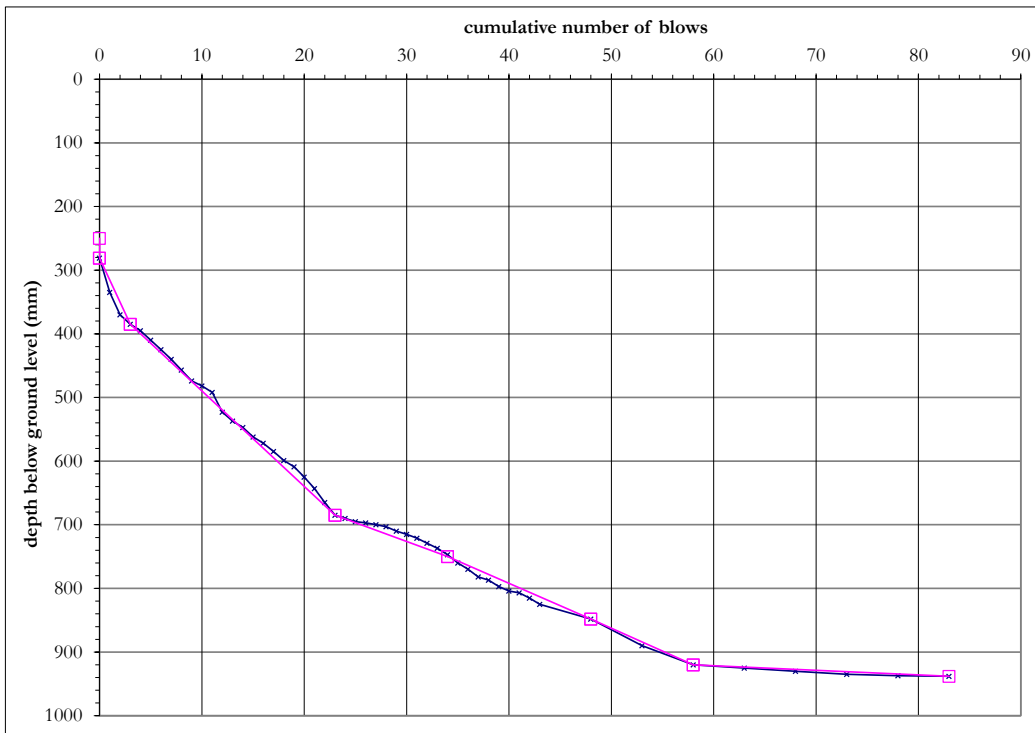


Test Number	DCP13A
Depth bgl (m)	0.25

Date Tested	14/03/2023
Weather	Dry and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
281		
281	35	7.1
385		
385	15	17
685		
685	5.9	46
750		
750	7	39
848		
848	7.2	37
920		
920	0.7	>100
938		

CBR Range	Min: 7.1 Max: >100	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
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Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

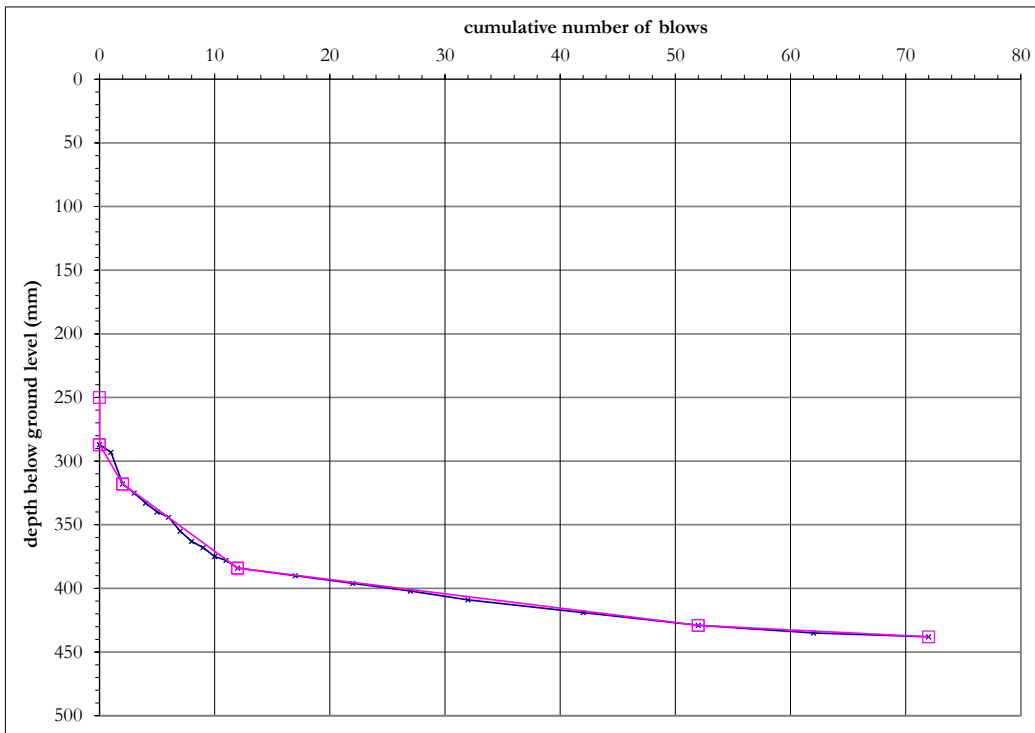


Test Number	DCP16A
Depth bgl (m)	0.25

Date Tested	15/03/2023
Weather	Wet and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP-7 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
287		
287	16	17
318		
318	6.6	41
384		
384	1.1	>100
429		
429	0.5	>100
438		

CBR Range	Min: 17	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

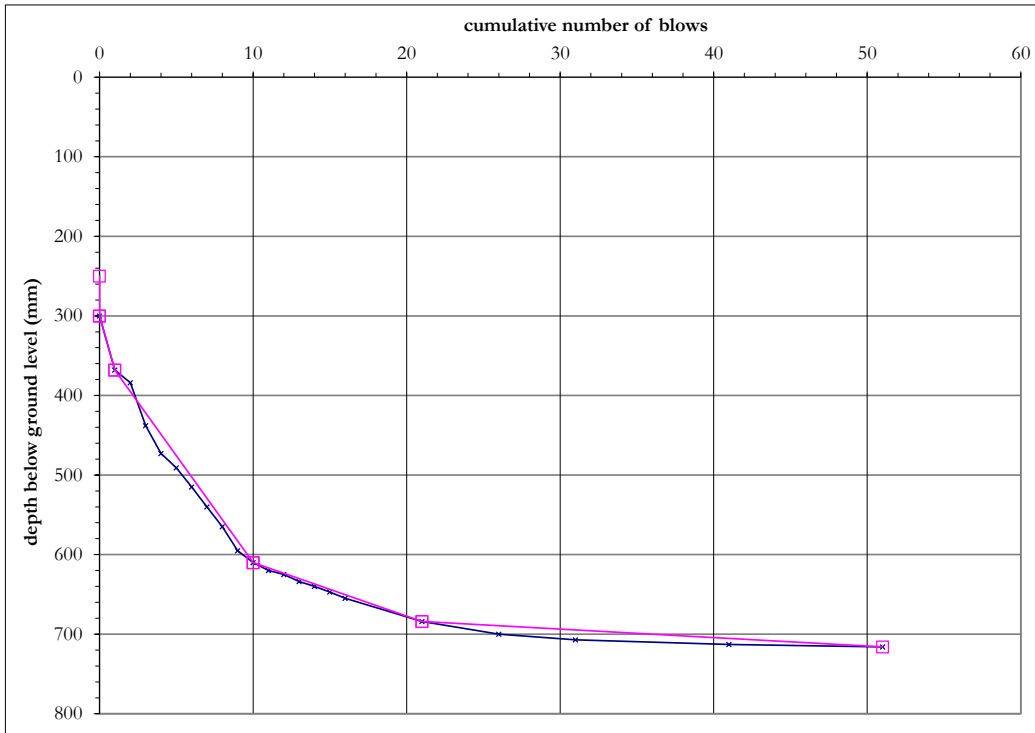


Test Number	DCP18
Depth bgl (m)	0.25

Date Tested	15/03/2023
Weather	Wet and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
300	N/A	N/A
300	68	3.5
368	68	3.5
368	27	9.3
610	27	9.3
610	6.7	40
684	6.7	40
684	1.1	>100
716	1.1	>100

CBR Range	Min: 3.5	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

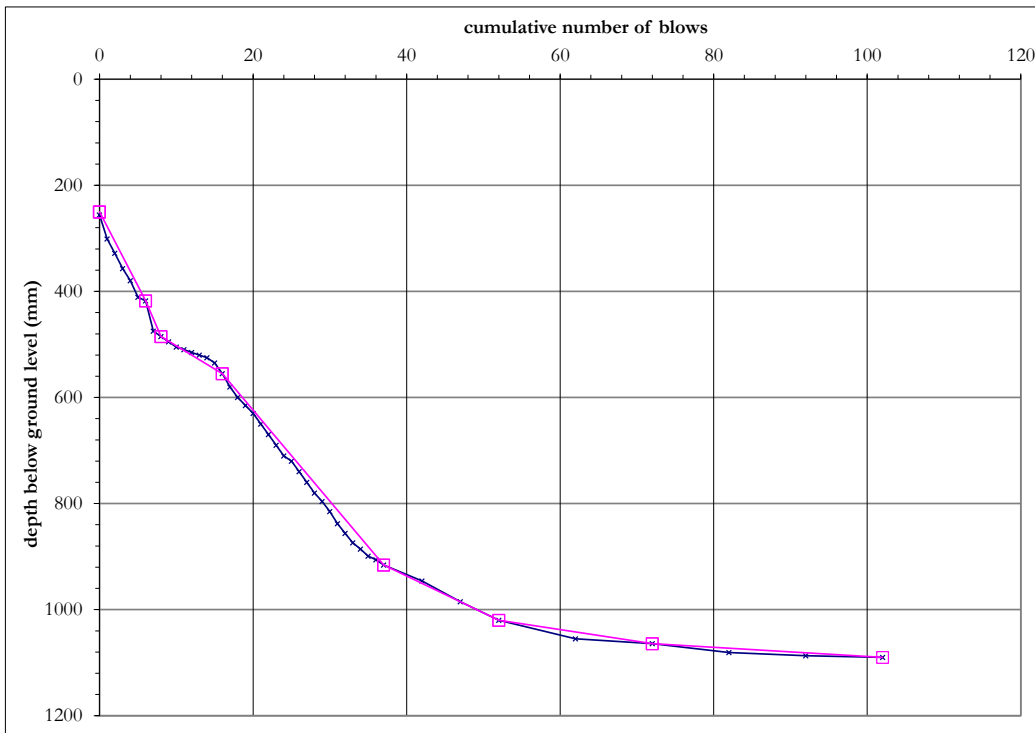


Test Number	DCP23
Depth bgl (m)	0.25

Date Tested	15/03/2023
Weather	Wet and windy

Test conducted in accordance with Documented In-House Technical Procedure IMS TP-7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
418	28	8.9
485	34	7.4
555	8.8	30
916	17	15
1020	6.9	39
1064	2.2	>100
1090	0.9	>100

CBR Range	Min: 7.4 Max: >100	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
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Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

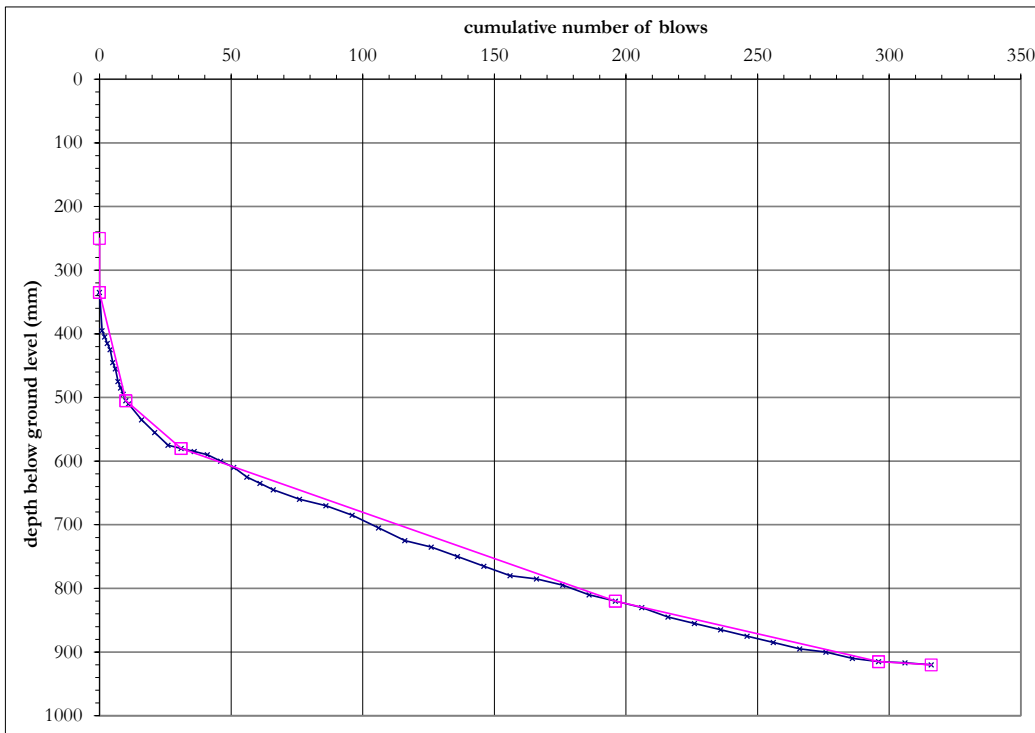


Test Number	DCP27
Depth bgl (m)	0.25

Date Tested	15/03/2023
Weather	Wet

Test conducted in accordance with Documented In-House Technical Procedure IMS TP-7 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
335		
335	17	15
505		
505	3.6	79
580		
580	1.5	>100
820		
820	1	>100
915		
915	0.3	>100
920		

CBR Range	Min: 15	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

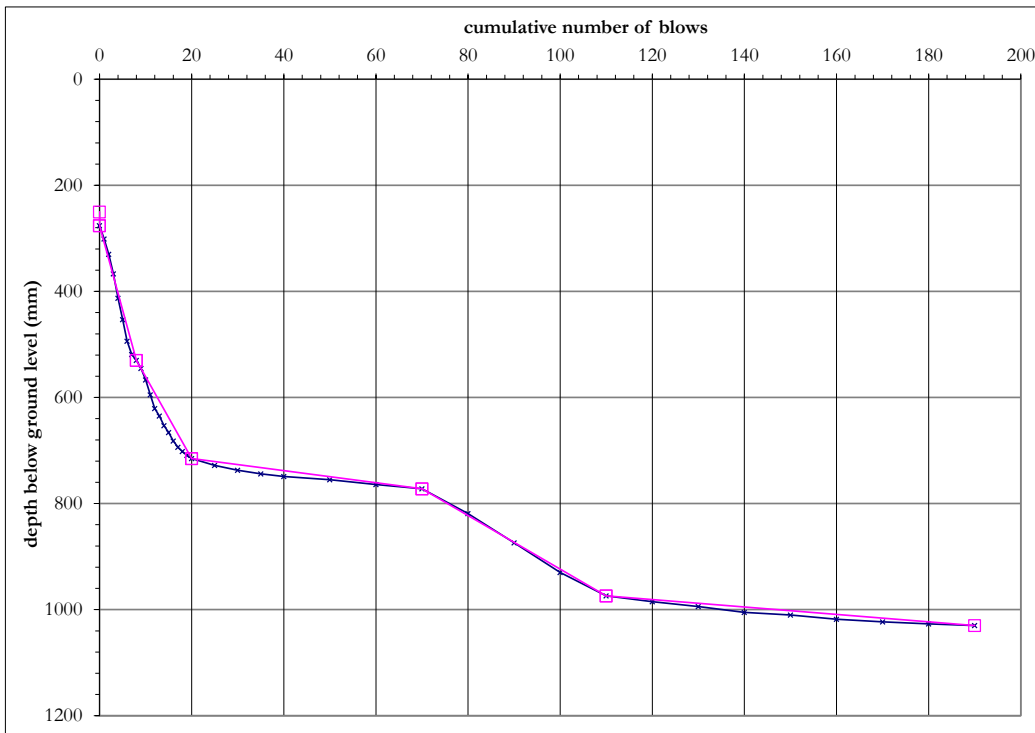


Test Number	DCP29
Depth bgl (m)	0.25

Date Tested	15/03/2023
Weather	Wet

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
276	N/A	N/A
276	32	7.8
530	15	17
530	15	17
715	1.1	>100
715	1.1	>100
772	5.1	55
772	5.1	55
974	0.7	>100
974	0.7	>100
1030	0.7	>100
1030	0.7	>100

CBR Range	Min: 7.8	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

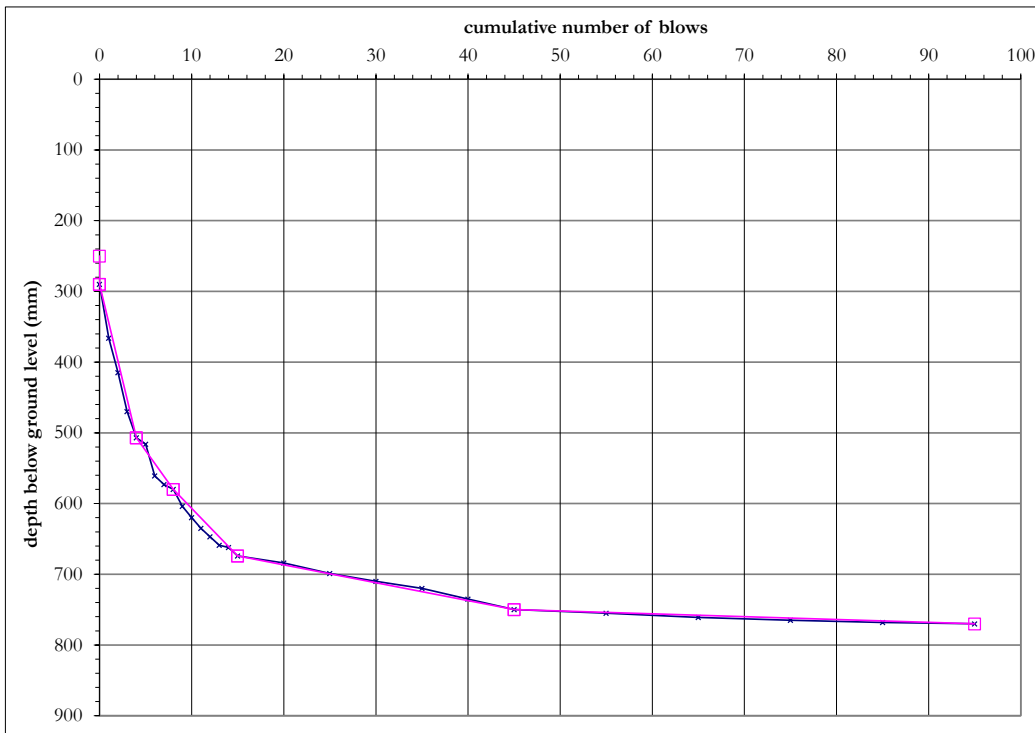


Test Number	DCP32A
Depth bgl (m)	0.25

Date Tested	15/03/2023
Weather	Wet

Test conducted in accordance with Documented In-House Technical Procedure IMS TP7-4 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
290	N/A	N/A
290	54	4.4
507	54	4.4
507	18	14
580	18	14
580	13	19
674	13	19
674	2.5	>100
750	2.5	>100
750	0.4	>100
770	0.4	>100

CBR Range	Min: 4.4 Max: >100	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
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Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023



Dynamic Cone Penetrometer (DCP) test results and estimated CBR

Project Number	23-0237
Project Name	Laurclavagh
Site Location	

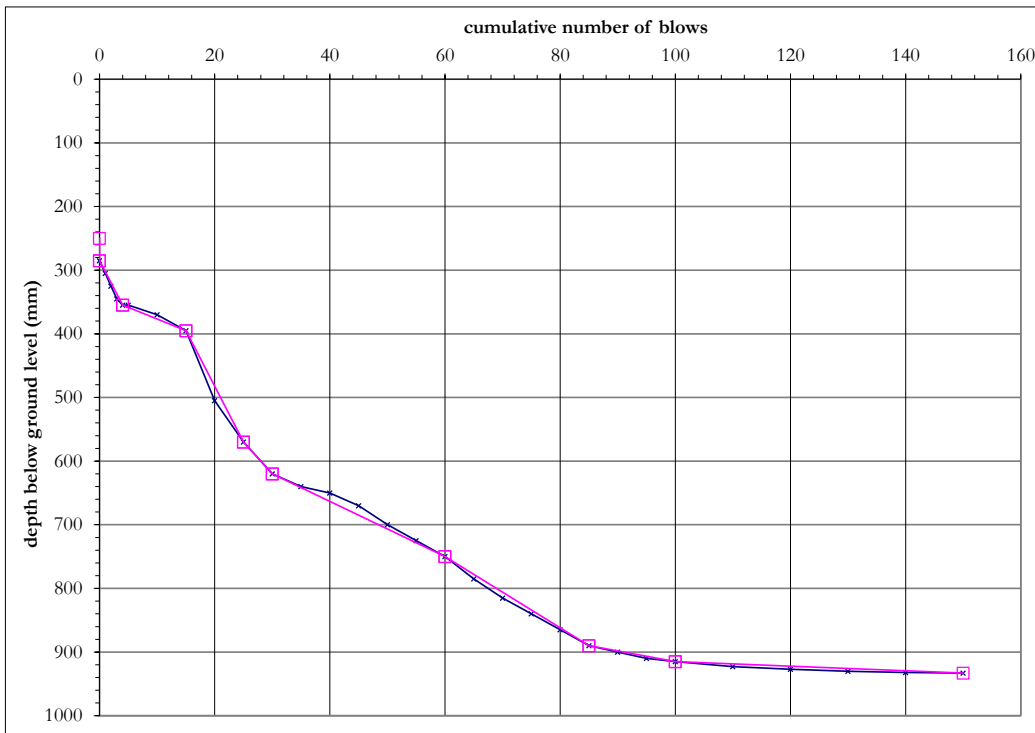


Test Number	DCP37
Depth bgl (m)	0.25

Date Tested	16/03/2023
Weather	Wet

Test conducted in accordance with Documented In-House Technical Procedure IMS TP-7 and DMRB CS 229 Rev 0
 CBR calculated using the TRRL CBR DCP relationship: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{mm/blow})$ in accordance with DMRB CS 229 Rev 0

Surface preparation	Description of surface material at test depth
N/A	CLAY



top / base of layer (mm)	mm/blow	CBR (%)
250	N/A	N/A
285		
285	18	15
355		
355	3.6	77
395		
395	18	15
570		
570	10	26
620		
620	4.3	64
750		
750	5.6	49
890		
890	1.7	>100
915		
915	0.4	>100
933		

CBR Range	Min: 15	The self-weight penetration at the start of the test (shown above) has not been included in the minimum and maximum values shown to the left. The selection of layers is based on visual interpretation of the data. The insitu DCP reading (mm/blow) and CBR values are valid at the time of testing; variation in moisture content or other factors may affect the insitu value. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This report should not be reproduced except in full without the written approval of the laboratory.
	Max: >100	

Deviation(s) from standard procedure	None
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Observations and comments	
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Approved Name and Appointment		
Darren O'Mahony Director		March 2023





CAUSEWAY
— GEOTECH

APPENDIX H
GEOTECHNICAL LABORATORY TEST RESULTS



**SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT**

19 May 2023

Project Name:	Laurclavagh WF; Ground Investigation
Project No.:	23-0237
Client:	Turnkey Developments
Engineer:	Enerco Energy

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 10/05/2023 and 19/05/2023.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.



Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd



Project Name: Laurclavagh WF; Ground Investigation

Report Reference: Schedule 1

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Moisture Content of Soil	BS 1377-2: 1990: Cl 3.2	20
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	20
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	20
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	18

SUB-CONTRACTED TESTS

In agreement with Client, the following tests were conducted by an approved sub-contractor. All sub-contracting laboratories used are UKAS accredited.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL – Subcontracted to Eurofins Chemtest Ltd (<i>UKAS 2183</i>)	pH Value of Soil		15
SOIL – Subcontracted to Eurofins Chemtest Ltd (<i>UKAS 2183</i>)	Sulphate Content water extract		15



Summary of Classification Test Results

Project No. 23-0237	Project Name Laurclavagh
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Hole No.	Sample				Specimen Description	Density		w	Passing 425µm	LL	PL	PI	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type		bulk	dry							
						Mg/m3		%	%	%	%	%		
ITP01	3	2.00		B	Brown sandy slightly gravelly silty CLAY.			8.7	71	20 -1pt	10	10		CL
ITP02	1	0.60		B	Brown sandy slightly gravelly silty CLAY.			8.3	57	21 -1pt	12	9		CL
ITP06	2	1.20		B	Brown sandy slightly gravelly clayey SILT.			31	94	58 -1pt	33	25		MH
ITP07	2	1.50		B	Brown sandy slightly gravelly silty CLAY.			12	56	24 -1pt	15	9		CL
ITP08	2	1.50		B	Grey gravelly slightly silty fine to coarse SAND.			8.4	32	24 -1pt	17	7		CL
ITP09	2	1.00		B	Greyish brown sandy slightly gravelly silty CLAY.			8.6	57	20 -1pt	12	8		CL
ITP09	4	3.00		B	Brown sandy gravelly clayey SILT.			11	58	28 -1pt	23	5		ML
ITP10	1	0.70		B	Greyish brown sandy slightly gravelly silty CLAY.			10	65	20 -1pt	14	6		ML/CL
ITP10	3	2.50		B	Greyish brown sandy slightly gravelly silty CLAY.			8.4	55	20 -1pt	11	9		CL
ITP11	2	1.00		B	Greyish brown sandy slightly gravelly silty CLAY.			10	60	22 -1pt	13	9		CL
ITP11	4	2.20		B	Greyish brown slightly gravelly silty fine to coarse SAND.			13	67	20 -1pt	15	5		ML
ITP13	3	2.00		B	Greyish brown sandy slightly gravelly silty CLAY.			9.2	58	20 -1pt	12	8		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key Density test Liquid Limit Particle density Linear measurement unless : 4pt cone unless : sp - small pycnometer wd - water displacement cas - Casagrande method gj - gas jar wi - immersion in water 1pt - single point test	Date Printed <p style="text-align: center;">19/05/2023</p>	Approved By <p style="text-align: center;">Stephen Watson</p>	 <p style="margin-top: 5px;">10122</p>
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Summary of Classification Test Results

Project No. 23-0237	Project Name Laurclavagh
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Hole No.	Sample				Specimen Description	Density		w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Casagrande Classification
	Ref	Top	Base	Type		bulk Mg/m3	dry							
ITP13	4	3.00		B	Greyish brown sandy slightly gravelly silty CLAY.			13	49	21 -1pt	13	8		CL
TP01	4	3.00		B	Greyish brown sandy slightly gravelly clayey SILT.			10	63	20 -1pt	15	5		ML
TP02	2	1.20		B	Greyish brown gravelly slightly silty fine to coarse SAND.			11	39	38 -1pt	27	11		MI
TP03	2	1.30		B	Greyish brown sandy slightly gravelly clayey SILT.			11	57	20 -1pt	15	5		ML
TP06	2	1.50		B	Greyish brown sandy slightly gravelly silty CLAY.			9.3	69	20 -1pt	12	8		CL
TP06	4	3.30		B	Greyish brown sandy slightly gravelly silty CLAY.			7.7	71	20 -1pt	12	8		CL
TP07	1	0.50		B	Greyish brown sandy slightly gravelly clayey SILT.			39	66	51 -1pt	34	17		MH
TP08	2	1.60		B	Greyish brown sandy slightly gravelly silty CLAY.			9.3	61	20 -1pt	13	7		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise
LAB 01R Version 6

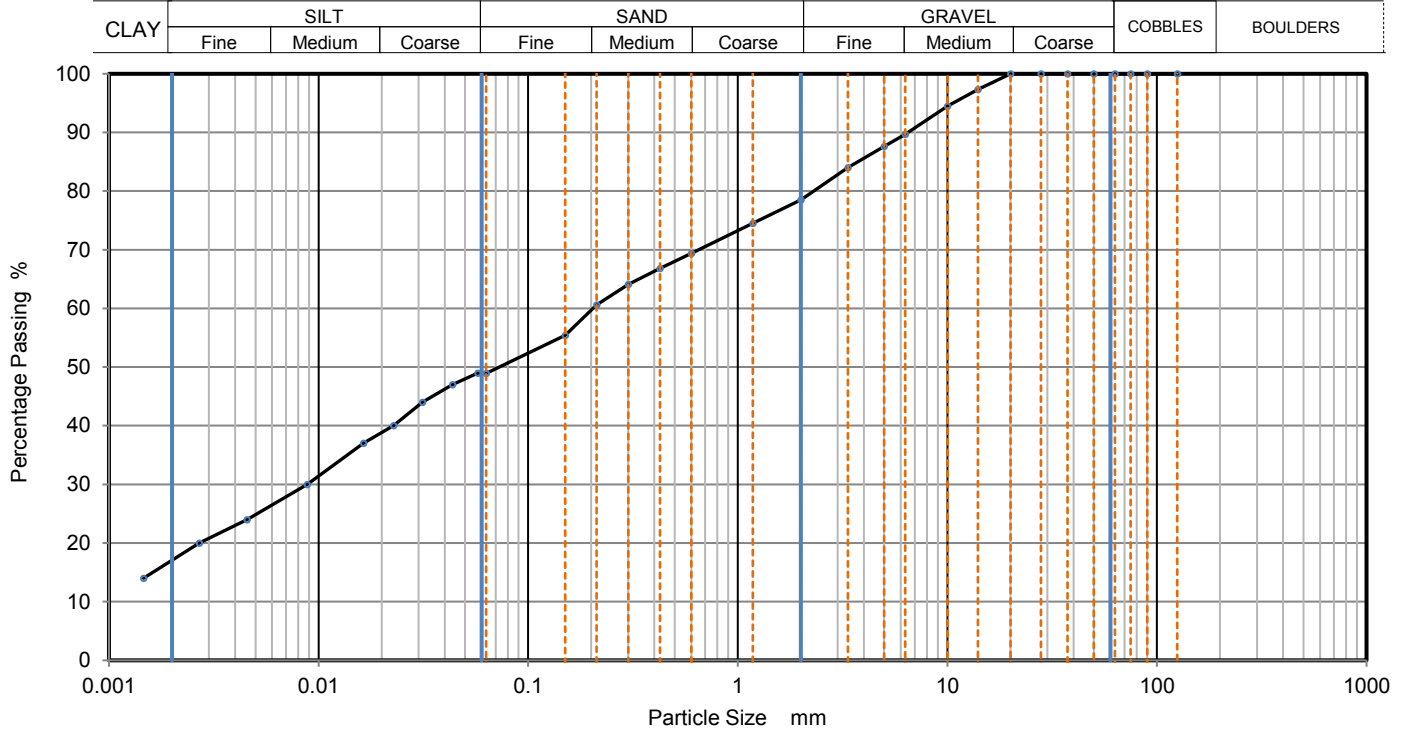
Key Density test Liquid Limit Particle density Linear measurement unless : 4pt cone unless : sp - small pycnometer wd - water displacement cas - Casagrande method gj - gas jar wi - immersion in water 1pt - single point test	Date Printed <p style="text-align: center;">19/05/2023</p>	Approved By <p style="text-align: center;">Stephen Watson</p>	 10122
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PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP01
Sample No.	3
Sample Depth (m)	Top 2.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051017

Site Name	Laurclavagh		
Specimen Description	Brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	2 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05761	49
90	100	0.04357	47
75	100	0.03131	44
63	100	0.02284	40
50	100	0.01639	37
37.5	100	0.00883	30
28	100	0.00456	24
20	100	0.00270	20
14	97	0.00146	14
10	95		
6.3	90		
5	88		
3.35	84		
2	79		
1.18	75		
0.6	69	Particle density (assumed) 2.65 Mg/m3	
0.425	67		
0.3	64		
0.212	61		
0.15	55		
0.063	49		

Dry Mass of sample, g 504

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	21.5
Sand	29.6
Silt	32.0
Clay	16.9

Grading Analysis		
D100	mm	
D60	mm	0.204
D30	mm	0.00856
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

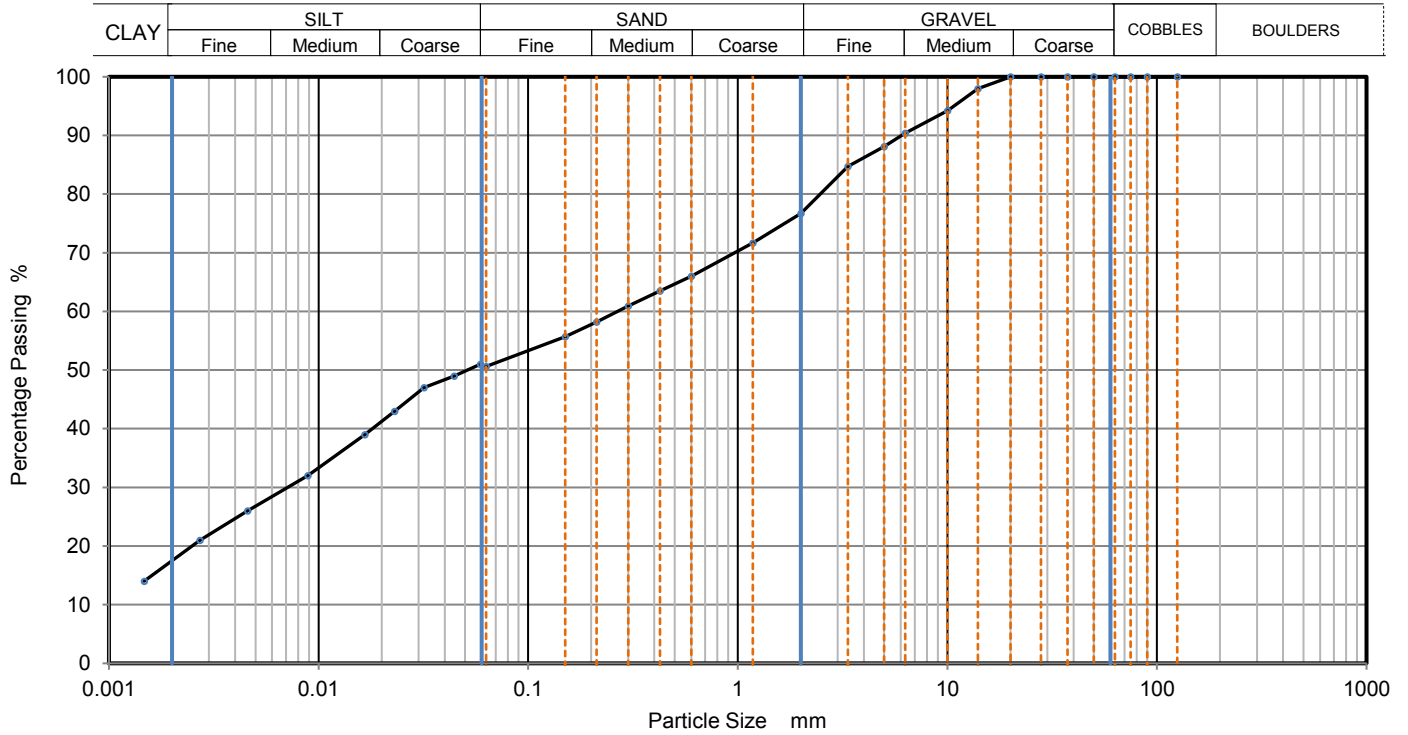
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP02
Sample No.	1
Sample Depth (m)	Top 0.60
	Base
Specimen Reference	6
Specimen Depth	0.6 m
Sample Type	B
KeyLAB ID	Caus2023051018



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05908	51
90	100	0.04428	49
75	100	0.03181	47
63	100	0.02301	43
50	100	0.01663	39
37.5	100	0.00889	32
28	100	0.00459	26
20	100	0.00271	21
14	98	0.00147	14
10	94		
6.3	90		
5	88		
3.35	85		
2	77		
1.18	72		
0.6	66	Particle density (assumed) 2.65 Mg/m ³	
0.425	64		
0.3	61		
0.212	58		
0.15	56		
0.063	51		

Dry Mass of sample, g 535

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.3
Sand	26.2
Silt	33.0
Clay	17.5

Grading Analysis		
D100	mm	
D60	mm	0.267
D30	mm	0.00693
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

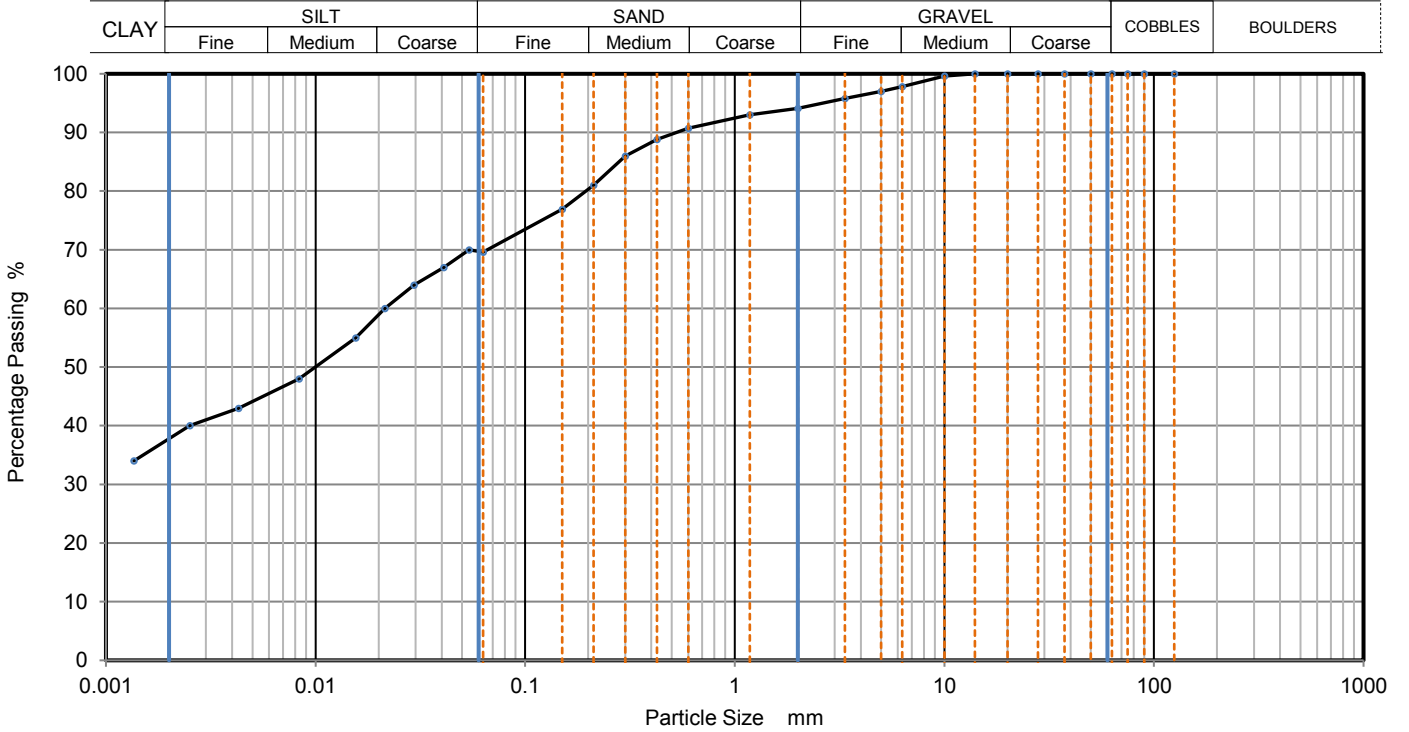




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP06
Sample No.	2
Sample Depth (m)	Top 1.20
	Base
Sample Type	B
KeyLAB ID	Caus2023051021

Site Name	Laurclavagh		
Specimen Description	Brown sandy slightly gravelly clayey SILT.		
Specimen Reference	6	Specimen Depth	1.2 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05404	70
90	100	0.04096	67
75	100	0.02950	64
63	100	0.02142	60
50	100	0.01553	55
37.5	100	0.00834	48
28	100	0.00429	43
20	100	0.00251	40
14	100	0.00136	34
10	100		
6.3	98		
5	97		
3.35	96		
2	94		
1.18	93		
0.6	91		
0.425	89	Particle density (assumed)	
0.3	86	2.65	Mg/m3
0.212	81		
0.15	77		
0.063	70		

Dry Mass of sample, g 469

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	5.9
Sand	24.6
Silt	31.8
Clay	37.7

Grading Analysis		
D100	mm	
D60	mm	0.022
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

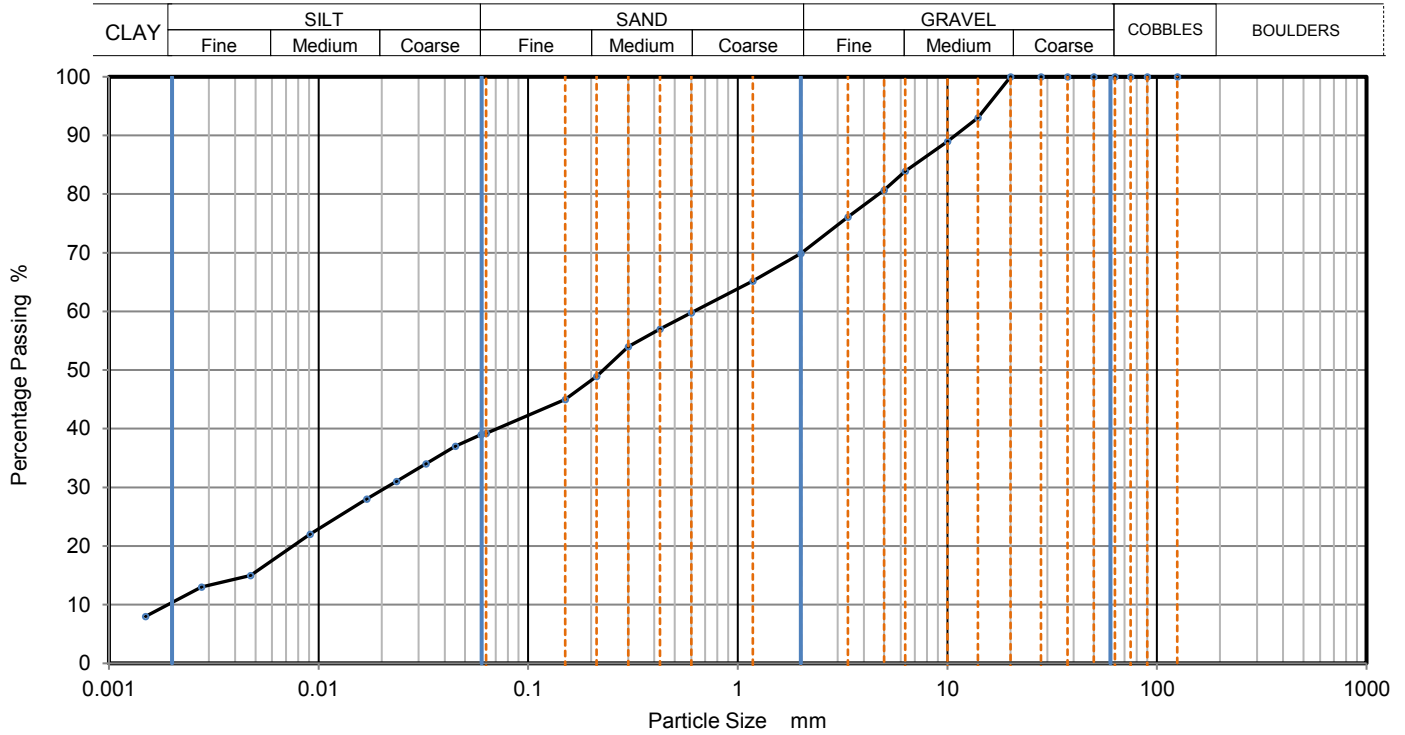
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP07
Sample No.	2
Sample Depth (m)	Top 1.50
	Base
Sample Type	B
KeyLAB ID	Caus2023051023



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05956	39
90	100	0.04499	37
75	100	0.03255	34
63	100	0.02352	31
50	100	0.01698	28
37.5	100	0.00912	22
28	100	0.00473	15
20	100	0.00276	13
14	93	0.00149	8
10	89		
6.3	84		
5	81		
3.35	76		
2	70		
1.18	65		
0.6	60		
0.425	57	Particle density (assumed)	
0.3	54	2.65	Mg/m3
0.212	49		
0.15	45		
0.063	39		

Dry Mass of sample, g 540

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.1
Sand	30.8
Silt	28.4
Clay	10.7

Grading Analysis	
D100	mm
D60	mm 0.619
D30	mm 0.0213
D10	mm 0.00184
Uniformity Coefficient	340
Curvature Coefficient	0.4

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

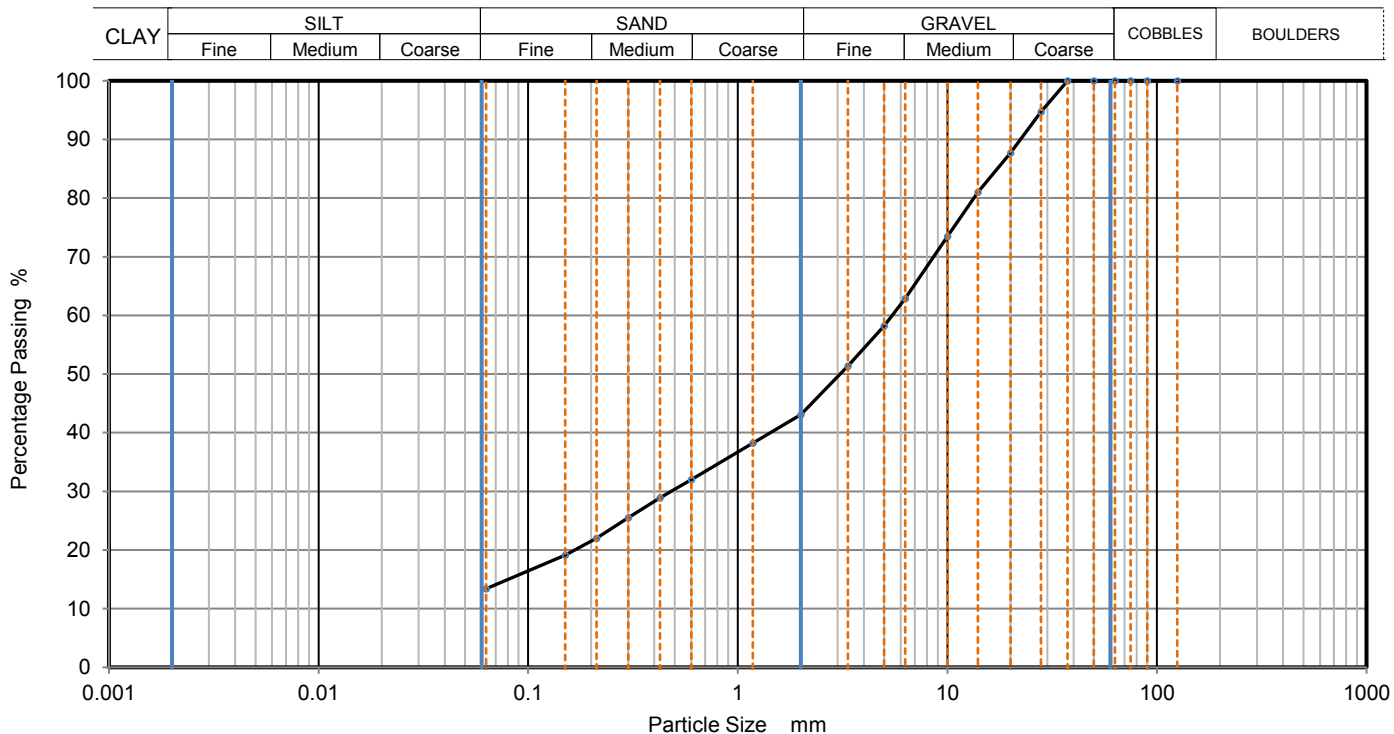




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP08
Sample No.	2
Sample Depth (m)	Top 1.50
	Base
Sample Type	B
KeyLAB ID	Caus2023051025

Site Name	Laurclavagh		
Specimen Description	Grey gravelly silty fine to coarse SAND.		
Specimen Reference	6	Specimen Depth	1.5 m
Test Method	BS1377:Part 2:1990, clause 9.2		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	88		
14	81		
10	74		
6.3	63		
5	58		
3.35	51		
2	43		
1.18	38		
0.6	32		
0.425	29		
0.3	26		
0.212	22		
0.15	19		
0.063	13		

Dry Mass of sample, g 4043

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	56.9
Sand	29.7
Fines <0.063mm	13.0

Grading Analysis		
D100	mm	
D60	mm	5.48
D30	mm	0.481
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

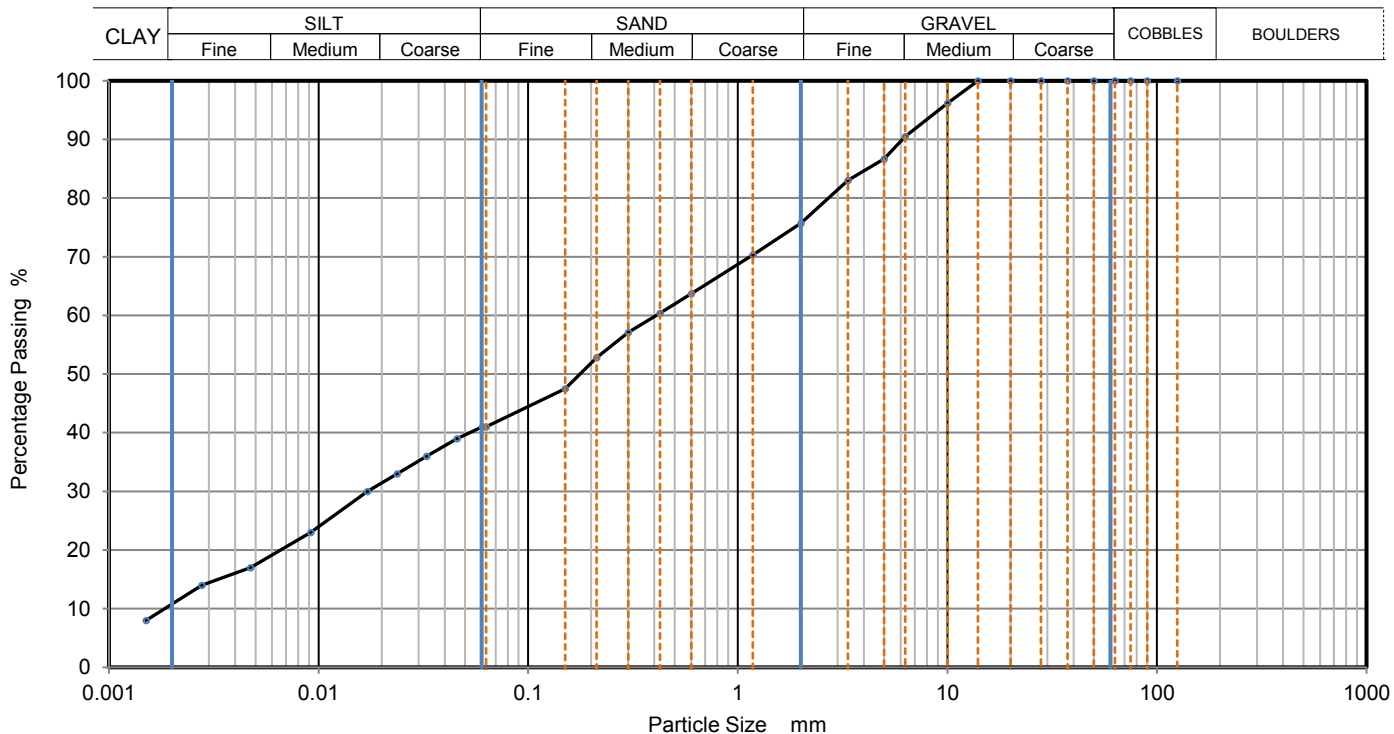




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP09
Sample No.	2
Sample Depth (m)	Top 1.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051027

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	1 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06050	41
90	100	0.04568	39
75	100	0.03279	36
63	100	0.02369	33
50	100	0.01710	30
37.5	100	0.00918	23
28	100	0.00473	17
20	100	0.00278	14
14	100	0.00150	8
10	96		
6.3	91		
5	87		
3.35	83		
2	76		
1.18	70		
0.6	64		
0.425	60	Particle density (assumed)	
0.3	57	2.65 Mg/m3	
0.212	53		
0.15	48		
0.063	41		

Dry Mass of sample, g 537

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.3
Sand	34.7
Silt	30.4
Clay	10.6

Grading Analysis	
D100	mm
D60	mm 0.409
D30	mm 0.0177
D10	mm 0.00187
Uniformity Coefficient	220
Curvature Coefficient	0.41

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

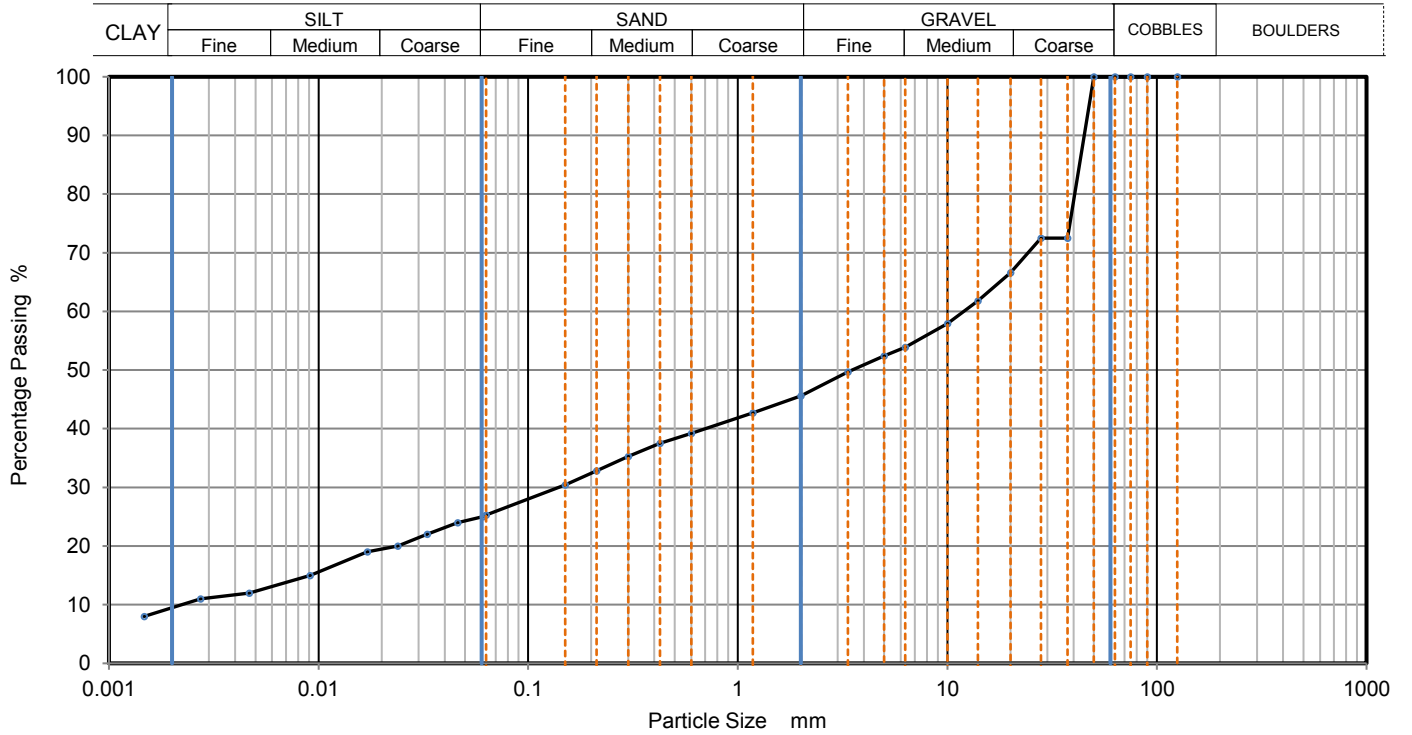
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP09
Sample No.	4
Sample Depth (m)	Top 3.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051028



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06097	25
90	100	0.04603	24
75	100	0.03303	22
63	100	0.02385	20
50	100	0.01710	19
37.5	73	0.00912	15
28	73	0.00467	12
20	67	0.00273	11
14	62	0.00147	8
10	58		
6.3	54		
5	52		
3.35	50		
2	46		
1.18	43		
0.6	39		
0.425	38	Particle density (assumed)	
0.3	35	2.65	Mg/m3
0.212	33		
0.15	30		
0.063	25		

Dry Mass of sample, g 2544

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	54.4
Sand	20.3
Silt	15.9
Clay	9.4

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	5300
Curvature Coefficient	0.73

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved

Stephen Watson

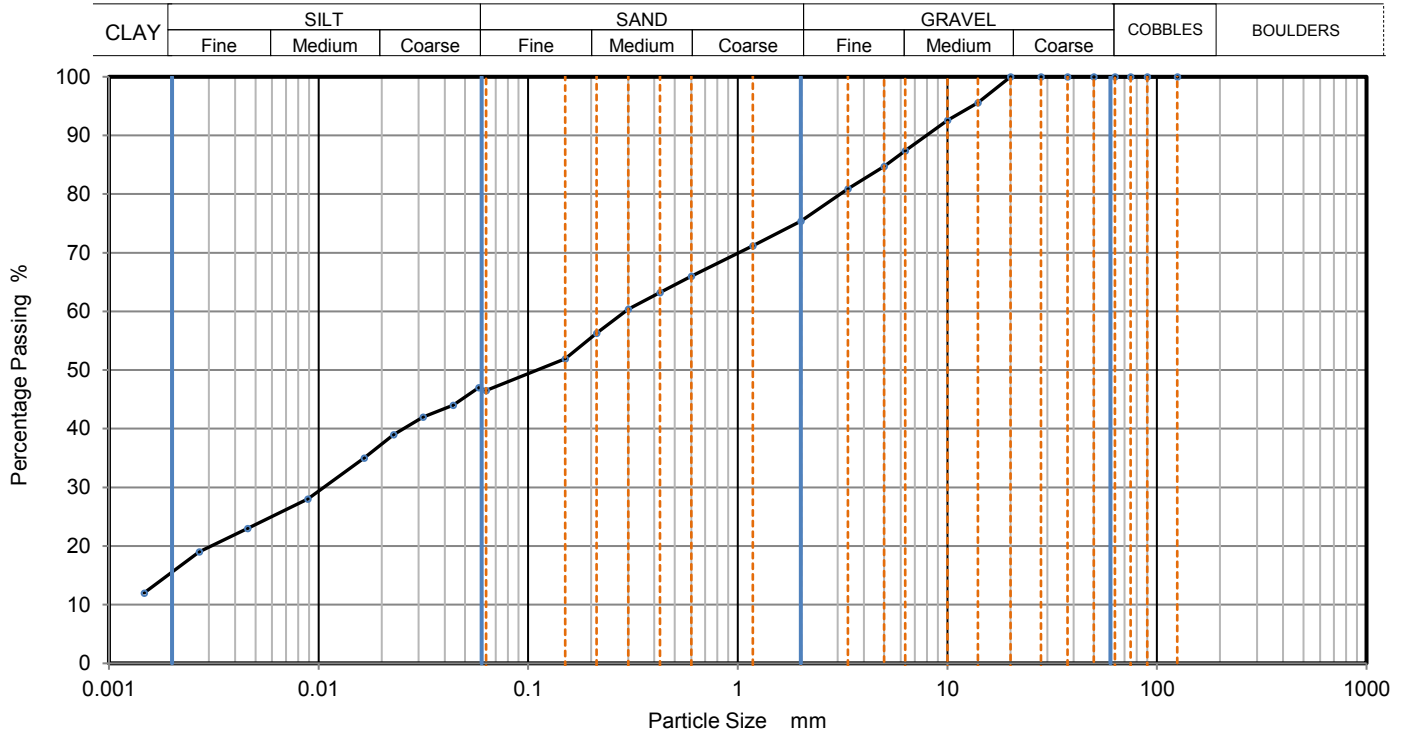




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP10
Sample No.	1
Sample Depth (m)	Top 0.70
	Base
Sample Type	B
KeyLAB ID	Caus2023051029

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	0.7 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05810	47
90	100	0.04393	44
75	100	0.03156	42
63	100	0.02284	39
50	100	0.01651	35
37.5	100	0.00889	28
28	100	0.00459	23
20	100	0.00270	19
14	96	0.00147	12
10	93		
6.3	87		
5	85		
3.35	81		
2	75		
1.18	71		
0.6	66	Particle density (assumed) 2.65 Mg/m ³	
0.425	63		
0.3	60		
0.212	56		
0.15	52		
0.063	47		

Dry Mass of sample, g	508
Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.6
Sand	28.9
Silt	30.6
Clay	15.9
Grading Analysis	
D100	mm
D60	mm 0.29
D30	mm 0.0103
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

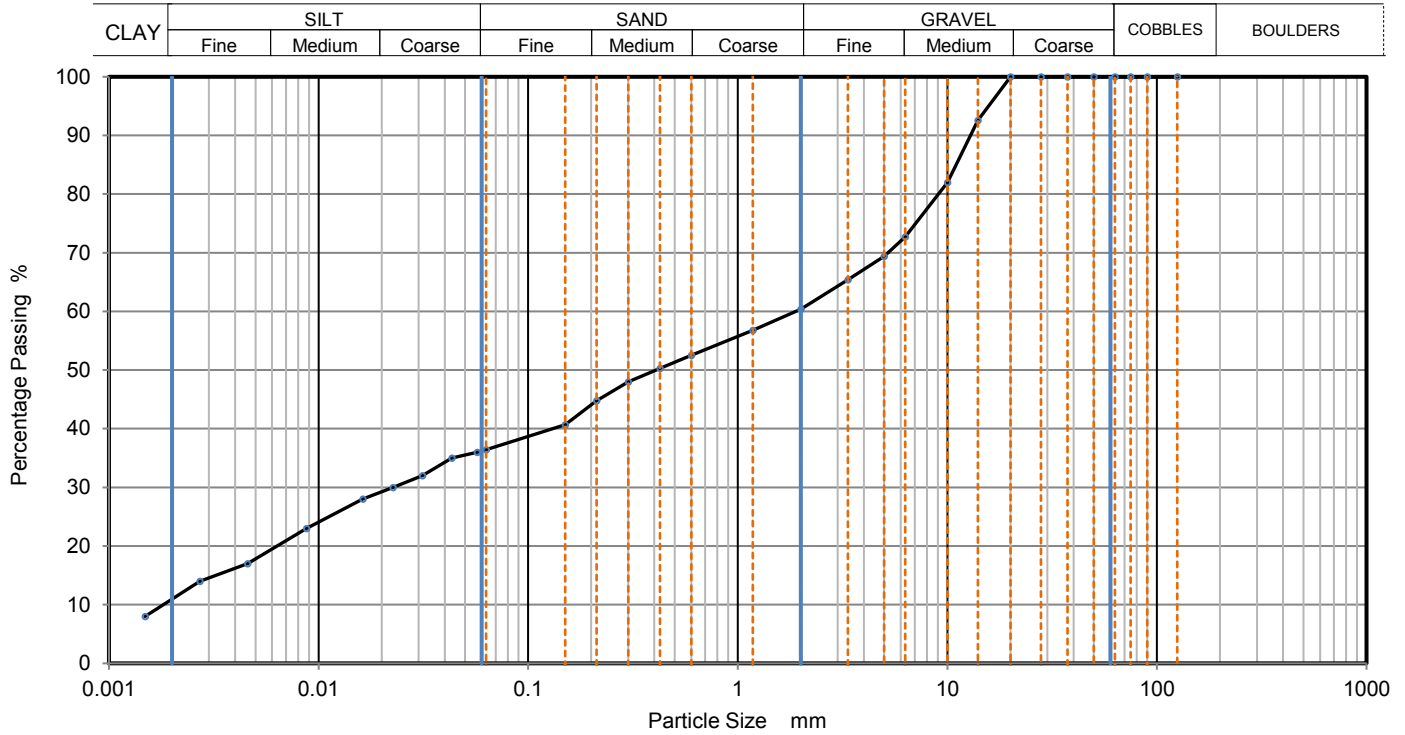
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP10
Sample No.	3
Sample Depth (m)	Top 2.50
	Base
Sample Type	B
KeyLAB ID	Caus2023051031



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05712	36
90	100	0.04320	35
75	100	0.03131	32
63	100	0.02267	30
50	100	0.01627	28
37.5	100	0.00877	23
28	100	0.00459	17
20	100	0.00271	14
14	93	0.00149	8
10	82		
6.3	73		
5	69		
3.35	65		
2	60		
1.18	57		
0.6	53		
0.425	50	Particle density (assumed) 2.65 Mg/m3	
0.3	48		
0.212	45		
0.15	41		
0.063	36		

Dry Mass of sample, g 512

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.6
Sand	24.0
Silt	25.9
Clay	10.5

Grading Analysis		
D100	mm	
D60	mm	1.89
D30	mm	0.0238
D10	mm	0.00189
Uniformity Coefficient		1000
Curvature Coefficient		0.16

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved

Stephen Watson

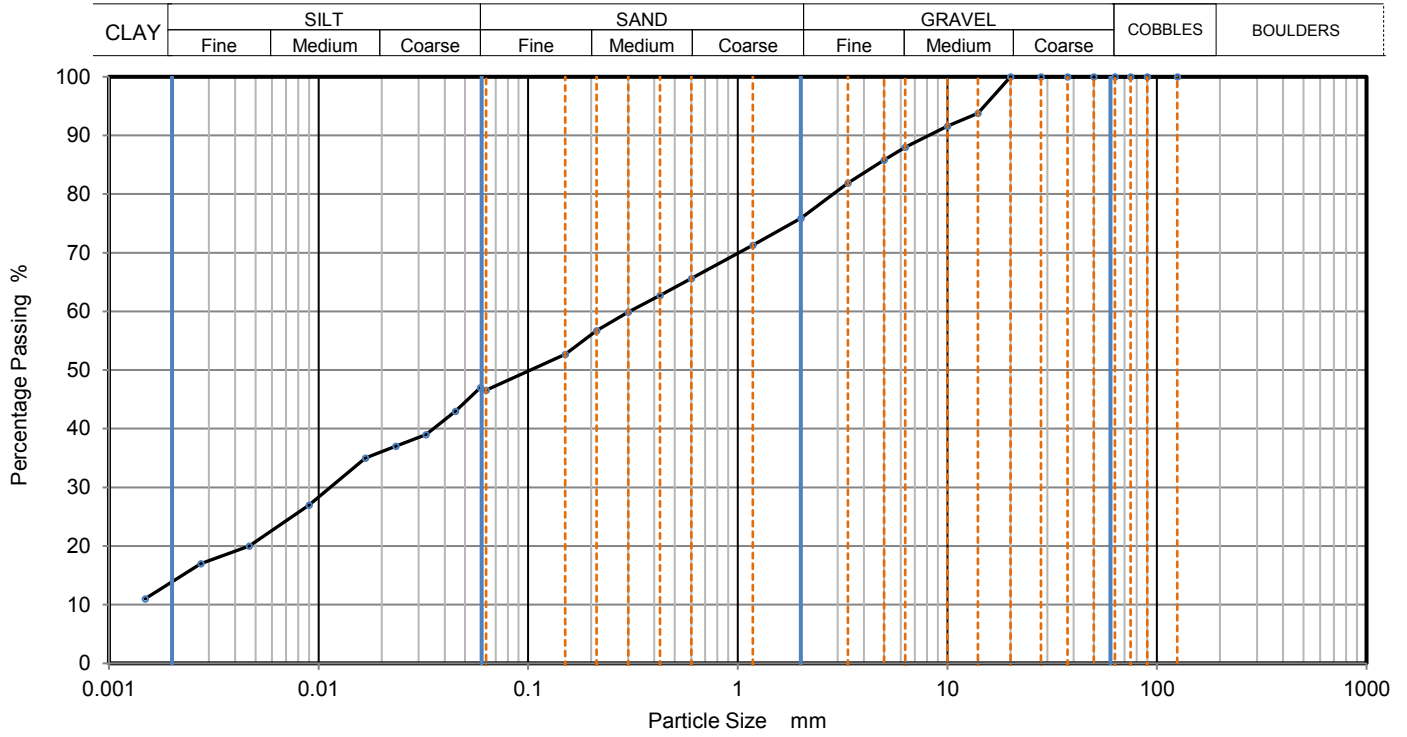




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP11
Sample No.	2
Sample Depth (m)	Top 1.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051032

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	1 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05908	47
90	100	0.04499	43
75	100	0.03255	39
63	100	0.02335	37
50	100	0.01675	35
37.5	100	0.00901	27
28	100	0.00467	20
20	100	0.00275	17
14	94	0.00149	11
10	92		
6.3	88		
5	86		
3.35	82		
2	76		
1.18	71		
0.6	66		
0.425	63	Particle density (assumed)	
0.3	60	2.65 Mg/m3	
0.212	57		
0.15	53		
0.063	47		

Dry Mass of sample, g	504
Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.1
Sand	29.3
Silt	33.0
Clay	13.6
Grading Analysis	
D100	mm
D60	mm 0.303
D30	mm 0.0112
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

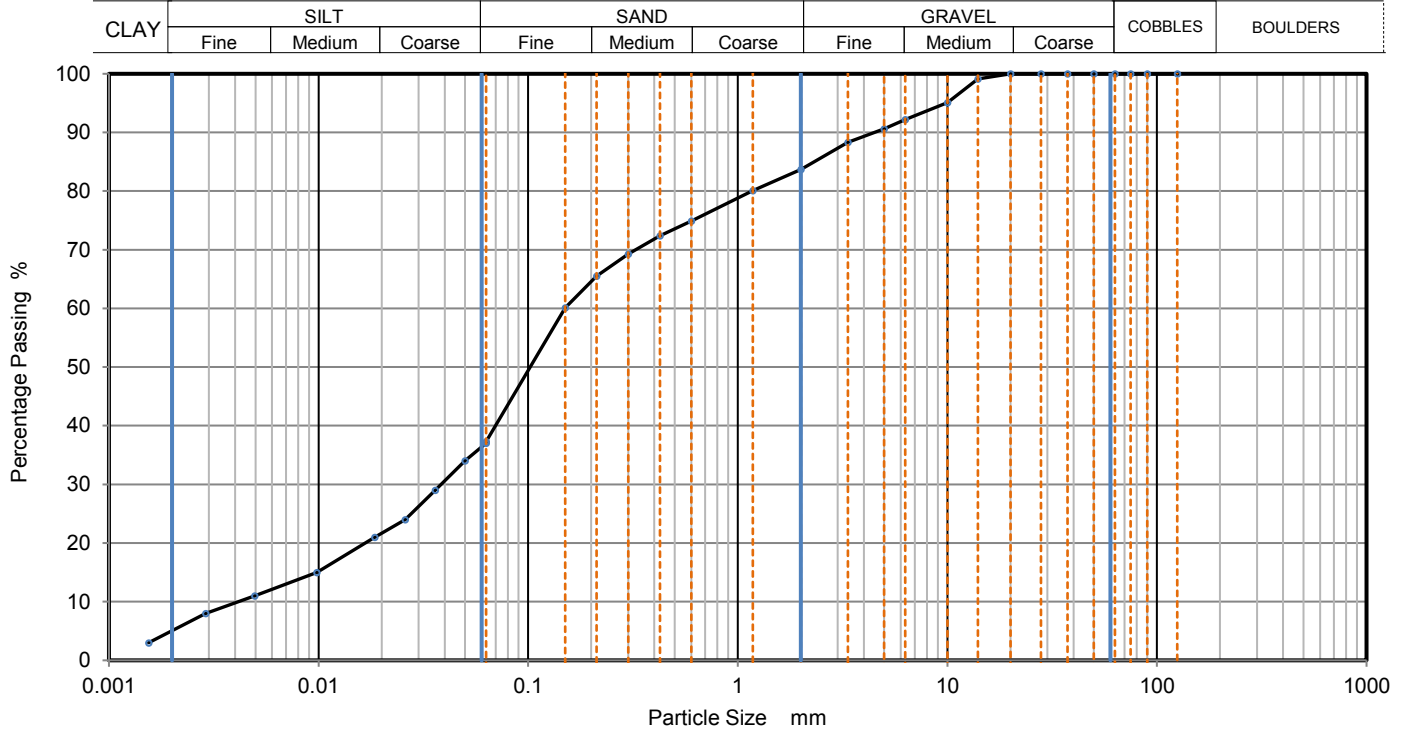




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP11
Sample No.	4
Sample Depth (m)	Top 2.20
	Base
Sample Type	B
KeyLAB ID	Caus2023051034

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly clayey SILT.		
Specimen Reference	6	Specimen Depth	2.2 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.04994	34
75	100	0.03599	29
63	100	0.02592	24
50	100	0.01855	21
37.5	100	0.00980	15
28	100	0.00495	11
20	100	0.00289	8
14	99	0.00155	3
10	95		
6.3	92		
5	91		
3.35	88		
2	84		
1.18	80		
0.6	75		
0.425	72	Particle density (assumed)	
0.3	69	2.65	Mg/m3
0.212	66		
0.15	60		
0.063	37		

Dry Mass of sample, g 540

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.3
Sand	46.4
Silt	32.1
Clay	5.2

Grading Analysis		
D100	mm	
D60	mm	0.149
D30	mm	0.038
D10	mm	0.00396
Uniformity Coefficient		38
Curvature Coefficient		2.4

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

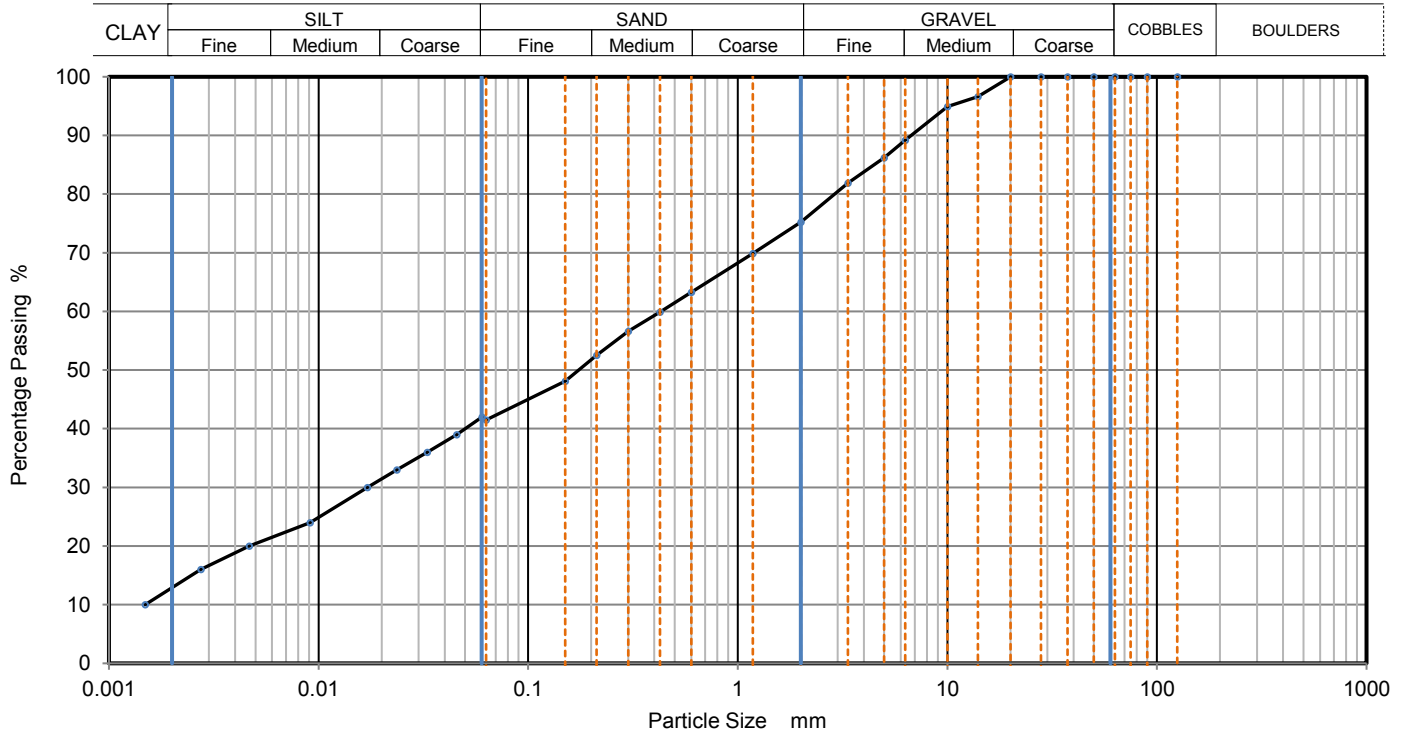




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP13
Sample No.	3
Sample Depth (m)	Top 2.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051036

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	2 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06028	42
90	100	0.04554	39
75	100	0.03295	36
63	100	0.02364	33
50	100	0.01707	30
37.5	100	0.00912	24
28	100	0.00468	20
20	100	0.00275	16
14	97	0.00149	10
10	95		
6.3	89		
5	86		
3.35	82		
2	75		
1.18	70		
0.6	63		
0.425	60	Particle density (assumed)	
0.3	57	2.65 Mg/m3	
0.212	53		
0.15	48		
0.063	42		

Dry Mass of sample, g 516

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.8
Sand	33.7
Silt	28.4
Clay	13.1

Grading Analysis	
D100	mm
D60	mm 0.428
D30	mm 0.0171
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

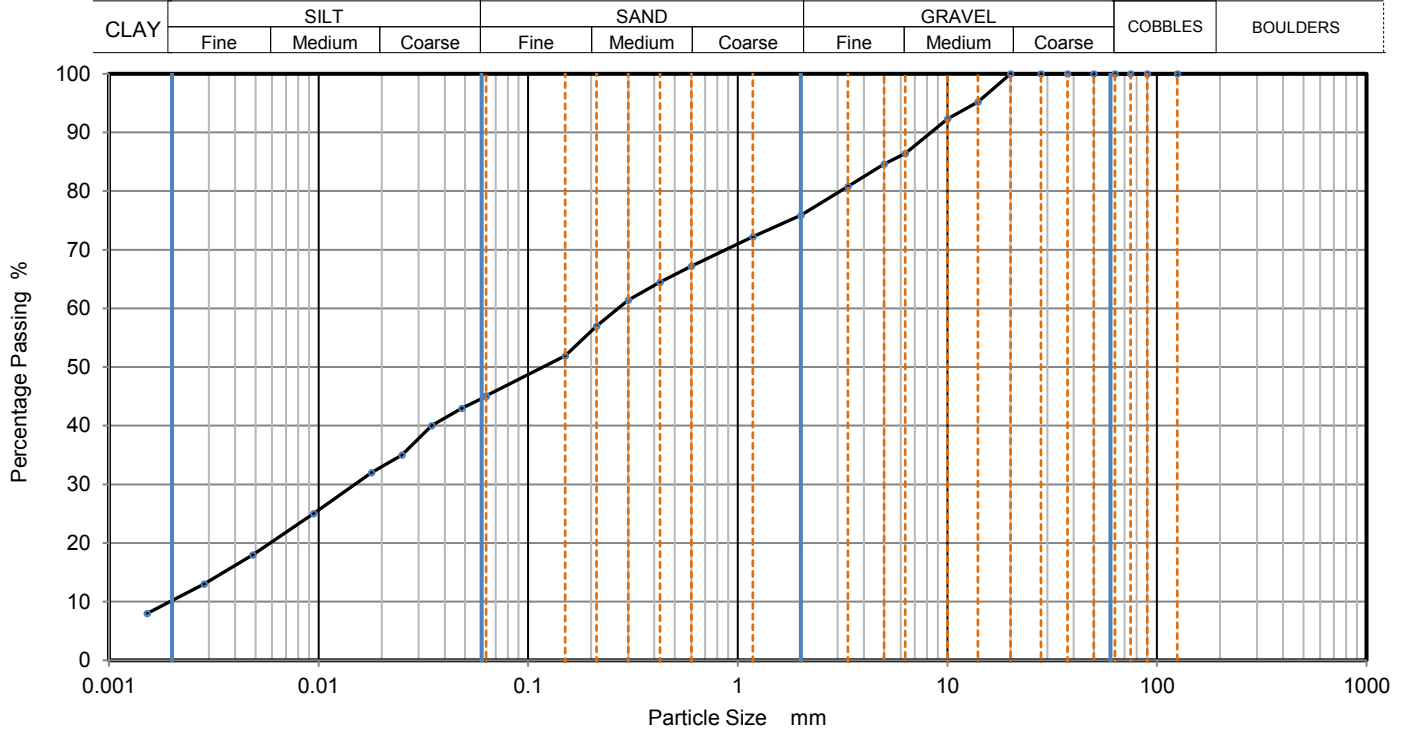




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	ITP13
Sample No.	4
Sample Depth (m)	Top 3.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051037

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	3 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	45
90	100	0.04829	43
75	100	0.03462	40
63	100	0.02497	35
50	100	0.01788	32
37.5	100	0.00947	25
28	100	0.00484	18
20	100	0.00284	13
14	95	0.00152	8
10	92		
6.3	86		
5	85		
3.35	81		
2	76		
1.18	72		
0.6	67		
0.425	65	Particle density (assumed)	
0.3	61	2.65 Mg/m3	
0.212	57		
0.15	52		
0.063	45		

Dry Mass of sample, g 503

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	24.1
Sand	30.9
Silt	34.5
Clay	10.5

Grading Analysis	
D100	mm
D60	mm 0.269
D30	mm 0.0152
D10	mm 0.00187
Uniformity Coefficient	140
Curvature Coefficient	0.46

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

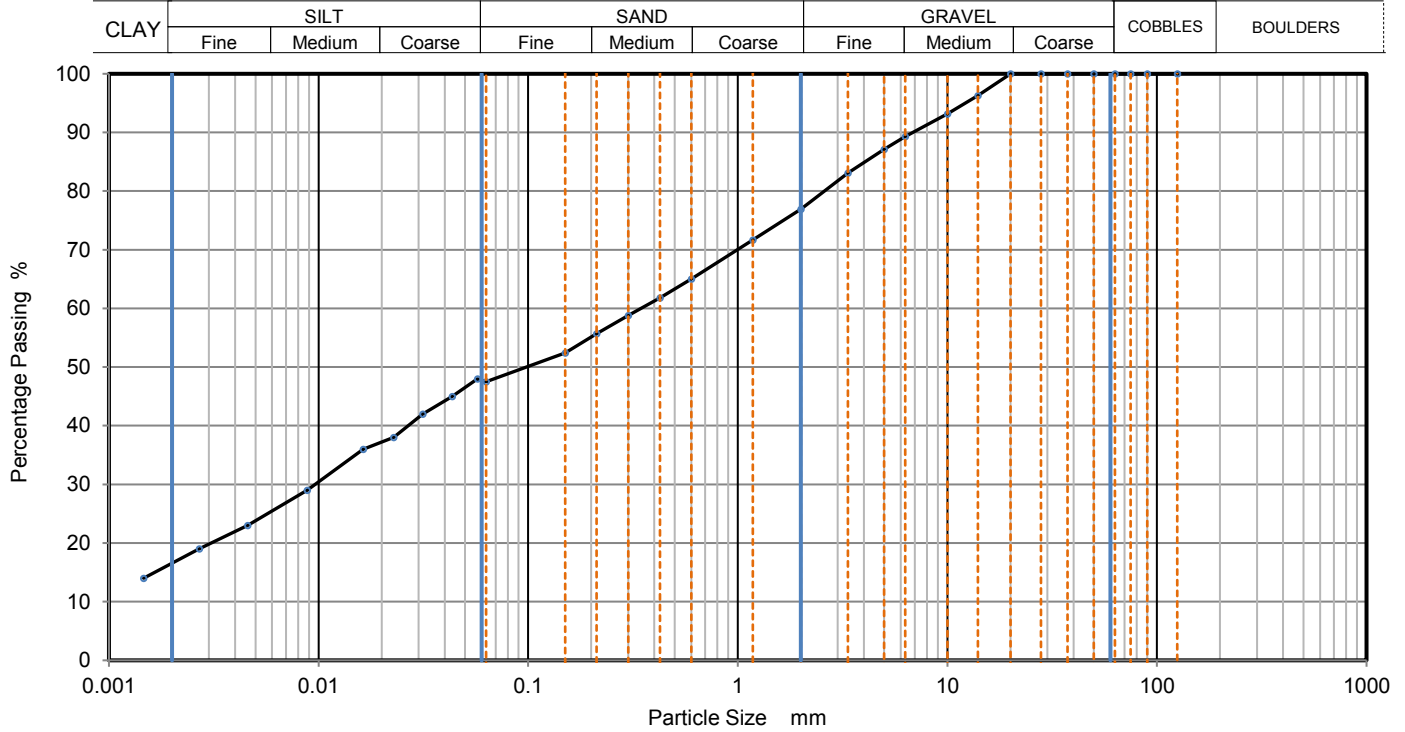




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP01
Sample No.	4
Sample Depth (m)	Top 3.00
	Base
Sample Type	B
KeyLAB ID	Caus2023051039

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly clayey SILT.		
Specimen Reference	6	Specimen Depth	3 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05730	48
90	100	0.04336	45
75	100	0.03144	42
63	100	0.02277	38
50	100	0.01635	36
37.5	100	0.00882	29
28	100	0.00459	23
20	100	0.00270	19
14	96	0.00146	14
10	93		
6.3	89		
5	87		
3.35	83		
2	77		
1.18	72		
0.6	65		
0.425	62	Particle density (assumed)	
0.3	59	2.65 Mg/m3	
0.212	56		
0.15	52		
0.063	48		

Dry Mass of sample, g 515

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	23.1
Sand	29.3
Silt	31.1
Clay	16.5

Grading Analysis		
D100	mm	
D60	mm	0.346
D30	mm	0.00931
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

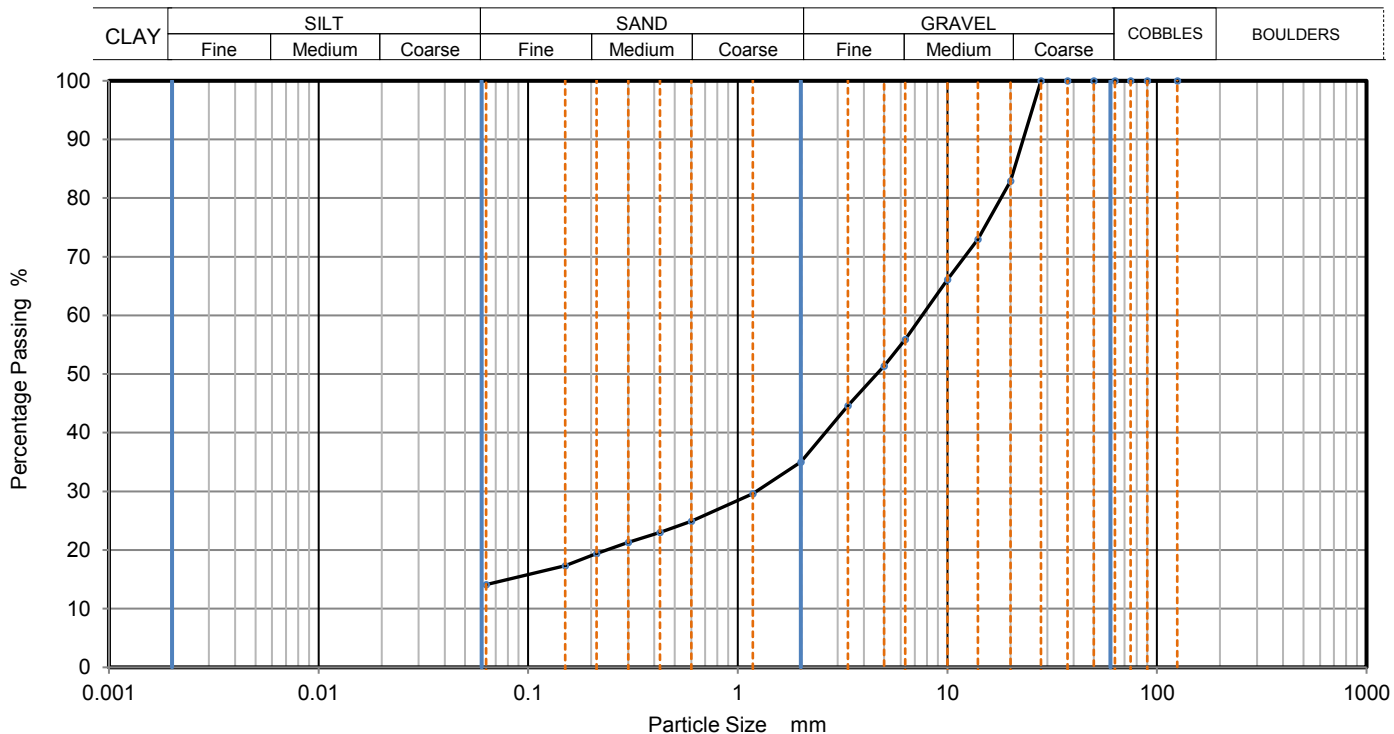




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP02
Sample No.	2
Sample Depth (m)	Top 1.20
	Base
Sample Type	B
KeyLAB ID	Caus2023051041

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly clayey SILT.		
Specimen Reference	6	Specimen Depth	1.2 m
Test Method	BS1377:Part 2:1990, clause 9.2		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	83		
14	73		
10	66		
6.3	56		
5	51		
3.35	45		
2	35		
1.18	30		
0.6	25		
0.425	23		
0.3	21		
0.212	19		
0.15	17		
0.063	14		

Dry Mass of sample, g 1307

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	65.0
Sand	20.8
Fines <0.063mm	14.0

Grading Analysis	
D100	mm
D60	mm 7.59
D30	mm 1.23
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

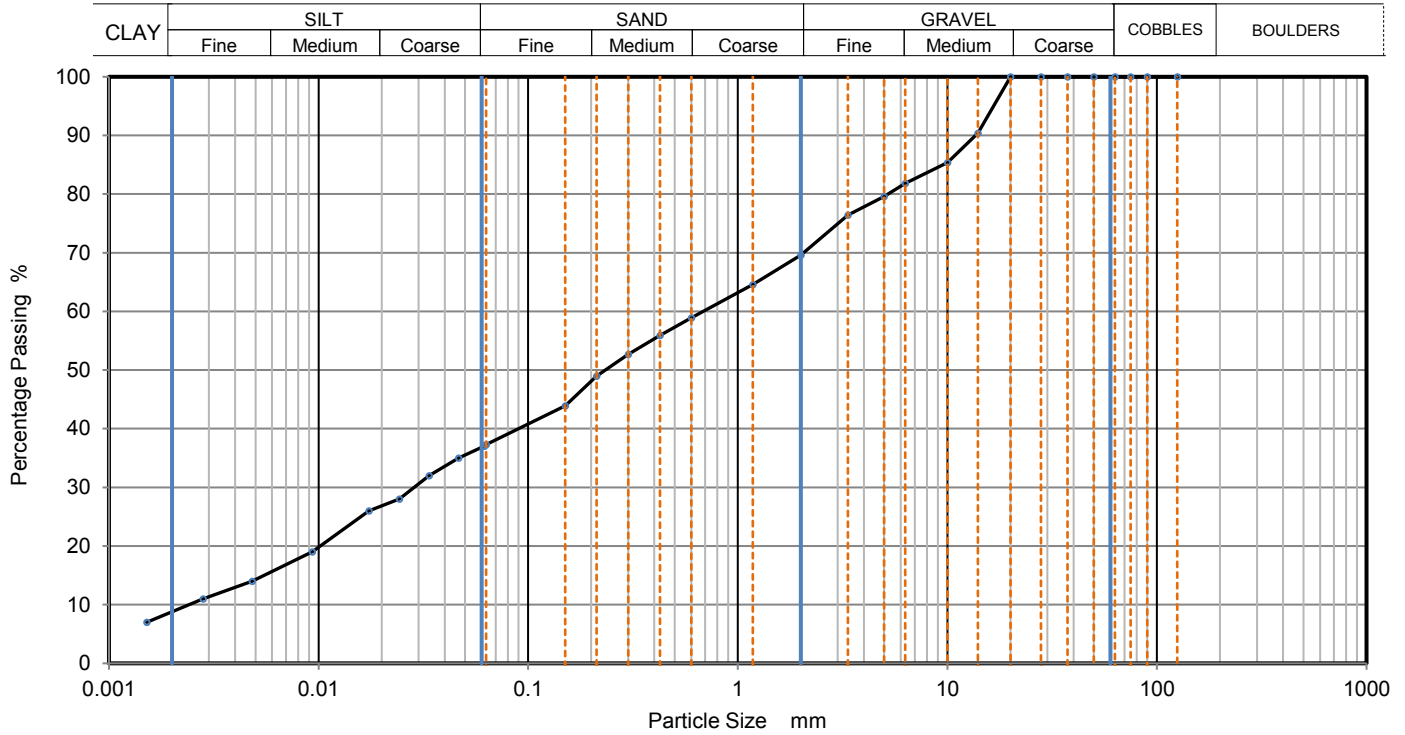




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP03
Sample No.	2
Sample Depth (m)	Top 1.30
	Base
Sample Type	B
KeyLAB ID	Caus2023051043

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly clayey SILT.		
Specimen Reference	6	Specimen Depth	1.3 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06172	37
90	100	0.04659	35
75	100	0.03367	32
63	100	0.02431	28
50	100	0.01743	26
37.5	100	0.00935	19
28	100	0.00482	14
20	100	0.00281	11
14	90	0.00151	7
10	85		
6.3	82		
5	80		
3.35	76		
2	70		
1.18	65		
0.6	59		
0.425	56	Particle density (assumed) 2.65 Mg/m ³	
0.3	53		
0.212	49		
0.15	44		
0.063	37		

Dry Mass of sample, g 532

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.4
Sand	32.4
Silt	28.4
Clay	8.8

Grading Analysis		
D100	mm	
D60	mm	0.68
D30	mm	0.0287
D10	mm	0.00235
Uniformity Coefficient		290
Curvature Coefficient		0.52

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

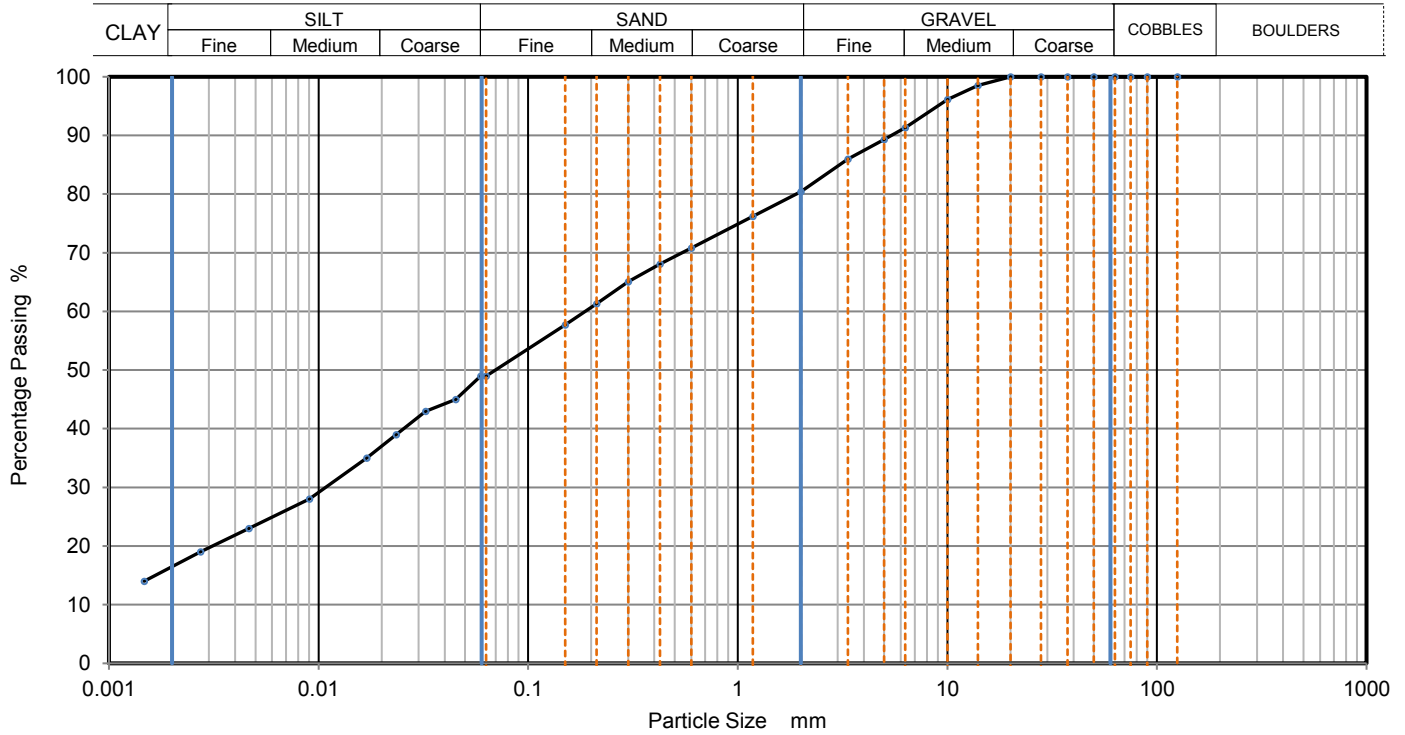




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP06
Sample No.	2
Sample Depth (m)	Top 1.50
	Base
Sample Type	B
KeyLAB ID	Caus2023051045

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	1.5 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05931	49
90	100	0.04518	45
75	100	0.03245	43
63	100	0.02347	39
50	100	0.01696	35
37.5	100	0.00906	28
28	100	0.00465	23
20	100	0.00273	19
14	99	0.00147	14
10	96		
6.3	91		
5	89		
3.35	86		
2	80		
1.18	76		
0.6	71		
0.425	68	Particle density (assumed)	
0.3	65	2.65	Mg/m3
0.212	61		
0.15	58		
0.063	49		

Dry Mass of sample, g 541

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.6
Sand	31.4
Silt	32.3
Clay	16.7

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

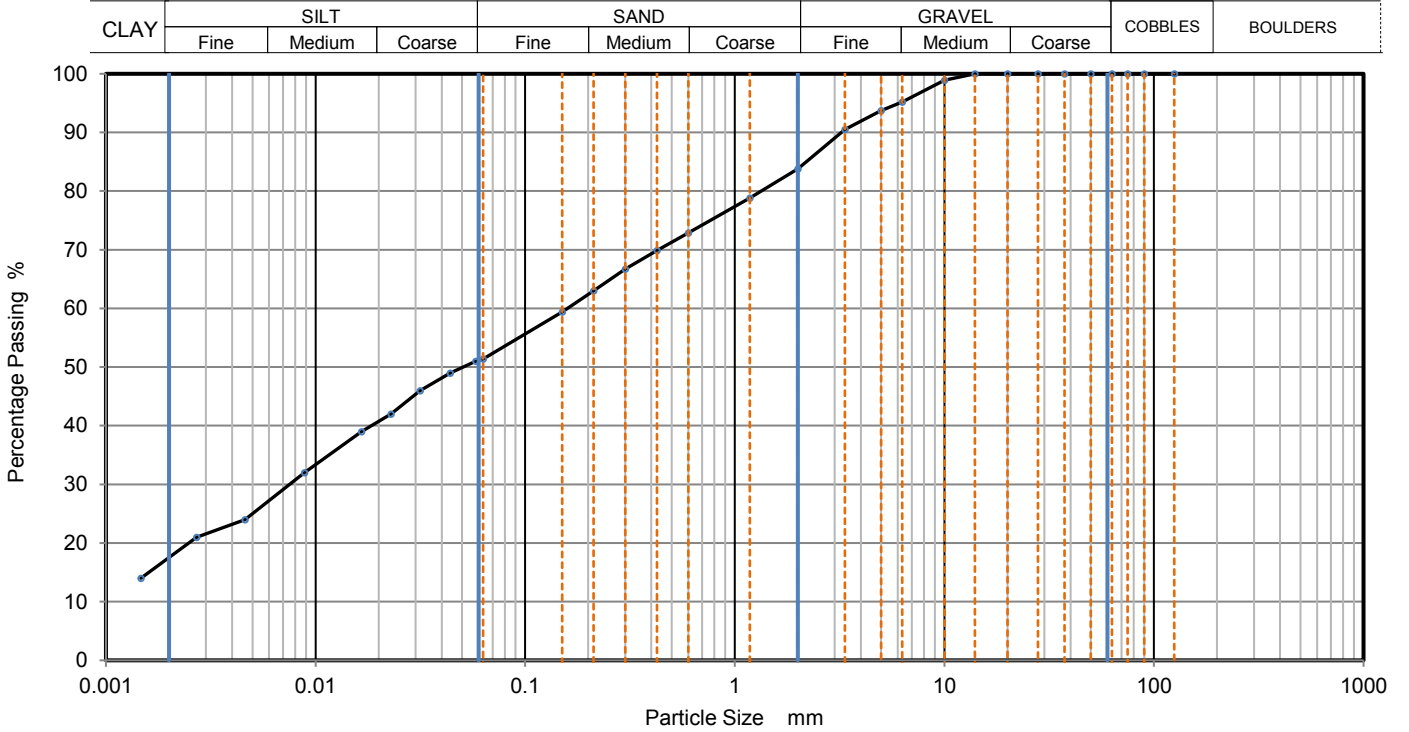




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP06
Sample No.	4
Sample Depth (m)	Top 3.30
	Base
Sample Type	B
KeyLAB ID	Caus2023051047

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	3.3 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05805	51
90	100	0.04391	49
75	100	0.03157	46
63	100	0.02286	42
50	100	0.01653	39
37.5	100	0.00885	32
28	100	0.00460	24
20	100	0.00271	21
14	100	0.00147	14
10	99		
6.3	95		
5	94		
3.35	91		
2	84		
1.18	79		
0.6	73		
0.425	70	Particle density (assumed)	
0.3	67	2.65	Mg/m3
0.212	63		
0.15	59		
0.063	51		

Dry Mass of sample, g	568
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	16.2
Sand	32.4
Silt	34.0
Clay	17.4

Grading Analysis		
D100	mm	
D60	mm	0.159
D30	mm	0.00739
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

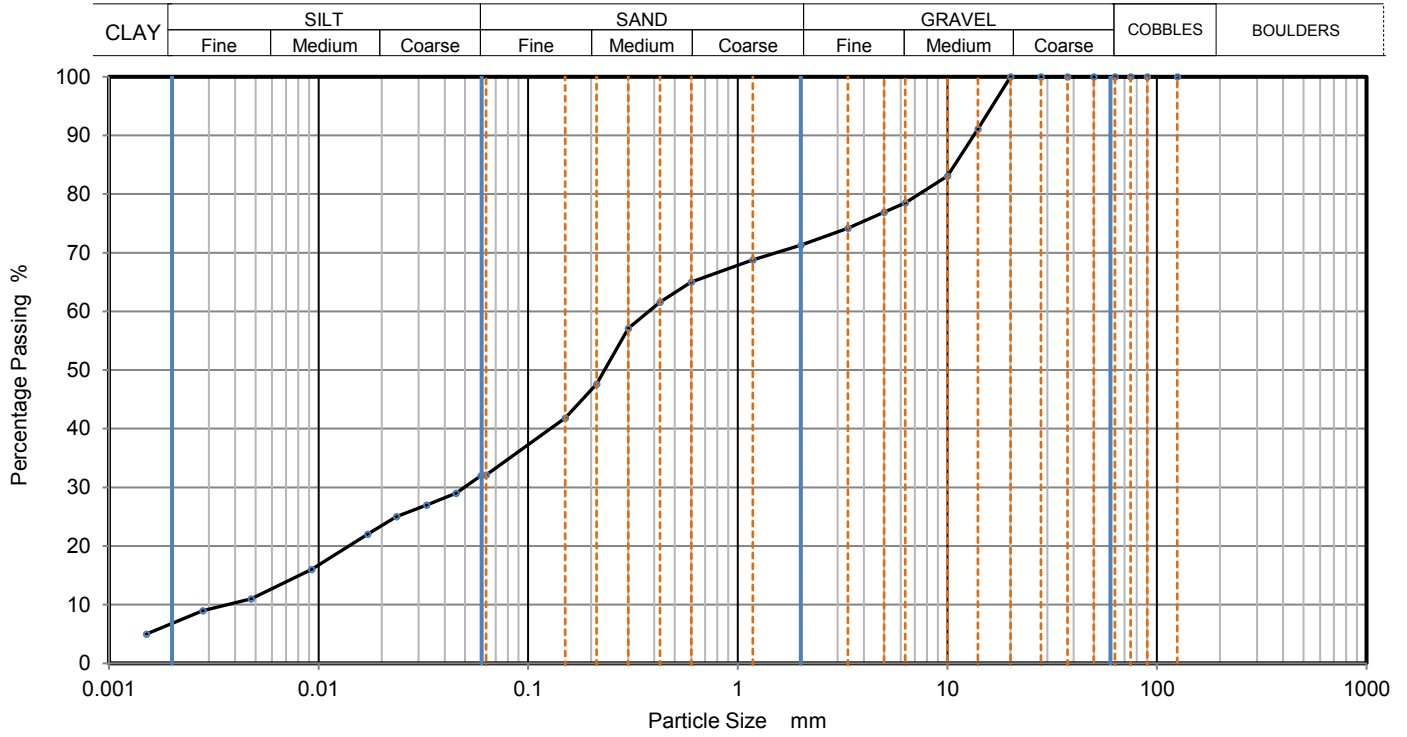




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP07
Sample No.	1
Sample Depth (m)	Top 0.50
	Base
Sample Type	B
KeyLAB ID	Caus2023051048

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly clayey SILT.		
Specimen Reference	6	Specimen Depth	0.5 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05955	32
90	100	0.04536	29
75	100	0.03282	27
63	100	0.02355	25
50	100	0.01713	22
37.5	100	0.00926	16
28	100	0.00477	11
20	100	0.00281	9
14	91	0.00151	5
10	83		
6.3	79		
5	77		
3.35	74		
2	71		
1.18	69		
0.6	65		
0.425	62	Particle density (assumed) 2.65 Mg/m3	
0.3	57		
0.212	48		
0.15	42		
0.063	32		

Dry Mass of sample, g	545
Sample Proportions	% dry mass
Cobbles	0.0
Gravel	28.7
Sand	39.2
Silt	25.3
Clay	6.8
Grading Analysis	
D100	mm
D60	mm 0.376
D30	mm 0.0478
D10	mm 0.00368
Uniformity Coefficient	100
Curvature Coefficient	1.7

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

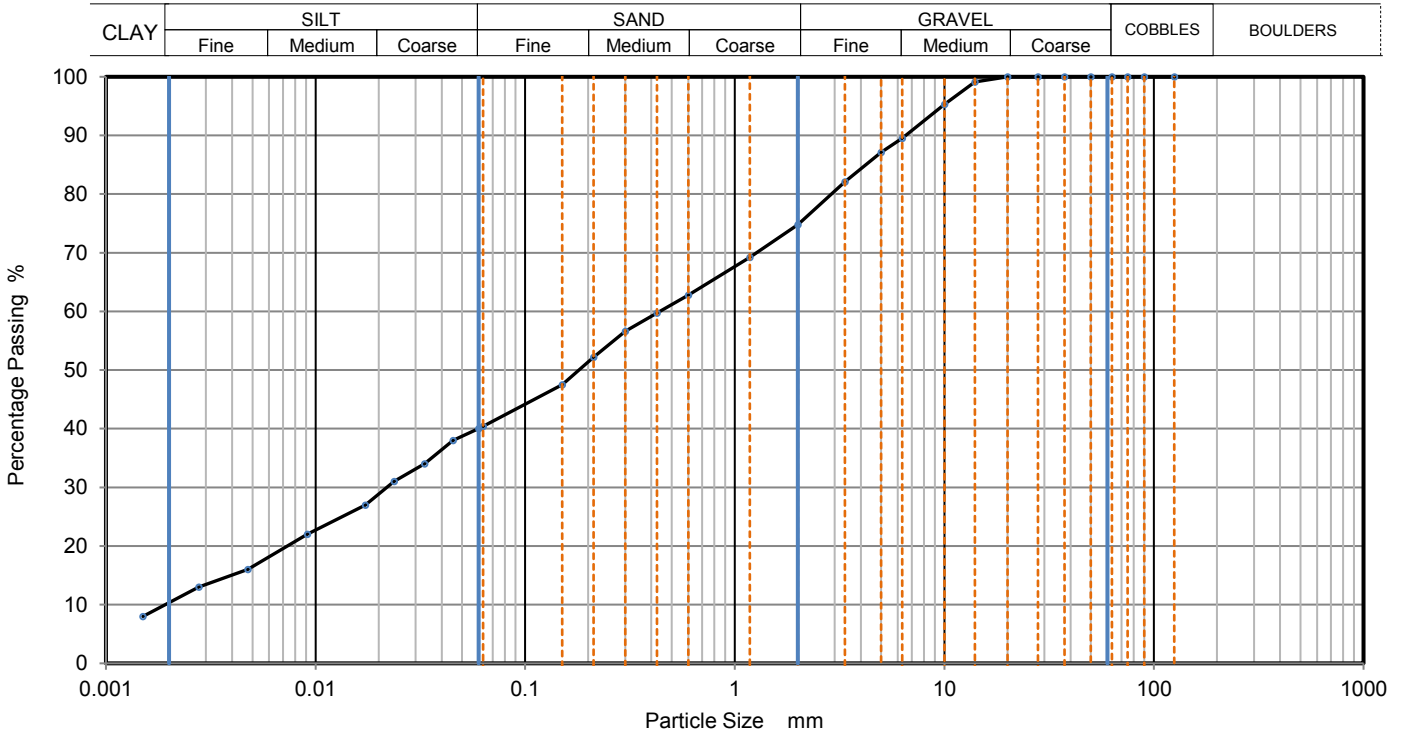




PARTICLE SIZE DISTRIBUTION

Job Ref	23-0237
Borehole/Pit No.	TP08
Sample No.	2
Sample Depth (m)	Top 1.60
	Base
Sample Type	B
KeyLAB ID	Caus2023051050

Site Name	Laurclavagh		
Specimen Description	Greyish brown sandy slightly gravelly silty CLAY.		
Specimen Reference	6	Specimen Depth	1.6 m
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06003	40
90	100	0.04536	38
75	100	0.03306	34
63	100	0.02372	31
50	100	0.01725	27
37.5	100	0.00915	22
28	100	0.00475	16
20	100	0.00277	13
14	99	0.00150	8
10	95		
6.3	90		
5	87		
3.35	82		
2	75		
1.18	69		
0.6	63		
0.425	60	Particle density (assumed) 2.65 Mg/m3	
0.3	57		
0.212	52		
0.15	48		
0.063	40		

Dry Mass of sample, g	562
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.2
Sand	34.4
Silt	29.9
Clay	10.5

Grading Analysis		
D100	mm	
D60	mm	0.438
D30	mm	0.0214
D10	mm	0.0019
Uniformity Coefficient		230
Curvature Coefficient		0.55

Remarks
Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson





Final Report

Report No.: 23-16004-1

Initial Date of Issue: 19-May-2023

Re-Issue Details:

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road
Balnamore
Ballymoney
County Antrim
BT53 7QL

Contact(s): Alistair McQuat
Carin Cornwall
Celine Rooney
Colm Hurley
Dean McCloskey
Gabriella Horan
Lucy Newland
Matthew Gilbert
Matthew Graham
Neil Haggan
Sean Ross
Stephen Franey
Stephen Watson
Stuart Abraham
Darren O'Mahony
Neil Patton
Paul Dunlop

Project 23-0237 Laurclavagh

Quotation No.: Date Received: 15-May-2023

Order No.: Date Instructed: 15-May-2023

No. of Samples: 15

Turnaround (Wkdays): 5 Results Due: 19-May-2023

Date Approved: 19-May-2023

Approved By:

Details:

Stuart Henderson, Technical
Manager ☐

Results - Soil

Project: 23-0237 Laurclavagh

Client: Causeway Geotech Ltd		Chemtest Job No.:		23-16004	23-16004	23-16004	23-16004	23-16004	23-16004	23-16004	23-16004	
Quotation No.:		Chemtest Sample ID.:		1639216	1639217	1639218	1639219	1639220	1639221	1639222	1639223	
Order No.:		Client Sample Ref.:		2	1	1	1	1	1	2	3	
		Sample Location:		ITP01	ITP03	ITP06	ITP07	ITP08	ITP09	ITP10	ITP11	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		1	0.5	0.4	0.8	0.6	0.3	1.7	1.6	
		Date Sampled:		12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	
Determinand	Accred.	SOP	Units	LOD								
Moisture	N	2030	%	0.020	17	11	24	13	16	24	12	12
pH	U	2010		4.0	8.1	8.2	8.1	8.5	8.7	7.8	8.7	8.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.030	0.030	0.017	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Results - Soil

Project: 23-0237 Laurclavagh

Client: Causeway Geotech Ltd		Chemtest Job No.:		23-16004	23-16004	23-16004	23-16004	23-16004	23-16004	23-16004	
Quotation No.:		Chemtest Sample ID.:		1639224	1639225	1639226	1639227	1639228	1639229	1639230	
Order No.:		Client Sample Ref.:		2	2	1	1	1	3	1	
		Sample Location:		ITP13	TP01	TP02	TP03	TP05	TP06	TP08	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		1.1	0.9	0.4	0.6	0.5	2.6	0.8	
		Date Sampled:		12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	12-May-2023	
Determinand	Accred.	SOP	Units	LOD							
Moisture	N	2030	%	0.020	10	14	11	11	14	8.8	9.9
pH	U	2010		4.0	8.6	8.5	8.3	8.0	8.2	8.4	8.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

**SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT**

2 May 2023

Project Name:	Laurclavagh WF; Ground Investigation
Project No.:	23-0237
Client:	Turnkey Developments
Engineer:	Enerco Energy

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 18/04/2023 and 02/05/2023.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.



Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd



Project Name: Laurclavagh WF; Ground Investigation

Report Reference: Schedule 1

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

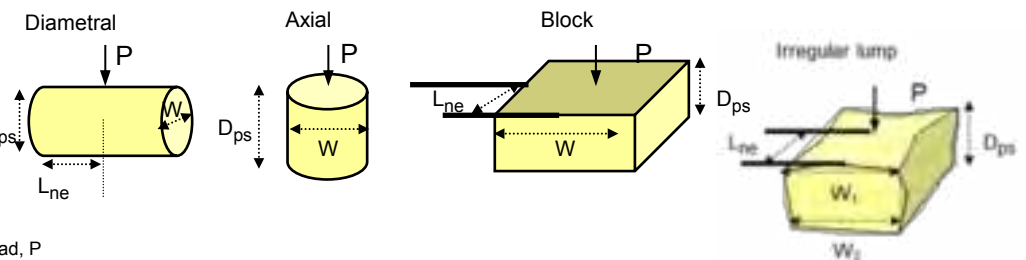
Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
ROCK	Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985	12
ROCK	Uniaxial Compressive Strength (UCS)*	ISRM Suggested Methods -Rock Characterization Testing and Monitoring, Ed. E T Brown - 1981	4

Point Load Strength Index Tests Summary of Results

Project No. <p style="text-align: center;">23-0237</p>	Project Name <p style="text-align: center;">Laurclavagh</p>
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Borehole No.	Sample			Specimen		Rock Type	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index		Remarks (including water content if measured)
	Depth m	Ref.	Type	Ref.	Depth m		Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa	
BH RC01	6.50	1	C	1	6.50	LIMESTONE	A	U	YES		101.7	67.0	58.0	0.7	86.7	0.1	0.1	
BH RC01	6.80	2	C	1	6.80	LIMESTONE	A	U	YES		101.0	90.0	80.0	10.9	101.4	1.1	1.5	
BH RC01	9.70	3	C	1	9.70	LIMESTONE	A	U	YES		100.3	102.0	91.0	6.8	107.8	0.6	0.8	
BH RC01	10.30	4	C	1	10.30	LIMESTONE	D	U	YES	85.7	101.6	101.6	100.0	9.4	100.8	0.9	1.3	
BH RC04	6.25	1	C	1	6.25	LIMESTONE	D	U	YES	122.4	101.6	101.6	100.0	15.4	100.8	1.5	2.1	
BH RC04	9.30	2	C	1	9.30	LIMESTONE	A	U	NO		101.9	88.0	86.0	23.7	105.6	2.1	3.0	
BH RC06	6.30	2	C	1	6.30	LIMESTONE	D	U	NO	82.0	101.4	101.4	98.0	20.1	99.7	2.0	2.8	
BH RC06	9.60	3	C	1	9.60	LIMESTONE	A	U	YES		101.9	87.0	85.0	15.5	105.0	1.4	2.0	
BH RC07	5.00	1	C	1	5.00	LIMESTONE	A	U	NO		101.6	94.0	91.0	25.8	108.5	2.2	3.1	
BH RC07	8.20	2	C	1	8.20	LIMESTONE	D	U	NO	100.3	101.8	101.8	99.0	35.5	100.4	3.5	4.8	
BH RC09	8.60	2	C	1	8.60	LIMESTONE	D	U	NO	116.2	101.8	101.8	99.0	24.5	100.4	2.4	3.3	
BH RC09	9.20	3	C	1	9.20	LIMESTONE	A	U	YES		101.8	90.0	88.0	14.2	106.8	1.2	1.8	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise
Detailed legend for test and dimensions, based on ISRM, is shown above.
Size factor, $F = (De/50)^{0.45}$ for all tests.
LAB 17R - Version 5

Date Printed
05/02/2023 00:00

Approved By
Stephen Watson





CAUSEWAY
— GEOTECH

APPENDIX I

SPT HAMMER ENERGY MEASUREMENT REPORT



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: 0208.
Test Date: 18/02/2023
Report Date: 20/02/2023
File Name: 0208..spt
Test Operator: RWS

Instrumented Rod Data

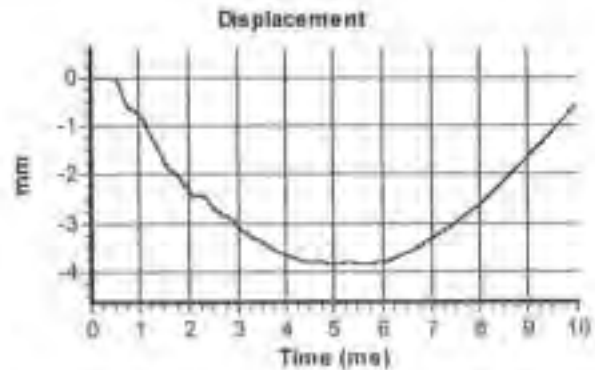
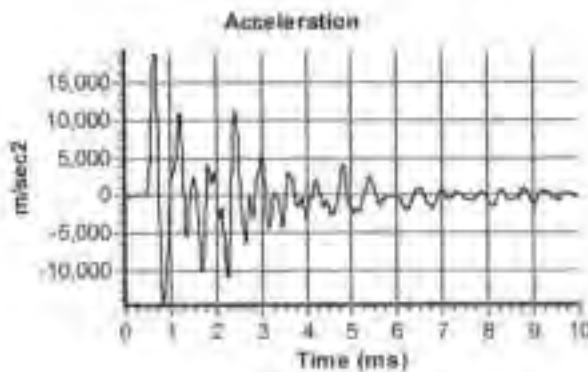
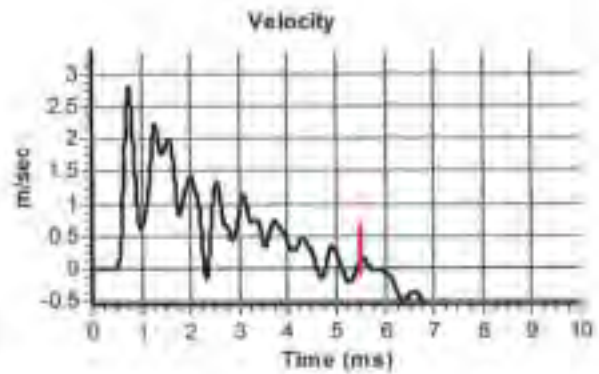
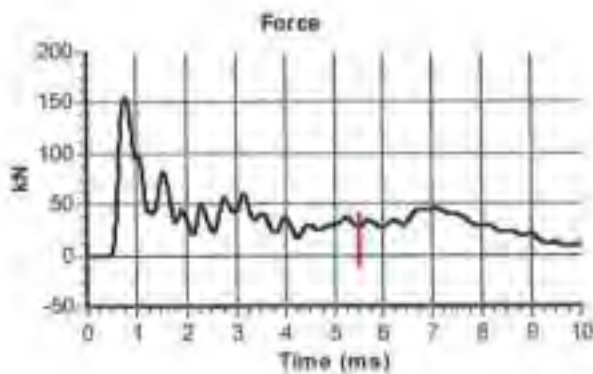
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.7
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 64785
Accelerometer No.2: 64789

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location

CAUSEWAY



Calculations

Area of Rod A (mm^2): 996
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 244

Energy Ratio E_r (%): 52

Signed: Bob Stewart

Title: Technician

The recommended calibration interval is 12 months