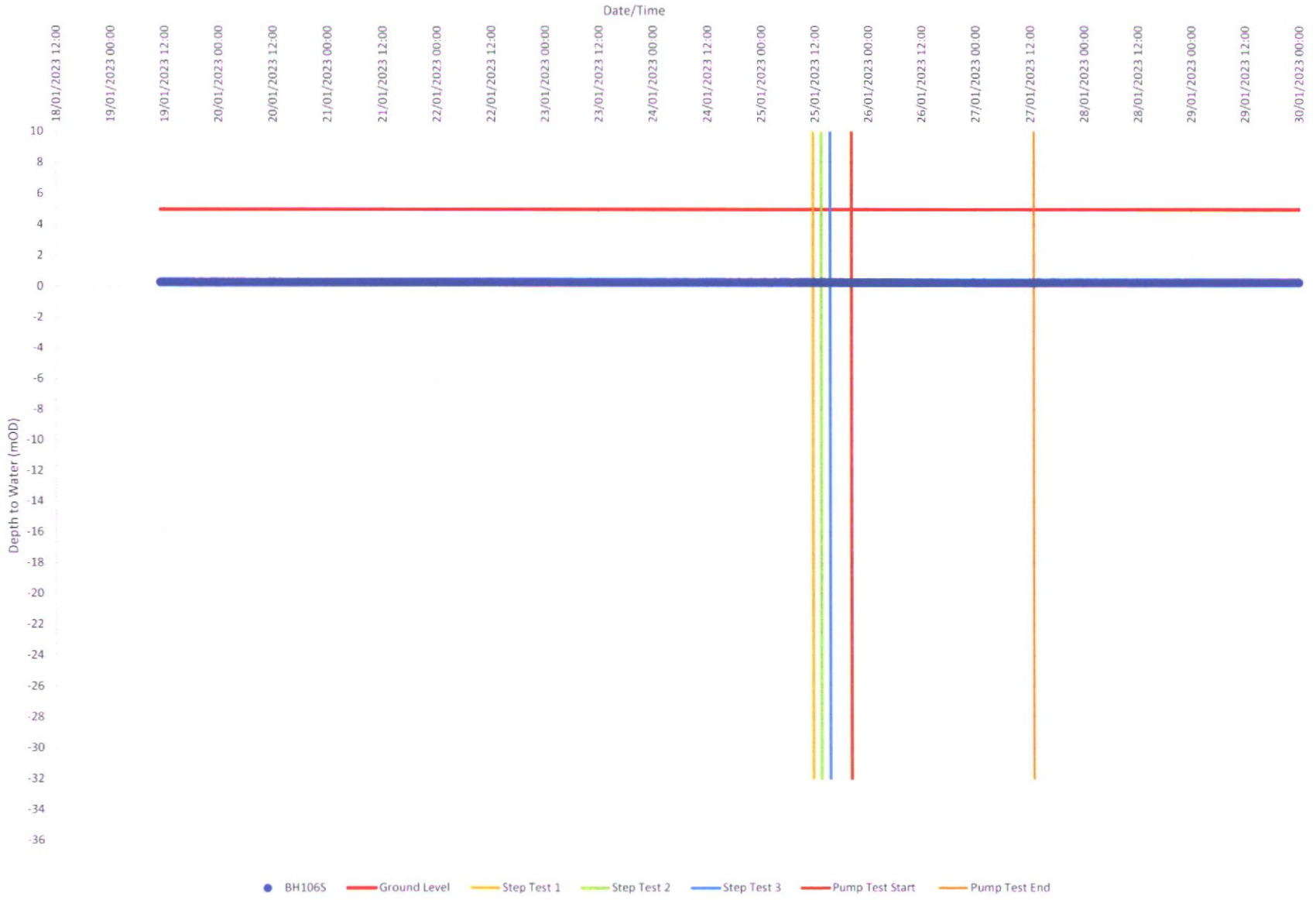
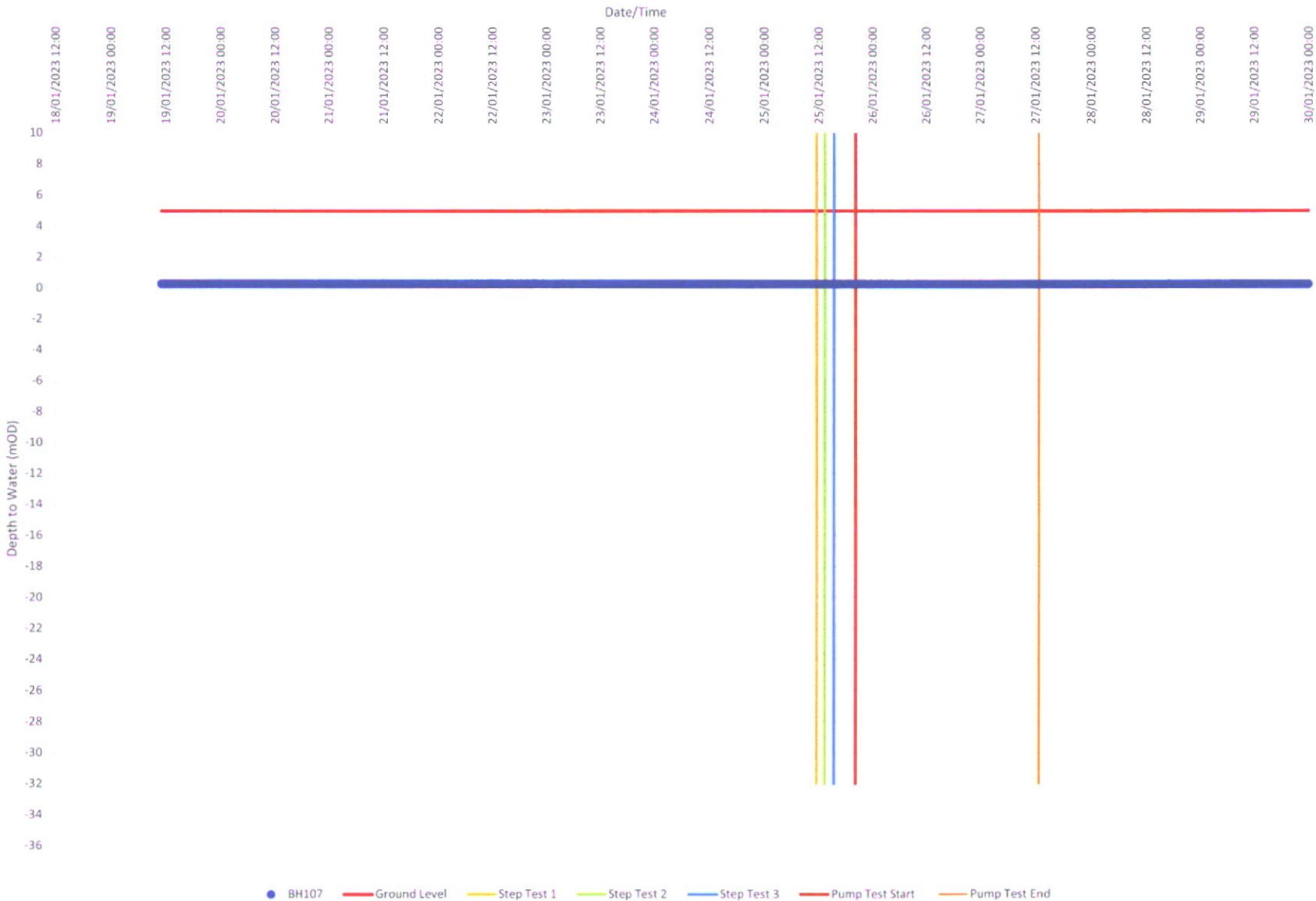


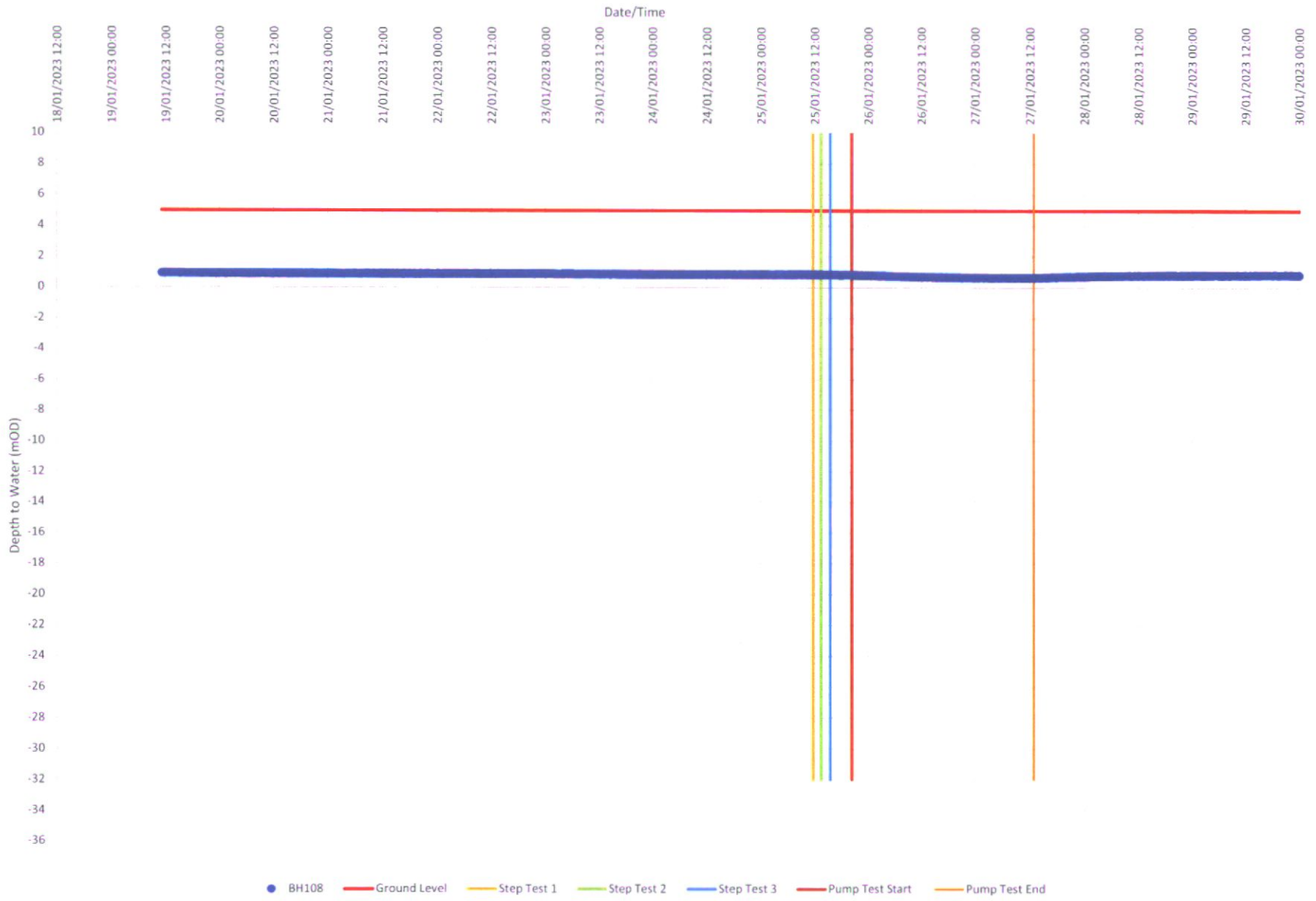
DC-BH106S 25/01/2023 - 27/01/2023



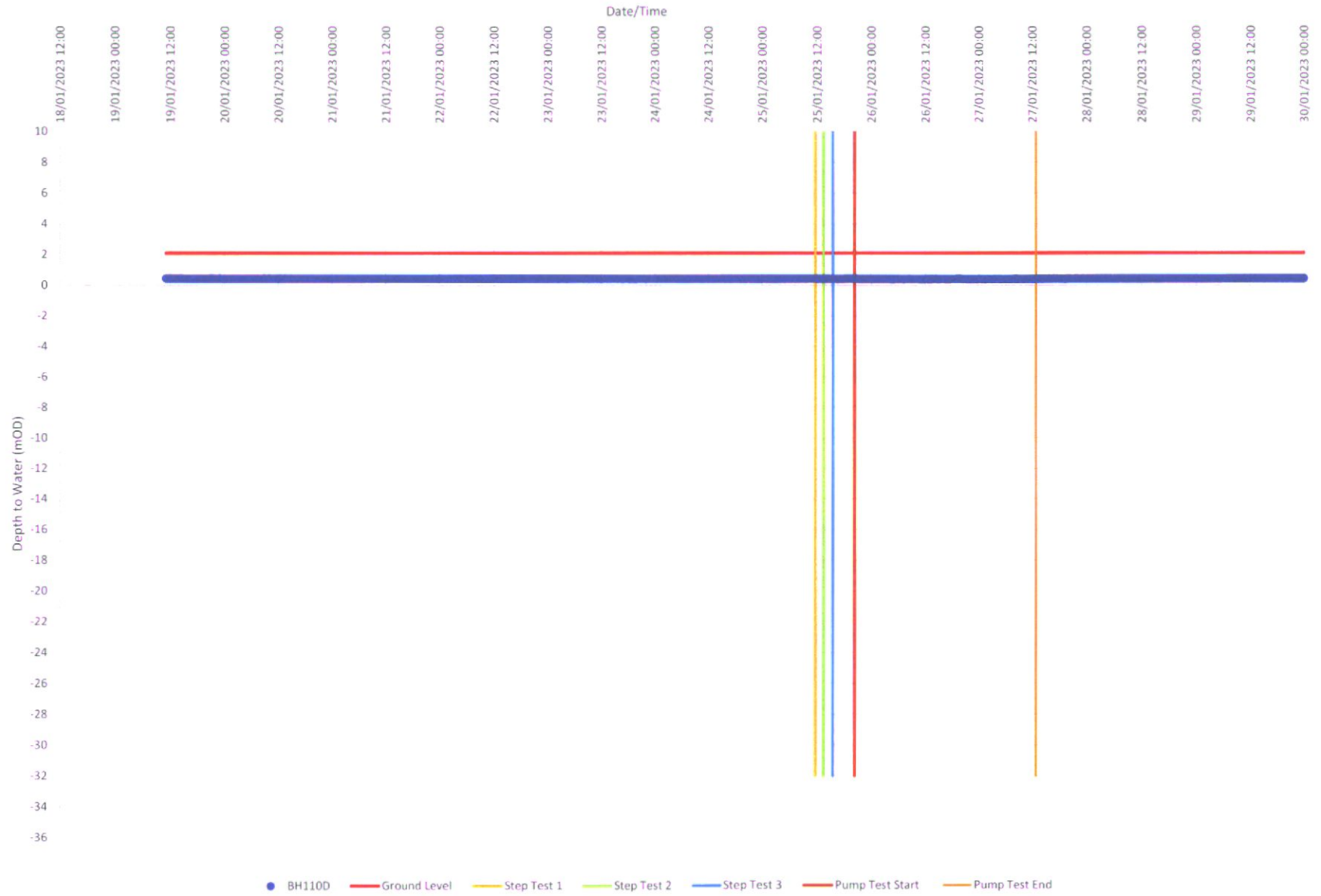
DC-BH107 25/01/2023 - 27/01/2023



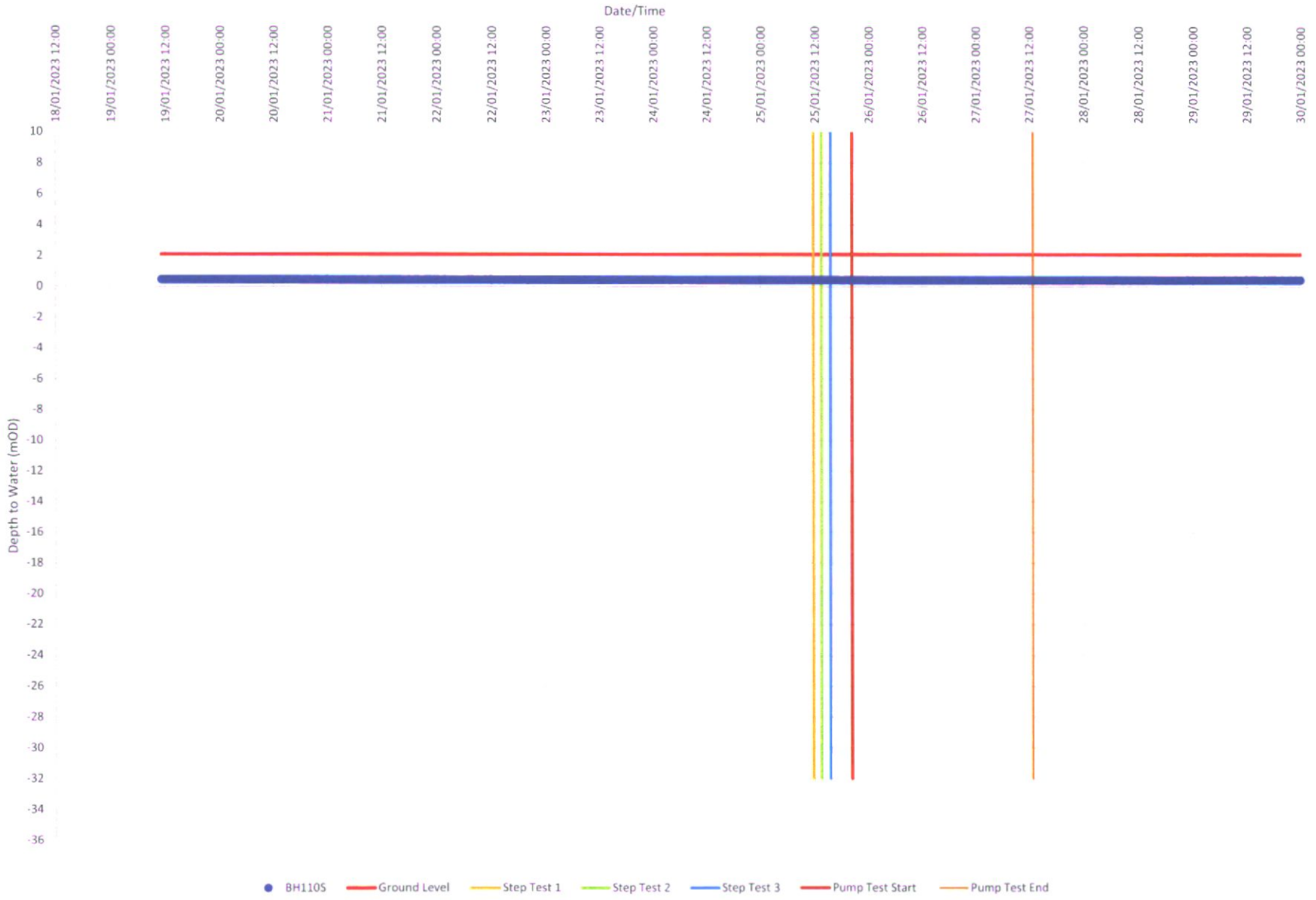
DC-BH108 25/01/2023 - 27/01/2023

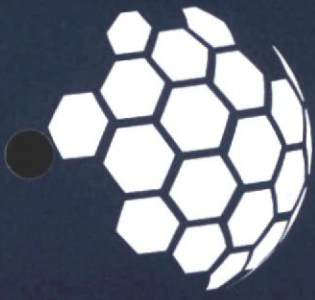


DC-BH110D 25/01/2023 - 27/01/2023



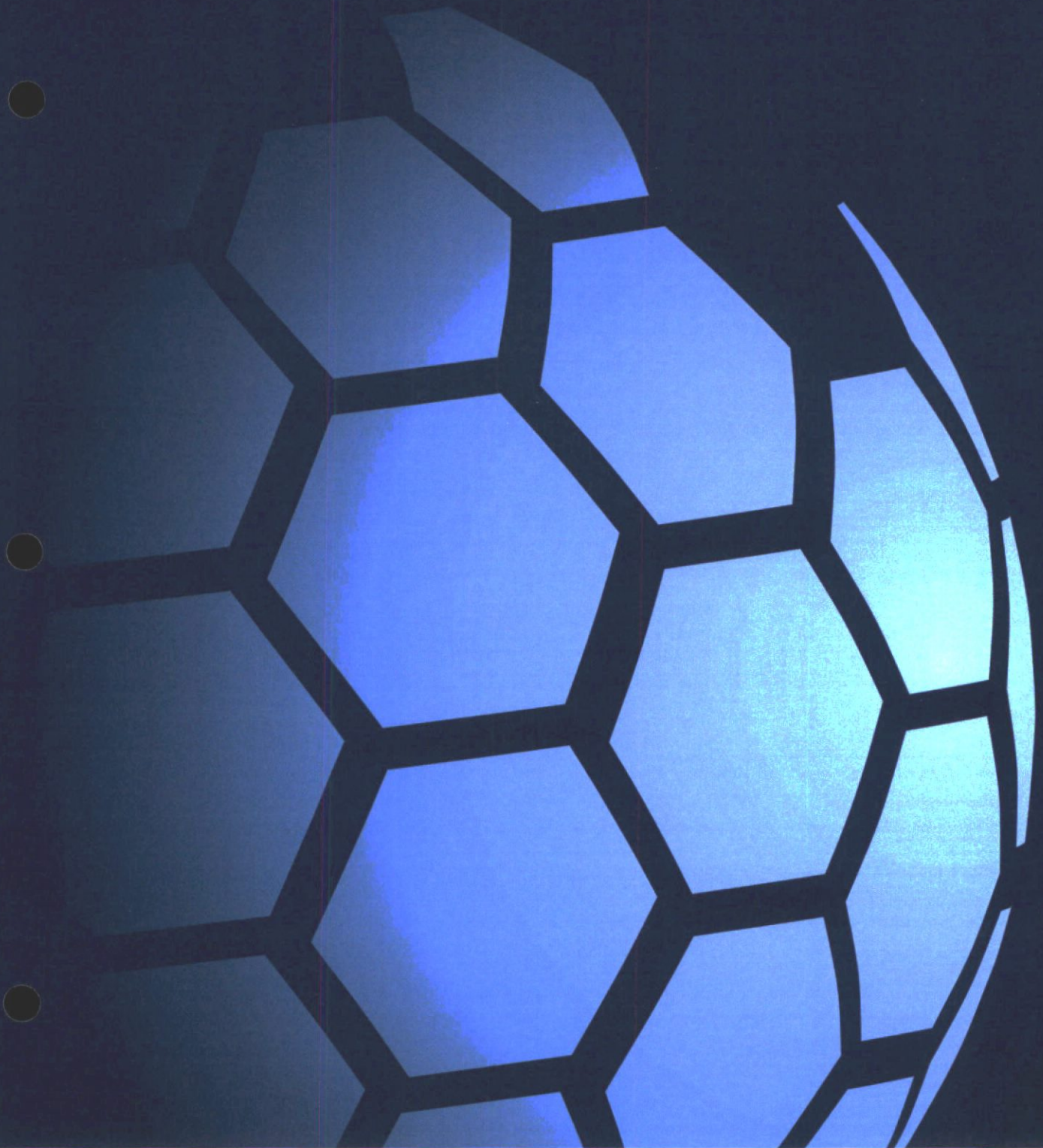
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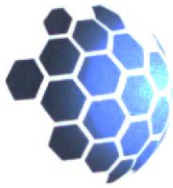




CAUSEWAY
— GEOTECH

APPENDIX E
GEOTECHNICAL LABORATORY TEST RESULTS





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

1 February 2023

Project Name:	Dublin Central Ground Investigation
Project No.:	22-0874
Client:	Dublin Central GP Ltd
Engineer:	Waterman

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 06/12/2022 and 20/12/2022.

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: Dublin Central Ground Investigation

Report Reference: Schedule 1 - FINAL

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	13
SOIL	Liquid and Plastic Limits of soil-4 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	12
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	2

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 (UKAS 2183)	BRE Test - Suite B		13
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite D		5

Summary of Classification Test Results

Project No. 22-0874	Project Name Dublin Central Ground Investigation
------------------------	---

Hole No.	Sample				Specimen Description	Density		w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		bulk	dry							
DC-BH103	10	2.50	3.00	B	Brown sandy slightly gravelly clayey SILT.			33	55	52	43	9		MH
DC-BH103	21	14.60	15.00	B	Brownish grey sandy gravelly silty CLAY.			10	49	23	13	10		CL
DC-BH103	24	18.00	19.50	C	Brownish grey sandy gravelly silty CLAY.			9.3	48	23	14	9		CL
DC-BH106	9	2.00	2.50	B	Brownish grey sandy gravelly silty CLAY.			10	45	30	19	11		CL
DC-BH106	13	5.70	6.00	B	Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.			12	53	23	15	8		CL
DC-BH106	24	14.00	14.50	B	Brownish grey sandy gravelly silty CLAY.			9.7	57	24	15	9		CL
DC-BH107	15	1.50	2.00	B	Brownish grey sandy gravelly clayey SILT.			15	44	45	29	16		MI
DC-BH107	17	3.50	4.00	B	Brownish grey slightly sandy slightly clayey subangular fine to coarse GRAVEL.			7.4						
DC-BH107	19	5.70	6.00	B	Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.			9.2	36	27	15	12		CL
DC-BH107	21	6.50	7.00	B	Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.			6.8	47	28	15	13		CL
DC-BH107	29	13.00	13.50	B	Brownish grey sandy slightly gravelly silty CLAY.			7.6	52	21	14	7		CL
DC-BH110	14	8.50	9.00	B	Brownish grey sandy slightly gravelly silty CLAY.			9.3	50	24	16	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 pyknometer
wd - water displacement	cas - Casagrande method	gj - gas jar
wi - immersion in water	1pt - single point test	

Date Printed

20/12/2022

Approved By

Stephen Watson




10122

Summary of Classification Test Results

Project No. 22-0874	Project Name Dublin Central Ground Investigation
------------------------	---

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							
DC-BH110	27	19.00	19.50	B	Brownish grey gravelly slightly clayey fine to coarse SAND.			9.9	84	21	15	6		ML/CL

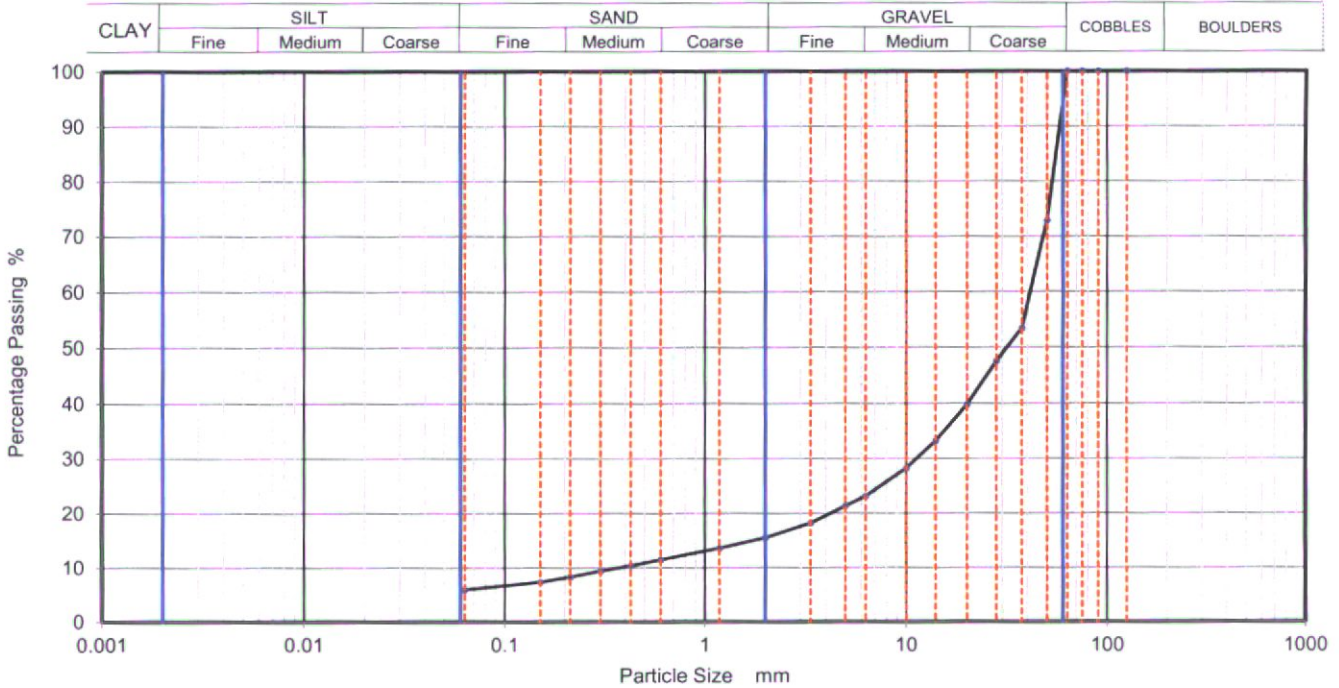
All tests performed in accordance with BS1377:1990 unless specified otherwise LAB 01R Version 6

Key Density test Liquid Limit Particle density Linear measurement unless : 4pt cone unless : sp - small pyknometer wd - water displacement cas - Casagrande method gj - gas jar wi - immersion in water 1pt - single point test	Date Printed 20/12/2022	Approved By Stephen Watson	 10122
---	---------------------------------------	--	---



PARTICLE SIZE DISTRIBUTION

Job Ref		22-0874	
Borehole/Pit No.		DC-BH103	
Sample No.		11	
Specimen Description	Brownish grey slightly sandy slightly clayey subangular fine to coarse GRAVEL.	Sample Depth (m) - Top	3.50
		Sample Depth (m) - Base	4.00
Specimen Reference	2	Specimen Depth	3.5 m
Test Method		BS1377:Part 2:1990, clause 9.2	KeyLAB ID
			Caus2022120657



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	73		
37.5	53		
28	48		
20	40		
14	33		
10	28		
6.3	23		
5	21		
3.35	18		
2	16		
1.18	14		
0.6	12		
0.425	10		
0.3	9		
0.212	8		
0.15	7		
0.063	6		

Dry Mass of sample, g 5754

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	84.5
Sand	9.5
Fines <0.063mm	6.0

Grading Analysis	
D100	mm
D60	mm 41.3
D30	mm 11.3
D10	mm 0.366
Uniformity Coefficient	110
Curvature Coefficient	8.4

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

Approved
Stephen Watson



PARTICLE SIZE DISTRIBUTION

 Job Ref **22-0874**

 Borehole/Pit No. **DC-BH103**

 Site Name **Dublin Central Ground Investigation**

 Sample No. **12**

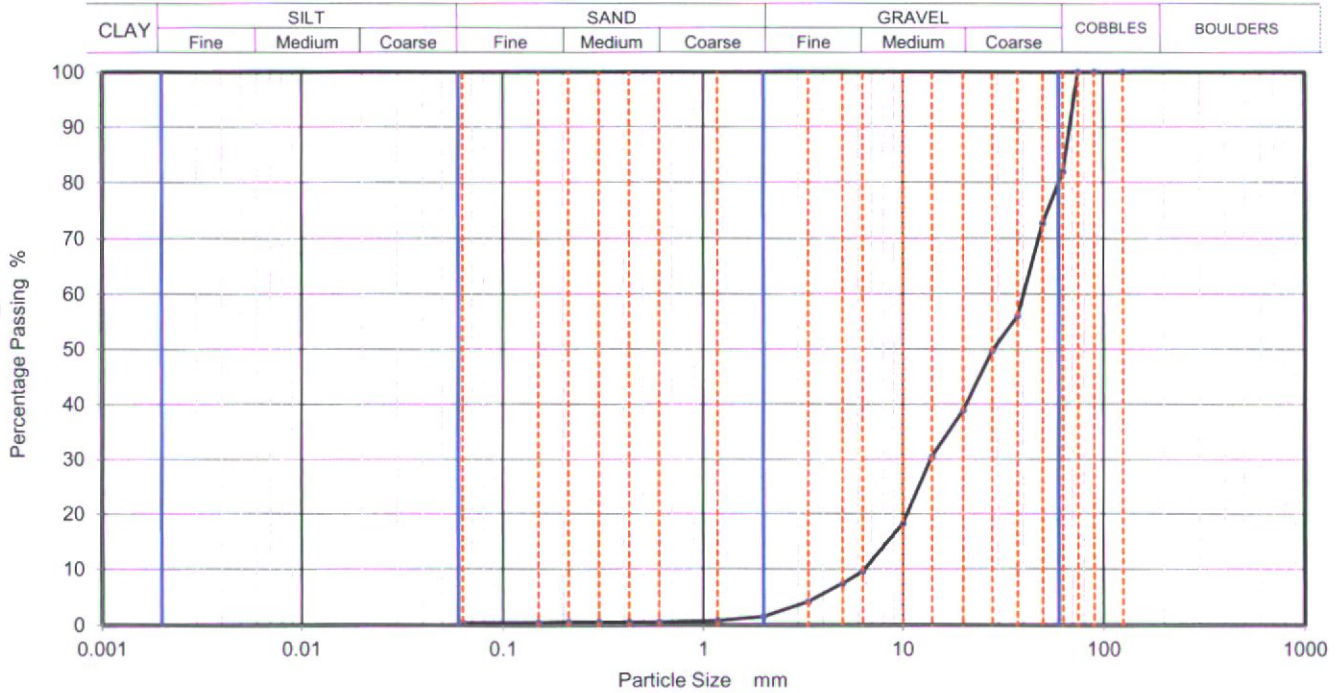
 Specimen Description **Brownish grey slightly sandy slightly clayey subangular fine to coarse GRAVEL.**

Sample Depth (m)	Top	4.50
	Base	5.00

Specimen Reference	2	Specimen Depth	4.5	m
--------------------	---	----------------	-----	---

 Sample Type **B**

 Test Method **BS1377:Part 2:1990, clause 9.2**

 KeyLAB ID **Caus2022120658**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	82		
50	73		
37.5	56		
28	50		
20	39		
14	31		
10	18		
6.3	10		
5	7		
3.35	4		
2	2		
1.18	1		
0.6	1		
0.425	1		
0.3	1		
0.212	1		
0.15	0		
0.063	0		

 Dry Mass of sample, g 4401

Sample Proportions	% dry mass
Cobbles	18.1
Gravel	80.4
Sand	1.1
Fines <0.063mm	0.0

Grading Analysis		
D100	mm	
D60	mm	40.2
D30	mm	13.8
D10	mm	6.44
Uniformity Coefficient		6.2
Curvature Coefficient		0.74

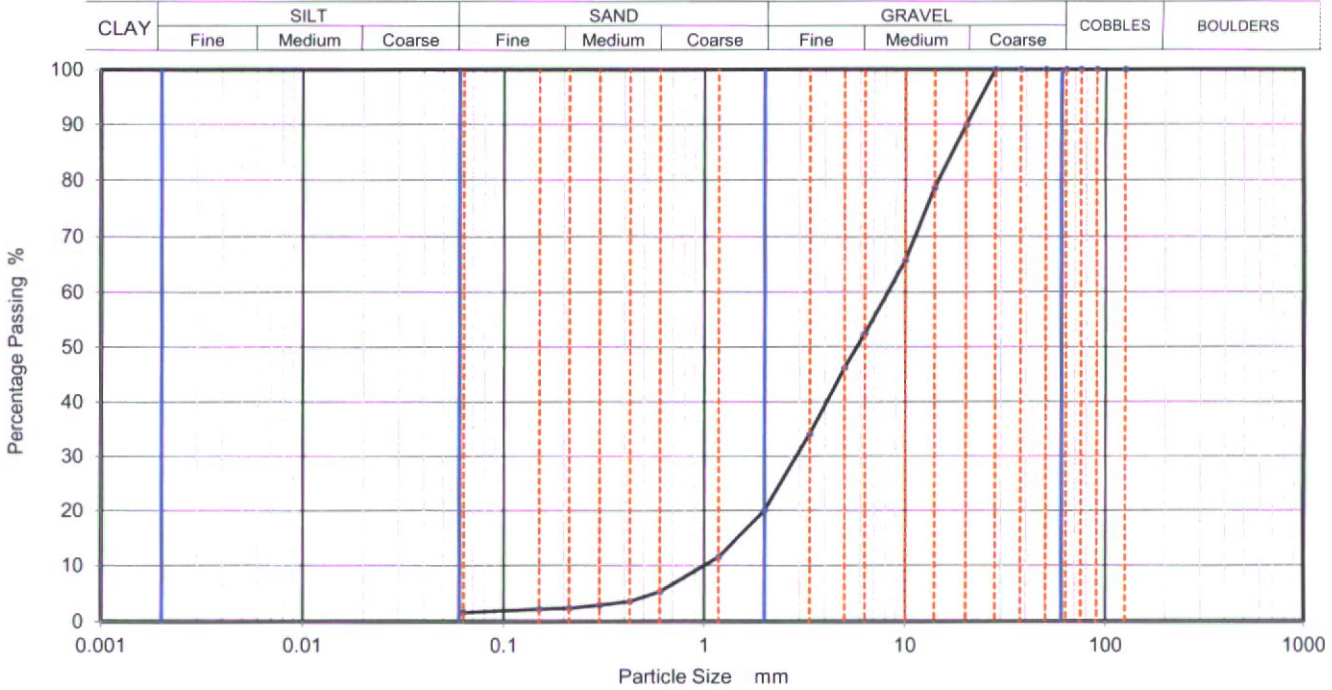
 Remarks
 Preparation and testing in accordance with BS1377-2:1990 unless noted below

Approved
Stephen Watson



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH103
Sample No.	15
Sample Depth (m)	Top 9.00
	Base 9.30
Specimen Reference	2
Specimen Depth	9 m
Sample Type	B
KeyLAB ID	Caus2022120660



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	90		
14	79		
10	66		
6.3	52		
5	46		
3.35	34		
2	20		
1.18	12		
0.6	5		
0.425	4		
0.3	3		
0.212	2		
0.15	2		
0.063	2		

Dry Mass of sample, g 1170

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	80.0
Sand	18.5
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	8.2
D30	mm	2.88
D10	mm	1
Uniformity Coefficient		8.2
Curvature Coefficient		1

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

Approved

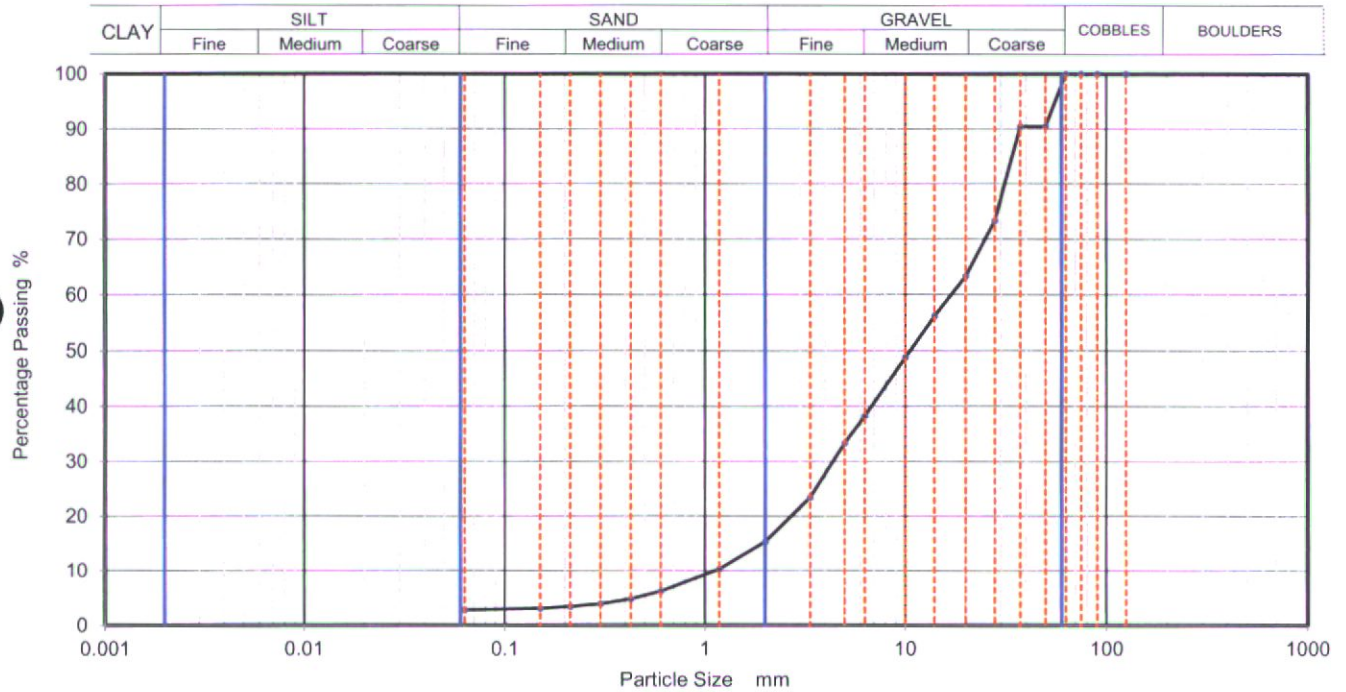
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874						
		Borehole/Pit No.		DC-BH103						
Site Name		Dublin Central Ground Investigation		Sample No.		18				
Specimen Description		Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.		Sample Depth (m)		Top		11.50		
						Base		12.00		
Specimen Reference		2		Specimen Depth		11.5		m		
				Sample Type		B				
Test Method		BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022120662		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	91		
28	73		
20	63		
14	56		
10	49		
6.3	38		
5	33		
3.35	23		
2	15		
1.18	10		
0.6	6		
0.425	5		
0.3	4		
0.212	3		
0.15	3		
0.063	3		

Dry Mass of sample, g

4566

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	84.7
Sand	12.5
Fines <0.063mm	3.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	15
Curvature Coefficient	1

Remarks

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

Approved

Stephen Watson

LAB 05R - Version 6

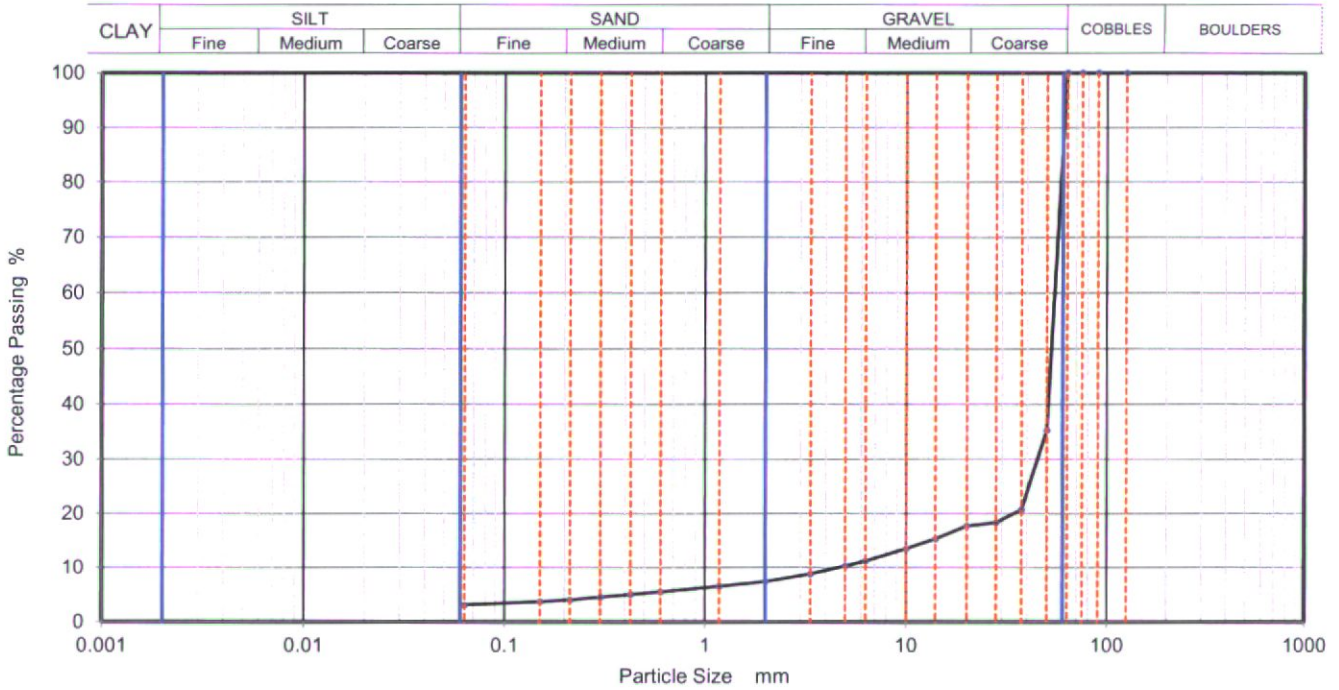


10122



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH103
Sample No.	22
Sample Depth (m)	Top 15.00
	Base 15.40
Specimen Reference	2
Specimen Depth	15 m
Sample Type	B
KeyLAB ID	Caus2022120665



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	35		
37.5	21		
28	18		
20	18		
14	15		
10	14		
6.3	11		
5	10		
3.35	9		
2	7		
1.18	7		
0.6	6		
0.425	5		
0.3	5		
0.212	4		
0.15	4		
0.063	3		

Dry Mass of sample, g 4706

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	92.6
Sand	4.3
Fines <0.063mm	3.0

Grading Analysis		
D100	mm	
D60	mm	54.6
D30	mm	45.1
D10	mm	4.6
Uniformity Coefficient		12
Curvature Coefficient		8.1

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

Approved

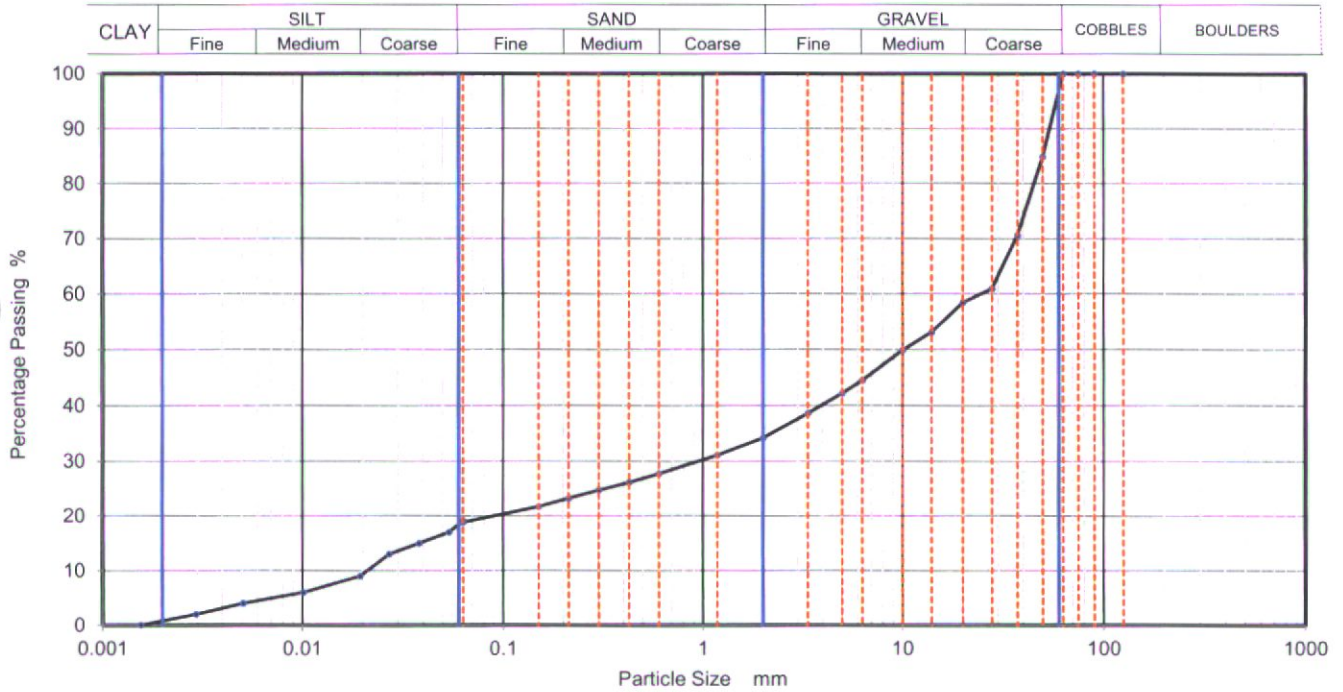
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH103		
Site Name		Dublin Central Ground Investigation		Sample No.		24
Specimen Description		Brownish grey sandy gravelly silty CLAY.		Sample Depth (m)		16.20
				Base		16.50
Specimen Reference		2	Specimen Depth		16.2	m
Test Method		BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID		Caus2022120667
		Sample Type		B		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.05367	17
75	100	0.03816	15
63	100	0.02713	13
50	85	0.01938	9
37.5	71	0.01011	6
28	61	0.00508	4
20	58	0.00295	2
14	53	0.00156	0
10	50		
6.3	45		
5	42		
3.35	39		
2	34		
1.18	31		
0.6	28		
0.425	26	Particle density (assumed) 2.65 Mg/m3	
0.3	25		
0.212	23		
0.15	22		
0.063	19		

Dry Mass of sample, g

4099

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	65.8
Sand	15.4
Silt	18.1
Clay	0.7

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	1200
Curvature Coefficient	1.8

Remarks

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

Approved

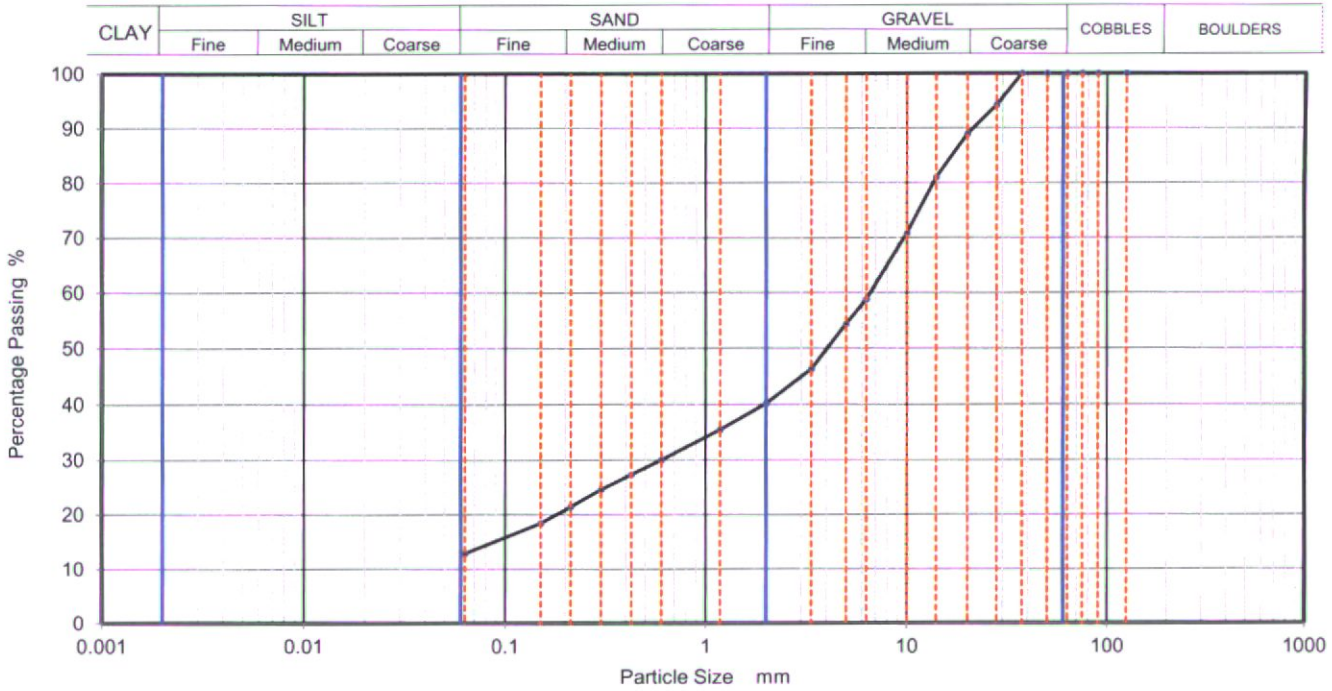
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874					
Borehole/Pit No.	DC-BH106					
Sample No.	12					
Sample Depth (m)	Top	4.50				
	Base	5.00				
Specimen Reference	2	Specimen Depth	4.5	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022120670	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	94		
20	89		
14	81		
10	71		
6.3	59		
5	54		
3.35	46		
2	40		
1.18	36		
0.6	30		
0.425	27		
0.3	25		
0.212	21		
0.15	18		
0.063	13		

Dry Mass of sample, g 3851

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	59.8
Sand	27.3
Fines <0.063mm	13.0

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

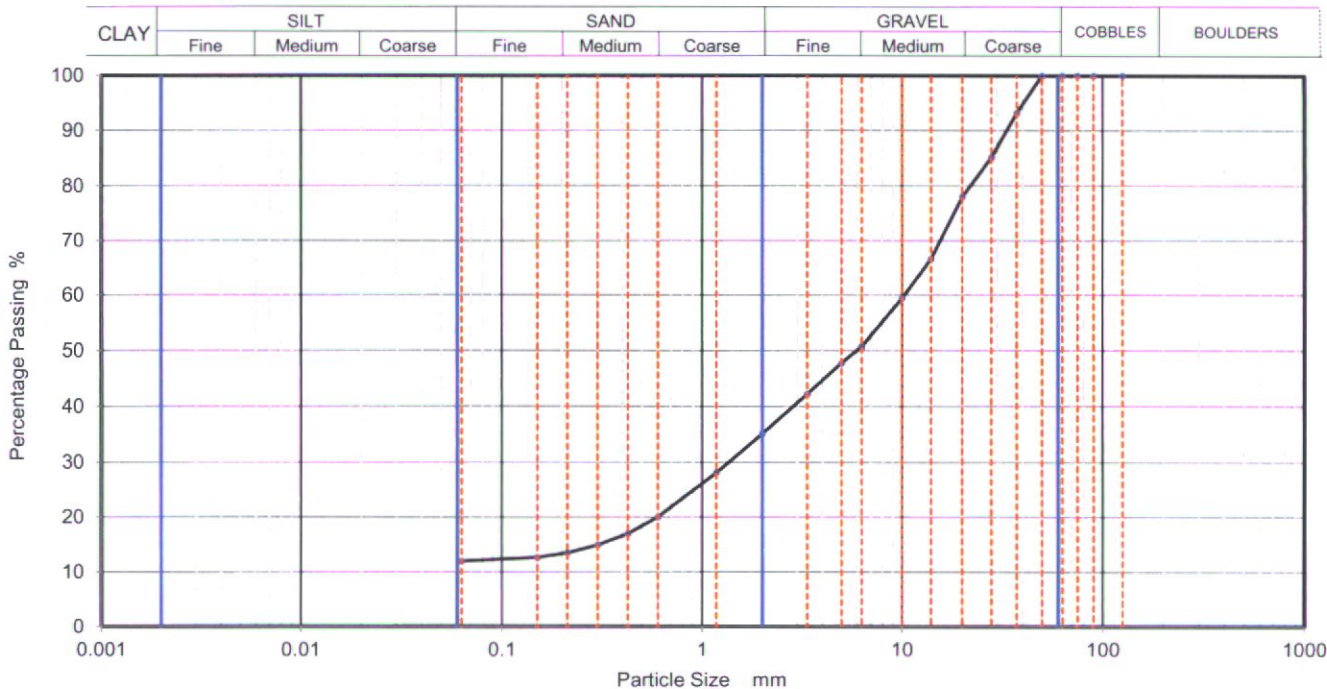
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874				
Borehole/Pit No.	DC-BH106				
Sample No.	15				
Sample Depth (m)	Top	6.50			
	Base	7.00			
Specimen Reference	2	Specimen Depth	6.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022120673



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	93		
28	85		
20	78		
14	67		
10	59		
6.3	51		
5	48		
3.35	42		
2	35		
1.18	28		
0.6	20		
0.425	17		
0.3	15		
0.212	14		
0.15	13		
0.063	12		

Dry Mass of sample, g 6192

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	64.9
Sand	23.1
Fines <0.063mm	12.0

Grading Analysis	
D100	mm
D60	mm 10.3
D30	mm 1.36
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

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

Approved

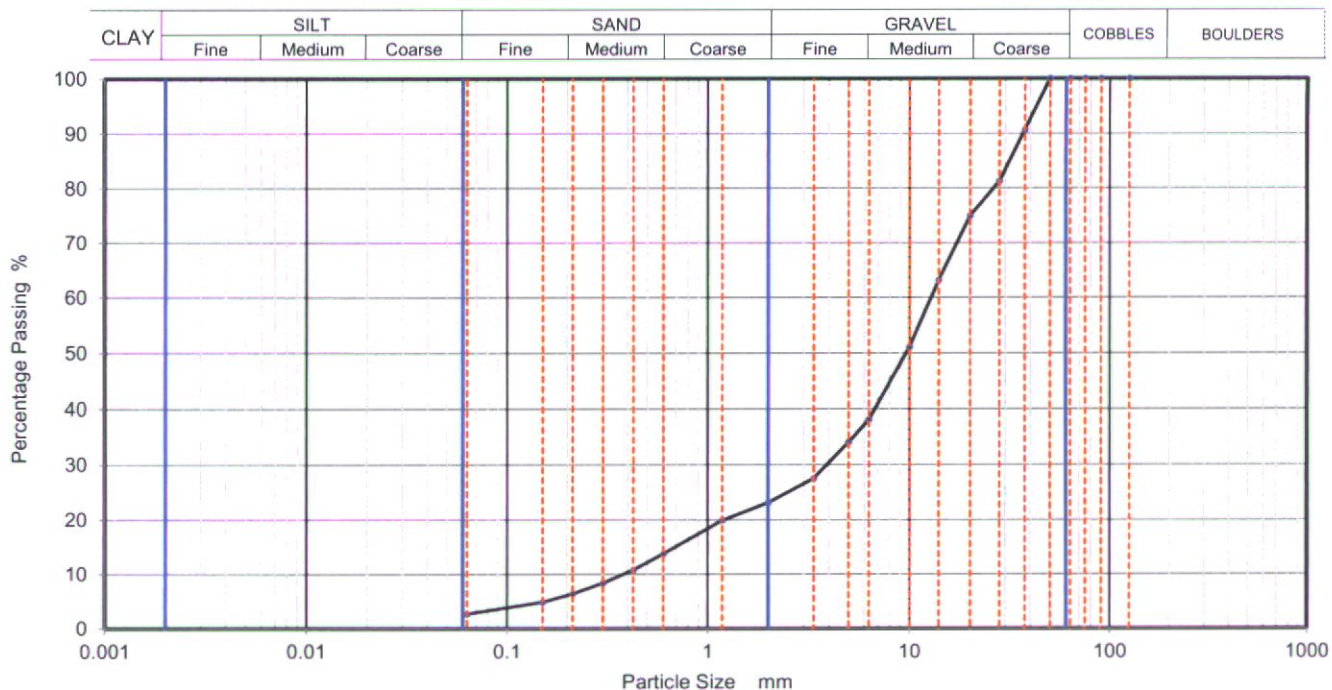
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH106
Sample No.	18
Sample Depth (m)	Top 8.50
	Base 9.00
Specimen Reference	2
Specimen Depth	8.5 m
Sample Type	B
KeyLAB ID	Caus2022120674



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	91		
28	81		
20	75		
14	63		
10	51		
6.3	38		
5	34		
3.35	28		
2	23		
1.18	20		
0.6	14		
0.425	11		
0.3	8		
0.212	6		
0.15	5		
0.063	3		

Dry Mass of sample, g 2912

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	76.9
Sand	20.4
Fines <0.063mm	3.0

Grading Analysis	
D100	mm
D60	mm 12.8
D30	mm 3.9
D10	mm 0.377
Uniformity Coefficient	34
Curvature Coefficient	3.1

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

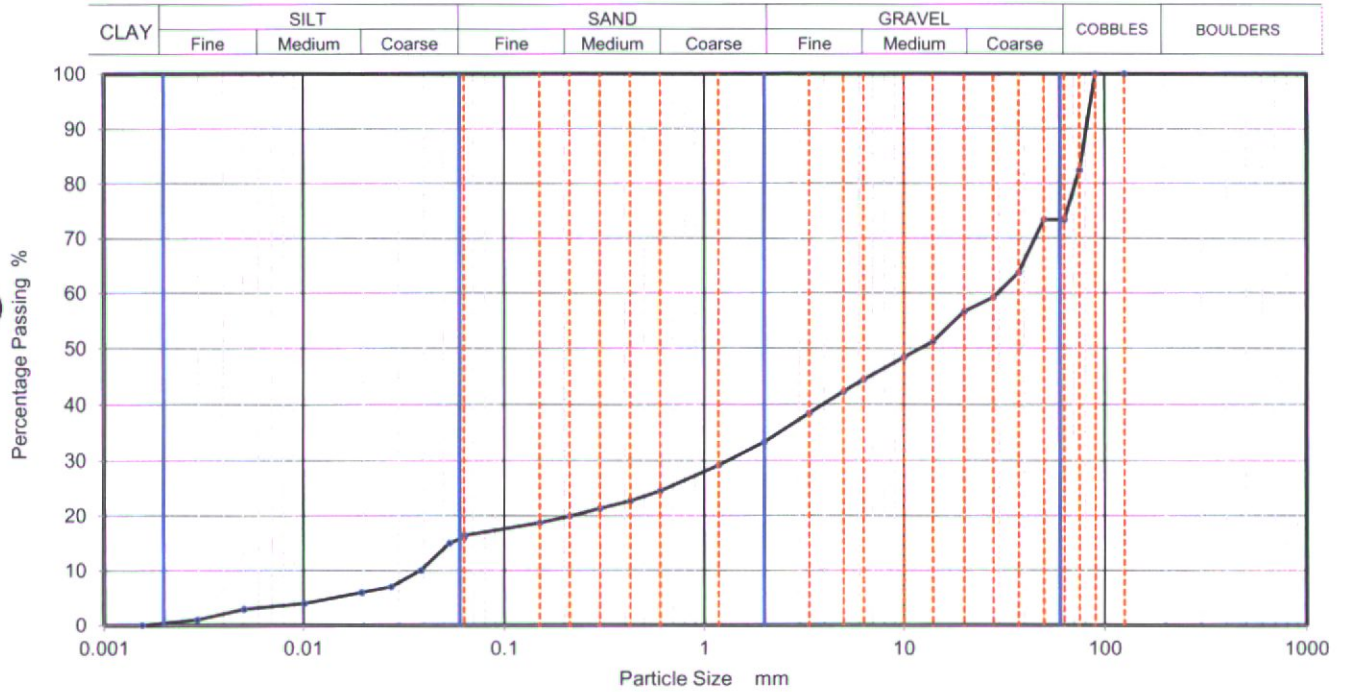
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874					
		Borehole/Pit No.		DC-BH106					
Site Name		Dublin Central Ground Investigation		Sample No.		20			
Specimen Description		Brownish grey sandy gravelly silty CLAY.		Sample Depth (m)		Top		10.50	
						Base		11.00	
Specimen Reference		2		Specimen Depth		10.5		m	
				Sample Type		B			
Test Method		BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID		Caus2022120676	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	100	0.05337	15
75	82	0.03836	10
63	73	0.02741	7
50	73	0.01949	6
37.5	64	0.01011	4
28	59	0.00508	3
20	57	0.00295	1
14	51	0.00156	0
10	48		
6.3	44		
5	42		
3.35	39		
2	33		
1.18	29		
0.6	25	Particle density (assumed)	
0.425	23	2.65 Mg/m3	
0.3	21		
0.212	20		
0.15	19		
0.063	16		

Dry Mass of sample, g

5562

Sample Proportions	% dry mass
Cobbles	26.6
Gravel	40.0
Sand	16.9
Silt	15.9
Clay	0.6

Grading Analysis		
D100	mm	
D60	mm	29.6
D30	mm	1.31
D10	mm	0.0365
Uniformity Coefficient		810
Curvature Coefficient		1.6

Remarks

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

Approved

Stephen Watson

LAB 05R - Version 6



10122



PARTICLE SIZE DISTRIBUTION

Job Ref **22-0874**

Borehole/Pit No. **DC-BH107**

Site Name **Dublin Central Ground Investigation**

Sample No. **17**

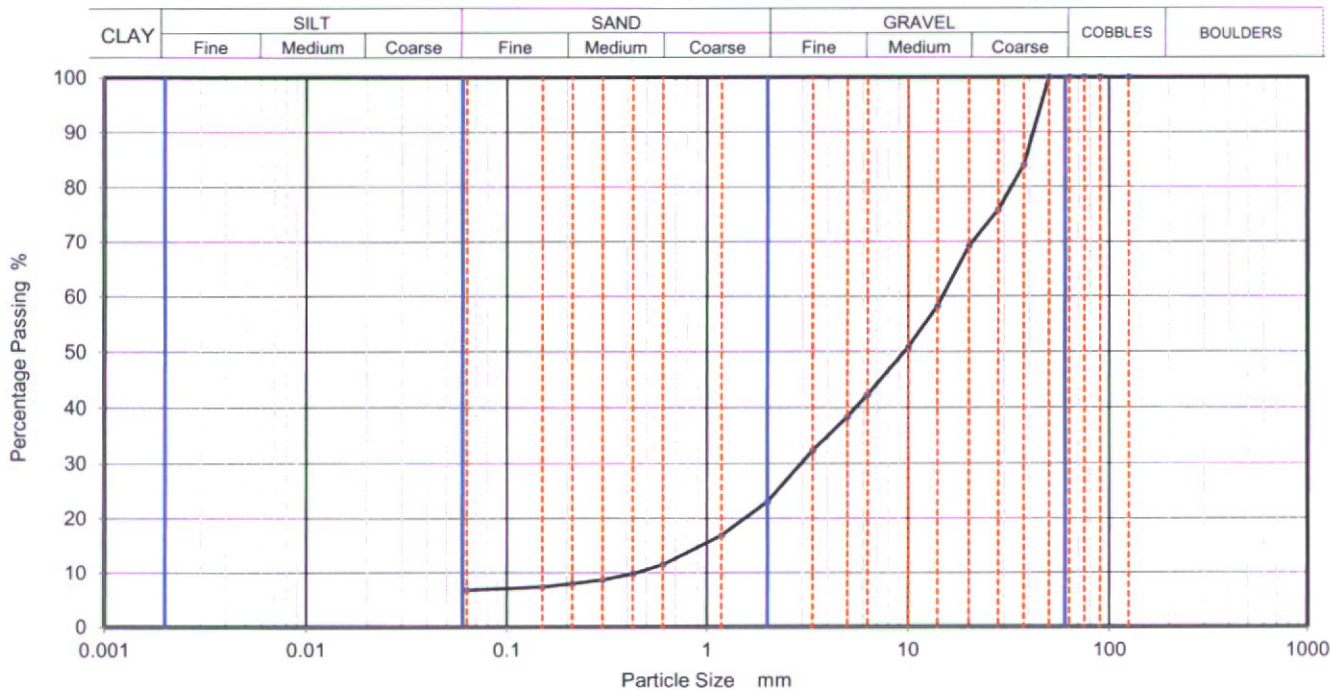
Specimen Description **Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.**

Sample Depth (m)	Top	3.50
	Base	4.00

Specimen Reference	6	Specimen Depth	3.5	m	Sample Type	B
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Test Method **BS1377:Part 2:1990, clause 9.2**

KeyLAB ID **Caus2022120681**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	84		
28	76		
20	69		
14	58		
10	51		
6.3	42		
5	38		
3.35	32		
2	23		
1.18	17		
0.6	12		
0.425	10		
0.3	9		
0.212	8		
0.15	7		
0.063	7		

Dry Mass of sample, g **5638**

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	77.0
Sand	16.2
Fines <0.063mm	7.0

Grading Analysis		
D100	mm	
D60	mm	14.9
D30	mm	2.95
D10	mm	0.442
Uniformity Coefficient		34
Curvature Coefficient		1.3

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

Approved
Stephen Watson

LAB 05R - Version 6



10122



PARTICLE SIZE DISTRIBUTION

Job Ref **22-0874**

Borehole/Pit No. **DC-BH107**

Site Name **Dublin Central Ground Investigation**

Sample No. **20**

Specimen Description **Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL.**

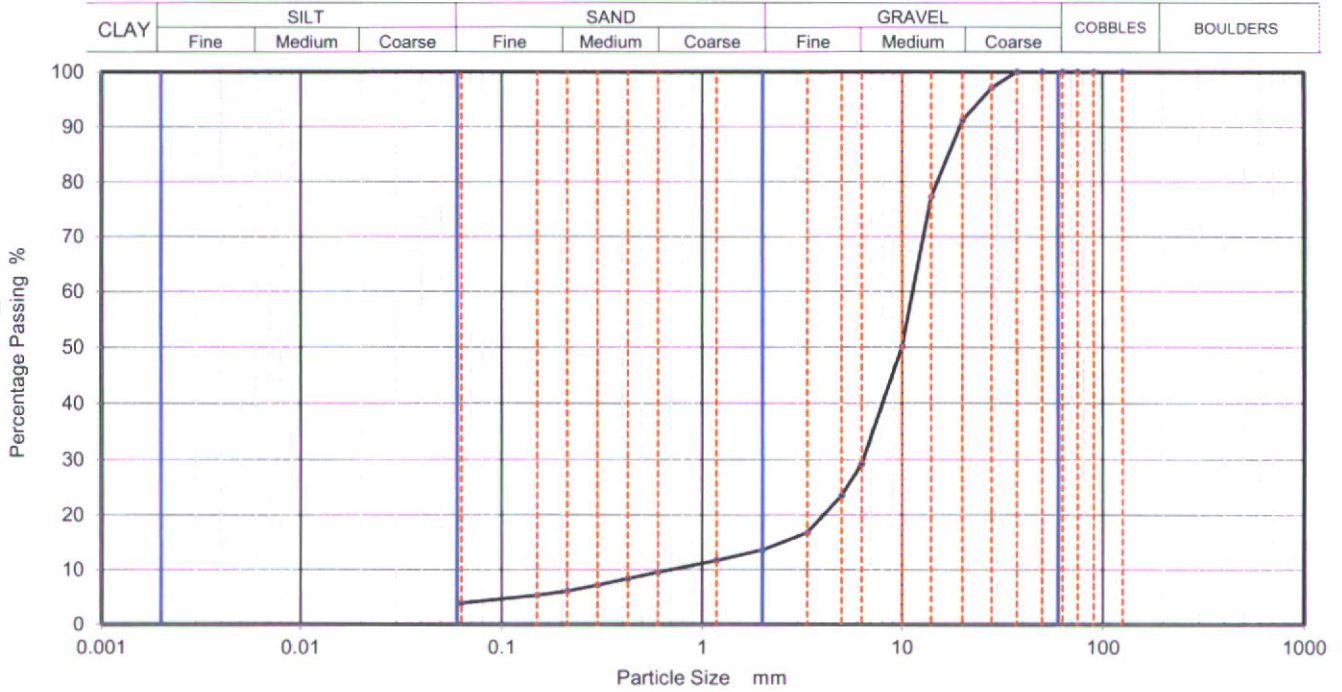
Sample Depth (m)	Top	6.00
	Base	6.40

Specimen Reference	2	Specimen Depth	6	m
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Sample Type **B**

Test Method **BS1377:Part 2:1990, clause 9.2**

KeyLAB ID **Caus2022120684**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	97		
20	91		
14	77		
10	50		
6.3	29		
5	24		
3.35	17		
2	14		
1.18	12		
0.6	10		
0.425	8		
0.3	7		
0.212	6		
0.15	5		
0.063	4		

Dry Mass of sample, g 3390

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	86.4
Sand	9.7
Fines <0.063mm	4.0

Grading Analysis	
D100	mm
D60	mm 11.3
D30	mm 6.42
D10	mm 0.703
Uniformity Coefficient	16
Curvature Coefficient	5.2

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

Approved

Stephen Watson

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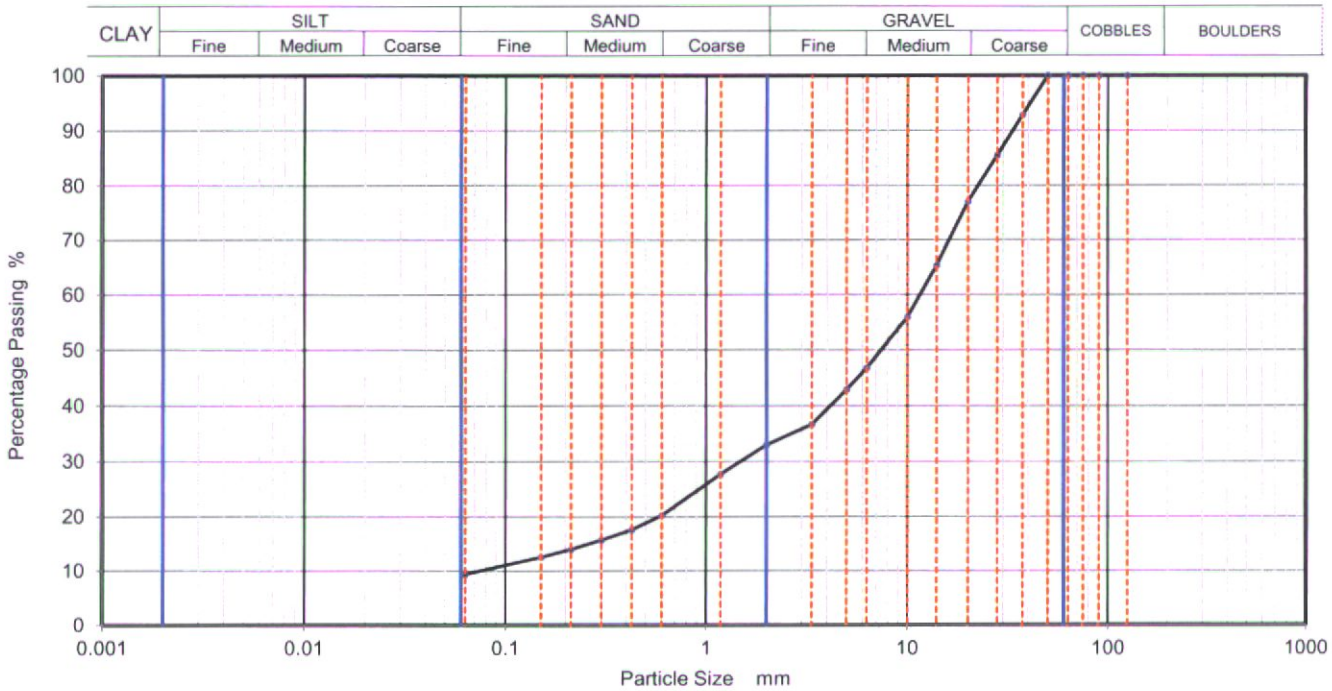


10122



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH107
Sample No.	26
Sample Depth (m)	Top 10.50
	Base 11.00
Specimen Reference	2
Specimen Depth	10.5 m
Sample Type	B
KeyLAB ID	Caus2022120687



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	93		
28	86		
20	77		
14	65		
10	56		
6.3	47		
5	43		
3.35	37		
2	33		
1.18	28		
0.6	20		
0.425	18		
0.3	16		
0.212	14		
0.15	13		
0.063	9		

Dry Mass of sample, g 5384

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	67.0
Sand	23.6
Fines <0.063mm	9.0

Grading Analysis	
D100	mm
D60	mm 11.6
D30	mm 1.48
D10	mm 0.0745
Uniformity Coefficient	160
Curvature Coefficient	2.5

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

Approved

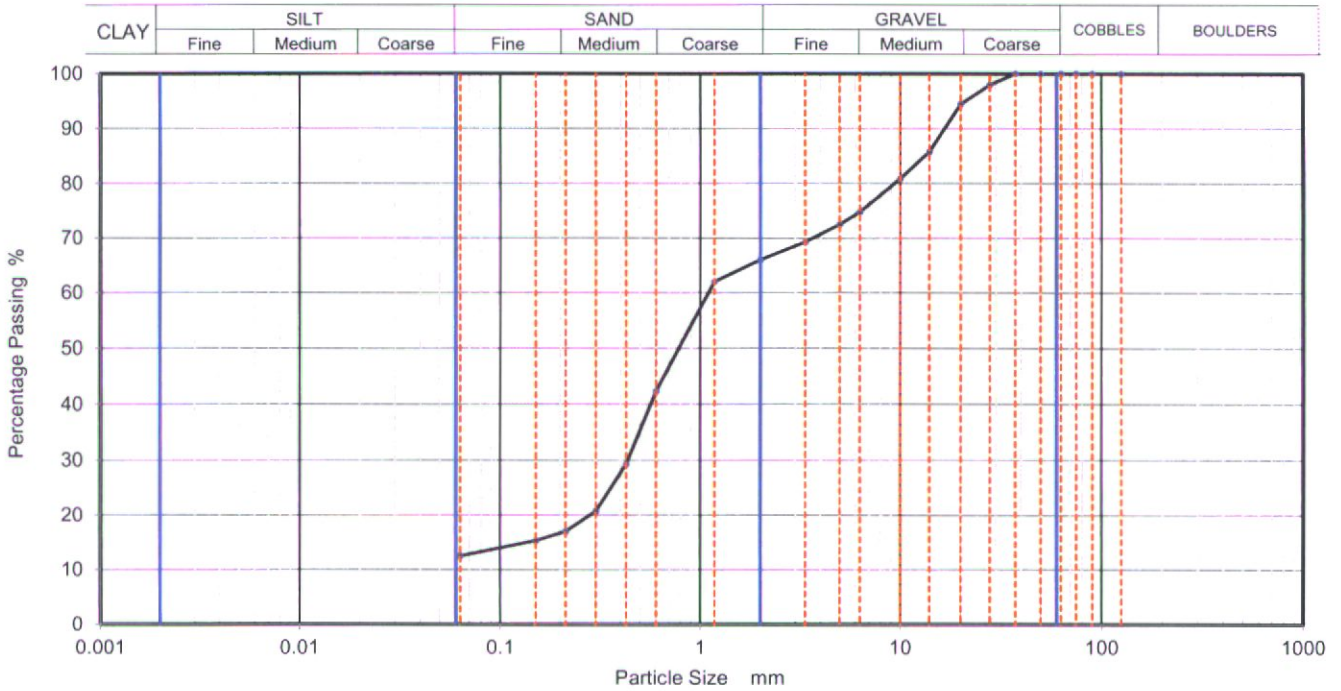
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH107		
Site Name		Dublin Central Ground Investigation		Sample No.		28
Specimen Description		Brownish grey gravelly slightly clayey fine to coarse SAND.		Sample Depth (m)		12.00
				Top		12.50
Specimen Reference		2	Specimen Depth		12	m
				Sample Type		B
Test Method		BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022120688



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	95		
14	86		
10	81		
6.3	75		
5	73		
3.35	69		
2	66		
1.18	62		
0.6	42		
0.425	29		
0.3	21		
0.212	17		
0.15	15		
0.063	13		

Dry Mass of sample, g

4958

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.0
Sand	53.5
Fines <0.063mm	13.0

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

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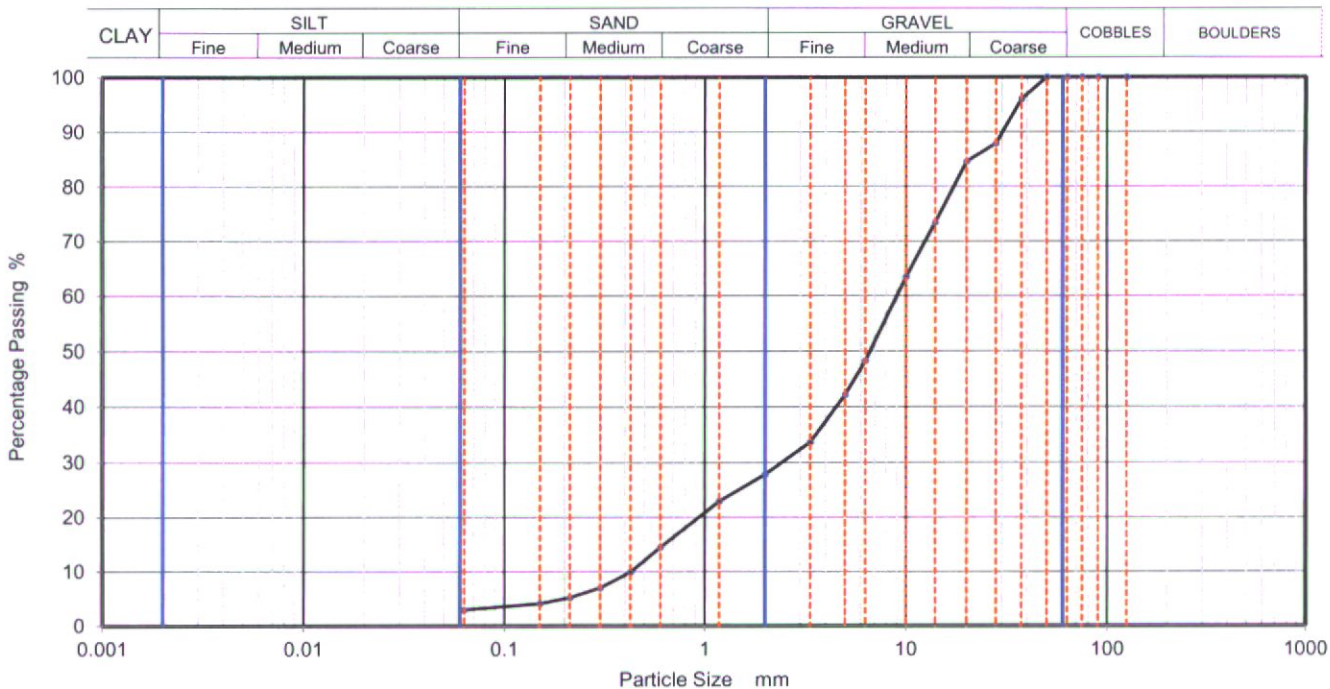


10122



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH110
Sample No.	9
Sample Depth (m)	Top 4.00
	Base 4.50
Specimen Reference	2
Specimen Depth	4 m
Sample Type	B
KeyLAB ID	Caus2022120692



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	96		
28	88		
20	85		
14	73		
10	63		
6.3	48		
5	42		
3.35	34		
2	28		
1.18	23		
0.6	15		
0.425	10		
0.3	7		
0.212	5		
0.15	4		
0.063	3		

Dry Mass of sample, g 6415

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	72.2
Sand	24.8
Fines <0.063mm	3.0

Grading Analysis		
D100	mm	
D60	mm	9.02
D30	mm	2.42
D10	mm	0.427
Uniformity Coefficient		21
Curvature Coefficient		1.5

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

Approved

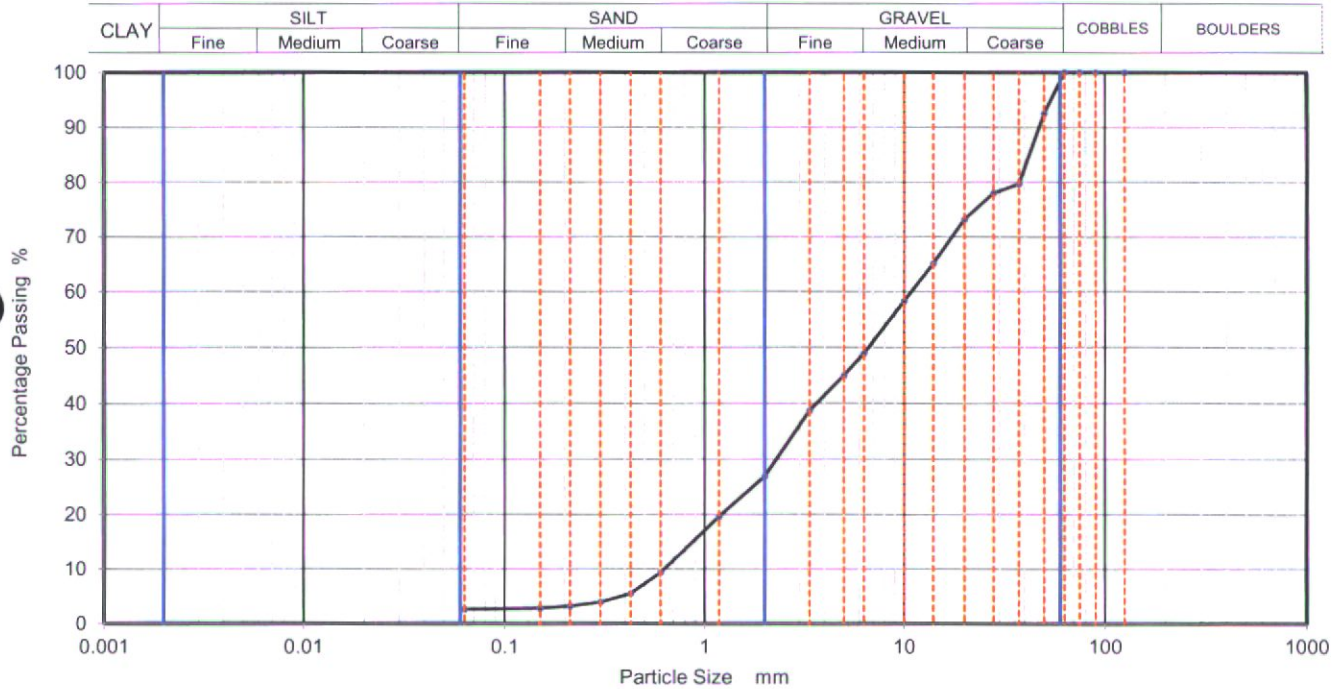
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH110		
Site Name		Dublin Central Ground Investigation		Sample No.		11
Specimen Description		Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		Sample Depth (m)		5.50
				Top		6.00
Specimen Reference		2	Specimen Depth		5.5	m
				Sample Type		B
Test Method		BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022120694



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	93		
37.5	80		
28	78		
20	73		
14	65		
10	58		
6.3	49		
5	45		
3.35	39		
2	27		
1.18	20		
0.6	9		
0.425	6		
0.3	4		
0.212	3		
0.15	3		
0.063	3		

Dry Mass of sample, g

5041

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	73.1
Sand	24.4
Fines <0.063mm	3.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	17
Curvature Coefficient	0.77

Remarks

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

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10122



PARTICLE SIZE DISTRIBUTION

Job Ref **22-0874**

Borehole/Pit No. **DC-BH110**

Site Name **Dublin Central Ground Investigation**

Sample No. **15**

Specimen Description **Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.**

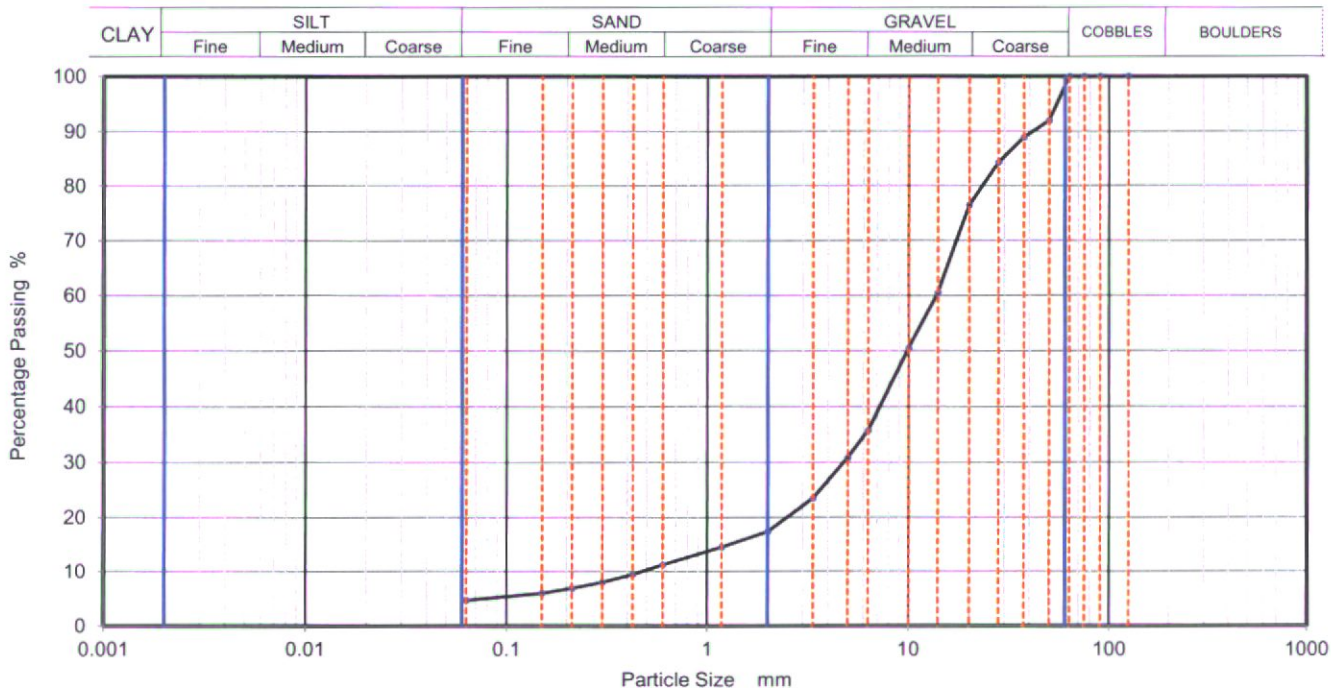
Sample Depth (m)	Top	9.50
	Base	10.00

Specimen Reference	2	Specimen Depth	9.5	m
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Sample Type **B**

Test Method **BS1377:Part 2:1990, clause 9.2**

KeyLAB ID **Caus2022120696**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	92		
37.5	89		
28	84		
20	77		
14	61		
10	51		
6.3	36		
5	31		
3.35	24		
2	17		
1.18	15		
0.6	11		
0.425	9		
0.3	8		
0.212	7		
0.15	6		
0.063	5		

Dry Mass of sample, g

5711

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	82.6
Sand	12.8
Fines <0.063mm	5.0

Grading Analysis	
D100	mm
D60	mm 13.8
D30	mm 4.78
D10	mm 0.478
Uniformity Coefficient	29
Curvature Coefficient	3.5

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

Approved
Stephen Watson



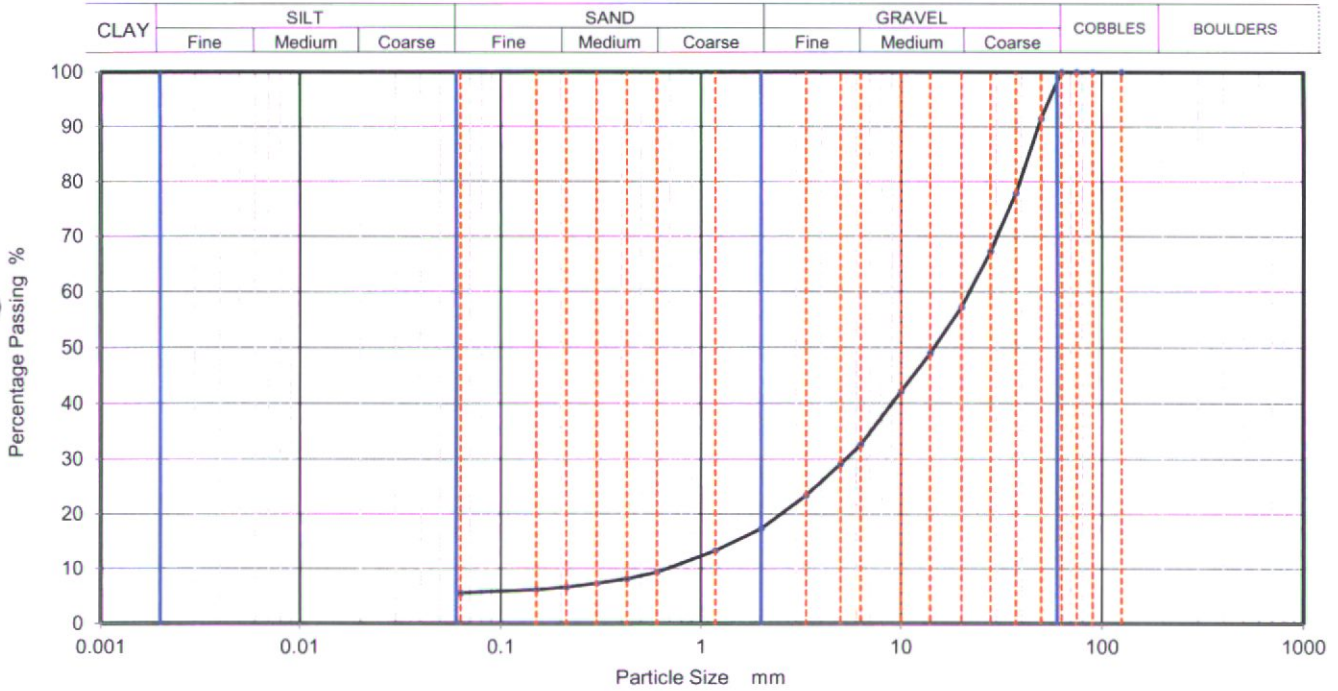
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10122



PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH110		
Site Name		Dublin Central Ground Investigation		Sample No.		19
Specimen Description		Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		Sample Depth (m)		12.50
				Base		13.00
Specimen Reference		2	Specimen Depth		12.5	m
Test Method		BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022120698
				Sample Type		B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	92		
37.5	78		
28	67		
20	57		
14	49		
10	42		
6.3	33		
5	29		
3.35	23		
2	17		
1.18	13		
0.6	9		
0.425	8		
0.3	7		
0.212	7		
0.15	6		
0.063	6		

Dry Mass of sample, g

4500

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	82.7
Sand	11.8
Fines <0.063mm	5.0

Grading Analysis		
D100	mm	
D60	mm	22
D30	mm	5.3
D10	mm	0.678
Uniformity Coefficient		32
Curvature Coefficient		1.9

Remarks

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

Approved

Stephen Watson

LAB 05R - Version 6



10122



PARTICLE SIZE DISTRIBUTION

Job Ref **22-0874**

Borehole/Pit No. **DC-BH110**

Site Name **Dublin Central Ground Investigation**

Sample No. **21**

Specimen Description **Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.**

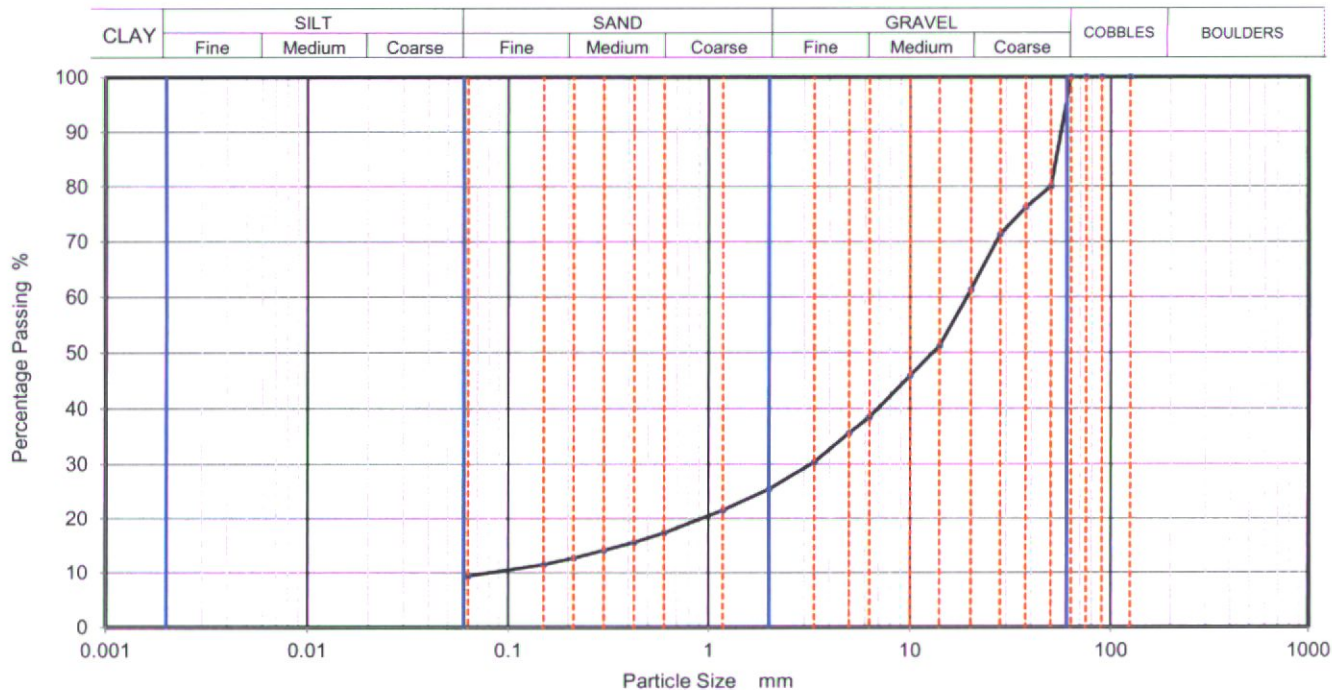
Sample Depth (m)	Top	13.50
	Base	14.00

Specimen Reference	2	Specimen Depth	13.5	m
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Sample Type **B**

Test Method **BS1377:Part 2:1990, clause 9.2**

KeyLAB ID **Caus2022120699**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	80		
37.5	76		
28	71		
20	61		
14	51		
10	46		
6.3	39		
5	36		
3.35	30		
2	25		
1.18	22		
0.6	17		
0.425	16		
0.3	14		
0.212	13		
0.15	12		
0.063	9		

Dry Mass of sample, g **4800**

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	74.6
Sand	16.0
Fines <0.063mm	9.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	240
Curvature Coefficient	6.8

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

Approved

Stephen Watson

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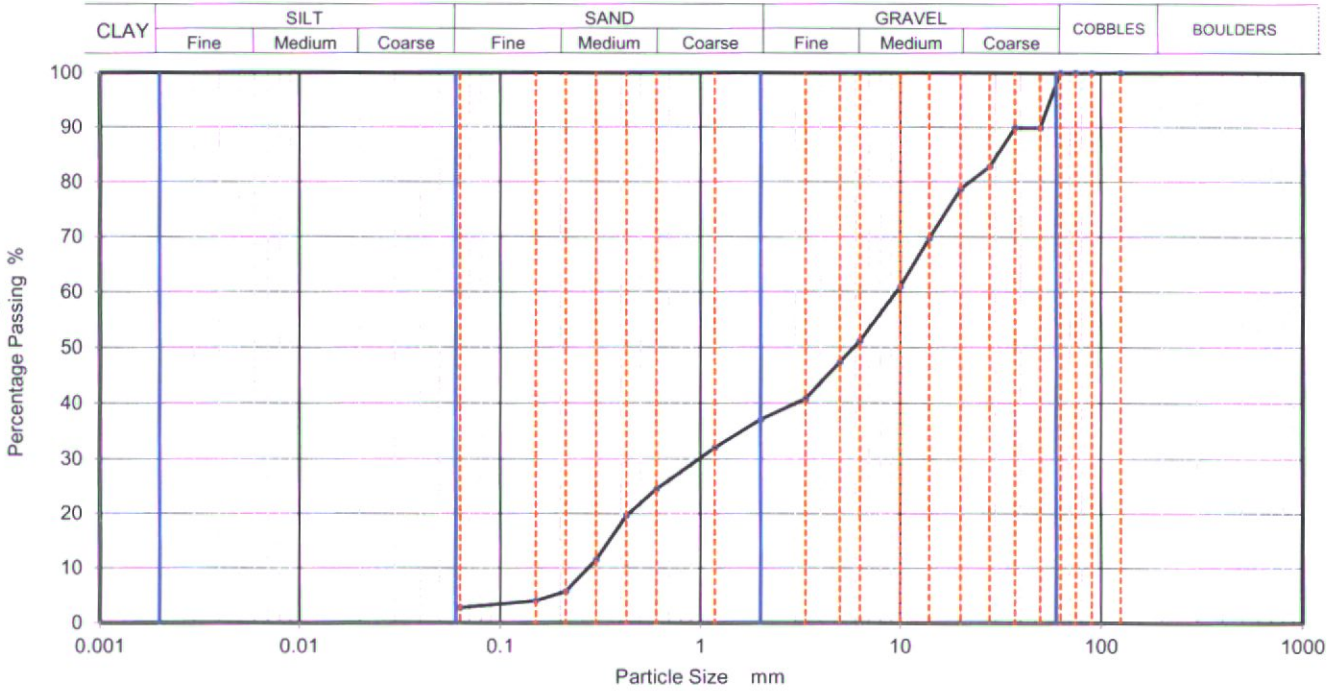
10122



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874	
Borehole/Pit No.	DC-BH110	
Sample No.	24	
Sample Depth (m)	Top	16.50
	Base	17.00
Sample Type	B	
KeyLAB ID	Caus20221206101	

Site Name	Dublin Central Ground Investigation		
Specimen Description	Brownish grey gravelly slightly clayey fine to coarse SAND.		
Specimen Reference	2	Specimen Depth	16.5 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	90		
37.5	90		
28	83		
20	79		
14	70		
10	61		
6.3	51		
5	47		
3.35	41		
2	37		
1.18	32		
0.6	25		
0.425	20		
0.3	12		
0.212	6		
0.15	4		
0.063	3		

Dry Mass of sample, g 5139

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	62.9
Sand	34.3
Fines <0.063mm	3.0

Grading Analysis	
D100	mm
D60	mm 9.57
D30	mm 0.982
D10	mm 0.274
Uniformity Coefficient	35
Curvature Coefficient	0.37

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

Approved

Stephen Watson





Amended Report

Report No.: 22-47695-2

Initial Date of Issue: 19-Dec-2022 **Date of Re-Issue:** 06-Jan-2023

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
Darren O'Mahony
Dean McCloskey
Gabriella Horan
Joe Gervin
John Cameron
Lucy Newland
Martin Gardiner
Matthew Gilbert
Neil Haggan
Paul Dunlop
Sean Ross
Stephen Franey
Stephen McCracken

Project: 22-0874 Dublin Central Ground Investigation


Quotation No.: **Date Received:** 13-Dec-2022

Order No.: COLM HURLEY **Date Instructed:** 13-Dec-2022

No. of Samples: 18

Turnaround (Wkdays): 14 **Results Due:** 06-Jan-2023

Date Approved: 06-Jan-2023

Approved By:


Details: Stuart Henderson, Technical Manager

Results - Soil

Project: 22-0874 Dublin Central Ground Investigation

Client: Causeway Geotech Ltd	Chemtest Job No.:		22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	
Quotation No.:	Chemtest Sample ID.:		1563403	1563404	1563405	1563406	1563407	1563408	1563409	1563410	1563411		
Order No.: COLM HURLEY	Client Sample Ref.:		10	13	16	19	23	9	14	19	23		
	Sample Location:		DC-BH103	DC-BH103	DC-BH103	DC-BH103	DC-BH103	DC-BH106	DC-BH106	DC-BH106	DC-BH106		
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):		2.50	6.50	9.50	12.50	15.50	2.00	6.00	9.50	13.00		
	Bottom Depth (m):		3.00	7.00	10.00	13.00	16.00	2.50	6.40	10.00	13.50		
	Date Sampled:		12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022		
Determinand	Accred.	SOP	Units	LOD									
Moisture	N	2030	%	0.020	24	2.2	3.3	4.8	5.1	9.7	7.4	5.5	7.3
Soil Colour	N	2040		N/A	Brown					Brown			
Other Material	N	2040		N/A	Stones					Stones			
Soil Texture	N	2040		N/A	Sand					Loam			
pH (2.5:1)	N	2010		4.0	8.8	8.4	8.3	8.4	8.4	8.9	8.6	9.2	8.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.085	< 0.010	< 0.010	< 0.010	< 0.010	0.10	< 0.010	0.11	< 0.010
Total Sulphur	M	2175	%	0.010	0.13	0.034	0.042	0.040	0.11	0.10	0.054	0.076	0.084
Sulphate (Acid Soluble)	U	2430	%	0.010	0.14	0.019	0.013	0.010	0.010	0.036	0.012	0.078	0.010

Results - Soil

Project: 22-0874 Dublin Central Ground Investigation

Client: Causeway Geotech Ltd	Chemtest Job No.:		22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	22-47695	
Quotation No.:	Chemtest Sample ID.:		1563412	1563413	1563414	1563415	1563416	1563417	1563418	1563419	1563420		
Order No.: COLM HURLEY	Client Sample Ref.:		15	16	22	30	8	10	17				
	Sample Location:		DC-BH107	DC-BH107	DC-BH107	DC-BH107	DC-BH110	DC-BH110	DC-BH110	DC-BH110	DC-BH110	DC-BH110	
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
	Top Depth (m):		1.50	2.50	7.50	14.00	3.00	4.5	11.50	14.50	18.20		
	Bottom Depth (m):		2.00	3.00	8.00	14.50	3.50	5.00	12.00				
	Date Sampled:		12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	12-Dec-2022	
Determinand	Accred.	SOP	Units	LOD									
Moisture	N	2030	%	0.020	11	14	7.3	6.8	5.2	3.9	6.3	8.8	5.7
Soil Colour	N	2040		N/A	Brown	Brown			Brown				
Other Material	N	2040		N/A	Stones	Stones			Stones				
Soil Texture	N	2040		N/A	Loam	Loam			Sand				
pH (2.5:1)	N	2010		4.0	8.3	8.0	8.7	8.6	9.4	8.8	8.3	8.5	8.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.071	0.046	< 0.010	0.017	0.14	< 0.010	0.052	0.022	0.024
Total Sulphur	M	2175	%	0.010	0.077	0.057	0.037	0.15	0.076	0.046	0.18	0.042	0.071
Sulphate (Acid Soluble)	U	2430	%	0.010	0.040	0.041	0.010	0.022	0.037	0.011	< 0.010	0.036	0.041

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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by 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

LABORATORY RESTRICTION REPORT

Project Reference	22-0874	To	Colm Hurley
Project Name	Dublin Central GI	Position	Project Manager
TR reference	22-0874 /	From	Joseph Nicholl
		Position	Laboratory Quality Manager

The following sample(s) and test(s) are restricted as detailed below. Could you please complete the "Required Action" column and return the completed form to the laboratory.

Hole Number	Sample			Test Type	Reason for Restriction	Required Action
	Number	Depth (m)	Type			
DC-BH107	17	3.50	B	Atterberg limits	Unsuitable material for test - GRAVEL	CANCEL
DC-BH107	31	4.50	U	UU Triaxial	Unsuitable material for test - GRAVEL	CANCEL

For electronic reporting a form of electronic signature or printed name is acceptable

Laboratory Signature Joseph Nicholl	Project Manager Signature Colm Hurley
Date 13 December 2022	Date



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Company Number: NI610766

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Registered in Ireland
Company Number: 633786

www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS LABORATORY TEST REPORT

1 February 2023

Project Name:	Dublin Central Ground Investigation
Project No.:	22-0874
Client:	Dublin Central GP Ltd
Engineer:	Waterman

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 06/01/2023 and 01/02/2023.

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: Dublin Central Ground Investigation

Report Reference: Schedule 2 - FINAL

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	16
SOIL	Liquid and Plastic Limits of soil-4 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	16
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	18
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	2

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 (UKAS 2183)	BRE Test - Suite B		8
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite D		1

Summary of Classification Test Results

Project No.		Project Name												
22-0874		Dublin Central Ground Investigation												
Hole No.	Sample				Specimen Description	Density		w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		bulk	dry							
DC-BH101	18	14.50		B	Greyish brown sandy slightly gravelly silty CLAY.			10	60	22 -1pt	13	9		CL
DC-BH101	19	15.00		D	Greyish brown sandy slightly gravelly silty CLAY.			19	81	26 -1pt	14	12		CL
DC-BH101	22	18.00	19.50	C	Greyish brown sandy slightly gravelly silty CLAY.			18	95	43 -1pt	18	25		CI
DC-BH102	15	14.00		B	Brownish grey sandy slightly gravelly silty CLAY.			12	52	26 -1pt	14	12		CL
DC-BH102	19	15.00	16.50	C	Brownish grey sandy slightly gravelly silty CLAY.			9.7	60	25 -1pt	14	11		CL
DC-BH102	20	16.50	18.00	C	Brownish grey sandy slightly gravelly silty CLAY.			9.6	62	24 -1pt	14	10		CL
DC-BH104	15	12.10	12.60	B	Greyish brown sandy slightly gravelly silty CLAY.			11	63	21 -1pt	15	6		ML/CL
DC-BH104	17	14.50	15.00	B	Greyish brown sandy slightly gravelly silty CLAY.			9.5	41	22 -1pt	16	6		ML/CL
DC-BH104	19	16.50	18.00	C	Greyish brown sandy slightly gravelly silty CLAY.			11	78	23 -1pt	16	7		CL
DC-BH104	20	18.00	19.50	C	Greyish brown sandy slightly gravelly silty CLAY.			11	83	21 -1pt	13	8		CL
DC-BH105	1	2.00	2.50	B	Brownish grey sandy slightly gravelly silty CLAY.			30	66	40 -1pt	25	15		MI/CI
DC-BH105	2	4.00	4.50	B	Brownish grey sandy slightly gravelly silty CLAY.			19	44	45 -1pt	23	22		CI

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

31/01/2023

Approved By

Stephen Watson




10122

Summary of Classification Test Results

Project No. 22-0874	Project Name Dublin Central Ground Investigation
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Hole No.	Sample				Specimen Description	Density		w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		bulk	dry							
DC-BH105	10	12.50	13.30	B	Brownish grey sandy slightly gravelly silty CLAY.			10	49	24 -1pt	15	9		CL
DC-BH105	12	14.70	15.00	B	Brownish grey sandy slightly gravelly silty CLAY.			7.7	30	26 -1pt	15	11		CL
DC-BH105	14	16.50	18.00	C	Brownish grey sandy slightly gravelly silty CLAY.			10	61	22 -1pt	15	7		CL
DC-BH105	15	18.00	19.50	C	Brownish grey sandy slightly gravelly silty CLAY.			17	79	25 -1pt	15	10		CL

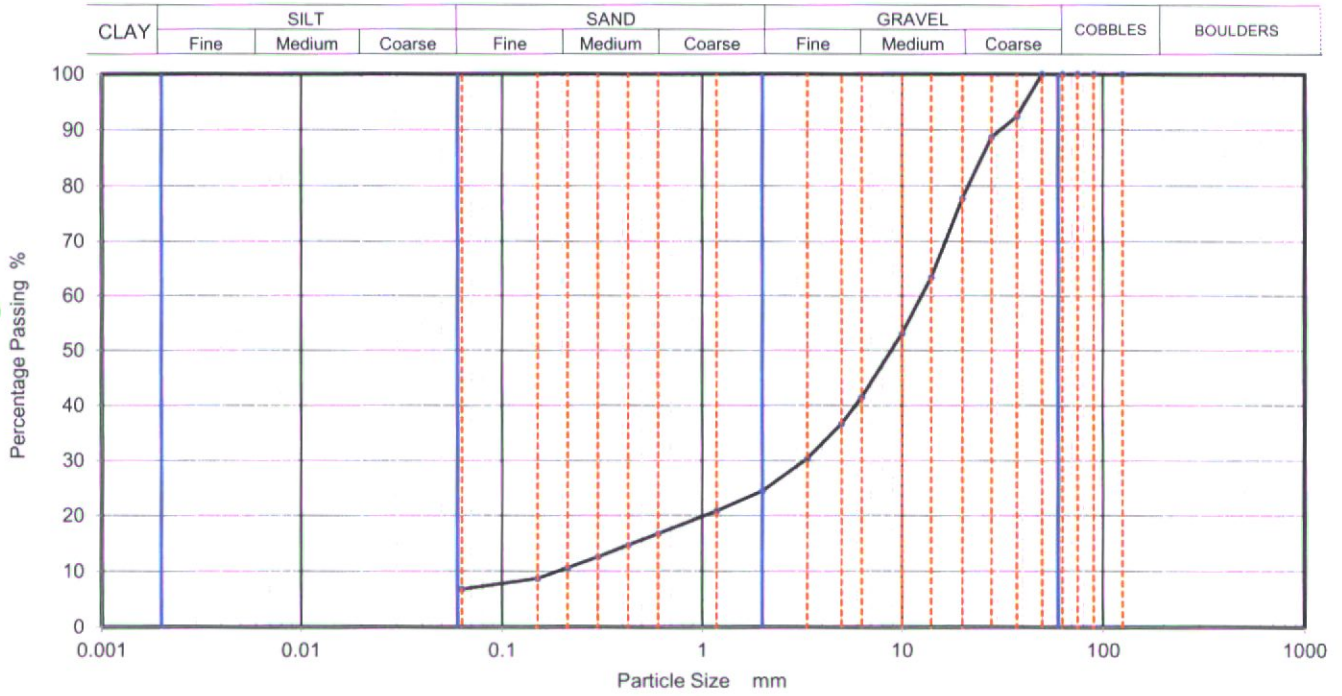
All tests performed in accordance with BS1377:1990 unless specified otherwise LAB 01R Version 6

Key Density test Liquid Limit Particle density Linear measurement unless : 4pt cone unless : sp - small pyknometer wd - water displacement cas - Casagrande method gj - gas jar wi - immersion in water 1pt - single point test	Date Printed 31/01/2023	Approved By Stephen Watson	 10122
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PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874				
Borehole/Pit No.	DC-BH101				
Sample No.	10				
Sample Depth (m)	Top	5.00			
	Base				
Specimen Reference	2	Specimen Depth	5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022122141



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	92		
28	89		
20	78		
14	63		
10	53		
6.3	42		
5	37		
3.35	30		
2	24		
1.18	21		
0.6	17		
0.425	15		
0.3	13		
0.212	11		
0.15	9		
0.063	7		

Dry Mass of sample, g 3255

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	75.6
Sand	17.5
Fines <0.063mm	7.0

Grading Analysis	
D100	mm
D60	mm 12.5
D30	mm 3.27
D10	mm 0.19
Uniformity Coefficient	66
Curvature Coefficient	4.5

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

Approved

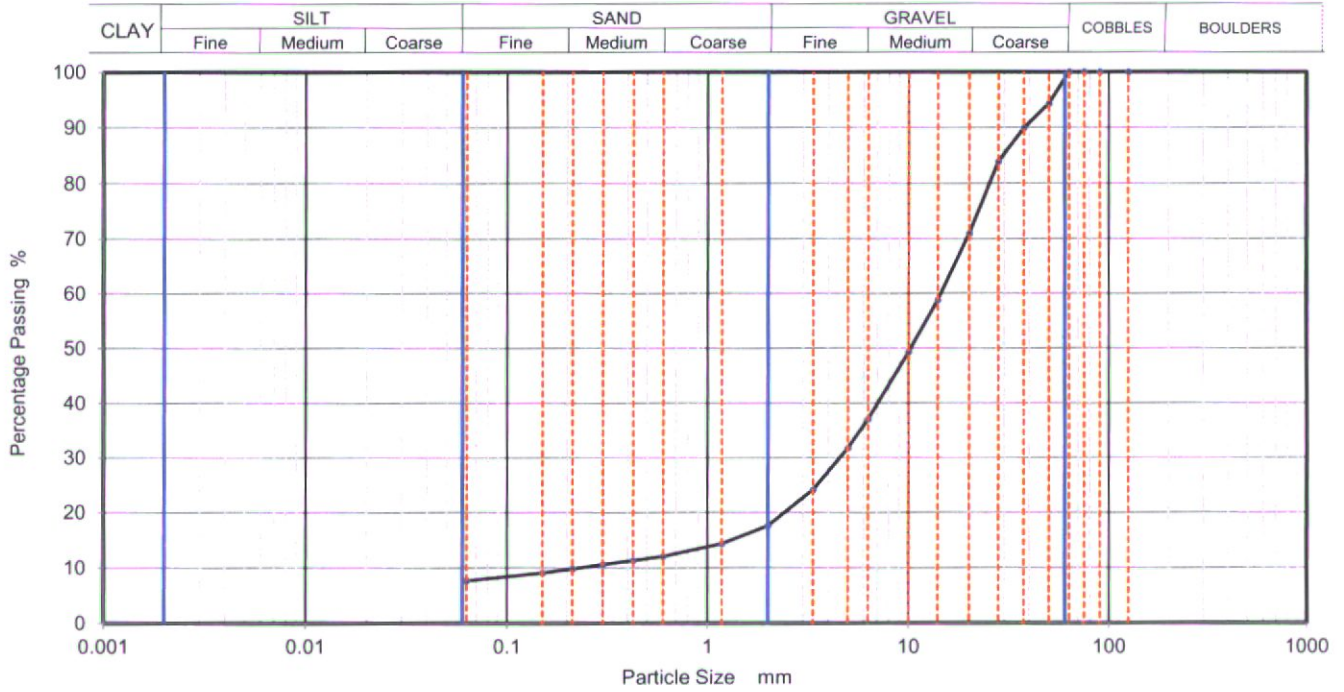
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH101		
Site Name		Dublin Central Ground Investigation		Sample No.		12
Specimen Description		Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		Sample Depth (m)		7.00
				Top		
Specimen Reference		2	Specimen Depth		7	m
Test Method		BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022122142
		Sample Type		B		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	94		
37.5	90		
28	84		
20	71		
14	59		
10	49		
6.3	37		
5	32		
3.35	24		
2	18		
1.18	14		
0.6	12		
0.425	11		
0.3	11		
0.212	10		
0.15	9		
0.063	8		

Dry Mass of sample, g

4614

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	82.4
Sand	9.8
Fines <0.063mm	8.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	63
Curvature Coefficient	6.3

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

Approved

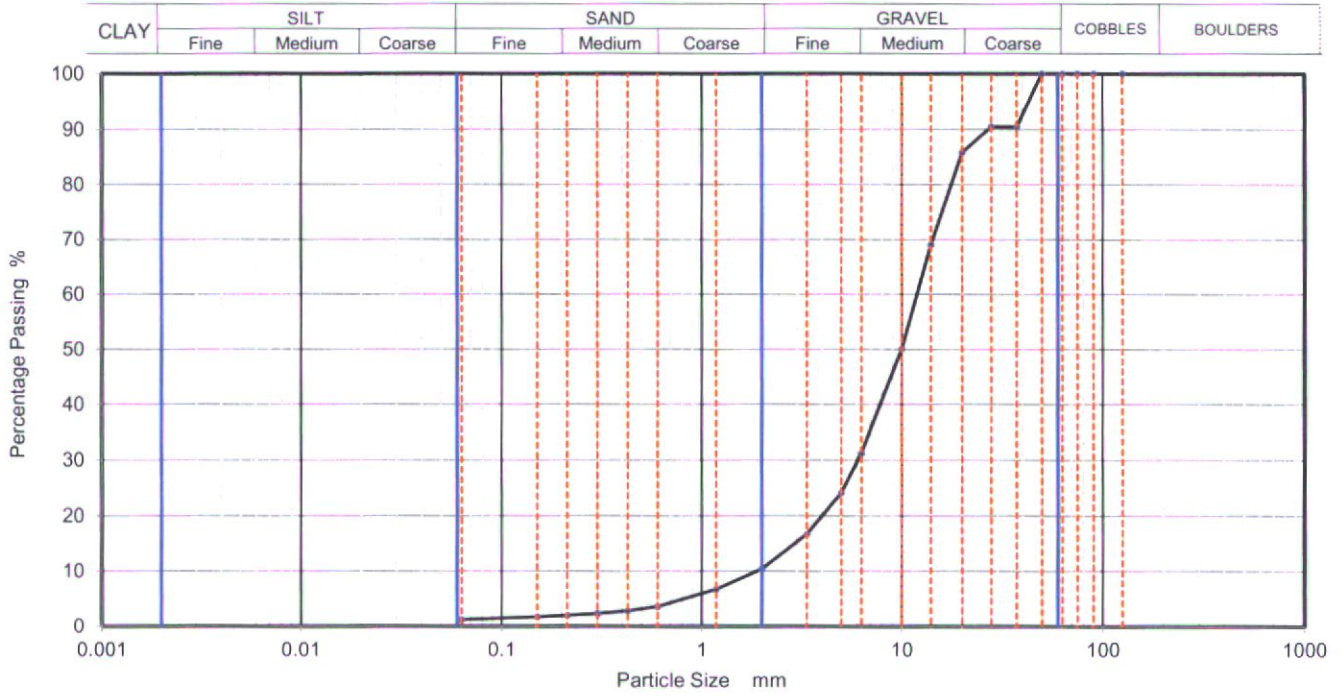
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874						
		Borehole/Pit No.		DC-BH101						
Site Name		Dublin Central Ground Investigation		Sample No.		14				
Specimen Description		Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		Sample Depth (m)		Top		9.00		
						Base				
Specimen Reference		2		Specimen Depth		9		m		
				Sample Type		B				
Test Method		BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022122143		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	91		
28	91		
20	86		
14	69		
10	50		
6.3	31		
5	24		
3.35	17		
2	10		
1.18	7		
0.6	4		
0.425	3		
0.3	2		
0.212	2		
0.15	2		
0.063	1		

Dry Mass of sample, g

2347

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	89.6
Sand	9.2
Fines <0.063mm	1.0

Grading Analysis	
D100	mm
D60	mm 11.9
D30	mm 6.06
D10	mm 1.9
Uniformity Coefficient	6.3
Curvature Coefficient	1.6

Remarks

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

Approved

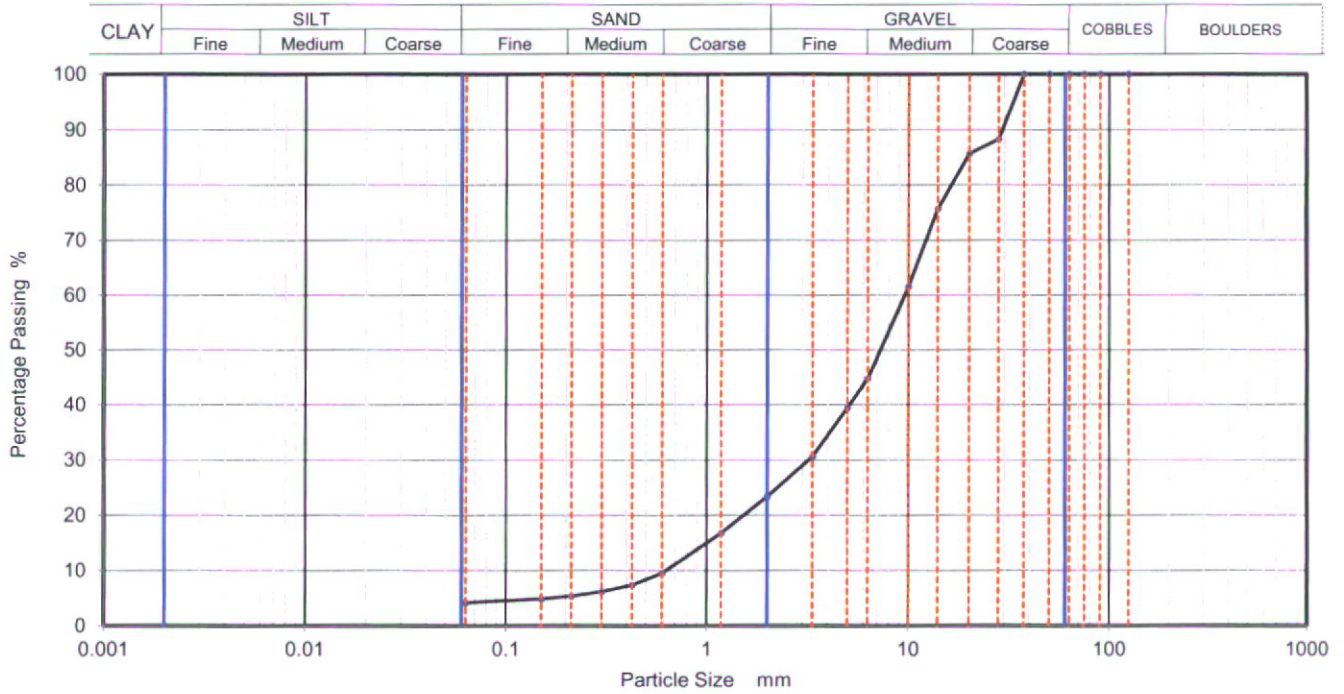
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH101
Sample No.	16
Sample Depth (m)	Top 11.50
	Base
Specimen Reference	2
Specimen Depth	11.5 m
Sample Type	B
KeyLAB ID	Caus2022122144



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	88		
20	86		
14	76		
10	62		
6.3	45		
5	39		
3.35	31		
2	23		
1.18	17		
0.6	10		
0.425	7		
0.3	6		
0.212	5		
0.15	5		
0.063	4		

Dry Mass of sample, g 3213

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	76.6
Sand	19.2
Fines <0.063mm	4.0

Grading Analysis	
D100	mm
D60	mm 9.6
D30	mm 3.21
D10	mm 0.626
Uniformity Coefficient	15
Curvature Coefficient	1.7

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

Approved

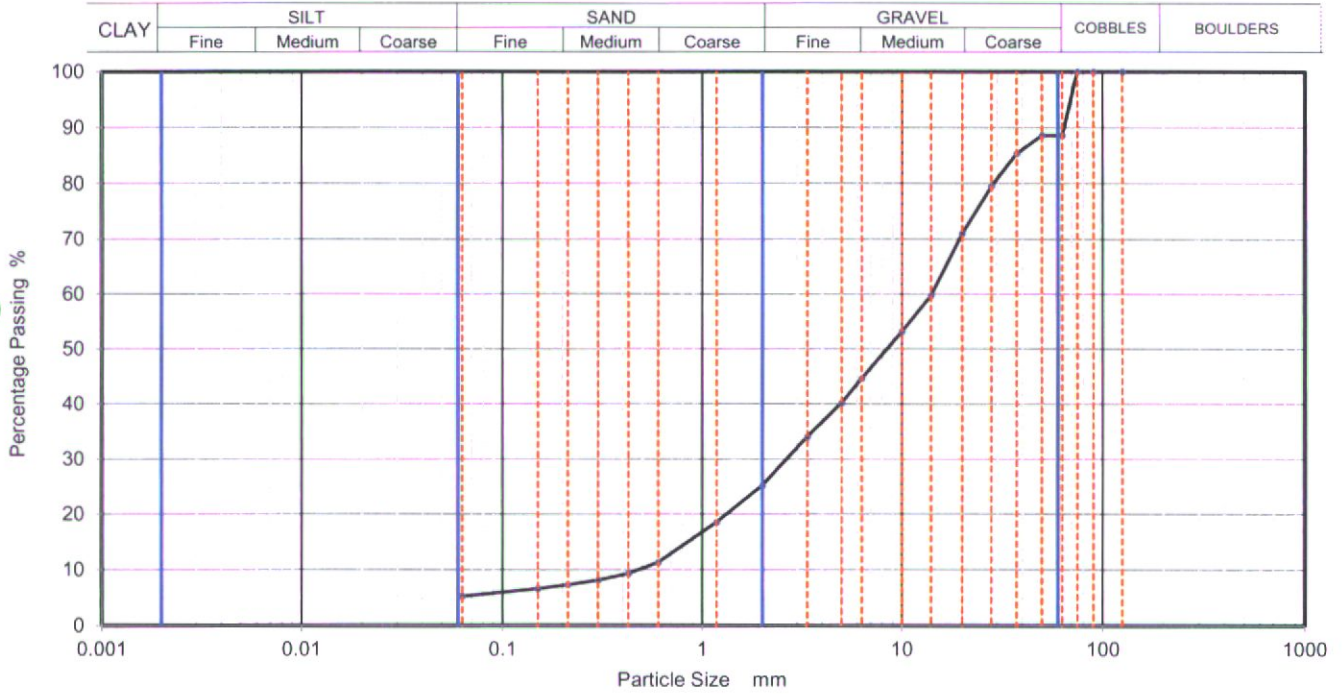
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874				
Borehole/Pit No.	DC-BH102				
Sample No.	9				
Sample Depth (m)	Top	5.50			
	Base				
Specimen Reference	2	Specimen Depth	5.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022122150



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	89		
50	89		
37.5	85		
28	80		
20	71		
14	60		
10	53		
6.3	45		
5	40		
3.35	34		
2	25		
1.18	19		
0.6	11		
0.425	9		
0.3	8		
0.212	7		
0.15	7		
0.063	5		

Dry Mass of sample, g 6034

Sample Proportions	% dry mass
Cobbles	11.4
Gravel	63.4
Sand	20.1
Fines <0.063mm	5.0

Grading Analysis	
D100	mm
D60	mm 14.1
D30	mm 2.65
D10	mm 0.48
Uniformity Coefficient	29
Curvature Coefficient	1

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

Approved

Stephen Watson

LAB 05R - Version 6



10122



PARTICLE SIZE DISTRIBUTION

Job Ref **22-0874**

Borehole/Pit No. **DC-BH102**

Site Name **Dublin Central Ground Investigation**

Sample No. **11**

Specimen Description **Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.**

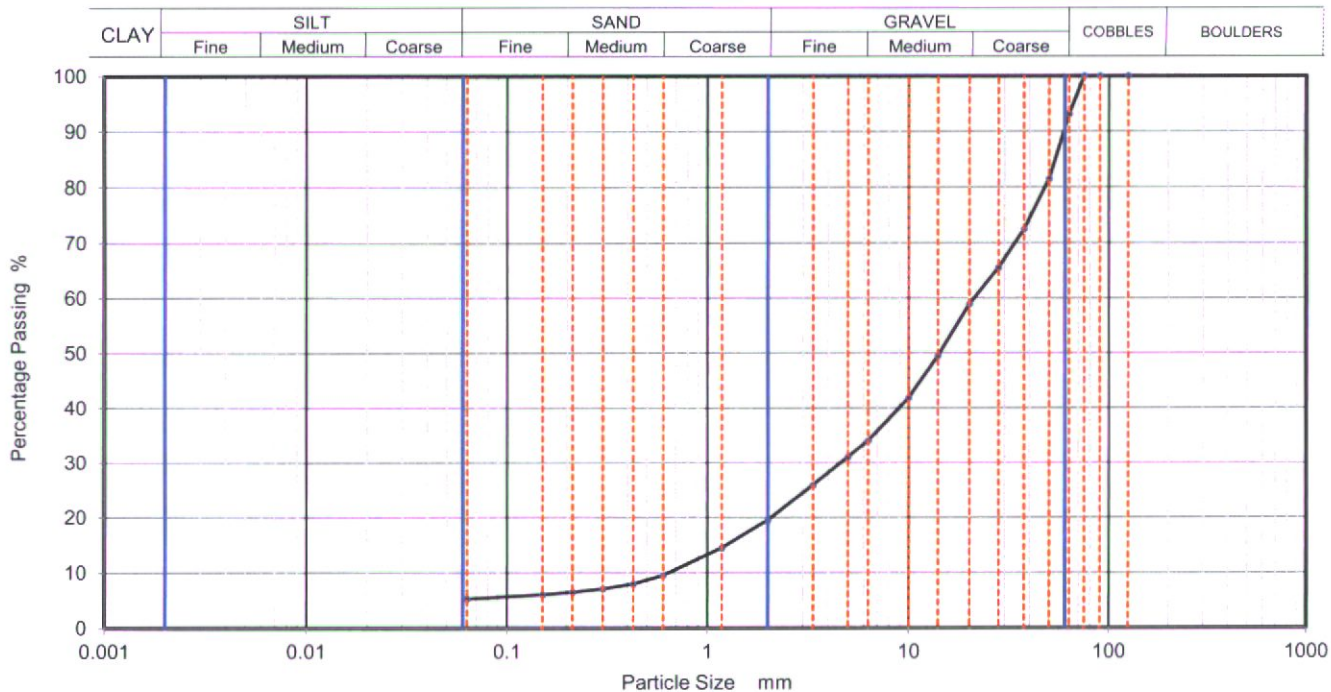
Sample Depth (m)	Top	9.00
	Base	

Specimen Reference	2	Specimen Depth	9	m
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Sample Type **B**

Test Method **BS1377:Part 2:1990, clause 9.2**

KeyLAB ID **Caus2022122151**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	93		
50	82		
37.5	73		
28	66		
20	59		
14	50		
10	42		
6.3	34		
5	31		
3.35	26		
2	20		
1.18	15		
0.6	10		
0.425	8		
0.3	7		
0.212	7		
0.15	6		
0.063	5		

Dry Mass of sample, g **9896**

Sample Proportions	% dry mass
Cobbles	6.9
Gravel	73.6
Sand	14.2
Fines <0.063mm	5.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	33
Curvature Coefficient	1.6

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

Approved

Stephen Watson

LAB 05R - Version 6

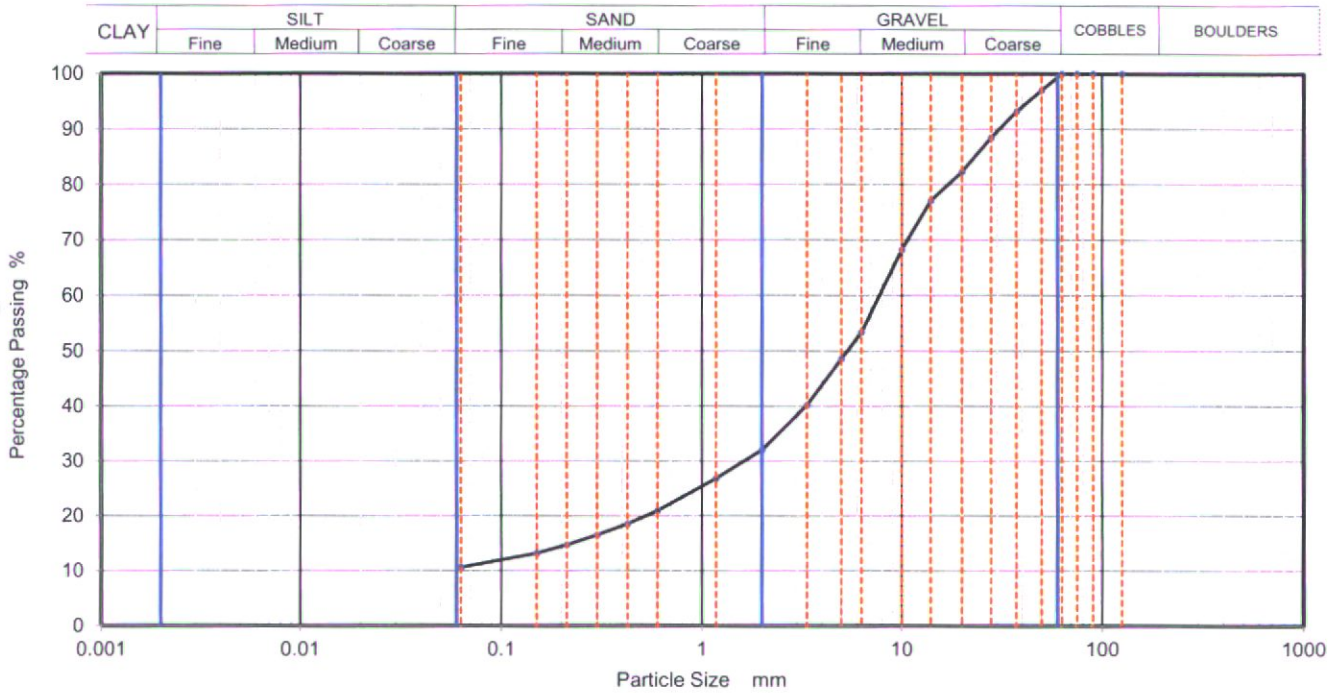


10122



PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH102		
Site Name		Dublin Central Ground Investigation		Sample No.		13
Specimen Description		Greyish brown slightly sandy slightly clayey subangular fine to coarse GRAVEL.		Sample Depth (m)		12.00
				Top		Base
Specimen Reference		2	Specimen Depth		12	m
		Sample Type		B		
Test Method		BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022122152



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	93		
28	89		
20	82		
14	77		
10	68		
6.3	53		
5	49		
3.35	40		
2	32		
1.18	27		
0.6	21		
0.425	19		
0.3	17		
0.212	15		
0.15	13		
0.063	11		

Dry Mass of sample, g

7550

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	68.0
Sand	21.5
Fines <0.063mm	11.0

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

LAB 05R - Version 6



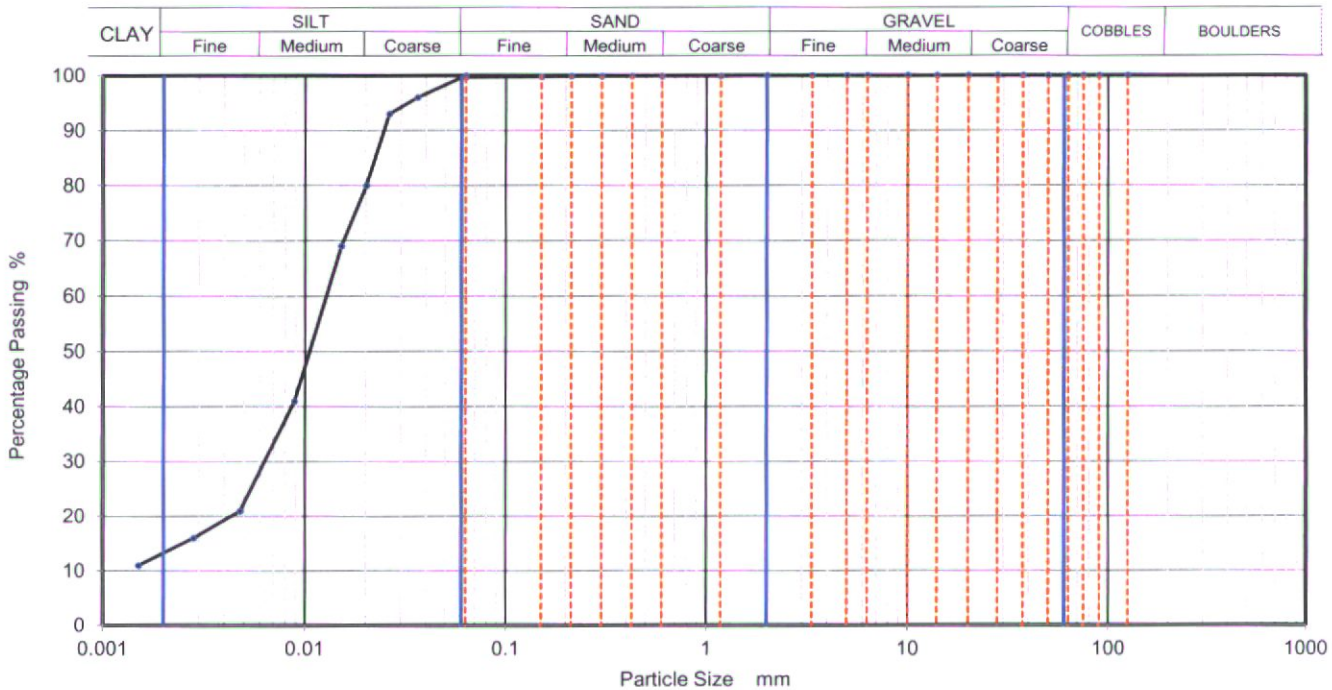
10122



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874	
Borehole/Pit No.	DC-BH102	
Sample No.	21	
Sample Depth (m)	Top	18.00
	Base	19.50
Sample Type	C	
KeyLAB ID	Caus2022122157	

Site Name	Dublin Central Ground Investigation		
Specimen Description	Brownish grey silty CLAY.		
Specimen Reference	2	Specimen Depth	18 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	100
90	100	0.03614	96
75	100	0.02617	93
63	100	0.02013	80
50	100	0.01517	69
37.5	100	0.00890	41
28	100	0.00479	21
20	100	0.00281	16
14	100	0.00150	11
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.65 Mg/m ³	
0.3	100		
0.212	100		
0.15	100		
0.063	100		

Dry Mass of sample, g 317

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.0
Sand	0.2
Silt	86.1
Clay	13.7

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

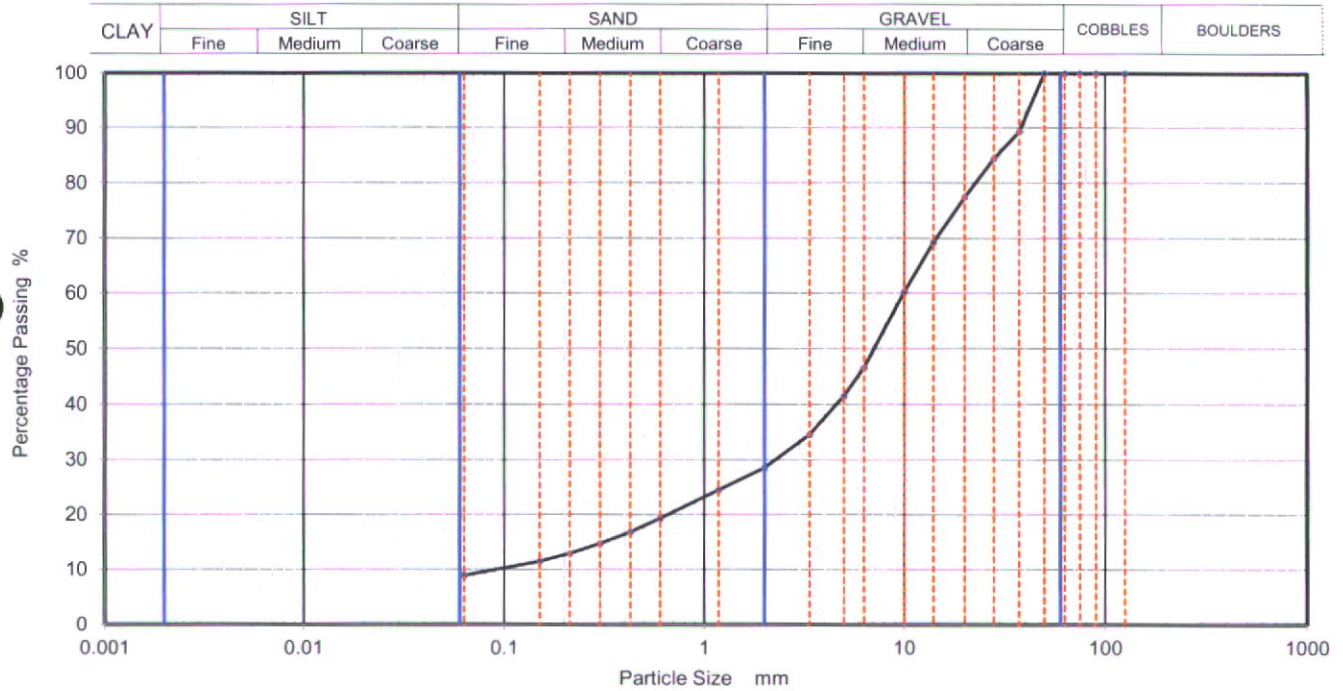
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874		
		Borehole/Pit No.		DC-BH104		
Site Name		Dublin Central Ground Investigation		Sample No.		9
Specimen Description		Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		Sample Depth (m)		4.00
				Base		4.40
Specimen Reference		2	Specimen Depth		4	m
				Sample Type		B
Test Method		BS1377:Part 2:1990, clause 9.2		KeyLAB ID		Caus2022122158



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	89		
28	84		
20	77		
14	69		
10	60		
6.3	47		
5	42		
3.35	35		
2	29		
1.18	25		
0.6	19		
0.425	17		
0.3	15		
0.212	13		
0.15	12		
0.063	9		

Dry Mass of sample, g

3209

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	71.5
Sand	19.6
Fines <0.063mm	9.0

Grading Analysis		
D100	mm	
D60	mm	9.93
D30	mm	2.28
D10	mm	0.0914
Uniformity Coefficient		110
Curvature Coefficient		5.7

Remarks

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

Approved

Stephen Watson

LAB 05R - Version 6



10122



PARTICLE SIZE DISTRIBUTION

Job Ref **22-0874**

Borehole/Pit No. **DC-BH104**

Site Name **Dublin Central Ground Investigation**

Sample No. **11**

Specimen Description **Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.**

Sample Depth (m) **Top 5.00**

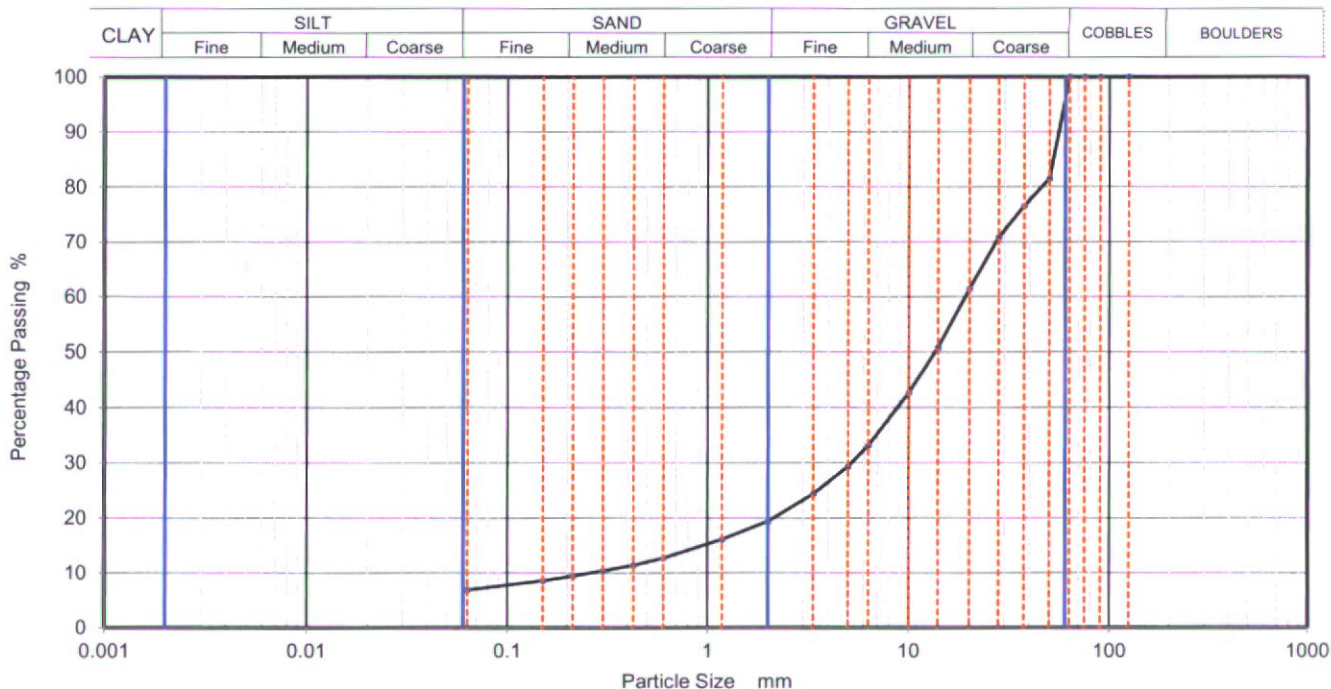
Base 5.30

Specimen Reference **2** Specimen Depth **5** m

Sample Type **B**

Test Method **BS1377:Part 2:1990, clause 9.2**

KeyLAB ID **Caus2022122159**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	82		
37.5	77		
28	71		
20	61		
14	51		
10	43		
6.3	33		
5	29		
3.35	24		
2	19		
1.18	16		
0.6	13		
0.425	11		
0.3	10		
0.212	9		
0.15	9		
0.063	7		

Dry Mass of sample, g

4449

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	80.6
Sand	12.5
Fines <0.063mm	7.0

Grading Analysis	
D100	mm
D60	mm 19.1
D30	mm 5.21
D10	mm 0.262
Uniformity Coefficient	73
Curvature Coefficient	5.4

Remarks

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

Approved

Stephen Watson

LAB 05R - Version 6

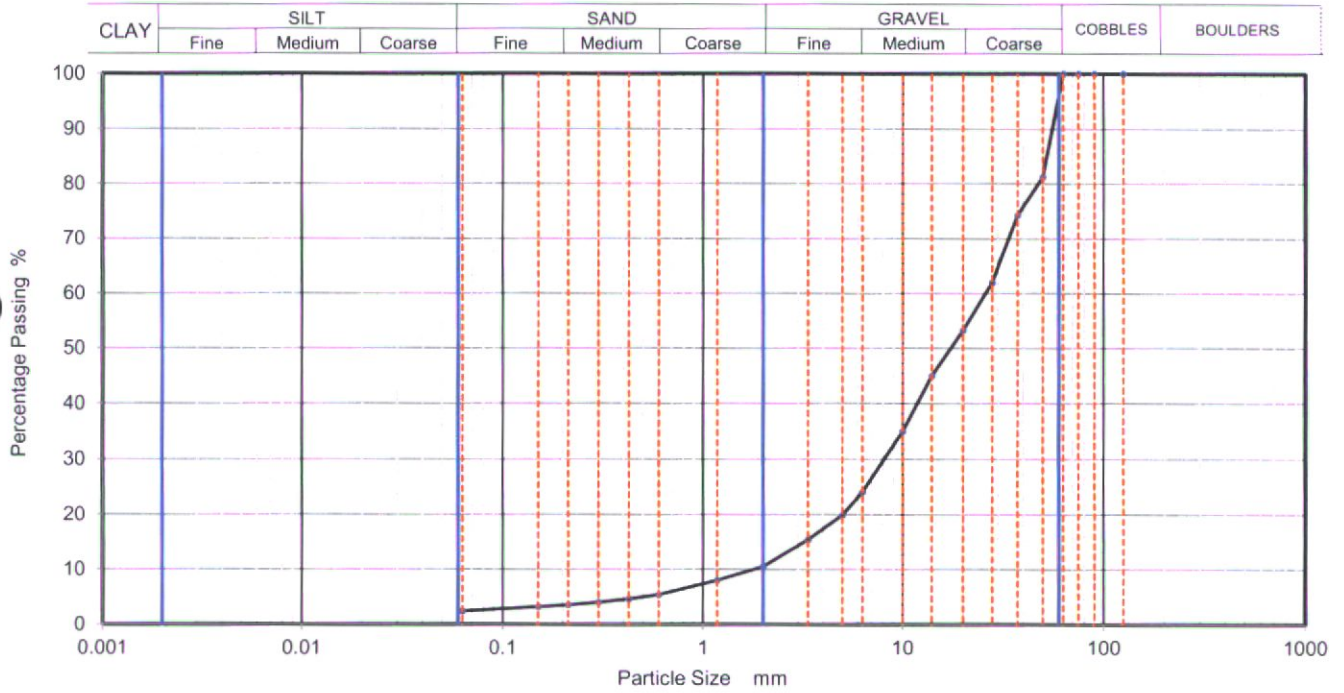


10122



PARTICLE SIZE DISTRIBUTION

		Job Ref		22-0874					
		Borehole/Pit No.		DC-BH104					
Site Name		Dublin Central Ground Investigation		Sample No.		13			
Specimen Description		Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		Sample Depth (m)		Top		8.30	
						Base		8.50	
Specimen Reference		2		Specimen Depth		8.3		m	
				Sample Type		B			
Test Method		BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2022122160	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	81		
37.5	74		
28	62		
20	53		
14	45		
10	35		
6.3	24		
5	20		
3.35	15		
2	11		
1.18	8		
0.6	5		
0.425	5		
0.3	4		
0.212	4		
0.15	3		
0.063	2		

Dry Mass of sample, g

4267

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	89.5
Sand	8.1
Fines <0.063mm	2.0

Grading Analysis	
D100	mm
D60	mm 25.9
D30	mm 8.09
D10	mm 1.8
Uniformity Coefficient	14
Curvature Coefficient	1.4

Remarks

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

Approved

Stephen Watson

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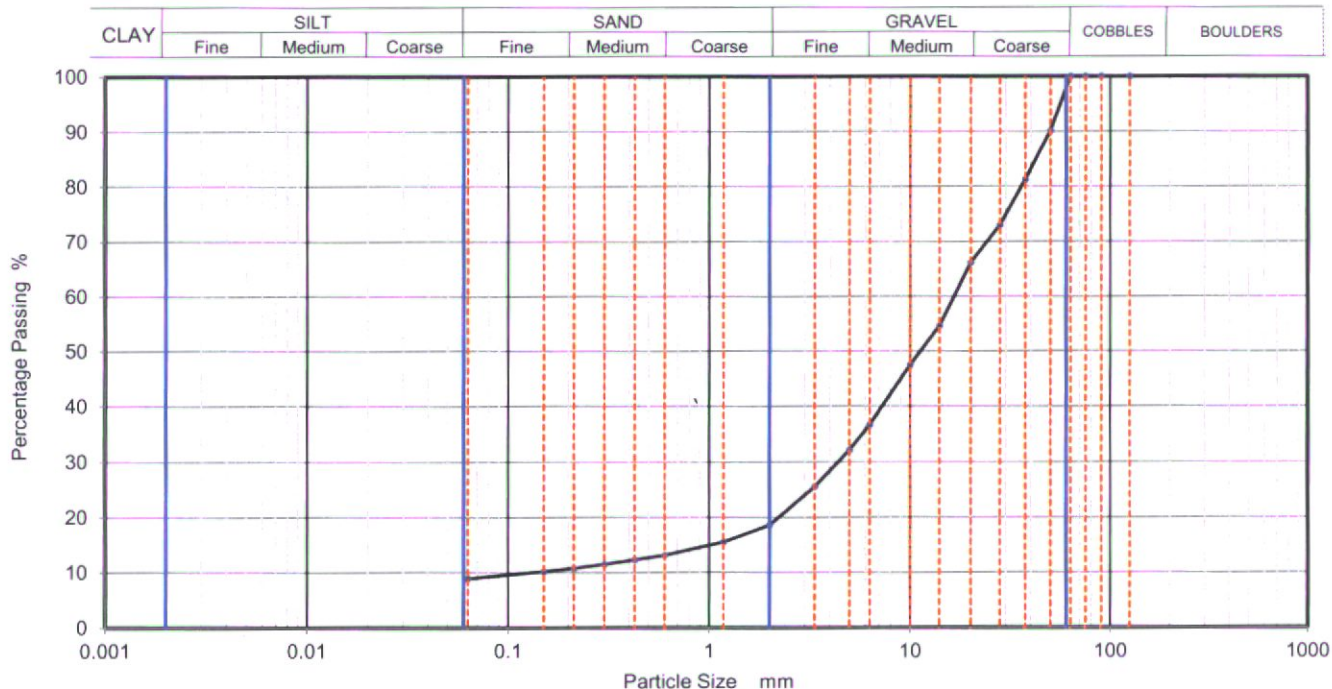
10122



PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874
Borehole/Pit No.	DC-BH104
Sample No.	14
Sample Depth (m)	Top 10.50
	Base 11.00
Sample Type	B
KeyLAB ID	Caus2022122161

Site Name	Dublin Central Ground Investigation		
Specimen Description	Brownish grey slightly sandy slightly silty subangular fine to coarse GRAVEL.		
Specimen Reference	2	Specimen Depth	10.5 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	90		
37.5	81		
28	73		
20	66		
14	55		
10	48		
6.3	37		
5	32		
3.35	26		
2	19		
1.18	16		
0.6	13		
0.425	12		
0.3	12		
0.212	11		
0.15	10		
0.063	9		

Dry Mass of sample, g 4466

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	81.4
Sand	9.6
Fines <0.063mm	9.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	120
Curvature Coefficient	8.8

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

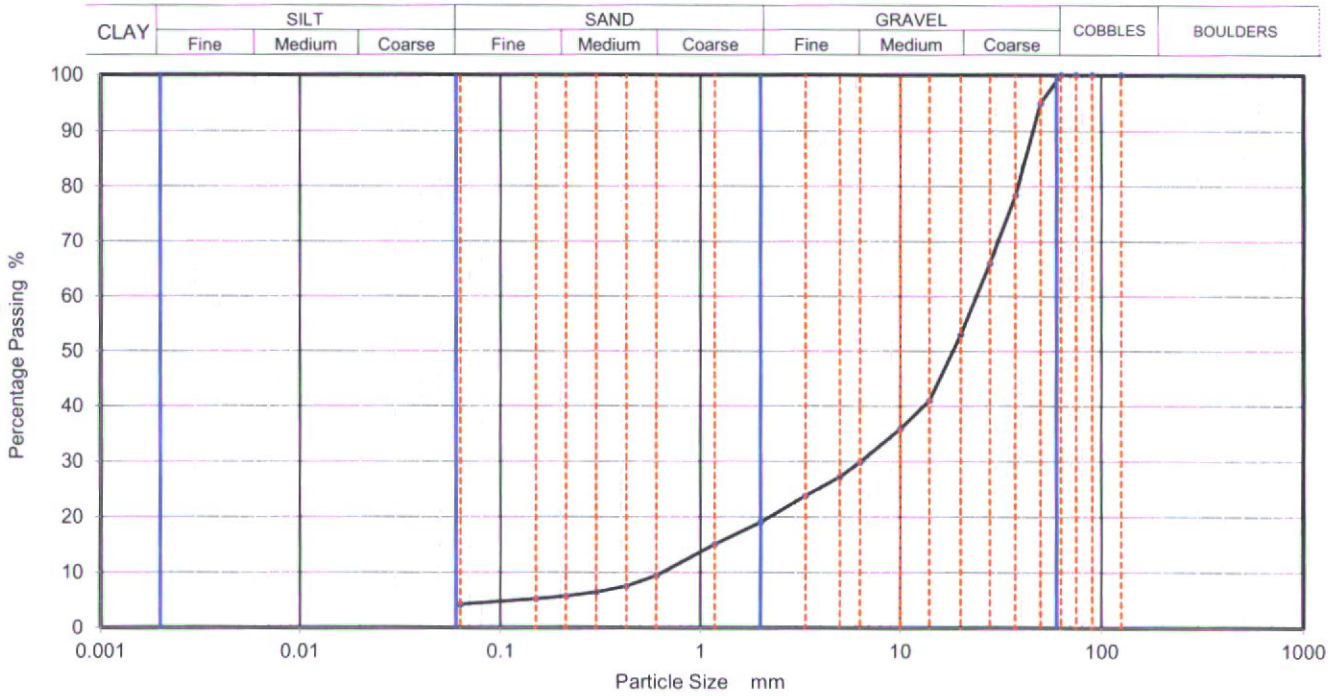
Approved
Stephen Watson





PARTICLE SIZE DISTRIBUTION

Job Ref	22-0874					
Borehole/Pit No.	DC-BH104					
Sample No.	21					
Sample Depth (m)	Top	19.50				
	Base	21.00				
Specimen Reference	2	Specimen Depth	19.5	m	Sample Type	C
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022122167	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	78		
28	66		
20	53		
14	41		
10	36		
6.3	30		
5	27		
3.35	24		
2	19		
1.18	15		
0.6	9		
0.425	8		
0.3	6		
0.212	6		
0.15	5		
0.063	4		

Dry Mass of sample, g 7786

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	81.0
Sand	14.9
Fines <0.063mm	4.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	37
Curvature Coefficient	2.6

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

Approved

Stephen Watson

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10122