Appendix 6-4. DAA Airfield Underpass – Ground Investigation



DAA Airfield Underpass - Ground Investigation

Client: DAA

Client's Representative: Ramboll Consulting Engineers

Report No.: 21-1219

Date: June 2022

Status: Draft Report

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Rev 0





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Document Control Sheet

Report No.:		21-1219			
Project Title:		DAA Airfield Un	derpass		
Client:		DAA			
Client's Repres	entative:	Ramboll Consul	ting Engineers		
Revision:	A00	Status:	Draft Report	Issue Date:	10 th June 2022
Prepared by:		Reviewed by:		Approved by:	
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The works were conducted in accordance with:

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

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 Site Investigation.

Abbreviations use	ed 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.
В	Bulk disturbed sample.
LB	Large bulk disturbed sample.
D	Small disturbed sample.
С	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of Nx5=Cu is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
$\overline{}$	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relatin	g to rock core – reference Clause 36.4.4 of BS 5930: 2015
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.





DAA Airfield Underpass

1 AUTHORITY

On the instructions of Ramboll Consulting Engineers, ("the Client's Representative"), acting on the behalf of DAA ("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 proposed underpass tunnel to connect the existing facilities in the eastern part of Dublin Airport (in the vicinity of the current Pier 3) to proposed areas of development to the west. To facilitate this, a cut-and-cover tunnel is proposed, passing beneath the existing crosswind runway. The tunnel will be approximately 1km in plan length, with the construction depth below ground level extending to a maximum of approximately 15-20m.

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. A discussion on the recommendations for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the site 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, soil and rock core sampling, environmental 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 on the site of Dublin Airport, in an east-west direction in the vicinity of the crosswind runway. The operational crosswind runway is bounded on both sides by several adjoining taxiways and areas of soft landscaping. The majority of the investigation lies within the grass areas however there was also some works on the existing apron areas, adjacent to Pier 3.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 09th March and 3rd May 2022, comprised:

- thirteen rotary drilled boreholes
- a standpipe installation in eleven boreholes; and
- two pump tests

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

4.2 Boreholes

Eleven boreholes (BH101-BH111) were put to their completion by rotary drilling techniques only. The boreholes were completed using a Comacchio 601 tracked drilling rig, a Comacchio 405 tracked drilling rig and a truck mounted Beretta T44 rotary drilling rig.

Inspection pits at all boreholes locations were undertaken by Kilwex. They were not logged or photographed by Causeway Geotech.

Symmetrix-cased full hole rotary percussive drilling techniques were employed to advance the boreholes to a certain depth, after which rotary coring was employed to recover core samples of the overburden and bedrock. SPTs were carried out at standard intervals throughout the overburden, in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals using the split spoon sampler (SPT(s)) or solid cone attachment (SPT(c)). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The N-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. The SPT hammer energy measurement report is provided in Appendix G.





Where coring was carried out within overburden and 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.

Following completion of BH105 and BH107, both boreholes were re-drilled to a larger diameter to allow installation of a pumping well.

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: Code of practice for ground investigations*.

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

4.3 Standpipe installations

Groundwater monitoring standpipes were installed in boreholes as shown below in Table 1.

Standpipe Type GI Ref Response Zone (mbgl) BH101 50mm standpipe 15.0-20.0 BH102 50mm standpipe 3.0-14.0 BH103 50mm standpipe 5.0-12.0 BH104 50mm standpipe 15.0-19.0 BH105 150mm pumping well 2.50-20.5 BH106 50mm standpipe 13.0-18.5 BH107 150mm pumping well 2.50-28.0 BH108 14.0-18.0 50mm standpipe BH109 50mm standpipe 2.5-25.0 BH110 50mm standpipe 3.8-16.0 BH111 50mm standpipe 4.0-31.5

Table 1 Summary of standpipe installations

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

4.4 Pump tests

Pump and step tests were carried in borehole BH105 and BH107 after the installation of a 150mm groundwater well.

Monitoring of nearby standpipes was carried out using manual dip-meters and digital data loggers to measure "drawdown" of the groundwater during tests.





Results have been provided to the client's representative in electronic format and are not presented as part of this report.

4.5 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 plan presented in Appendix A shows these as-built positions.

Note, at the time of issuing this report, BH110 and BH111 have not been surveyed due to access restrictions. Co-ordinates and elevations provided on the logs are based on the co-ordinates provided in the tender documents and drawings.

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, particle size distribution analysis and bulk density tests
- **shear strength** (total stress): unconsolidated undrained triaxial tests (UU)
- **shear stress** (effective stress): consolidated undrained triaxial tests (CU)
- consolidation: oedometer testing
- **compaction related:** California bearing ratio tests and dry density/moisture content relationship tests
- **soil chemistry:** pH, organic matter content, BRE Test Suite C and D.

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 E.

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	ISRM Suggested Methods (1981) Suggested method for determining
compression	deformability of rock materials in uniaxial compression, Part 2
strength tests	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 E.

5.3 Environmental laboratory testing of soils

Environmental testing was conducted on selected environmental soil and water samples by Chemtest at its laboratory in Newmarket, Suffolk.

Testing was carried out in accordance with Engineer's Ireland Specification for Ground Investigation (2016) Suite I. This included testing for a range of determinants, including:

- Metals
- Speciated total petroleum hydrocarbons (TPH)
- Speciated polycyclic aromatic hydrocarbons (PAH)
- BTEX compounds
- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Polychlorinated biphenyls (PCBs)
- Phenols
- Organic matter
- Total Organic Carbon (TOC)
- Cyanides
- Asbestos screen
- Sulphate and sulphide





- Sulphur
- Phosphate
- Calcium
- pH
- Waste acceptance criteria (WAC)

Results of environmental laboratory testing are presented in Appendix F.

5.4 Environmental laboratory testing of water samples

Environmental testing was conducted on groundwater samples from before and after pump tests by Chemtest at its laboratory in Newmarket, Suffolk.

Testing was carried out in accordance with Engineer's Ireland Specification for Ground Investigation (2016) Suite F and also for PFAS and ammonia.

Results of laboratory testing are presented in Appendix F.

NOTE GW TESTING FROM AFTER PUMP TESTS IS OUTSTANDING AT THE TIME OF ISSUING THIS REPORT.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise Glacial Till. These deposits are underlain by calcareous shale and limestone conglomerate of the Tober Colleen 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:

- **Glacial Till:** sandy gravelly clay, frequently with low cobble content, typically firm or stiff in upper horizons, becoming very stiff with increasing depth. Frequently with lenses of granular material, same large in extent as seen in BH103 and BH104. It should be noted that the method of drilling may have washed out the fines content of the granular deposits and it is possible they may just be a more granular glacial till.
- **Bedrock (Limestone):** Rockhead comprising mudstone and limestone was encountered at depths ranging from 21.40m in BH102 to 32.55m in BH111





6.3 Groundwater

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

Groundwater was encountered during rotary drilling through soil as water strikes as shown in Table 2 below.

Table 2 Groundwater strikes encountered during ground investigations.

Location	Depth (mbgl)
BH101	4.00
BH102	4.00
BH103	3.70
BH105-Well	16.50

Groundwater was not noted during drilling at any of the other borehole 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.

Due to the nature of the drilling system (Geobor-S), whereby water is added, groundwater strikes within overburden or bedrock may have been masked by the fluid used as the drilling flush medium.

Seasonal variations should 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.



APPENDIX A SITE AND EXPLORATORY HOLE LOCATION PLANS





Project No.: 21-1219

Client: DAA

Project Name:

DAA Airfield Underpass

Client's

Representative: Ramboll Consulting Engineers

Legend Key



Title:

Site Location Plan

Last Revised: Scale: 10/06/2022 1:50000



Project No.: 21-1219

DAA Airfield Underpass

Client: Client's

Project Name:

Representative:

Ramboll Consulting Engineers

DAA

Legend Key

Locations By Type - RC

Locations By Type - RO



Title:

Exploratory Hole Location Plan

Last Revised: Scale: 10/06/2022 1:5000



APPENDIX B
BOREHOLE LOGS



	C	AUS	E	W	A	Y H			Proje 21 -1	ct No.	Project Client:	Name: DAA Airfield Underpass DAA Rep Ramboll Consulting Engineers	Borehole ID BH101					
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Depth							Casing Depth	Water	74311 Level	7.50 N Depth	Elevatio		e	FINAL				
(m)	Samples /	Field Records	TCR	SCR	RQD	FI	Depth (m)	Depth (m)	mOD	(m)	Legend	Description Inspection pit excavated by Kilwex to 1.20m	Water	Backfill				
20 20 - 1.65 70 70 - 3.15	D2 SPT(S) N: (4,7/10,5	2,3,4,6) mer SN = 0643				2.70		61.64	1.20		Stiff becoming very stiff dark brown sandy gravelly CLAY. (Driller's description)	_	0.5 1.0 - 1.5 2.0 - 2.5 3.0 -					
.20 .20 - 4.65 .30 .60 - 4.85	SPT(S) N=40 (4,7/10,9,7,14) Hammer SN = 0643 Slow seepage at 4.00m D3 SPT(S) N=44 (3,4/6,12,12,14) Hammer SN = 0643 ES1 60						4.20	4.00	58.64	4.20		Very stiff greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of predominantly limestone. Cobbles are subangular to subrounded of limestone.	_	4.0 - 4.5 5.0 -				
5.55 5.10 5.25 - 6.60	D4 C1		100							-				6.0 -				
5.70										- - - - -				7.0 -				
			TCR	SCR	RQD													
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Rotary Co	oring	Comacch	110 40)5	4.2	20	27.7	0		4.50 E 7.50 N	Elevatio	n: 62.84 mOD	End Date:	23/03/2022	Logger:	MRG		FINAL	_
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										<u>-</u>									1
										-									ı
									38.34	- 24.50		Medium strong thic	kly laminated	dark grey LIMES	TONE. Larg	gely			24.
.70			\vdash		\vdash					-		unweathered with s Discontinuities:							
.97	C6									-		1. 0 to 15 degree be			ed (60/232	/600)			ı
,										-	HH	with some brown st 2. 80 to 90 degree j			7.55m nlan	nar.			25.
										-	HH	rough with some lig			ssm piai	,			
			100							-									25.
5.65 - 26.08	C7									-									ı
										_									ı
																			26.
.20 - 26.45	C8									-									
5.20																			ı
										-									26.5
										-									
			100							-									27.0
										-									ı
										_									
										_	ĖН								27.:
7.70			\vdash						35.14	- 27.70			End of Bore	hole at 27.70m					4
										-			2010	•					
										-									28.
										-									
										-									28.
										-									
										-									
										-									29.
			TCR	SCR	RQD	FI													1
		Strikes				ema	rks												_
uck at (m) Ca 4.00	sing to (m)	Time (min) 20		to (n .00	n) In	spec	tion pi	t exc	avated by	Kilwex to	1.20m.								
			1																
		C=	De:		_														
Casing De	etails iam (mm)	Core		el .															
4.20	200	SI	K6L																
27.70	150	Flush	Туре	е	Te	ermi	natio	n Re	ason							Last Up	date	d	J
1		l	ater		1_				eduled de								2022		,-

	C	AUS	E	W T	A	Y				ct No. 1219	Project Client:	·	rehole ID BH102
			3 L (<i>)</i>		1					Client's	Rep Ramboll Consulting Engineers	
Metho Rotary Dr Rotary Co	illing	Plant I Beretta Beretta	T44	ļ	0.0 4.0	00	Base 4.0 23.	00		linates 9.80 E	Final De	pth: 23.50 m Start Date: 12/05/2022 Driller: GT	eet 1 of 4 ale: 1:40
notary co	,	Derette								3.10 N	Elevatio		FINAL
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	3	Backfill
									61.45	1.20		Inspection pit excavated by Kilwex to 1.20m.	0.5 -
										-		Soft brown sandy gravelly CLAY (Driller description)	1.5 -
2.50 - 2.95	SPT(S) N (1,1/1,2,								60.15 59.15	- 2.50 		Gravels/Grey silty CLAY(Drillers description)	3.0 -
												Grey slightly sandy gravel (Drillers description)	
4.00 - 5.00 4.00 - 4.45	B1 SPT(S) N (2,2/3,3,								58.65	4.00		Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.	4.0 -
4.50	D11		87							-		•	4.5
5.00 - 13.00	B2								57.65	- 5.00 - - -		Stiff becoming very stiff dark brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone	5.0 -
5.50 - 5.95 5.50	SPT(S) N (4,4/4,6,		87							-		Fines possibly washed out by drilling.	6.0
										-			6.5
7.00 - 7.45 7.00	SPT(S) N (6,8/10,2									-		firm dark brown slightly clayey sand.	7.0 -
			TCR	SCR	RQD	FI							
ruck at (m) Ca					_	ema spec		it exc	avated by	r Kilwex to	1.20m.		
To (m) Di	etails iam (mm) 200	Core Sk	Barr (6L	el									
23.50	150	Flush	Тур	e	To	ermi	natio	n Re	ason			Last Updated	
		Wa	ater		Te	ermir	nated	at sch	neduled d	epth		10/06/2022	AGS

Method Rotary Dril Rotary Cor	CA	US	E	W		Y					1						•			
Rotary Dril	<i>—</i>	CAUSEWAY ——GEOTECH							21-1	219	Client:	DAA				BH102				
Rotary Dril	-					-					Client's	Rep Ramboll	Consulting	Engineers						
	1	Plant U	Jsed		Тор	(m)	Base	(m)	Coord	inates	-						Sheet 2 c	 of 4		
Rotary Cor		Beretta	T44		0.0	00	4.0	0			Final De	epth: 23.50 m	Start Date:	12/05/2022	Driller:	GT	Scale: 1:			
notally COI	ring	Beretta	144		4.0	00	23.5	50	715939 74312		Flavetia	C2 CE OD	Find Date:	12/05/2022		DMC	FINIA			
									74312.	3.10 N	Elevatio	n: 62.65 mOD	End Date:	12/05/2022	Logger:	DIVIC	FINAI	L		
Depth (m)	Samples / Fiel	d Records	TCR	SCR	RQD	FI	Depth [Vater Depth (m)	Level mOD	Depth (m)	Legend			cription			ag Backfill			
										-		Stiff becoming very CLAY with low cobb						7.5		
70 - 8.00	ES18									-	0 0 0 0 a 0 0 0	subangular fine to c	coarse. Cobble	s are subangula	r of limesto	one				
			100							-										
00	D12									_	٠٠٠٠ نم: ۵۰۰ ه							8.0		
										-	٠٠٠٠ نم: ۵۰۰ ه							.*		
i0 - 8.65	SPT(S) N=0 (0.0/0								-								. 8.5		
I	for 0mm)	0,0/0								-										
										-	٠٠٠٠ م م									
										-	٠٠٠٠ م م							. 9.		
			100							-	٠٠٠. م مه									
			100							-	٠٠٠٠ م م									
										-								• 9.		
										-	٠٠٠٠ م م									
.00 - 10.45	SPT(S) N=47									-								° 10.		
	(7,8/11,12,1									-										
										-										
										-								10.		
.70 - 11.00	ES19		100							-										
										-										
										-								11.		
										-										
.50 - 11.91	SPT(S) 0 (75	for								- -		firm dark brown slightly sa	andy clay	_				11.		
	111mm/,,,)									-		iiini dark brown siigniiy sa	anuy ciay	-						
										-		J								
										-								12.0		
			100							-										
										=										
										-								.* 12.		
										-										
.00 - 13.95									49.65	- 13.00	0.00	Firm brown slightly	clavov SAND	Sand is fine to co	narco			.*13.		
	SPT(S) N=40 (6,8/8,10,10									-		Firm brown slightly	ciayey SAND.	Saliu is lille to to	uaise.					
	(3,0,0,10,10	·,±=1								-										
.50	D13									= -								13.		
			100							-										
.95 - 14.50	B4								48.70	_ 13.95		Very stiff greyish bro	own slightly s	andy GDAVEL Co	nd is fine t	to coarso		14		
										-		gravel is subangular				.o coaise				
										-										
	D14								48.15	14.50		Firm brown slightly	clayey SAND.	Sand is fine to co	oarse.			14.		
.50 - 15.15			TCR	SCR	RQD	FI														
ick at (m) Car	Water Str		Rose	to In	_	ema				Kili.	1 20									
4.00	g to (III) TIF	e (111111)	nose	ιυ (n	In <u>Ivi</u>	spect	non pi	exca	avated by	KIIWEX to	1.20m.									
Casing De	tails	Core	 Barre	el	\dashv															
Го (m) Dia	am (mm)	SK	(6L																	
4.00 23.50	200 150	Flush		<u> </u>	T-	rmi	natio	ı Do	ason						-	Last Up	dated ==	_		
			i iype ater	٠					ason eduled de							10/06/				

	CAU	SI-GE	V OT	VA	Y H			-	ct No. L 219	Project Client: Client's	Name: DAA Airfield Underpass DAA Rep Ramboll Consulting Engineers		orehole BH10	
Metho	d Pla	nt Use	-d	Tor	(m)	Base	(m)	Coord	inates	Client	Ramboli Consulting Engineers	c	heet 3 c	
Rotary Dri	lling Ber	etta T	44	0	.00	4.0	00		9.80 E	Final De	pth: 23.50 m Start Date: 12/05/2022 Driller: GT		Scale: 1:	
,	3								3.10 N	Elevatio	n: 62.65 mOD End Date : 12/05/2022 Logger: DMC		FINA	L
Depth (m)	Samples / Field Reco		CR SCI	R RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill	
1.50 - 14.88 1.50	SPT(S) 75 (12,13/ for 229mm)	/5							-		Firm brown slightly clayey SAND. Sand is fine to coarse.			
.00	D15								-					15.0
.15 - 16.40	B6							47.50	15.15		Stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine to			
		10	00						-		coarse gravel is subangular fine to coarse of various lithologies.			
.50	D16								-					15.
									-					
.00 - 16.00	SPT(S) 0 (0 for				-				- -		firm slightly clayey slightly gravelly SAND			16.
.00	0mm/0 for 0mm								-					ı
40 - 20.25	B7							46.25	16.40		Firm becoming stiff dark brown slightly sandy CLAY. Sand is fine to			
									-		coarse.			16.
		10	00						-					
									_					17.
									-					
									-					
.50 - 17.95 .50	SPT(S) N=34 (8,8/7,8,9,10)								-					17.
	(-,-, ,-,-,								-					
00	D17								-					18
		1,	20						-					
		10	00						-					
									-					18
									-		Very stiff slight sandy clay. Sand is fine.			
.00 - 19.42	SPT(S) 0 (75 for								-					19.
.00	119mm/,,,)								-					
									_					ı
														19.
		10	00						_					ı
									_					20
														20.
).25 - 21.40	B8							42.40	20.25		Very stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine			
	SPT(S) 0 (0 for	<u> </u>	+	+	-				_		to coarse gravel is subangular fine to coarse of various lithologies.			20.
.50	0mm/0 for 0mm								[
									_					-1-4
			0						-					21
		10	טע					44.25	24.40		Medium strong grey LIMESTONE. Partially weathered; slightly reduced strength, slightly reduced fracture spacing.			
								41.25	- 21.40 -		Discontinuities:			21.
									[1. 5-10 degree joints, medium spaced (70/260/500), clean, smooth with some brown discolouration on joint surfaces.			
		т/	SB SC	R RQD) FI				_		2. One 80-90 degree joint from 22.35-23.00m, rough and undulating.	-		
	Water Strikes	110	30	- -	Rema	irks				1			<u> </u>	_
4.00 Casing De	sing to (m) Time (n	ore Ba					it exc	avated by	Kilwex to	1.20m.				
	am (mm) 200	SK6L												
	450	ush Ty		٠,	Term	inatio	n Re	ason			Last Up	date	d 🔳	_
23.50			/PC											

	C	AUS	E	W DTI	A	Y			Project		Client:	Name: DAA Airf						orehol	
Metho		Plant I					Base	(m)	Coord	inates	Client's	veh kamboli	Consulting	Engineers			c	heet 4	of 4
Rotary Dr Rotary Co	rilling	Beretta Beretta	a T44		0.		_	00	71593		Final De	pth: 23.50 m	Start Date:	12/05/2022	Driller:	GT		neet 4 Scale: 1	
	-								74312		Elevatio	n: 62.65 mOD	End Date:	12/05/2022	Logger:	DMC		FINA	L
Depth (m)		Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription			Water	Backfill	
2.00 - 22.39 2.00 3.05 - 23.40 3.40 - 23.50 3.50	94mm/,,	Strikes	TCR		_	ema	ırks		39.15	- 23.50	1.20m.	Medium strong gre reduced strength, s Discontinuities: 1. 5-10 degree joint with some brown d 2. One 80-90 degree	slightly reduce ts, medium sp liscolouration te joint from 2	d fracture spacir paced (70/260/5 on joint surfaces	ng. 00), clean, i.	smooth			22.0 22.5 23.0 24.5 25.0 26.5 27.0 28.5 28.5
4.00	asing to (m)	ııme (min)	Kose	ε το (n	<u>11)</u> r	ispec	tion p	it exc	cavated by	Kilwex to	1.20m.								
Casing Do	etails	Core	Barre	el	\dashv														
To (m) Di	iam (mm)	SI	K6L																
4.00 23.50	200 150				+-	or	in c.e.									lest!!	da.	d	
23.30	130	Flush	Тур	е	1	ermi	natio	n Re	eason							Last Up			Į
		Wa	ater		Te	ermir	nated	at sch	neduled de	epth						10/06/	2022		ſΗ

		AUS							21-1	ct No. 1219	Project Client: Client's		Consulting Enginee	ers		Borehole ID BH103
Rotary Co	rilling	Plant I Comacch Comacch	nio 60	01	0.0 4.0	00	Base 4.0 25.	00	71589	1.00 E 7.30 N	Final De		Start Date: 11/05/2			Sheet 1 of 4 Scale: 1:40 FINAL
Depth (m)	Samples / F	ield Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Description		1	Backfill
										- - - - - - -		Inspection pit excav	rated by Kilwex to 1.20n	n.		0.5 —
2.50 - 2.95	SPT(C) N=	19							61.85	1.20		Firm brown gravelly	/ CLAY (Driller descriptic	on)		1.5 —
	(3,3/4,5,5,								60.05	3.00		Firm sandy gravelly description)	CLAY with cobbles and	boulders. (Drillers		3.0 —
4.00 4.00 - 4.75 4.00 - 4.45	D11 B1 SPT(C) N=: (3,5/7,6,7)		75						59.05	- 4.00 		Medium dense dar	k greyish brown clayey f	fine to coarse SAND).	4.0
4.75 4.90 - 6.50 5.00	D12 B2					AZCL			58.30 58.15	4.75 - 4.90 -		is subangular fine. Dark greyish brown spaced medium be	gravelly sandy CLAY. Sa clayey fine to coarse SA ds of subrounded fine to sivel and cobbles are of I	AND with very wide o coarse GRAVEL wi	ely	5.0
			50							-		5.00-5.75m: AZCL fines (oossibly washed out with drilling t	fluid.		5.5
6.50 - 6.82 6.50 7.00 - 7.30	SPT(C) N=4 for 174mn		80							- - - - - - -						6.5 -
Struck at (m) Ca	4.00	Time (min)	Rose	e to (r	_	ema		oit exc	avated by	Kilwex to) 1.20m.					
To (m) D 4.00 25.50	etails Diam (mm) 200 150	Flush	(6L						ason leduled de	enth					Last Upda 10/06/20.	

	1							Proj	ect No.	Project	: Name: DAA Airfi	ield Under	oass		Borehole ID
	C	AUS	E	W	A	Y		21-	1219	Client:	DAA				BH103
	<i>/</i> –		GEC	TE	ECI	Н				Client's	Rep Ramboll	Consulting	Engineers		
Metho		Plant l					Base (ı	n) Coor	dinates				11/05/0000		Sheet 2 of 4
Rotary Dri Rotary Co		Comacch Comacch			0.0 4.0		4.00 25.50		91.00 E	Final De	epth: 25.50 m	Start Date:	11/05/2022	Driller: JG	Scale: 1:40
	8	001110001					25.5		87.30 N	Elevatio	on: 63.05 mOD	End Date:	11/05/2022	Logger: TH	FINAL
Depth (m)	Samples /	/ Field Records	TCR	SCR	RQD	FI	Casing Wa Depth De (m) (r	ith	Depth (m)	Legend			cription		म्हें Backfill
1.00 - 8.15	SPT(C) N	l=0 (25,25/0							-		Dark greyish brown spaced medium bec cobble content. Gra	ds of subroun	ded fine to coars	e GRAVEL with low	7.5
3.00	for 0mm								-						
3.50 - 8.80	ES20		90						-	م م م م م م م م م م م م					8.5
0.00 - 9.30	ES21								- - - -						9.0
0.50 - 11.25 0.50 - 9.95 0.50	B3 SPT(C) N (3,8/6,8,	=38 .11,13)							-						9.5
			100						-						10.0
1.00									- - -	4					11.0
	D13 B4 SPT(C) N (4,7/10,2	=46 10,12,14)	100					51.80	11.25		Very stiff dark brow to coarse. Gravel is s				11.5
2.50															12.5
3.15 3.15 - 14.15	D14 B5		97					49.90	13.15		Very stiff dark grey s cobble content. San coarse of limestone	d is fine to co			13.0
4.00 - 14.45 4.00	SPT(C) N (5,7/9,10								-						14.0
									-						14.5
		· "	TCR	SCR	RQD		\bigsqcup								
ruck at (m) Ca		Strikes Time (min)	Rose	to (n	_	ema ispec		excavated b	y Kilwex to	1.20m.					
Casing De		Core	Barre	el	\dashv										
To (m) Di 4.00	am (mm) 200	Sk	(6L												
25.50	150	Flush	Тур	e	To	ermi	nation	Reason						Last U	pdated I
			ater					scheduled (denth					10/00	

	C	AUS	E	W	A	Y H			Proje		Project Client: Client's	Name: DAA Airfield Underpass DAA Rep Ramboll Consulting Engineers	ı	Borehole ID BH103
Metho		Plant U					Base	(m)	Coord	inates	Client s	Rep Ramboli Consulting Engineers		Sheet 3 of 4
Rotary Dri Rotary Co	lling	Comacch	nio 60)1	0.0 4.0	00	4.0 25.5	0	71589		Final De	oth: 25.50 m Start Date: 11/05/2022 Dril	ler: JG	Scale: 1:40
										7.30 N	Elevatio	n: 63.05 mOD End Date: 11/05/2022 Log	ger: TH	FINAL
Depth (m)	Samples / F	ield Records	TCR	SCR	RQD	FI	Depth	Water Depth (m)	Level mOD	Depth (m)	Legend	Description Very stiff dark grey slightly sandy slightly gravelly CLAY	with low	Backfill
5.50			100							- - - - - - - -		cobble content. Sand is fine to coarse. Gravel is subang coarse of limestone.		15.C
6.10 - 16.40	U22		97							- - - - - -				16.0
	D15								46.15	- - 16.90	\$2.00 \cdot	Dense dark greyish brown very clayey fine to coarse SA	ND.	17.0
	SPT(C) N= (5,6/7,9,9					AZCL				-		17.00-17.50m: AZCL disturbance due to SPT.		17.0
7.00	(3,0) 7,3,3	,-1	67							- - - - - - - -				17.5 18.0
8.50			83							- - - - - - -				18.
9.60 9.60 - 20.60	D16 B7								43.45	- - 19.60		Very dense dark grey fine to medium SAND.		19.5
0.00 - 20.40			83							- - - - - - - - -				20. 20. 21.
1.50										- - -				21.:
										- - -				
			TCR	SCR	RQD	FI								
ack at (m) Cas 3.70	Water S sing to (m) 4.00	Time (min)			_	ema spec		t exc	avated by	Kilwex to	1.20m.			
	am (mm)	Core SK	Barre	el										
4.00 25.50	200 150	Flush		e	Te	ermi	natio	n Re	ason				Last Updat	ted I
			ater						neduled de	enth			10/06/202	

									rioje	ct No.	lioject	Name: DAA Airf	iela Offaei pass			orehole II
	C	AUS	E	W	A	Y			21 -1	L219	Client:	DAA				BH103
	<i>/</i> –		GEC	OTE	ECI	Н					Client's	Rep Ramboll	Consulting Engineers			
Metho	d	Plant l	Used		Тор	(m)	Base	(m)	Coord	linates						Sheet 4 of 4
Rotary Dri	illing	Comacch	nio 60)1	0.0	00	4.0	00		1.00 E	Final De	pth: 25.50 m	Start Date: 11/05/2022	Driller: JG		Scale: 1:40
									74308	7.30 N	Elevatio	n: 63.05 mOD	End Date: 11/05/2022	Logger: Th	1	FINAL
Depth (m)	Samples ,	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	V d dd	Description		Water	Backfill
										- - -		very dense dark gre	y fine to medium SAND.			22.
.35 .35 - 22.90	D17 B8		100						40.70	22.35			sh brown slightly sandy slightl se. Gravel is subangular fine to		<i>(</i> .	22.:
.90 .90 - 23.90		50							40.15	_ 22.90 _	× × ×	Very dense greyish	black silty fine SAND.			23.0
.00 - 23.45 .00	SPT(C) N (6,8/9,12									-	x					23.
			100							- - -	× × × × × × × × ×					24.
.30 - 24.65 .50	B10								38.75	- - 24.30 -	X: X	Sand is fine to coars	sh brown slightly sandy slightl se. Gravel is subrounded fine t		<i>t</i> .	24.
			80	80	80	1	-		38.40	24.65			ssive dark grey LIMESTONE. Pa ength, dark orangish brown di ces.			25.
50									37.55	- - 25.50		1. 70-90 degree joir	nt, at 24.75-25.50m (incipient lulating, smooth, dark orangis		ng on	25
										-			End of Boreliole at 25.50m			
										-						26.1
										-						26.
																27.0
										-						27.
																28.
										-						28.
										- - -						29.1
			TCR	SCR	RQD	FI										
		Strikes			-	ema										
ck at (m) Ca 3.70	4.00	Time (min)	Rose	to (n	n) In	ispec	tion p	it exc	avated by	Kilwex to	1.20m.					
					4											
o (m) Di	iam (mm)	Core Sk		21												
Casing De (o (m) Di (4.00 25.50			(6L		Te	ermi	natio	n Re	ason					1	ast Update	ed ■

	7								Proje	ct No.	Project	Name: DAA Airf	ield Underp	ass		В	orehole ID
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA					BH104
	—		GEC	T	ECI	Н					Client's	Rep Ramboll	Consulting	Engineers			
Metho	od	Plant (Used		Тор	(m)	Base	(m)	Coord	inates		·				9	Sheet 1 of 4
Rotary Dr Rotary Co		Comacch Comacch			0.0 4.0		4.0 29.0		71619	5.12 E	Final De		Start Date:		Driller:	JG .	Scale: 1:40
Depth							Casing	Water	74304 Level	7.22 N Depth	Elevatio	n: 62.44 mOD	End Date:		Logger:		FINAL
(m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing N Depth I (m)	Water Depth (m)	mOD	(m)	Legend	Inspection pit excav		ription		Water	Backfill
20 - 1.65 50 - 2.95	SPT(C) N (3,3/3,3,	4,5) r SN = 1387							61.24	1.20		Soft to firm brown s			escription)		1.0 1.5 2.0 2.5
.00 .00 - 5.00 .00 - 4.45	D27 B1 SPT(C) N (3,5/6,6, Hammer	,8,8) r SN = 1387	100						58.44	- 4.00		Stiff dark greyish br cobble content. San coarse of limestone	nd is fine to coa c. Cobbles are s	arse. Gravel is su subangular of lir	ibrounded fi		4.0
.40	(4,4/5,6, Hammer	.5,6) r SN = 1387	73			AZCL			56.04	- 6.40	다 아이			_			5.5
40 - 7.40 50 - 6.95 50	B2 SPT(C) N (3,5/5,7)		90	200					36.04	- 0.40		Stiff, becoming very CLAY with medium subangular fine to c quartz. Cobbles are	cobble content coarse of predo	t. Sand is fine to ominantly limes	coarse. Gra	vel is	7.0
	Water	Strikes	ICR	SCR	RQD	FI ema	rks										
ıck at (m) Ca		Time (min)	Rose	to (n	n) In	spec	tion pi		avated by undwater			d during drilling.					
Casing Do	etaile	Core	Barre	el	-												
To (m) Di	iam (mm)	-	(6L	-													
4.00 29.00	200 150	Flush		<u> </u>	T.	arm:	natio	n Pa	ason							Last Update	od ■ -
		inusi	yp	-	''	1111			u3011						1	-use opualt	.~ I

							Proje	ct No.	Project	Name: DAA Airf	ield Under	pass		Borel	nole ID
	CAU	SI	EV	VA	Y		21-:	1219	Client:	DAA				ВН	104
	<i></i>	GE	ОТ	EC	Н				Client's	s Ren Ramboll	Consulting	Engineers			
Metho	d Plar	t Use	ed	Ton	(m)	Base (m)	Coord	linates	Circiic	nambon	Consuming	LIIGINECIS		Shoot	2 of 4
Rotary Dri	lling Coma	chio	601	0.	.00	4.00			Final De	epth: 29.00 m	Start Date:	21/04/2022	Driller: JG		e: 1:40
Rotary Co	ring Coma	cchio	601	4.	.00	29.00		95.12 E 17.22 N	Elevatio	on: 62.44 mOD	End Date:	22/04/2022	Logger: TH		NAL
Depth (m)	Samples / Field Reco	ds TO	CR SCF	R RQD	FI	Casing Water Depth Depth (m) (m)	Level mOD	Depth (m)	Legend		Des	cription		Mater Bac	kfill
						(, (,		-	4 100	Stiff, becoming very CLAY with medium				elly	
								-		subangular fine to c				II IS	7.5
								-		quartz. Cobbles are	subangular o	f limestone.			
3.00 - 8.28	SPT(C) N=38 (3,8/	38 —						-		8.00-8.90m: AZCL disturb	nance due to SPT	_			8.0 ·
3.00	for 130mm) Hammer SN = 138							-		0.00-0.30m. AZGE distant	variece due to Gr. 1.	_			
	Hammer SN = 138	'						_							
					AZCL			_							8.5
		4	10												
									a o o						
								_	ia :00 .						9.0
								-	4 00						
9.50 - 9.95	SPT(C) N=41							-							9.5
9.50	(4,6/8,10,11,12)							_	34 .00						
	Hammer SN = 138	7						-	34 .00						
								-		9.95-10.10m: Lens of sub	angular fine to coa	arse gravel of limestone	·.		10.0
		٩	90					-	4 000						
			,,,					-							
								-							10.5
								_							
11.00								-							11.0
11.00								-							11.0
								_	0 0 0 0 d 00 0						
11.45 - 11.75	U21							-							11.5
			37					-							
	222	l°	97				50.40	- 44.05							
11.95 11.95 - 12.50	D29 B3						50.49	_ 11.95		Very stiff dark brow cobble content. San					12.0
										coarse of limestone	. Cobbles are	angular of limes	tone.		
									0 0						
12.50 12.50 - 12.80	D30 B4						49.94	- 12.50 -		Dark brown very sa	ndy CLAY. San	d is fine to coars	e.		12.5
12.50							49.64	- - 12.80		CHEE Acadelia "	hali cara !	abelia energy (C.	AViel !!		
12.80 12.80 - 13.45	D31 B5							-		Stiff dark brown slig cobble content. San					13.0 -
								-	0 0 0	coarse of limestone					
		10	00					-	0 0 0						
13.45 13.45 - 13.80	D32 B6						48.99	13.45		Dark brown gravelly					13.5
							40.51	42.55		content. Gravel is sulare subangular of li	mestone.			es	
13.80 13.80 - 14.70	D33 B7						48.64	13.80		13.70-13.80m: Lens of su Very stiff dark brow	ıbangular fine to co				
14.00					1			-		cobble content. San	d is fine to co	arse. Gravel is su	bangular fine		14.0 -
								-		coarse of limestone	. copples are	supangular of lir	nestone.		
								-	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	14.45-15.55m: Lens of gr	avelly very clayey	fine to coarse sand.			14.5
		т	CR SCF	R ROD	FI			-	<u> </u>						
	Water Strikes	1.0	501		Rema	rks		1		<u> </u>					
ruck at (m) Ca	sing to (m) Time (m	in) Ro	ose to (tion pit exc	avated by	/ Kilwex to	1.20m.						
										ed during drilling.					
Casing De	etails Co	re Ba	rrel	\dashv											
To (m) Di	am (mm)	SK6L													
4.00 29.00	200 150 Flu	ısh Ty		-	ermi	nation Re	ason						1.1	ast Updated	
	"														ليرا
		Wate	r	1	ermir	nated at sch	neduled d	epth.						10/06/2022	似叶

20	1							Proje	ct No.	Project Name: DAA Airfield Underpass	Borehole ID
	C	AUS	E	W	A	Y		21-	1219	Client: DAA	BH104
			GEC	TC	EC	Н				Client's Rep Ramboll Consulting Engineers	
Metho	od	Plant l			Тор	(m)	Base (m	Coord	dinates		Sheet 3 of 4
Rotary Di Rotary C		Comacch Comacch				00 00	4.00 29.00	71619	95.12 E	inal Depth: 29.00 m Start Date: 21/04/2022 Driller: JG	Scale: 1:40
				-					17.22 N	Elevation: 62.44 mOD End Date: 22/04/2022 Logger: TH	FINAL
Depth (m)		Field Records	TCR	SCR	RQD	FI	Casing Water Depth Depth (m) (m)	Level mOD	Depth (m)	Legend Description	Backfill
14.70 14.70 - 15.50			100					47.74	- 14.70 - - -	Course of limestone. Cobbles are subangular of limestone. Coarse of limestone. Cobbles are subangular of limestone. Coarse of limestone. Cobbles are subangular of limestone. Cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.	O
15.50 15.50 - 16.25 15.50	D35 B9							46.94	- 15.50 - - - - -	Dark greyish brown very clayey fine to coarse SAND.	15.5
16.25 16.25 - 17.00	D36 B10		100					46.19	16.25	Dark grey subangular fine to coarse GRAVEL of limestone with his cobble content. Cobbles are subangular of limestone.	jh
17.00 17.00 - 18.10 17.00	D37 B11							45.44	- 17.00	Dark grey very clayey fine to coarse SAND.	17.0
			93							2007년 경소화	
18.10 18.10 - 19.10	D38 B12							44.34	18.10	Very stiff dark greyish brown slightly gravelly sandy CLAY with lov cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone.	
18.50 19.20 - 19.50	O U22		100						-	18.50-18.60m: Lens of subangular fine to coarse gravel of limestone.	19.0
20.00									-		20.0 —
20.25 20.25 - 20.55								42.19	20.25	Very stiff dark greyish brown sandy SILT. Sand is fine to coarse.	20.5
20.55 20.55 - 21.55	D40 B14		100					41.89	_ 20.55 - - - - - -	Greyish black fine to medium SAND.	21.0
21.50									-	#3.77 48.71 48.71 48.72 48.73	21.5
			TCP	SCE	RQD	FI			-		
	Water	Strikes	ICR	JUK	Ч-	ema	rks				
Struck at (m) C			Rose	e to (r	n) Ir	rspec	tion pit ex	cavated by oundwate		20m. Ier added during drilling.	
Casing D)etails	Core	Barre	el	\dashv						
To (m)	Diam (mm)		<6L								
4.00 29.00	200 150	Flush		e	T	ermi	nation R	eason		La	st Updated
			ater					heduled d	epth.		.0/06/2022 AGS

	<u> </u>	AUS	E	V DT						ct No. 1 219	Project Client: Client's	Name: DAA Airf DAA Rep Ramboll	Tield Underp						oreho	ole ID .04
Metho Rotary Di		Plant I Comacch			Top 0.0		Base 4.0		Coord	inates	Final De	pth: 29.00 m	Start Date:	21/04/2022	Driller:	: J(G		heet 4 Scale:	4 of 4
Rotary C		Comacch	nio 60	01	4.0	00	29.	.00		5.12 E 7.22 N	Elevatio	n: 62.44 mOD	End Date:	22/04/2022	Logger	r: T	Н		FIN	
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Desc	ription				Water	Back	fill
22.55 22.55 - 23.55 23.00	D41 5 B15		100							-		Greyish black fine to	o medium SAN	ID.						22.5 23.0
24.50 24.50 - 24.90 24.50	D42 D B16		100						37.94	- 24.50	× × × × ×	Greyish black silty fi	ine to coarse S	SAND.						24.0 24.5
24.90 24.90 - 25.05 25.05 25.05 - 26.00	D44		97						37.54 37.39	24.90	× × · · · · · · · · · · · · · · · · · ·	Very stiff dark grey Greyish black fine S								25.0 25.5
26.45 26.45 - 27.30	D46 B20								35.99	26.45		Very stiff dark greyi Sand is fine to coars				/ CLA	AY.			26.0 26.5
27.45 27.56			100	4	4				35.14	- 27.30		Medium strong indi								27.0
27.45 - 27.50 27.50 27.83 - 27.95						11				- - - -		Partially weathered spacing. Discontinuities: 1. 5-15 degree bedoplanar, rough. 2. 30-50 degree joir	ding fractures,	closely spaced ((25/105/3	390)	,			27.5 28.0
28.20 - 28.50 28.70 - 28.80			100	93	57	7				- - -		undulating, smooth 3. 60-70 degree joir	١.			., 5118	-···· <i>1</i>			28.5
29.00			TCR	SCR	RQD	FI			33.44	- - 29.00 -			End of Borel	hole at 29.00m				_		29.0
	Details Diam (mm)	Core	Rose	e to (r	R n) Ir	ema	tion p		cavated by bundwater			d during drilling.								
4.00 29.00	200 150	Flush		e					e ason neduled de	epth.							Last U ₁			A G

	8 0	AUS	SE	V	/A	Y			Project	ct No.	Project	·	ehole ID H105
			GEC	ΣТ	EC	Н					Client's		
Meth	hod	Plant	Used		Тор	(m)	Base	(m)	Coord	inates		She	et 1 of 4
Rotary D Rotary 0		Comaccl Comaccl			0.	00	4.0 27.	00		6.20 E	Final De	epth: 27.00 m Start Date: 25/04/2022 Driller: JG	le: 1:40
										1.80 N	Elevatio		INAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	3	ackfill
1.20 - 1.65	SPT(C) N (3,3/4,5 Hamme								61.61	1.20		Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse. (Driller's description)	1.0 — 1.5 — 2.0 — 2.5 — 3.0 —
4.00 - 5.00 4.00 - 4.45			50						58.81	- 4.00		Very stiff greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse. 4.00-4.65m: AZCL disturbance due to SPT.	4.0 —
5.00 - 8.00 5.00		N=40 (3,6/40	50						57.81	- 5.00	이 기업	Dark grey GRAVEL and COBBLES of limestone with some slightly sandy slightly gravelly clay. 5.00-5.90m: AZCL fines washed out with drilling fluid.	5.0
6.50	for 140r		50							- - - - -		6.50-7.30m: AZGL disturbance due to SPT.	7.0
			TCR	SCR	RQD								
Struck at (m)		Strikes Time (min)	Rose	e to (m) Ir		tion p		cavated by oundwater			d during drilling.	
Casing	Details	Core	Barr	el	\dashv								
To (m) 4.00	Diam (mm)	SI	K6L										
27.00	150	Flush	Typ	е					eason heduled de	anth		Last Updated 10/06/2022	\Cc
		VV	ater			emili	iated i	at SCI	neuulea ae	epul.		10/06/2022	AUS

Metho Rotary Dri	C	AUS	E	W	Δ	Y		-		1					
Rotary Dri	/ -				_			23	-1219	Client:	DAA				BH105
Rotary Dri	7		GEC	OTI	ECH	Н				Client's		Consulting Engineers			
Rotary Dri	d	Plant l	Used		Ton	(m)	Base (n) Cod	rdinates	- Circlic 3	cp Rumbon	Consuming Engineers			Sheet 2 of 4
Doto ^	illing	Comacch	nio 60	01	0.0	00	4.00			Final De	pth: 27.00 m	Start Date: 25/04/202	Driller:	JG	Scale: 1:40
Rotary Co	oring	Comacch	nio 60	01	4.0	00	27.00		016.20 E 061.80 N	Elevatio	- C2 81 m OD	End Date: 25/04/202	12 1 = = = = = = = = = = = = = = = = = =	TII	
			I	1			Casing W			Elevatio	n: 62.81 MOD	25/04/202	Logger:		FINAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing War Depth De (m) (i	ter oth n) MOD		Legend	D CDAV5	Description		W to the same of t	Backfill
									-		sandy slightly grave	and COBBLES of limestone Ily clay.	with some slig	ntiy	7.5
	В3							54.8	8.00		Grevish brown grav	elly very clayey fine to coa	rse SAND with	low	8.0
00									[ۇ. قىنى	cobble content. Gra	vel is subrounded fine to o			
									_	ئ ئى قىرى	8.00-8.90m: AZCL fines v	ular. vashed out with drilling fluid.			8.5
										ئے °۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔۔					
			50							هٔ مُحدًا فیقت م					
									-	**************************************					9.
									-	ه ف					
0 - 9.57	SPT(C) N	I=0 (14 for							-	ە. قىنىدە	0.50.40.00				9.
0 - 9.57	75mm/0	for 0mm)							-	-dd -0	9.50-10.00m: AZCL distu	roance due to SPT.			
	натте	r SN = 1387							ŀ	ە. ف د. ف					
									-	ه ف ،	J				10.
			65							ة. ن في.					
										ەلىقىد. ھ					10
									[ە.ھ.، ئە قىم،،					10.
									[ئے میں۔ م					
.00 - 11.45					\vdash				-	ە ئەن ئەرىمە					11.
.00	(4,7/7,1) Hamme	0,13,14) r SN = 1387							-	ه څخه					
										ە. ئەس. ئە					
										ە. ئىسى: ئەرىمى:					11.
			65							ە ھىلى ھا ئە ئىلىد					
									-	ە جەن بەر ئە					12.
									-	ە جەن بەر ئە					
									-						
.50									-						12.
.95 - 13.95	В4							49.8	12.95		Very stiff dark brow	n slightly sandy gravelly Cl	AY with low co	obble	13.
			0.5						-		content. Sand is fine	e to coarse. Gravel is subar			
			95						-		Cobbles are subang	uiai OI IIIIIESTONE.			
.50 - 13.95		=44 11,11,12)							-						13.
		r SN = 1387							-						
.00									_		14.00.14.70	ich brown von sleve.	cond possible de-	rhad by	14.
-									-		14.00-14.70m: Dark grey. drilling.	ish brown very clayey fine to coarse	sariu, possibly distur	ueu uy	
									-	و. من من م					
									ļ						14.
	<u> </u>		TCR	SCR	RQD										
ck at (m) Ca		Strikes Time (min)	Rose	to (n	-	ema snec		aycavatad	by Kilwex to	n 1 20m					
== () Cd.	6 60 (111)	(11111)		(1							d during drilling.				
Casing De	etails	Core	Barre	el	\dashv										
o (m) Di	iam (mm)	Sk	K6L												
4.00 27.00	200 150	Flush		<u> </u>	Te	ermi	nation	Reason					I	Last Upda	ted = -
			ater	-				scheduled	المميداد					10/06/202	

CAUSEWAY GEOTECH										ct No.	Project Name: DAA Airfield Underpass Client: DAA							Borehole ID BH105				
				711		'					Client's	Rep Ramboll	Consulting E	ngineers	_							
Method Rotary Drilling Rotary Coring		Plant L Comacch Comacch	01	0.0 4.0	00	4.00 27.00		Coordinates 716016.20 E		Final De	pth: 27.00 m	Start Date:	25/04/2022	Driller:	: JG	à		heet :				
									743061.80 N		Elevation: 62.81 mOD		End Date: 25/04/2022 Logg		Logger				FIN.	INAL		
Depth (m)		Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Descr					Water	Backt	ill		
4.70 5.50	D9		80							- - - - - - -		Very stiff dark brow content. Sand is fine Cobbles are subang	e to coarse. Gra ular of limestor	ivel is subangu ne.	lar fine to	coar	rse.			15.0 15.5		
5.50 - 16.95			80							- - - - - - -										16.0 16.5		
	(3,6/8,11,11,14) Hammer SN = 1387									-												
7.00 7.00 - 18.10 7.00	D10 B5								45.81	- - 17.00		Very stiff greyish bla coarse. Gravel is sub			Y. Sand is	fine	to			17.0		
			95							- - - -										17.!		
3.00 - 18.29	(6,17/47 140mm)	6,17/47 for L40mm) Hammer SN = 1387 D11							44.71	- - 18.10 -		Dense greyish black	very silty fine t	to medium SAN	ND.					18.		
3.10 3.10 - 19.10 3.50	D11									- - - - - -										18.5 19.0		
0.00			75							- - - - -										19.! 20.		
			100							- - - - -										20.		
00 - 21.45	SPT(C) N=34 (3,3/5,8,10,11) Hammer SN = 1387																			21.0		
50										- - -										21.		
			TCR	SCR	RQD	FI				_												
	Water				R	ema	rks			1	1											
ck at (m) Cas	sing to (m)	Time (min)	Rose	to (n					avated by oundwater			d during drilling.										
Casing De To (m) Dia 4.00 27.00	am (mm) 200	Core Barrel																				
	150	Flush Type							ason								ast Up			Ļ		
		ater		Te	Terminated at sch			eduled de	epth.	1				10/06/	10/06/2022 AG							

								Proje	ct No.	Project	Name: DAA Airf	ieid Offderpa	355		'	Borehole I
	CAU	SE	W	A	Y			21 -1	219	Client:	DAA					BH105
		GE	TC	EC	Н					Client's	Rep Ramboll	Consulting E	ngineers			
Metho Rotary Dri	lling Comac		01	0.	00	4.00	0	Coord		Final De		Start Date:		Driller:	JG	Sheet 4 of Scale: 1:40
Rotary Co	ring Comac	CHIO 6	01	4.	00	27.0		71601 74306	1.80 N	Elevatio	n: 62.81 mOD	End Date:	25/04/2022	Logger:	TH	FINAL
Depth (m)	Samples / Field Record	s TCR	SCR	RQD	FI	Casing V Depth (m)	Vater Depth (m)	Level mOD	Depth (m)	Legend	Dense greyish black	Descri			Water	Backfill
.50 - 22.95 .75 .75 - 23.75 .00	23.35-23.40m: Greyish black clay. 23.50-23.60m: Greyish black slightly sandy slightly gravelly clay. 5 SPT(S) N=44														22 23	
00 - 24.45 30 30 - 25.30	4.45 SPT(S) N=44 (8,8/10,10,12,12) D13 38.51 24.30 24.30 24.30 24.30 24.30 38.51													.AY.	2:	
4.50 5.50 - 25.62	SPT(S) N=50 (25 for 50mm/50 for 70mm) SPT(S) N=50 (25 for 50mm/50 for 70mm)										aminated LIME:	STONE. Part		24 25 28		
5.00	50mm/50 for 70mm)	100	53	11	13				- - - - - - - - - -			lding fractures, grey gravelly cla	closely spaced ay infill on somo	(15/94/110 e fracture si	0),	26
7.00								35.81	- 27.00 - 27.00 			End of Boreho	ole at 27.00m			2:
	Water Strikes	TCR	s SCR	RQD	FI	arks			- - - - - - -							28
Casing De To (m) Dia	etails Coram (mm)	e Barr		m) Ir	rspec	tion pit			Kilwex to		d during drilling.					
27.00	150 Flu	sh Typ	е	T	ermi	ination	n Re	ason							Last Updat	ted

					Pro	ect No.	Project	t Name: DAA Airf	ield Under	oass		E	Borehole ID
大 只	C	AUSEW GEOT	AY		21	-1219	Client:	DAA				В	H105-We
	—	——GEOT	ECH				Client's	s Rep: Ramboll	Consulting	Engineers			
Metho	od	Plant Used	Top (m)	Base (r	n) Coo	rdinates							Sheet 1 of 4
otary Dr	illing	Comacchio 601	0.00	22.00)		Final De	epth: 22.00 m	Start Date:	27/04/2022	Driller:	ig l	Scale: 1:40
						016.20 E 061.80 N	Elevatio	on: 62.81 mOD	Fnd Date:	27/04/2022	Logger:	СН	FINAL
Depth	Sample /			Casing Wa		Depth							
(m)	Tests	Field Records		Casing Wa Depth Dep (m) (n	mOD	(m)	Legend	Inspection pit excav		ription		Water	Backfill
asing Do	etails iam (mm)	Time (min) Rose to (r			61.61 57.81	5.00	on of 150mm	Dark grey GRAVEL v					2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
.00	254		Core	Barrel	Flus	h Type	Termina	tion Reason				Last Updat	ed
			1		1		1	ed at scheduled depth			- 1	10/06/202	

Client's Rep: Ramboll Consulting Engineers Method Plant Used Top (m) Base (m) Coordinates	CAL	SEW	/AY			ect No.	Project Name: DAA Airf	iela emaerpass		Borehole II BH105-We
Method Plant Used Top (m) Base (m) Coordinates of tary Drilling Comacchio 601 0.00 22.00 716016.20 E 743061.80 N Elevation: 62.81 moD End Date: 27/04/2022 Logger: CH Fin/ Scale: 1	CAC	-GEOT	ECH		21	1219		o li s		BH102-446
Table 20 of the property of th				D (d:	Client's Rep: Ramboll	Consulting Engineers		01 10 64
T-16015-20 E 743061-80 N Elevation: 62.81 mOD End Date: 27/04/2022 Logger: CH FIN/Open Tests Prior Tes							Final Depth: 22.00 m	Start Date: 27/04/2022	Driller: JG	Sheet 2 of 4 Scale: 1:40
Dark grey GRAVEL with cobbles. (Driller's description) Grey to brown SAND. (Driller's description)							Elevation: 62.81 mOD	End Date: 27/04/2022	Logger: CH	FINAL
Dark grey GRAVEL with cobbles. (Driller's description) 54.81 8.00 Grey to brown SAND. (Driller's description)	Depth Sample / Tests	Field Records		Casing Water Depth Depth (m) (m)		Depth (m)	Legend	Description	1	ë Backfill
Water Strikes k at (m) Casing to (m) Time (min) Rose to (m) Solution Casing Details Water Added (m) Diam (mm) From (m) To (m) 2.00 254 Remarks BH105 expanded to allow installation of 150mm ID pumping well.	at (m) Casing to (m) Time (n .50 asing Details Wa (m) Diam (mm) From (ter Added	m) BH105		49.86	12.95	Grey to brown SANI	D. (Driller's description)	n)	9.9

	C	AUSEW GEOTE	AY ECH			ect No. 1219		DAA Airfield Un DAA Ramboll Consul				rehole ID 105-We
Meth	od	Plant Used	Top (m)	Base (m	Coor	dinates					Sh	eet 3 of 4
otary D	rilling	Comacchio 601	0.00	22.00	7160	16.20 E 61.80 N			ate: 27/04/2022 te: 27/04/2022		Si	cale: 1:40 FINAL
Depth (m)	Sample / Tests	Field Records		Casing Water Depth Depth (m) (m)	Level mOD	Depth (m)	Legend		Description		Water	Backfill
	Water	Strike at 16.50m	Rema	rks	44.71	- 18.10	Grey SANE	D. (Driller's descrip	priller's description			16.0 16.0 16.0 16.0 16.0 17.0 18.0 18.0 18.0 19.0
k at (m) C 5.50	asing to (m	Time (min) Rose to (m	<u>ነ)</u> BH105	expanded	d to allow	installatio	n of 150mm ID pumpin	ng well.				
		<u> </u>										
(m)	Details Diam (mm)	Water Added From (m) To (m)										
2.00	254	10 (11)								1		- I
			Core	Barrel	Flush	Туре	Termination Reaso				ast Updated	
					A	ir	Terminated at schedu	led depth.			10/06/2022	N/G

	C	AUS	EW	AY ECH				ct No.	Project Client: Client's		ield Underp				orehole	
Met Rotary		Plant U		Top (m) 0.00	Base 22.		Coord	inates	Final De	epth: 22.00 m	Start Date:	27/04/2022	Driller: J	GI	Sheet 4 c	
Notary	21111116	Comaccin	0 001	0.00				6.20 E 1.80 N	Elevatio	on: 62.81 mOD	End Date:	27/04/2022	Logger: (CH	Scale: 1: FINAI	
Depth (m)	Sample / Tests	Fiel	d Records		Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription		Water	Backfill	
	Tests		d Records			Water Depth (m)	Level mOD 40.81	Depth (m) - 22.00	Legend	Grey SAND. (Driller	's description)			Water	Backfill	
Casing To (m)	Casing to (m) Details Diam (mm)	Strikes) Time (min) I Water A) From (m)		Rema		nded	to allow i	nstallatio	n of 150mr	n ID pumping well.						
22.00	254			Cara	Barr	ام	Flush	Typo	Tormina	tion Reason				Last Update	ad 💻	<u>_</u>
				Core	: Darr	eı	Flusn Ai			ព០n Reason d at scheduled depth	ì.			10/06/2022		GS

		A 1 10							Proje		Project Na	me: DAA Airf	iela Underf	oass				rehole ID
		AUS	EC	V	A	Y			21-1	219	Client:	DAA					١	BH106
			3 E C	711							Client's Re	p Ramboll	Consulting	Engineers				
Metho Rotary Dri	lling	Plant I	nio 60)1	0.	00	Base 4.0	00	Coord		Final Depth	: 29.00 m	Start Date:	20/04/2022	Driller:	JG+GT		neet 1 of 4 cale: 1:40
Rotary Co	ring	Comacch	110 60)1	4.	00	29.	00	71615 74311		Elevation:	63.04 mOD	End Date:	21/04/2022	Logger:	TH		FINAL
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Des	cription		"	Water	Backfill
.00 - 4.30 .30 .30 - 5.30	SPT(S) N (8,8/10,:	0,10,10) · SN = 0208	100						61.24 60.54 59.04 58.74	1.80	- × So	ft grey silty CLAY ey slightly sandy scription) ry stiff dark grey arse. Gravel is sul ry stiff dark greyichle content. San arse of limestone	(Driller's desc GRAVEL. Sand slightly sandy bangular fine sh brown sligh d is fine to co	slightly gravelly to medium.	CLAY. Sand	d is fine to		1.0 1.5 2.0 2.5 3.0 4.0 4.5 5.0 6.5
			TCR	SCR	RQD	FI				=	₹ <u>₩</u> :400 - ₩							
		Strikes		<u> </u>	R	ema	rks			·	1							
uck at (m) Cas	sing to (m)	Time (min)	Rose	to (r	n) Ir	spec	tion p		avated by oundwater		1.20m. vater added du	ring drilling.						
	am (mm)	Core Sk	 Barre (6L	el														
2.50	200 150	Flush			T	ermi	natio	n Re	ason							Last Up	date	d E
29.00																		

	7								Proje	ct No.	Project	Name: DAA Airfi	ield Underr	oass			Borehole	e ID
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA					BH10	6
	<i>/</i> —	—— G	GEC	ITC	EC	Н					Client's	Rep Ramboll	Consulting	Engineers				
Metho	d	Plant U					Base		Coord	inates		-					Sheet 2 o	 of 4
Rotary Dri Rotary Co		Comacch Comacch				00 00	4.0		71615	2.58 E	Final De	pth: 29.00 m	Start Date:	20/04/2022	Driller:	JG+GT	Scale: 1:	:40
,	J									7.56 N	Elevatio	n: 63.04 mOD	End Date:	21/04/2022	Logger	: TH	FINAL	L
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription	L CLAY	21.1	Backfill	
8.00 - 8.14 8.00	68mm/5	=50 (25 for 0 for lammer SN								- - - - - - - - -		Very stiff dark greyis cobble content. San coarse of limestone.	d is fine to co	arse. Gravel is su				7.5 - 8.0 -
9.50	D25		100						53.54	- - - - - - - - - - - - -		Very stiff dark browi	n slightly sann	tv gravelly CLAY	with low o	copple		9.0 —
9.50 - 10.50 9.50	B7		100							- - - - - - - -		and boulder content to coarse of limesto	t. Sand is fine	to coarse. Grave	l is suban	gular fine		10.0 —
11.00 - 11.45 11.00	SPT(S) N= (7,8/8,10 Hammer		100							- - - - - - - - - -								11.5
		=47 2,12,11,12) SN = 0208	90						50.54	- - 12.50 - - - -		Dense greyish brow	n very clayey	fine to coarse SA	ND			12.5
13.65 13.65 - 14.00	D27 B9								49.39	13.65		Very stiff dark brown to coarse. Gravel is s				and is fine		13.5
	D28 B10 SPT(S) N= (6,6/8,8,8 Hammer								49.04	- 14.00 - - - -		Dense dark greyish l	brown slightly	y clayey fine to co	oarse SAN	ID.		14.0 -
			TCR	SCR	RQD													
truck at (m) Cas	Water sing to (m)		Rose	to (n	n) Ir		tion p			Kilwex to strikes, w		d during drilling.						
Casing De	etails	Core	 Barre	el	\dashv													
	am (mm) 200	SK	(6L															
	150	Flush	Tun		+	ormi	inatio	n Re:	ason							Last Up	dated =	
29.00		ilusii	тур	e	"	emm	iiiatio									Last Up	uateu	

20									Proje	ct No.	Project	Name: DAA Airfield Underpass	Borehole ID
	C	AUS	E	V	VA	Y			21-1		Client:	DAA	BH106
	<i>/</i> –		EC	ΣТ	EC	Н					Client's		
Metho	d	Plant U	Jsed		Тор	(m)	Base	(m)	Coord	inates	Circiic	Nep Nambon Consulting Engineers	Sheet 3 of 4
Rotary Dri	illing	Comacch	nio 60	01	0.	00	_	00	71615		Final De	pth: 29.00 m Start Date: 20/04/2022 Driller: JG+GT	Scale: 1:40
									74311	7.56 N	Elevatio	n: 63.04 mOD End Date: 21/04/2022 Logger: TH	FINAL
Depth (m)	Samples /	Field Records	TCR	SCI	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description Control of the Control o	Backfill
										-		Dense dark greyish brown slightly clayey fine to coarse SAND. 14.80m to 14.90m: Lens of subangular fine to medium gravel.	
14.90 - 15.50	D29 B11		95						48.14	- 14.90 - -	0,0000000000000000000000000000000000000	Dark grey subangular fine to coarse GRAVEL of limestone with medium cobble content. Cobbles are of limestone.	15.0
15.50 15.50 - 16.00 15.50	D30 B12								47.54	- 15.50 - -		Dark greyish brown slightly clayey fine to coarse SAND.	15.5
16.00 16.00 - 16.65	D31 B13		95						47.04	- 16.00 - - - -		Dark greyish brown fine to medium SAND with pockets of dark brown sandy clay.	16.0
16.60 - 17.00 16.65	B14 D32							46.39	16.65		Dark greyish brown gravelly very clayey fine to coarse SAND. Gravel is subrounded fine to coarse of limestone.		
17.00 17.00 - 17.30	D33 B15					1			46.04	- 17.00 -		Dark greyish brown fine to coarse SAND	17.0
17.00 17.30 17.30 - 17.85	D35								45.74	17.30	× × × × ×	Greyish black silty fine to coarse SAND.	17.5
17.85 17.85 - 18.50 17.95 - 18.25	D35 50 B17 25 U40								45.19	17.85 -	× × × ×	Very stiff dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.	18.0
18.50 18.50 - 19.10 18.50	D36 B18					-			44.54	- - 18.50 - -		Dark brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium of limestone. (Possibly disturbed by drilling)	18.5 —
19.10 - 19.40	B19		87						43.94	- - 19.10		Dark grey subangular fine to coarse GRAVEL	- 19.0 — -
19.40 19.40 - 20.40	D37 B20								43.64	- 19.40 - -		Very stiff dark grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.	19.5 —
20.00 - 20.45 20.00	(4,7/10,	=50 13,14,13) · SN = 0208				-				- - - -			20.0 — - - -
			100							- - - - -			20.5 — - - 21.0 — -
21.50 - 21.95 21.50	(4,6/9,9,					AZCI	-			-		21.50m to 22.10m: AZCL disturbance due to SPT	21.5
			TCR	SCI	R RQD	FI				-			10 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		Strikes				lema	rks				,		
Struck at (m) Ca	sing to (m)	Time (min)	Rose	e to					cavated by oundwater			during drilling.	
Casing De	etails	Core	L Barre	el	-								
To (m) Di	iam (mm) 200	SK	(6L										
29.00	150	Flush	Тур	e	Т	ermi	inatio	on Re	eason			Last Upd	ated
		Wa	ater		Ţ	ermir	nated	at scl	neduled de	epth.		10/06/2	O22 AGS

26								Proje	ct No.	Project	: Name: DAA Airfi	ield Underp	ass			В	orehole ID
	C	AUS	E	W	A	Y		21-:	1219	Client:	DAA						BH106
			GEC	TC	EC	Н				Client's		Consulting I	Engineers				
Meth	od	Plant l	Jsed	ı	Top	(m)	Base (m)	Coord	linates	Chencs	nep nambon	Consuming	LIIGIIICCIS				heet 4 of 4
Rotary D	rilling	Comacch	nio 60	01	0.	00	4.00			Final De	epth: 29.00 m	Start Date:	20/04/2022	Driller:	JG+GT		Scale: 1:40
Rotary C	oring	Comacch	nio 60	01	4.	00	29.00		52.58 E 17.56 N	Elevatio	on: 63.04 mOD	End Date:	21/04/2022	Logger:	TH		FINAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Water Depth Depth (m) (m)	Level mOD	Depth (m)	Legend		Desc	ription		11	Water	Backfill
									_		Very stiff dark grey s coarse. Gravel is sub				l is fine to		22.0
									-		coarse. Graver is suc	vangular ilile ti	o coarse or iime	stone.			
			60						-								
			"						-								22.5
									-								
23.00	D38							40.04	- 23.00								23.0
23.00 - 23.70 23.00 - 23.4	B21	1-44									Dense dark grey cla	yey fine to coa	rse SAND				
23.00 - 23.4: 23.00		1=44 0,12,14)							_								
	Hamme	r SN = 0208							_								
23.70	D39		95					39.34	23.70	- :: ○ ° · ° p ° °	Very stiff dark grey s	slightly sandy g	gravelly CLAY wi	th low cob	ble	-	
23.70 - 24.70	D B22								L	-A : O O	content. Sand is fine	e to coarse. Gra	avel is subangul				
										-a - 0° ŏ 0							24.0
										-a - 0° ŏ 0	24.20m to 24.30m: Lens o	od subangular fine to	medium gravel				
24.50 - 24.9	5 SPT(C) N	l=44				-			-								24.5
24.50		1,13,13) r SN = 0208							-								
	riamine	1 314 - 0200							_								
									_								25.0
			95						_								
									_								25.5
									-								
									[
26.00 - 26.29						-			-		26.00m to 26.10m: Lens of	of subangular fine to	medium gravel (poss	sible weathere	d rock)		26.0
26.00	for 140n Hamme	nm) r SN = 0208						36.94	26.10		Medium strong indi Partially weathered						
26.40 - 26.5											spacing, some dark		-				
						15			-		Discontinuities: 1. 0 to 10 degree be	edding fracture	es, closely space	ed (10/80/:	150)		26.5
			87	60	47				-		planar, rough.	_					
								36.14	- 26.90 -		2. 70 to 80 degree jo slightly undulating,					1	27.0
									-		\surfaces. Strong indistinctly tl	hinly laminated	d black LIMESTO	ONE Partia	ally	/	
									-		weathered; closer fi				',		
27.50 - 27.60 27.50	C3					1			-		Discontinuities: 1. 0 to 10 degree be	edding fracture	es, closely space	ed (25/200)	/370)		. 27.5
									-		planar, smooth. 2. 80 to 90 degree jo	oints at 27 05n	n to 27 25m and	d 28 N3m t	·0		
27.95 - 28.03	3 C4					11			_		28.15m, undulating		27.23111 0111	20.00111			28.0
28.15 - 28.4	5 C1		22						-								
			93	93	72				_								
									-								28.5
29.00			L		L	L		34.04	_ _ 29.00								200
_5.00								57.04	25.00			End of Boreh	nole at 29.00m				25.0
			TCR	SCR	RQD												
Struck at (m)		Strikes Time (min)	Ross	a to /-	_	lema			. izil. :	1 20							
ou uck at (m) (asing to (m)	, rime (min)	NUSE	ະ ເບ (r			tion pit ex ticeable gr				d during drilling.						
Casing E	Details	Core	Barro	el	\dashv												
To (m) I	Diam (mm)	S.k	(6L														
2.50 29.00	200 150				+	orm:	nation P	22502							Lact III	ndata	d = -
		Flush		C			nation Re								Last U	-	"
		Wa	ater		Te	ermir	nated at sc	neduled d	epth.						10/06	5/2022	AU

								Pro	ject No.	Project	: Name: DAA Airf	ield Under	oass			Bor	ehole II	_)
		AUS	E	W	A	Y		21	-1219	Client:	DAA					В	H107	
			GEC	TC	EC	Н				Client's	Rep Ramboll	Consulting	Engineers					
Met		Plant l			_		Base (rdinates	Final Da	20.00.55	Start Data	11/04/2022	Duilleur	ıc	She	et 1 of 5	,
Rotary I Rotary		Comacch Comacch			1	00	30.0		243.80 E	Final De	epth: 30.00 m	Start Date:	11/04/2022	Driller:	JG	Sca	ale: 1:40	
·									104.60 N	Elevatio	on: 63.31 mOD	End Date:	12/04/2022	Logger:	DMC	F	INAL	
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Depth D	/ater Level mOD		Legend			cription			Water	ackfill	
											Inspection pit excav	ated by Kilwe	x to 1.20m					-
																	0.3	, — - -
								62.11	1.20	* * * * * * * * * * * * * * * * * * * *	Soft brown gravelly	CLAY (Driller's	description)				1.0	-
																	1.	5 —
2.00 2.00 - 3.00 2.00 - 2.45	SPT(C) N (2,2/3,5)							61.31	2.00		Stiff brown slightly scontent. Sand is fine various lithologies.	e to coarse. G	ravel is subangul				2.0	
			78															
3.00 3.00 - 3.45	(3,5/8,1) Hamme							60.31	3.00		Firm dark brown slig Sand is fine to coars			ghtly gravel	lly CLAY.		3.0	,—
3.50 3.50 - 4.50 3.50	D15 B2							59.81	3.50		Very stiff dark brow content. Sand is fine various lithologies.	e to coarse. G	ravel is subangul				3.3	
			68						-								4	5 —
5.00 - 5.45 5.00	(4,6/9,9					AZCL	-		-		5.00m to 5.30m: AZCL		=				5.	
			72														6.0	
6.50 - 6.86 6.50	for 210n Hamme	=50 (3,7/50 nm) r SN = 1387				-		56.71	- - - - 6.60		Very stiff dark brow cobble content. San						6.	5 -
6.60 6.60 - 7.60	D16 B3		100						-		coarse. Cobbles are						7.	o —
			TCR	SCR	RQD		Щ											_
Struck at (m)		Strikes Time (min)	Rose	e to (r	ıl (m		tion pit		by Kilwex to ter strikes,		d during drilling.							
Casing	Details	Core	Barre	el														
	Diam (mm)	Sk	K6L															
28.50	150	Flush		е				Reason	donth						Last Upo			
		Wa	ater			ermir	iated a	scheduled	aeptn.						10/06/2	<u>2</u> 022	AG	9

								Proje	ct No.	Project	: Name: DAA Airf	ield Under	oass			Borehole I
	C	AUS	E	W	A	Y		21-	1219	Client:	DAA					BH107
		(SEC		-CI	Н				Client's	Rep Ramboll	Consulting	Engineers			
Metho Rotary Dr	illing	Plant I	nio 60	01	0.0	00	2.00		dinates	Final De	epth: 30.00 m	Start Date:	11/04/2022	Driller:	JG	Sheet 2 of Scale: 1:40
Rotary Co	oring	Comacch	110 60)1	2.0	00	30.00		43.80 E 04.60 N	Elevatio	on: 63.31 mOD	End Date:	12/04/2022	Logger:	DMC	FINAL
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Wat Depth Dep (m) (m	th LCTC.	Depth (m)	Legend		Des	cription			# Backfill
3.00			100								Very stiff dark brow cobble content. San coarse. Cobbles are	nd is fine to co	arse. Gravel is su			8 8
.50 - 9.95 .50 .70 - 9.95		=50 13,14,13) · SN = 1387	100						-							<u>9</u>
1.00 - 11.45 1.00	(4,6/11,1	=50 11,15,13) · SN = 1387	93						-							11
2.00 2.00 - 13.00 2.50 - 12.95 2.50	SPT(C) N (4,6/9,13								-							12
3.00 3.00 - 14.00 3.20 - 13.45			95					50.31	- 13.00 		Very stiff brown slig coarse. Gravel is sul			AY. Sand is f	ine to	13
.4.00			100	SCR	RQD	FI		48.71	- - - - - - 14.60							14
, , .1		Strikes			_	ema		•							<u> </u>	
		Core						excavated b groundwate			d during drilling.					
3.50 28.50	150	Flush		e	To	ermi	nation	Reason							Last Upd	ated
			ater					scheduled o	lanth						10/06/2	

14.50 - 14.95 S (14.60 I I 14.60 I 15.00 - 15.27 S 15.00 (15.00 I I 15.00 I I I I I I I I I I I I I I I I I I	ing Coming Com	ant Unacchinacchinacchi	io 60)1)1	Top 0.0	Н	Base 2.0 30.	(m) 00 00 	21-1 Coordi 716243 743104 Level	219 inates 3.80 E	Client: Client's Final De		Sh	cale:	of 5 1:40
Rotary Drill Rotary Cori Pepth (m) 14.50 - 14.95 (14.60 [14.60 - 15.60 [15.00 - 15.27 (Pi ing Com	ant Unacchinacchinacchi	io 60)1)1	Top 0.0 2.0	(m) 00 00	2.0 30.	(m) 00 00	Coordi 716243 743104	inates 3.80 E	Client's Final De	Rep Ramboll Consulting Engineers	Sh	eet 3	of 5 1:40
Depth (m) 14.50 - 14.95 [14.60	Samples / Field Re SPT(C) N=35 3,5/5,8,10,12) 4ammer SN = 1 019 36 SPT(C) N=47 7,13/47 for 120mm) Hamm	cords	io 60)1	0.0	00	2.0 30.	00 00 Water Depth	716243 743104 Level	3.80 E	Final De			cale:	1:40
Depth (m) 14.50 - 14.95 (14.60 14.60 15.00 15.00 (15.00 15.00 (1	Samples / Field Re SPT(C) N=35 3,5/5,8,10,12) Hammer SN = 1 019 36 SPT(C) N=47 7,13/47 for 120mm) Hamm	cords	io 60)1	2.0	00	30.	Water Depth	743104 Level			pth: 30.00 m Start Date: 11/04/2022 Driller: JG		cale:	1:40
(m) 14.50 - 14.95 (14.60 - 15.60 E 15.00 - 15.27 S 15.00 (SPT(C) N=35 3,5/5,8,10,12) Hammer SN = 1 D19 36 SPT(C) N=47 7,13/47 for 120mm) Hamm	.387	TCR	SCR	RQD	FI	Depth	Water Depth	Level	1.60 N	l	1			\ I
(m) 14.50 - 14.95 (14.60 - 15.60 E 15.00 - 15.27 (15.00 (1	SPT(C) N=35 3,5/5,8,10,12) Hammer SN = 1 D19 36 SPT(C) N=47 7,13/47 for 120mm) Hamm	.387	TCR	SCR	RQD	FI	Depth	Depth			Elevatio	, , , , ,		FINA	۱L
.4.60 [.4.60 - 15.60] E .5.00 - 15.27] (3,5/5,8,10,12) Hammer SN = 1 D19 36 SPT(C) N=47 7,13/47 for 120mm) Hamm							- 1	mOD	Depth (m)	Legend	Description Brown sandy very clayey subangular fine to coarse GRAVEL with	Water	Backf	11
			94									medium spaced thin beds of stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.			15.0 - 15.5
16.50 - 17.50 E 16.50 - 16.95 S 16.50 (D20 37 SPT(C) N=50 7,7/9,14,12,15 Hammer SN = 1		87					4	46.81	16.50		Very stiff greyish brown slightly sandy slightly gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.			16.5 17.0 -
18.00 - 19.00 E 18.00 - 18.45 S 18.00 (D21 38 PPT(C) N=47 8,10/10,11,13, Hammer SN = 1		97									18.30m to 18.50m: Lens of fine to coarse gravel			18.0 -
19.30 - 20.20 E 19.50 - 19.95 S 19.50 (D22 39 SPT(S) N=40 7,8/8,10,10,12 Hammer SN = 1							4	13.81	19.50		Greyish brown very clayey fine to coarse SAND			19.5
20.20 [20.20 - 21.00 E	D23 310		100					4	13.11	20.20		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular fine to coarse of limestone.			20.0 -
21.00	SPT(S) N=50 (25 66mm/50 for 35mm) Hamme							4	12.31	- - 21.00 -		Very stiff greyish black slightly gravelly CLAY with closely spaced, partings of fine to medium sand. Gravel is sub angular fine to coarse.			21.0 -
=	= 1387		100					4	11.81	21.50		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular fine to coarse of limestone.			21.5
			TCR	SCR	RQD										
	Water Strike		Rose	to (ı	m) Ir		tion p			Kilwex to strikes, v		d during drilling.			
Casing Det	ails (Core B	Barre	el .	\dashv										
To (m) Dia	m (mm) 200	SK													
	150	Flush	Туре	e	To	ermi	natio	n Reas	on			Last Upda	ated		
		Wat			T ₄	ermir	nated :	at sched	luled de	pth.		10/06/20			TH.

									Proje	ct No.	Project	: Name: DAA Airf	ield Underp	oass			Borehole I
	$\langle \rangle$	C	AUS	E	W	A	Y		21-	1219	Client:	DAA					BH107
		/	——G	EC	DΤΙ	ECI	Н				Client's	Rep Ramboll	Consulting	Engineers			
Meth Rotary D		ng	Plant L Comacch			Top		Base (m) 2.00	Coord	linates	Final De	epth: 30.00 m	Start Date:	11/04/2022	Driller: JG		Sheet 4 of
Rotary L		-	Comacch				00	30.00	71624	13.80 E		99,000		11/0 1/2022			Scale: 1:4
									74310	04.60 N	Elevatio	on: 63.31 mOD	End Date:	12/04/2022	Logger: DN	MC	FINAL
Depth (m)	s	Samples / Fi	ield Records	TCR	SCR	RQD	FI	Casing Water Depth Depth (m) (m)	Level mOD	Depth (m)	Legend	1	Des	cription		Water	Backfill
22.00 22.00 - 23.0	- 1	24 11								_		Very stiff dark greyis					2
										-		to coarse. Cobbles a					
22.50 - 22.9	95 SI	PT(S) N=4	16							-							2:
2.50	(1	10,10/10,	12,12,12) N = 1387							-							
	'	annier 5	1507							-							
										-							2:
				100						-							
																	2:
										_							
4.00 - 24.4	45 SI	PT(S) N=4	12							_							2-
4.00	(7	7,8/8,10,1								-							
	"	annici 3	11 - 1507							-	٠٠٠٠ غد مث						
										-							2-
				100						-							
										Ĺ							25
										_							
5.50 - 25.6	50 51	DT/S) NI=5	50 (25 for														21
5.50 - 25.0	39	9mm/50	for							-							
		7mm) Ha 1387	mmer SN														
										_							20
				100						-							
										-							20
										-							
7.00										_							
7.00																	2
										-							2
				100						-							
8.00	D	25								-							2:
8.00 - 29.0	00 B	12								-							
8.50 - 28.6	22 61	DT/C\ NI=E	50 (25 for									Medium strong pro	bably thinly la	ıminated black LI	IMESTONE. Pa	rtially	2:
.8.50 - 28.0 !8.50	5	5mm/50	for									weathered slightly r spacing.	reduced stren	gth and slightly r	reduced fractu	ire	2.
		5mm) на 1387	mmer SN							-		Discontinuities: 1. 10 to 15 degree b	edding fractu	ıres medium spa	ced (60/200/3	360)	
									34.31	- 29.00 -	<u></u>	planar, smooth) 2. 30 to 40 degree j	-				25
				TCR	SCR	RQD	FI			-		2. 30 to 40 degree j	OIIIt3 at 23.20	iii and 29.80iii p	ianai, sinootii.	•	
ruels =+ '		Water St		Do	to '	_	ema									•	
ruck at (m)	casın	g to (m) I	ime (min)	rose	: ιο (r	- 1		tion pit ex iceable gr				d during drilling.					
Casing			Core I	Barre	el												
3.50	2	n (mm) 200	SK	6L													
28.50	1	150	Flush	Тур	е	To	ermi	nation R	eason						L	ast Upda	ted
			Wa	ter		Te	ermir	ated at sc	heduled d	enth						10/06/202	22 16

									Proje	ct No.	Project	Name: DAA Airf	ield Under	oass			Boı	rehole	П
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA					В	H107	7
			GEC	ТС	EC	Н					Client's	Ren Ramboll	Consulting	Engineers					
Metho	od	Plant	Used		Top	(m)	Base	(m)	Coord	inates	Circine	nep nameon		LIIBINICEIS			She	eet 5 of	
Rotary Dr		Comaccl	nio 60	01	0.	00	2.0	00	20010	mates	Final De	epth: 30.00 m	Start Date:	11/04/2022	Driller:	JG		ale: 1:4	
Rotary Co	oring	Comaccl	hio 60	01	2.	00	30.0	00	71624										
									74310	4.60 N	Elevatio	n: 63.31 mOD	End Date:	12/04/2022	Logger:	DMC	F	FINAL	
Depth (m)	Samples /	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Des	cription			Water	Backfill	
												Medium strong pro weathered slightly				Partially			
										-		spacing.	reduced Stren	gui anu siigiitiy i	euuceu nac	lure			29.
			100	67	77	7				-		Discontinuities: 1. 10 to 15 degree b	andding fractu	iros modium sna	cod (60/200	1/260)			l
										_		planar, smooth)	Jeduing Hactu	ires illeululli spa	ceu (60/200)/360)			l
00							1 1		33.31	- 30.00		2. 30 to 40 degree j	oints at 29.20	m and 29.80m p hole at 30.00m	lanar, smoo	th.			30
										-			End of Bore	noie at 30.00m					
										-									30
										-									l
										<u> </u>									31
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	\A/a+	Ctribos	TCR	SCR	RQD		rle-												L
ck at (m) Ca		Strikes Time (min)	Rose	to (r		Rema		it exc	avated by	Kilwex to	1.20m.								
												d during drilling.							
Casing D	etails	Core	Barre	el	\dashv														
o (m) D	Diam (mm)	, cı	K6L																
3.50 28.50	200 150			_	4_	· '	lac*								1	lack!! !	-t · '	I	_
	_50	Flush	ттур	e	1	ermi	inatio	n Ke	ason							Last Upd			
		14/	ater		I -		+	st coh	neduled de	nth					1	10/06/20	000		<u>, </u>

	C	AUSEW	AY			Project 21-1		Project Client:	: Name: DAA Airf	ield Underp	oass			Borehole ID H107-We
	<i></i>	GEOTE	СН					Client's		Consulting	Engineers			
Method		Plant Used	Top (m)	Base ((m)	Coord	inates		-					Sheet 1 of 4
Rotary Drill	ing	Comacchio 601	0.00	28.0		71624	2 90 E	Final De	epth: 28.00 m	Start Date:	18/04/2022	Driller: GT+	IG	Scale: 1:40
						743104		Elevatio	on: 63.31 mOD	End Date:	19/04/2022	Logger:		FINAL
Depth S	ample / Tests	Field Records		Casing W Depth D (m)	Vater epth (m)	Level mOD	Depth (m)	Legend			cription		Water	Backfill
Casing Det	ng to (m)	Strikes Time (min) Rose to (mage) Water Added From (m) To (m)	Rema) BH105		ded 1	to allow ir	anstallatio		Stiff brown sandy sl			description)		1.0 2.0 2.0 3.5 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0
28.00	190		Core	Barre	ı	Flush 1			tion Reason				t Upda	

						rioje	ct No.	Fioject	Name: DAA Airfi	ieid Offder	7033		"	orehole II
万分	C	AUSEW GEOT	AY			21 -1	219	Client:	DAA				ВН	1107-We
	/ —	——GEOT	СН					Client's		Consulting	Engineers			
Metho	od	Plant Used	Top (m)	Base	(m)	Coord	inates							heet 2 of 4
tary Dr		Comacchio 601	0.00	28.				Final De	pth: 28.00 m	Start Date:	18/04/2022	Driller: GT+JG		Scale: 1:40
						71624		FI	62.24 2-	F	10/04/2222		+	
						74310	4.6U N	Elevatio	n: 63.31 mOD	End Date:	19/04/2022	Logger:		FINAL
epth (m)	Sample / Tests	Field Records		Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription		Water	Backfill
									Stiff brown sandy sli	ightly gravelly	CLAY. (Driller's o	lescription)		
							-							
							-							
							-							
							_							8.1
							-							
							-							9.1
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						50.31	- 13.00							
						55.51	- 13.00		Stiff blackish grey sl	ightly sandy g	ravelly CLAY. (Dr	iller's description)		
							-							
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							-							
							-							
							-							14.
							-							
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						48.71	14.60	12 (12 (i					+	· · · ·
	Water 9	Strikes	Rema	arks				I						
at (m) Ca		Time (min) Rose to (r			nded	to allow i	nstallation	n of 150mm	n ID pumping well.					
sing De		Water Added]											
m) Di	iam (mm) 254	From (m) To (m)	+											
00	190		Core	Barr	el	Flush	Туре	Terminat	ion Reason			Last U	pdate	ed T

20	7						Proje	ct No.	Project I	Name: DAA Airf	ield Underp	oass		В	oreho	le ID
X	C	AUSI	EW	AY			21-1	219	Client:	DAA				В	H107	-Wel
	<i>[]</i> —	GI	ОТЕ	СН					Client's		Consulting	Engineers				
Meth		Plant Us		Top (m)	Bacc	(m)	Coord	inates	Chefft S	veh. vallingli	Consulting	riigii ieei s			Sheet 3	of 4
otary D		Comacchic		0.00	28.		Coord	mates	Final Dep	28.00 m	Start Date:	18/04/2022	Driller: GT+	IG	Sneet 3 Scale:	
•							71624									
							74310	4.60 N	Elevation	1: 63.31 mOD	End Date:	19/04/2022	Logger:		FINA	٩L
Depth (m)	Sample / Tests	Field	Records		Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	1	Des	cription	,	Water	Backfi	ill
										GRAVEL. (Driller's de	escription)					
								-								
								-								15.0
								-							l∴H	
								_							H	
								_							l∴H:	
															\mathbb{R}	
								_							ŀ.₽	16.0
								-							ŀ.₽	
								-								
							46.81	16.50		Stiff grey slightly sar	ndy slightly gr	avelly CLAY. (Dril	ler's description			16.5
								_			3	•				
								-							l:°H	17.0
								-							l:°H	
								- -							l∴H.	17.5
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								-							H	+18.0
								-							ĽЪ	• •
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								-							\mathbb{H}	• 18.5
								-							Ш	•
								-							ĿН	19.0
								-							ĿН	
															ĿН	
							43.81	- 19.50		Brown SAND. (Drille	r's description	n)			\mathbb{H}	19.5
								-				-,			\mathbb{H}	
								-							\mathbb{H}	
								-							H	20.0
							43.11	- 20.20 -		Stiff grey slightly sar	ndy slightly gr	avelly CLAY. (Dril	ler's description		ŀΗ	
								-								20.5
								-							H	
																21.0
															H	
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								-							KH	21.5
								<u>-</u>							Η	
								1	<u> </u>					\dashv	r	۰
1		Strikes		Rema										<u> </u>	•	
at (m) C	Casing to (m)	Time (min) R	ose to (m) BH105	expa	nded	to allow i	nstallatio	n of 150mm	ID pumping well.						
ncina 5	Dotails	Water A	ddcd													
(m) [.50	Diam (mm) 254		To (m)													
.00	190			Core	Barr	el	Flush	Туре	Terminati	on Reason			Las	t Update	ed	
														/06/2022		

20	1						Proje	ct No.	Project	Name: DAA Airf	ield Under	oass		E	Borehole II
X	C	AUS G	EW	A			21-3	1219	Client:	DAA				В	H107-We
		G	EOTE	ЕСН					Client's		Consulting	Engineers			
Meth		Plant U			n) Bas	e (m)	Coore	linates		-				+	Sheet 4 of 4
otary D		Comacchi		0.00		8.00			Final De	pth: 28.00 m	Start Date:	18/04/2022	Driller: GT+J	G I	Scale: 1:40
								13.80 E							
							/4310 	04.60 N	Elevatio	n: 63.31 mOD	End Date:	19/04/2022	Logger:		FINAL
Depth (m)	Sample / Tests	Fie	ld Records		Casin Depti (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription		Water	Backfill
			_					-		Stiff grey slightly sa	ndy slightly gr	avelly CLAY. (Dril	ler's description)		22.0
								_							
								-							
															23.0
								_							
								_							
								-							24.0
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								_							27.0
								-							
								-							27.5
								-							
								-							
								-			End of Bore	hole at 28.00m			28.0
								-							
							34.81	- - 28.50							28.5
								-							
								-							
								-							29.0
								-							
		Strikes	D- : :	_	marks										
aτ (m) (Lasing to (m)	Time (min)	ruse to (m	BH1	105 exp	anded	to allow i	nstallatio	n of 150mn	n ID pumping well.					
asing F	Details	Water	Added												
	Diam (mm) 254 190		To (m)		re D-	rro!	Elect	Tunc	Townsies	ion Bosses			1	Ilmd-1	ad T
	155			Co	re Ba	rrei	Flush			ion Reason				Updat	
							Ai	r	Ierminate	d at scheduled depth	i.		10	/06/202	

					<i>1</i> = 1				Proje			·	orehole ID
		AUS	E	V T	A EC	Y			21 -1	219	Client:	DAA	BH108
) ב (<i>)</i>							Client's	Rep Ramboll Consulting Engineers	
Metho Rotary Dr Rotary Co	rilling	Plant I Beretta Beretta	T44		0.	(m) 00 50	2 30		71638	inates 4.10 E	Final De	oth: 30.50 m Start Date: 06/04/2022 Driller: GT	heet 1 of 5 Scale: 1:40
-									74309	0.70 N	Elevatio		FINAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description to the state of the	Backfill
									63.68	1.20		Inspection pit excavated by Kilwex to 1.20m. Soft brown slightly sandy slightly gravelly CLAY (Driller's description)	1.0 —
2.50 - 2.95	SPT(S) N (4,4/4,5,		40						62.38	- 2.50		Medium dense coarse GRAVEL.	2.5 —
4.00 4.00 - 5.00 4.00 - 4.45 4.00	14 B1 SPT(S) N (8,7/8,8,		100						60.88	- 4.00		Very stiff dark greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	4.0
5.50 - 5.63 5.50 5.85 - 6.15	SPT(S) N 56mm/5 75mm) U28	=50 (25 for 00 for	100							- - - - - - - - - - - -			6.0
7.00 - 7.45 7.00	SPT(S) N (7,8/10,	=42 10,10,12)				-				- - - - -			7.0 —
			TCR	SCR	RQD	FI				_	<u> </u>		
		Strikes	_	_		lema	rks						'
Struck at (m) Ca					m) Ir	nspec	tion p		cavated by oundwater			d during drilling.	
To (m) D	Details Diam (mm)	Core		el									
2.50	200	Si	(6L										
30.50	150	Flush Wa	Typ ater	e					e ason heduled de	epth.		Last Update 10/06/2022	

								Proj	ect No.	Project	: Name: DAA Airfi	ield Underp	pass			Borehole ID
	S) C	AUS	E	M	A	Y		21	-1219	Client:	DAA					BH108
			GEC	ЭT	EC	Н				Client's	s Rep Ramboll	Consulting	Engineers			
Meth		Plant l			_		Base (rdinates	Final De	epth: 30.50 m	Start Date	06/04/2022	Driller:	GT	Sheet 2 of 5
Rotary D Rotary C		Beretta Beretta			1	.00 .50	2.50 30.5		84.10 E	I IIIai De	:ptii. 30.30 iii	Start Date.	00/04/2022	Dillier.	01	Scale: 1:40
				T		r			90.70 N	Elevatio	on: 64.88 mOD	End Date:	11/04/2022	Logger:	TH	FINAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing W Depth D (m)	ater Level mOD	Depth (m)	Legend			cription			Backfill
			98						- - - - - -		Very stiff dark greyis Sand is fine to coars				LAT.	7.5
8.50											Lens of subrounded fine to	to coarse gravel.	_ _			8.5
3.70	15							56.18	8.70		Very stiff dark brow	n slightly sand	ty slightly gravel	ly CLAV San	nd is fine	
8.70 - 9.70	B2								-		to coarse. Gravel is			iy CLAI. Jaii	ia is fine	9.0
									-							3.0
			100						-							
									-		Lens of subangular fine to	o coarse gravel of li	mestone.			9.5
10.00 - 10.13 10.00	SPT(S) N 60mm/5	=50 (25 for							_							10.0
10.00	70mm)	70 101							-		Lens of subangular fine to	o coarse gravel of li	mestone.			
									-							10.5
			100													
									-							11.0
									-							
									-							
11.50 - 11.95 11.50		=50 .2,12,12,14)														11.5
									-							
									-							12.0
			87						-							
																12.5
13.00	16					_		51.88	- - 13.00		Dense dark greyish	brown alayay	fine to medium	CAND		13.0
13.00 - 13.35 13.00 - 13.11		=50 (25 for							-		Dense dark greyish	brown clayey	line to medium	SAND.		
13.00	40mm/5 70mm)							51.53	13.35		Very stiff dark brow				nd is fine	12.5
13.35 13.35 - 14.35	17								-		to coarse. Gravel is	subangular fir	ne to coarse of li	mestone.		13.3
13.33 14.3			100						-							
									-							14.0
									-							
14.50 14.50 - 15.40	18 0 B5							50.38	14.50		Dense dark greyish	brown clayey	fine to medium	SAND.		14.5
. 7.50 15.40		Strikes	TCR	SCR	RQD											
ruck at (m) C		Time (min)	Rose	e to (r	m) Ir		tion pit	excavated I								
					N	No no	ticeable	groundwat	er strikes, v	vater adde	d during drilling.					
Casing D	Details Diam (mm)	Core		el												
2.50	200 150	SK SK	(6L		\perp	-										. , !
30.30	130	Flush		e				Reason							Last Upd	
		Wa	ater		Te	ermir	nated at	scheduled	depth.						10/06/2	D22 AG

A		A 1 1 5							Proje			Name: DAA Airfield Underpass	Borehole II
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA	BH108
			3 E C	וו	ECI	Н					Client's	Rep Ramboll Consulting Engineers	
Metho		Plant l					Base	$\overline{}$	Coord	inates	Final De	pth: 30.50 m Start Date: 06/04/2022 Driller: GT	Sheet 3 of 5
Rotary Dri Rotary Co		Beretta Beretta			0.0 2.!		30.		71638	4.10 E	rillai De	ptii. 30.30 iii Stait Date. 00/04/2022 Dilliei. Gi	Scale: 1:40
									74309		Elevatio	n: 64.88 mOD End Date: 11/04/2022 Logger: TH	FINAL
Depth (m) 1.50 - 14.95		Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description Dense dark greyish brown clayey fine to medium SAND.	ਬੇ Backfill ≥ •• □•••
1.50 - 14.93	(7,7/7,8,8									-		belise dark greyish brown dayey file to filedidiff SAND.	
										_			15.0
										-			
5.40	19		100						49.48	15.40		Very stiff dark brown slightly sandy slightly gravelly CLAY. Sand is fine	
5.40 - 16.40	В6									-		to coarse. Gravel is subangular to subrounded fine to coarse of	15.1
										-		limestone.	
.00 - 16.45	SPT(S) N=	33								-		Bed of dark greyish brown clayey fine to medium sand.	16.0
5.00	(4,4/7,8,8									-		Bed of dark greyish blown dayey line to medium sand.	
										-			
										<u> </u> -			16.
			100							_			
										-			17.
.50 - 17.95										-			17.
.50	(8,8/10,10	0,12,12)								-			
										-			
										-			18.
.30 - 18.60	U29		100							-			
										-			18.
										_			
										_			
.00 - 19.21													19.
.00	125mm/5 87mm)	U tor											
.40	20												
.40 - 20.35	B7									-			19.1
			100							<u>-</u>			
										-			20.
										-			
.35	21								44.53	20.35		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to	
.35 - 21.35 .50	B8									-		coarse. Gravel is subangular fine to coarse.	20.
										<u></u>			
										_			21
			100							_			21.0
			100							-			
													21.
										-			
			TOD	900	RQD	FI							
	Water S	Strikes	IUK	JUK	\vdash	ema	rks						
ck at (m) Ca		Time (min)	Rose	to (n	n) In	spec	tion p		avated by oundwater			d during drilling.	
Cosine	ataile	Core	Barre	al .	4								
Casing De	etails am (mm)			=1									
2.50	200		(6L										
30.50	150	Flush	Тур	е	Te	ermi	natio	n Re	ason			Last Up	dated
		Wa	ater		l Ta	rmir	hated	at sch	eduled de	enth		10/06/	(2022

								Proje	ct No	Project	Name: DAA Airfield Underpass Borehole I	
	C	AUS	F	V	/Δ	Y				219	Client:	DAA BH108
		— C	EC	ΣТ	EC	Н			21-3	.213		
							L	, ,			Client's	·
Rotary Dri	lling	Beretta Beretta	T44		0.	(m) 00 50	2.5 30.	0		4.10 E	Final De	Start Date: 06/04/2022 Driller: GT Sheet 4 of Scale: 1:40
										0.70 N	Elevatio	, , 60
Depth (m)	Samples / Fie		TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description
22.00 - 22.45 22.00	SPT(S) N=4: (10,10/10,1		100							- - - - - - - - - -		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.
	.50 - 24.20 B9 .50 - 23.62 SPT(S) N=0 (75 for 120mm/0 for 0mm)								41.38	- 23.50 - - -		Very loose dark greyish brown clayey fine to medium SAND.
24.20 24.20 - 25.00	D - 25.00 B10								40.68	- 24.20 - - -		Very stiff greyish black slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are subangular of limestone.
25.00 - 25.45	B11								39.88	- 25.00 - - - - -		Medium dense dark greyish brown clayey fine SAND.
25.85 25.85 - 26.50	25 B12		100						39.03			Very stiff greyish black slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular of limestone.
26.50 26.50 - 26.95 26.50	26 SPT(S) N=2 (4,5/6,7,7,7								38.38	- 26.50 -		Medium dense dark greyish brown clayey fine to coarse SAND.
27.00 27.00 - 28.00	27 B13		100						37.88	- 27.00 - - - -		Very stiff greyish black slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.
28.00 - 28.45 28.00	SPT(S) N=4: (8,8/10,10,		98							- - - - - - - - -		Greyish black slightly clayey fine sand.
										-		
	141		TCR	SCR	RQD		\sqcup					
ruck at (m) Cas	Water St		Rose	e to (i	m) Ir		tion p		cavated by oundwater			d during drilling.
Casing De	etails	Core	 Barre	el	\dashv							
	am (mm) 200	SK	(6L									
30.50	150	Flush	Тур	e	Т	ermi	natio	n Re	eason			Last Updated
		Wa	ater		Te	ermir	nated a	at sch	heduled de	epth.		10/06/2022 AG

									Proje	ct No.	Project	Name: DAA Airf	ield Underp	oass			Вс	orehole	: 11
	C	AUS	E	W	A	Y			21-1	L 219	Client:	DAA					1	BH108	3
5			GEC	ЭΤ	EC	Н					Client's		Consulting	Engineers			ı		
Nash		Plant	llaad		T	/\	D	()	6	·	Cilents	кер капіроп	T	Eligilieers	Т				_
Metho Rotary Dr Rotary Co	rilling	Beretta	a T44		0.	00 50	2.5 30.	50		4.10 E	Final De	pth: 30.50 m	Start Date:	06/04/2022	Driller:	GT		heet 5 o	
. , 5						-				0.70 N	Elevatio	n: 64.88 mOD	End Date:	11/04/2022	Logger:	TH		FINAL	-
Depth (m)	Samples /	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			ription			Water	Backfill	
										-	20 00 0	Very stiff greyish bla content. Sand is fine							
50									35.38	- 29.50	A (000)	Cobbles are subang	ular of limesto	one.					29.
										-		Medium strong mas slightly reduced stre				red:			ı
										-		Discontinuities:			_				ı
			80	70	56	6				_		1. 5-15 degree joint undulating, smooth		aced (35/200/25	0), slightly	′			30
												2. 40-50 degree joir		.65m, planar, sn	nooth.				ĺ
										-									ı
0									34.38	- 30.50 -			End of Bore	hole at 30.50m					30
										-									
										-							I		
										-							I		31
										<u> </u>									
										-									
										F							I		31
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										-									36
										-									
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			TCR	SCR	RQD	FI				-							ļ		
	Water	Strikes			ч-	Rema	rks			<u> </u>							_		_
at (m) Ca		Time (min)	Rose	e to (r	n) Ir	nspec	tion p			Kilwex to		11							
						io no	nceab	ie gro	undwate	r strikes, v	vater adde	d during drilling.							
asing D	etails	Core	Barre	el	\dashv														
(m) D	iam (mm)	, cı	K6L																
.50).50	200 150																		_
,.50	130	Flush	1 Тур	е	T	ermi	natio	n Re	ason							Last Up	date	d	
		14/	ater		1 -		atad :	at coh	eduled d	anth						10/06/2	2022	1.0	Ţ

	C	AUS	SE	V	/A	Y			Proje 21 -1	ct No.	Project	Name: DAA Airfield Underpass DAA	Borehole ID BH109
			GEC	TC	EC	Н					Client's		
Meth		Plant l					Base		Coord	inates			Sheet 1 of 5
Rotary D Rotary C		Beretta Bereta			1	00 50	2. 32		71640	6.60 F	Final De	pth: 32.50 m Start Date: 28/03/2022 Driller: GT	Scale: 1:40
	J								74303	9.50 N	Elevatio	n: 63.75 mOD End Date: 04/04/2022 Logger: TH	FINAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Backfill
									62.55	1.20		Excavation pit excavated by Kilwex to 1.20m. Greyish brown CLAY with roots (Driller's description)	1.5 —
2.50 2.50 - 3.50 2.50 - 2.95	D11 B1 SPT(S) N	=22							61.25	- - - - 2.50		Stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies.	2.5
	(4,4/5,5) Hamme		93							- - - -			3.0
3.50 3.50 - 4.50 4.00 - 4.45	D12 B2 SPT(S) N	=40							60.25	- 3.50 - - - -		Very stiff dark greyish brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.	3.5
4.00 4.25 - 4.50	(8,8/8,1		100							-			4.5
5.50 - 5.95 5.50		=48 (2,12,12,12) r SN = 0208	100							-			5.5 -
7.00										-			7.0
										-			
			TCR	SCR	RQD		_						
Struck at (m) C		Strikes Time (min)	Rose	e to (i	n) Ir		tion p		cavated by oundwater			d during drilling.	
Casing E	Details	Core	Barr	el	\dashv								
	Diam (mm) 200	SI	K6L										
		Flush		e					eason	+h		Last Up	
		W	ater		T	ermir	ıated	at scl	heduled de	eptn.		10/06/	AUS

202									Proje	ct No.	Project	Name: DAA Airfi	ield Underr	oass		E	Borehole ID
	C	AUS	E	W	/ A	Υ			21-1		Client:	DAA	,				BH109
			EC	ЭΤΙ	ECI	Н					Client's		Consulting	Engineers			
Metho	d	Plant l	Jsed		Тор	(m)	Base	(m)	Coord	inates							Sheet 2 of 5
Rotary Dri	illing	Beretta	T44		0.0	00	2.5	50			Final De	pth: 32.50 m	Start Date:	28/03/2022	Driller: 0	ST	Scale: 1:40
Rotary Co	oring	Beretaa	1144	•	2.!	50	32.	50	71640 74303		Elevatio	n: 63.75 mOD	End Date:	04/04/2022	Logger: T	гн	FINAL
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription		Water	Backfill
										-		Very stiff dark greyis cobble content. San coarse. Cobbles are	d is fine to co	arse. Gravel is su			7.5 —
	D13 B3		100						56.05	- 7.70 - - - - -		Very stiff dark brow cobble content. San coarse. Cobbles are	d is fine to co	arse. Gravel is su	y CLAY with Ibrounded fii	low ne to	8.0
8.50 - 8.95 8.50		=44 10,12,12) · SN = 0208	100							- - - - - -							8.5
9.55 - 9.85	U22		100							-							9.5
	60mm/5									 - - - -							10.0
			100							- - - - - -							11.0
11.50 11.70 11.70 - 12.70	D14 B4		100							- - - - - -							11.5 —
13.00 - 13.27										- - - - -							12.5
13.00	(10,15/5 117mm) SN = 020	Hammer	100							- - - - - - - - -							13.5
14.50										- - -							14.5
	Water	Strikes	TCR	SCR	RQD	FI ema	rks										
Struck at (m) Cas			Rose	to (r	n) In	spec	tion p		avated by oundwater			d during drilling.					
	am (mm)	Core Sk	Barre	el													
2.50	200	Flush	Тур	е	Te	ermi	natio	n Re	ason							Last Updat	ed
1		l	ater						neduled de							10/06/202	

	7							Proje	ct No.	Project	Name: DAA Airf	icia oriaci p	1433			Borehole ID
	CAUS	SE	W	A	Y			21-1	219	Client:	DAA					BH109
		GEC	ЭΤΙ	ECI	Ĥ							C 11:	. .			211200
***				-	, ,	_	, ,			Client's	кер катроп	Consulting	Engineers			
Rotary Dri	lling Berett	a T44		0.0 2.5	00	2.5 32.	0	71640		Final De	pth: 32.50 m	Start Date:	28/03/2022	Driller:	GT	Sheet 3 of 5 Scale: 1:40
,								74303		Elevatio	n: 63.75 mOD	End Date:	04/04/2022	Logger:	ТН	FINAL
Depth (m)	Samples / Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	\\ 		ription	l Cl AV	Water	Backfill
14.90 14.90 - 15.90	D15 B5	83						48.85	- - 14.90 - - - - - -		Very stiff dark brow cobble content. San coarse. Cobbles are Very stiff dark brow coarse. Gravel is sub	d is fine to coa subrounded on slightly grave	arse. Gravel is su of limestone. elly sandy SILT. S	ubrounded 1	fine to	15.0
6.00 - 16.14 6.00	SPT(S) N=10 (25 for 68mm/10 for 71mm) Hammer SN = 0208								- - - - - -							16.5
6.70 - 17.00	U23	100							- - - - -							17.0
17.50 17.50 - 18.50 17.50	D16 B6	100						46.25	- 17.50 - - - - - - - -		Very stiff brown slig coarse. Gravel is sub				ine to	18.0
9.00 - 19.45 9.00	SPT(S) N=50 (8,8/10,12,14,14) Hammer SN = 0208	100							- - - - - - - - -		18.90-19.00m: Bed of bro	wn very sandy clay.	:			19.0
20.30 20.30 - 21.30 20.50	D17 B7	100						43.45	- 20.30 - 20.30 		Very stiff greyish bla cobble content. San subrounded fine to limestone.	ack slightly sar d is fine to coa	ndy slightly grave arse. Gravel is su	ıbangular to	0	20.5
		TCR	SCR	RQD	FI	-			- - - -							21.5
Casing De	am (mm)	Barre		n) In		tion pi		avated by undwater			d during drilling.					
2.50	200	K6L		\perp												
	Flusi	тур	е	Te	ermi	inatio	n Re	ason						1	Last Upda	ted
														l	10/06/202	

	CAL	JS	E	W	A	Y				ct No.	Client:	Name: DAA Airf					В	orehole IC BH109
											Client's	Rep Ramboll	Consulting	Engineers				
Metho Rotary Dri Rotary Co	illing Be	ant L retta retaa	T44		0.0 2.5	00	2.5 32.5	0		6.60 E	Final De	pth: 32.50 m	Start Date:	28/03/2022	Driller:	GT		Sheet 4 of 5 Scale: 1:40
							Carina	Water		9.50 N	Elevatio	n: 63.75 mOD	End Date:	04/04/2022	Logger:	TH		FINAL
Depth (m) 2.00 - 22.45	Samples / Field Re	cords	TCR	SCR	RQD	FI	Depth I	Depth (m)	Level mOD	Depth (m)	Legend	Very stiff greyish bla		cription	II 61 AV		Water	Backfill
2.00	SPT(S) N=50 (8,10/12,12,12,12 Hammer SN = 0		100							-		cobble content. San subrounded fine to limestone.	d is fine to co	arse. Gravel is s	ubangular	to		22.5
3.50 4.30 4.30 - 25.30	D18 B8		100							-								23.5
5.00 - 25.45 5.00	SPT(S) N=48 (7,9/10,12,12,1 Hammer SN = 0		97							-								25.5
6.50 - 26.65 6.50 6.60 6.60 - 27.60	SPT(S) N=50 (2: 75mm/50 for 75mm) Hamme = 0208 D19 B9		100						37.15	- 26.60		Very stiff greyish bla coarse. Gravel is sul				ine to		26.9 26.9 27.0
8.00 - 28.45 8.00	SPT(S) N=44 (8,8/10,10,12,1 Hammer SN = 0		100							-								27.5 28.6 28.5 29.6
			TCR	SCR	RQD	FI				-	<u> </u>							
uck at (m) Cas	Water Strike		Rose	to (n	n) In		tion pi		avated by oundwate			d during drilling.						
Casing De	etails iam (mm) 200	Core I		el														
		Flush	Тур	е	Te	ermi	natio	n Re	ason							Last U	pdate	ed
		Wa	iter		Te	ermin	ated a	t sch	eduled d	epth.						10/0	6/2022	· AG

									Proje	ct No.	Project	Name: DAA Airf	ield Underpass		Bo	orehole II
	C	AUS	E	W	A	Y			21 -1	L 21 9	Client:	DAA				BH109
		—— C	GEC	ITC	ECI	Н					Client's	Rep Ramboll	Consulting Engineers			
Metho	od	Plant U	Jsed		Тор	(m)	Base	(m)	Coord	inates					ς.	heet 5 of 5
Rotary Dri Rotary Co	illing	Beretta Beretaa	T44		0.0	00	2.5 32.	50		6.60 E	Final De	epth: 32.50 m	Start Date: 28/03/2022	Driller:	GT	Scale: 1:40
									74303	9.50 N	Elevatio	63.75 mOD	End Date: 04/04/2022	Logger:		FINAL
Depth (m)	Samples / I	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Description		Water	Backfill
.50 .90 .90 - 30.90	D20 B10		100						33.85	29.90		coarse. Gravel is sub	ack slightly gravelly sandy CL bangular fine to coarse of lim ack slightly sandy slightly gravel el is subangular fine to coars	estone. velly CLAY. Sar	nd is	29. 30.
00			97	45	15	11			32.35	31.40		Partially weathered spacing. Discontinuities: 1. 0-10 degree bedo	istinctly thinly laminated blac : slightly reduced strength, ci ding fractures, closely spaced yey gravelly infill on some fra	oser fracture (20/110/190	0),	31.
50							-		31.25	- - 32.50			nts, at 31.40-31.65m and 32 End of Borehole at 32.50m			32.
uck at (m) Ca	Water S				-	ema			avated by							33. 34. 35. 36.
Casing De	etails iam (mm)	Core										d during drilling.				
2.50	200	Flush		<u> </u>	T	ermi	natio	n Re	ason					T	Last Update	d 💻 -
		iiusii	· • • •	_	1 1				~~~							

	C	AUS	E	W T	/ A	Y				ct No.	Project Client:	Name: DAA Airfield Underpass DAA		ehole ID H110
			3 E (<i>)</i>	EC	П					Client's	Rep Ramboll Consulting Engineers		
Meth Rotary D Rotary C	rilling	Plant I Comacch Comacch	nio 40		0.	(m) 00 50	2.5 32.	50	71651	inates	Final De	pth: 32.00 m Start Date: 11/03/2022 Driller: MW		et 1 of 5 ale: 1:40
	J							Water	74313	9.06 N	Elevatio	n: 65.09 mOD End Date: 14/03/2022 Logger: MRG		INAL
Depth (m)	Samples	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Depth (m)	Level mOD	Depth (m)	Legend	Description Inspection pit excavated by Kilwex to 1.20m.	Water	ackfill
1.20 1.20 - 1.36		=50 for 10mm) ·SN = 0643					1.20	Dry	63.89	- 1.20		MADE GROUND: Grey sandy silty GRAVEL. (Driller's description)		0.5
2.20 2.20 - 2.65 2.50 - 3.50	D2 SPT(S) N (2,3/3,3,	=12					2.20	Dry	63.09 62.59	- 2.00 - 2.50		Frim brown sandy gravelly CLAY. (Driller's description) Stiff brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded to		2.0
2.60 2.85 - 3.15 3.50 - 3.95	ES1 C1 SPT(C) N	=20	80						61.59	- 3.50	X_X_X_X_X_X_X_X_X_X_X_X_X_X_X_X_X_X_X_	subangular fine to medium of mixed lithologies. Cobbles are of limestone.		3.0
4.90 5.00 - 5.45	(4,6/6,5	4,5) · SN = 0643	26			AZCL				-		Low recovery: Medium dense becoming dense blackish grey slightly sandy clayey subangular to subrounded fine to coarse GRAVEL of limestone with low cobble content. Cobbles are of limestone.		4.5
5.00	(2,3/3,5		15			AZCL				- - - - - - - - - - -				5.5
6.50 - 6.95 6.50	SPT(C) N (3,4/4,5, Hammer									-				6.5
7.20	D3									- -	**************************************			
			TCR	SCR	RQD									
Struck at (m) C					n) Ir		tion p		cavated by oundwater			d during drilling.		
Casing D	Details Diam (mm)	Core		el										
16.00 32.00	200 150	Sr Sr	(6L		<u> </u>	·						1	dat- 1	
22.50	250	Flush Wa	Typ e ater	e					e ason neduled de	epth.		10/06/		AGS

	1								Proje	ct No.	Project	Name: DAA Airf	ield Under	oass			Borehole II
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA					BH110
	—		GEC	ITC	ECI	Н					Client's	Rep Ramboll	Consulting	Engineers			
Metho	od	Plant l	Used		Тор	(m)	Base	(m)	Coord	inates		-					Sheet 2 of 5
Rotary Dr	illing	Comacch	nio 40)5	0.0	00	2.5	0			Final De	pth: 32.00 m	Start Date:	11/03/2022	Driller	: MW	Scale: 1:40
Rotary Co	oring	Comacch	nio 40)5	2.5	50	32.	00	71651	1.40 E 9.06 N	Elevatio	CF 00 m 0D	Find Date:	14/02/2022		r: MRG	FINAL
									74313		Elevation	1: 65.09 MOD	end Date:	14/03/2022	Logge	r: IVIRG	
Depth (m)		Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription			Backfill
7.20 - 7.65	SPT(S) N: (3,10/8,8									-	a X . a X .	Low recovery: Medi sandy clayey subang					7.
'.65	Hammer ES3	SN = 0643								-	4 X	limestone with low	cobble conte	nt. Cobbles are	of limesto	ne.	
.80	D4		70			AZCL				-	a × , a × 8						
										-	a X. , a X. 8						
.20 - 8.55 .20	B2								56.89	- 8.20 -	ia : 00 a	Very stiff brown slig					
.40	ES4									- -	:A :00 B	content. Sand is fine fine to coarse of mix				-	
										-	A 000 0						
.80 - 9.10	C2		75							-							
										_	a .000 9						
											24 : 10° 0° 0°						
.60	D5									_							9.
.70										_							
										-							
										-	o						
										-							
			100							-	<u>0</u> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						10.
										-							
										-	:A :00 B						
1.20										- -							
1.30	D6									-							
1.50 - 11.90	B3									-							
										-							
			100							_							12.
										[
										[o						
2.70										-	o						
.2.70										-							
										_							13.
										-							
			100							-							13.
3.75 - 14.05	C3									_							
J.7J - 14.UJ										-	24 : 10° 0° 0°						
										-							
4.20										-							
										[] [] 14.
			TCR	SCR	RQD	FI											
ruck at (m) Ca	Water		Rose	to In	-	ema		it ove	avatad b	Kilway +	1 20~						
. ack at (111) Ca	July to (III)	(//////	11036	(1					avated by oundwater			d during drilling.					
Casing D		Core	Barre	el	7												
To (m) D 16.00	iam (mm) 200	Sk	(6L														
32.00	150	Flush	Тур	е	Te	ermi	natio	n Re	ason							Last U	odated
		Wa	ater		Te	ermin	ated a	at sch	eduled de	epth.						10/06	/2022 \\ C

2									Proie	ct No.	Project	Name: DAA Airf	ield Under	oass			В	oreh	ole	ID
	C	AUS	E	V	/Δ	Y				L219	Client:	DAA						BH		
	7 –		GEC	ΣТ	EC	Н					Client's		Consulting	Engineers						
Metho	od	Plant l	Used		Tor	(m)	Base	(m)	Coord	linates	Chefft	nep Namboli	Consulting	ruguice13	Τ		c	heet	3 of	5
Rotary Dr Rotary Co	illing	Comacch	nio 40	05	0	.00 .50	2.	50 .00		1.40 E	Final De	pth: 32.00 m	Start Date:	11/03/2022	Driller:	MW		Scale		
	-								74313	9.06 N	Elevatio	n: 65.09 mOD	End Date:	14/03/2022	Logger:	MRG		FIN	IAL	
Depth (m) 14.70 - 14.92		Field Records	TCR	SCF	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Vorustiff brown slig		cription	W with law	, aabbla	Water	Bacl	kfill	
14.70 - 14.92	(11,14/5	0 for	63			AZCI				-	a . a	Very stiff brown slig content. Sand is fine	e to coarse. G	ravel is subround	ded to sub	angular				-
15.00	75mm) F = 0643	lammer SN								_	o	fine to coarse of mi	xed lithologie: ler noted band of s	 Cobbles are of and and gravel likely w 	limestone ashed out due	to flush)				15.0 —
										-	ه څه د چه							l∵¦-		-
										-								l∵¦-		-
			0							-								l∵¦-		15.5 -
										-								l: F		-
16.00				_	+	-				-	A 00 0									16.0 —
16.25 - 16.55	R4									-	a 00 0									-
10.23 - 10.33	57									-	A 00 0									-
16.60	D7		100							<u> </u>	a 00 8								1	16.5 —
										-	و څه د									-
17.00				_	1	-				-									1	17.0 —
										-										-
									47.79	17.30	×××	Brownish grey sligh			ar to subr	ounded				-
									47.59	- 17.50 -		fine to coarse GRAV Very stiff brown slig			low cobble	content.			1	17.5 —
17.05 10.20	64		70							-		Sand is fine to coars coarse. Cobbles are	se. Gravel is su	ibrounded to su						-
17.85 - 18.20	C4									<u> </u>		coarse. Condies are	or innestone.						1	18.0 —
									46.99	18.10	-A -10° 0	Low recovery: Brow			subangula	ar to				-
						AZCI				-		subrounded fine to	coarse GRAVE	L of limestone.						-
18.50										-									1	18.5 —
18.80	D8					AZCI				-										-
18.80 - 19.40	1									-									1	19.0 —
										-										-
			75						45.69	- - 19.40	-									-
											2 0 0 B	Very stiff brown slig Sand is fine to coars							1	19.5 —
										-		coarse. Cobbles are	of limestone.							-
20.00										-									2	- 20.0 —
									45.04	20.05		Very stiff dark grey s								-
20.30 - 20.60	B6									-	A 00 0	fine to coarse of mi								-
										 -	a 00 0								2	20.5 —
20.70	D9		100							<u> </u>	A 00									-
										-									2	21.0 —
										<u> </u>	a . 0 0 0									-
										-										-
21.50				\vdash	+	1				 -	ا من من المناطقة المناطقة المناطقة الم								2	21.5 -
										<u> </u>										-
			TCR	SCF	RQD	FI				-	<u>;a40° ° . 8</u>									=
	Water		_	_		Rema	rks		1	1	ı							_		
truck at (m) Ca	sing to (m)	Time (min)	Rose	e to (cavated by oundwate			ed during drilling.								
Casing D		Core	Barr	el	\neg															
To (m) Di	iam (mm) 200	Sk	K6L																	
32.00	150	Flush	тур	e	1	[ermi	nati	on Re	eason							Last Up	date	ed [T
		Wa	ater			ermir	nated	at sc	heduled d	epth.						10/06/2	2022		Δſ	10
		- • •								* **						, 55/.			الدا	2

								Proje	ct No.	Project	Name: DAA Airf	ield Under	oass			Borehole	: ID
	C	AUS	E	W	A	Y		21-	1219	Client:	DAA					BH110	0
			GEC	DTI	EC	Н				Client's	Rep Ramboll	Consulting	Engineers				
Meth		Plant l					Base (m)	Coord	linates	Final De	nth: 22.00 m	Start Date:	11/03/2022	Driller:	\4\4/	Sheet 4 of	f 5
Rotary D Rotary C		Comacch Comacch				00 50	2.50 32.00	71651	1.40 E	Final De	ptn: 32.00 m	Start Date:	11/03/2022	Driller:	VIVV	Scale: 1:4	40
·								74313	9.06 N	Elevatio	n: 65.09 mOD	End Date:	14/03/2022	Logger: 1	MRG	FINAL	-
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Water Depth Depth (m) (m)	Level mOD	Depth (m)	Legend		Des	cription		į	Backfill	
									_		Very stiff dark grey s content. Sand is fine						22.0
									-		fine to coarse of mix						
			100						-								22.5
									-	o							İ
									-	o. °in. i							
3.00									-	-A - O - A							23.0
3.30 - 23.7	0 C5								-	A 000							İ
2.50	240								-								23.5
3.60 3.70 - 24.1	D10 0 B7		80						-								İ
									-	÷a : 0° 0° 0							24.0
																	24.0
									-								
4.50									_								24.5
									-								
									_	<u> </u>							25.0
			100						-								İ
			100						-								
									-	a . 000							25.5
									-	A 00							İ
6.00									_								26.0
									-	:a : 0 0 0							İ
									-	:a : 0 ° a							İ
								38.44	26.65								26.5
			100	100	35						Medium strong thic weathered.	kly laminated	dark grey MUDS	STONE. Distir	nctly		
						16					Discontinuities: 1. 0 to 30 degree be	edding fractur	es. closely paced	I (50/94/150))		27.0
											undulating, rough.	0	, ,	(,-,	´		İ
7.50								37.59	- 27.50								27.5
7.62	C6							37.33	27.50		Medium strong thic weathered.	kly laminated	dark grey LIMES	TONE. Distir	nctly		
									-		Discontinuities: 1. 0 to 30 degree be	adding fractur	مد دامدمار دمعرم	d (10/84/18	0)		İ
						15			_		(10/84/180) planar						28.0
			100	100	52				-		surfaces. 2. 80 to 90 degree j	oint a 30.08m	to 30.21m, at 30	0.91m to 31.	.03m,		İ
									-		at 31.70m to 32.00r brown staining on jo	oint surface.					28.5
									-		28.42m to 28.50m: Band to subrounded fine to coa	of dark brownish gi irse GRAVEL. Sand	rey slightly silty slightly I is fine to coarse.	sandy clayey sub	bangular		
						4			<u>-</u>								
9.00									-								29.0
			TCR	SCR	RQD	FI											L
ruck at (m) (Strikes Time (min)	Pose	to (n	_	ema			KIL I	1.20							
uch at (III)	casing tO (ITI	, inne (iiiii)	nose	(1			tion pit exc ticeable gro				ed during drilling.						
Casing I		Core	Barre	el	\dashv												
To (m) 16.00	Diam (mm) 200	Sk	(6L														
32.00	150	Flush	Тур	e	T	ermi	nation Re	eason							Last Upda	ted	7
		1			- 1												

									Fioje	ct No.	Fioject	Name: DAA Airf	icia oriaci	Ju 33			ь	rehole	: ID
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA					F	BH11(0
	/ –		GEC	ITC	ECI	Н					Client's	Rep Ramboll	Consulting	Engineers					
Method	d	Plant l	Jsed		Тор	(m)	Base	(m)	Coord	inates		·					Sh	eet 5 o	of 5
Rotary Dril		Comacch Comacch			0.0	00	2.5	50	74.654	1 10 5	Final De	pth: 32.00 m	Start Date:	11/03/2022	Driller:	MW		cale: 1:	
Rotary Co	ring	Comaccr	110 40	J5	2.:	50	32.	00	71651 74313		Elevatio	n· 65.09 mOD	End Date:	14/03/2022	Logger:	MRG		FINAL	_
Depth				1			Casing	Water	Level		Licvatio	05.05 11100	Elia Date.	14/03/2022	LOSSCI.				- —
(m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Depth (m)	mOD	Depth (m)	Legend	Medium strong thic		cription	TONE Die		Water	Backfill	
										-		weathered.	kiy lallillateu	uark grey Lilvies	TONE. DIS	uncuy			
.50 - 29.75	C7									-		Discontinuities: 1. 0 to 30 degree be							29.5
			100	100	50					-		(10/84/180) planar surfaces.	and undulatir	ng, smooth, brov	vn staining	on			
			100	100	30					_		2. 80 to 90 degree j							30.0
										-		at 31.70m to 32.00r brown staining on jo		gh, with patchy l	brown and	dark			ı
										-		,							ı
.50										-									30.5
										-									ı
						2				_									31.0
										_									
.30 - 31.45	C8		100	100	18					-									ĺ
										_	HH								31.
00									22.00	- 22.00									
.00									33.09	- 32.00 -			End of Bore	hole at 32.00m					32.0
										=									
										-									32.5
										-									
										-									
										_									33.0
										-									
										_									33.5
																			33.3
										_									34.0
										-									
										-									
										-									34.5
										-									
										-									35.0
										-									
										- -									35.
										-									
										-									36.
										- -									
										<u>-</u>							-		1
		o	TCR	SCR	RQD		Щ										\perp		L
ck at (m) Cas		Strikes Time (min)	Rose	to (n	_	ema Ispec		it exc	avated by	Kilwey to	1.20m								
. , , = ==	/	. ,										d during drilling.							
Casing De		Core	Barre	el															
o (m) Dia	am (mm) 200	Sk	(6L																
32.00	150	Flush	Тур	e	To	ermi	natio	n Re	ason							Last Upd	latec		-

	1								Proje	ct No.	Project	Name: DAA Airf	ieid Offderp	ass			"	orehole ID
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA						BH111
			GEC	ТС	EC	Н					Client's	Ren Ramboll	Consulting	Engineers				
Metho	d	Plant (Used		Тор	(m)	Base	(m)	Coord	inates	- Cilicité s	nep nambon	Consuming					Sheet 1 of 6
Rotary Dri Rotary Co	illing	Comacch Comacch	nio 40	05	0.	00 50	2.	50 .60	71650		Final De	pth: 36.60 m	Start Date:	09/03/2022	Driller:	MW		Scale: 1:40
										6.32 N	Elevatio	n: 66.61 mOD	End Date:	09/03/2022	Logger:	RS		FINAL
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Inspection pit excav		ription			Water	Backfill
.50 - 3.50 .00 .60 .80 - 4.10 .30	B1 C1 D1		100						65.41	2.50		Very stiff brownish a cobble content. San subangular fine to content. San is fine to coarse of mix	grey slightly sand is fine to coaccerse of mixed	ndy slightly gravirse. Gravel is sud lithologies.	velly CLAY ubrounded	v cobble		2.5 2.5 3.0 3.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4
			TCR	SCR	RQD	FI				-	\$3. :40°° . \$						1	·· 🕒 .
	Water	Strikes	1		Ч-	ema	rks											
ruck at (m) Ca			Rose	e to (r	n) Ir	rspec	tion p		avated by oundwater			d during drilling.						
Casing De	etails	Core	Barre	el	\dashv													
	am (mm) 200	SI	K6L															
36.60	150	Flush	тур	e	+ T	ermi	natio	on Re	ason							Last U	pdate	ed 🔳
					- 1											1		

20									Proje	ct No.	Proiect	Name: DAA Airf	ield Underi	oass			Во	reho	ole ID
	C	AUS	E	V	A	Υ			21-1		Client:	DAA	,					вн1	
			GEC	DТ	ECI	Н					Client's		Consulting	Engineers					
Metho	od	Plant l	Used		Тор	(m)	Base	(m)	Coord	inates		-					Sh	eet 2	2 of 6
Rotary Dri Rotary Co		Comacch			0.0	00	2.5 36.	50	71650		Final De	pth: 36.60 m	Start Date:	09/03/2022	Driller:	MW			1:40
Notally Co	Ji ilig	Comacci	110 40	JJ	2	30	30.	00	74327		Elevatio	n: 66.61 mOD	End Date:	09/03/2022	Logger:	RS		FIN	AL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend			cription			Water	Back	fill
										-		Very stiff brownish g	to coarse. G	ravel is subangul				ŀΕ	7.5 —
			100							-		fine to coarse of mix	ked lithologie	S.			4	ŀ	· -
										-							4	÷	-
8.10										-	2 0 0 0								8.0 —
ı										-									-
8.55 - 8.85	C2																		8.5 —
8.60	D2		100							-								E	-
			100							-								ŀ	9.0 —
										=								÷H	-
9.50	ES2																	÷	9.5
9.60 9.70 - 10.00	B3									_	7 7 0 0 2 0 0 0								:: -
9.70 - 10.00	ВЗ									-							,		-
ı										-							•		10.0 —
			100							=							,		-
																		$\cdot \mathbb{B}$	10.5
																		E	-
										-								·H	-
11.10										-	A . 00							ĿΉ	·
										-									-
11.60	D3									-							,		11.5 —
ı			100														,		-
										_								$\cdot \mathbb{B}$	12.0
										-								ď	-
										=								÷	12.5
12.60										-								· E	-
12.80 - 13.10	B4									-									-
										-							,		13.0
			100							-							•		-
										-								$: \mathbb{H}$	13.5 —
										-								H	-
										-								٠H	14.0
14.10											7 7 0 0 2 0 0 0								-
14.37 - 14.73	C3									_									145
			TCR	SCR	RQD	FI				=	ేద - చార్ త						4	• Ц	-
		Strikes	1-		_	ema													'
Struck at (m) Ca	asing to (m)	Time (min)	Rose	e to (r					avated by oundwater			d during drilling.							
								-		,									
Casing De		Core	Barre	el	1														
To (m) Di 2.50	iam (mm) 200	Sk	K6L																
36.60	150	Flush	Тур	е	To	ermi	natio	n Re	ason							Last Up	dated	i I	
		\w/:	ater		T _c	rmir		at coh	neduled de	+6						10/06/2	2022		100

									Proje	ct No.	Project	Name: DAA Airfi	ield Under _l	oass			В	oreh	ole ID
	C	AUS	E	W	A	Y			21-1	219	Client:	DAA						BH1	111
	—		GEC	TC	ECI	Н					Client's	Rep Ramboll	Consulting	Engineers					
Metho		Plant l			Тор	(m)	Base	(m)	Coord	inates		-			- ···		S	heet	3 of 6
Rotary Dr Rotary Co		Comacch Comacch			0.0 2.	00 50	36.		71650	7.31 E	Final De	ptn: 36.60 m	Start Date:	09/03/2022	Driller:	IVIVV	:	Scale:	: 1:40
·									74327	6.32 N	Elevatio	n: 66.61 mOD	End Date:	09/03/2022	Logger:	RS		FIN	IAL
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	'		cription			Water	Back	cfill
14.90	D4		100							- - - - - -		Very stiff brownish a content. Sand is fine fine to coarse of mix	to coarse. G	ravel is subangul					15.0
15.60										- - - - -									15.5
16.25 - 16.65	i B5		100						50.36	16.25	24 . (2 ° °)	Very stiff brown slig Sand is fine to coars		•					16.5
17.10										- - - -		coarse of mixed lith							17.0
17.70	D5		100							- - -									
18.00 - 18.35	C4									- - - -									18.0
18.60 19.00 - 19.40	B6		100							- - - - - - - - -									19.0
20.10									46.51	- - - 20.10		Very stiff brown slig Gravel is subrounde				coarse.			20.0
20.80 - 21.15	5 B7		100						45.91	- 20.70		lithologies. Cobbles Very stiff grey slight	are of mixed	lithologies. gravelly CLAY with	th low cob				20.5
24.40			100							- - - -		content. Sand is fine fine to coarse. Cobb				ounded			21.0
21.40 21.60	D6																	E	21.5
£1.0U										- -									
			TCR	SCR	RQD	FI				_	<u>:åå* å</u>						1		<u>+</u> *.
		Strikes	-		_	ema													
truck at (m) Ca	asing to (m)	Time (min)	Rose	to (r					avated by oundwater			d during drilling.							
Casing D	etails Diam (mm)	Core		el															
	200	Jr	(6L																
To (m) D 2.50 36.60	200 150	Flush		e	To	ermi	natio	n Re	ason							Last Up	date	d	

26									Proje	ct No.	Project	Name: DAA Airfi	eld Under	oass			В	orehole I	ID
	A) C	AUS	E	V	/A	Y				1219	Client:	DAA	·					BH111	
			GEC	TC	EC	Н					Client's		Consulting	Engineers					
Meth	nod	Plant	Used		Тор	(m)	Base	(m)	Coord	linates		-					S	heet 4 of	6
Rotary D Rotary C		Comacch Comacch			0.	00 50	2. 36	50		7.31 E	Final Dep	oth: 36.60 m	Start Date:	09/03/2022	Driller:	MW		Scale: 1:40	
				T		,				'6.32 N	Elevation	1: 66.61 mOD	End Date:	09/03/2022	Logger:	RS		FINAL	
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend علم	Very stiff grey slight		gravelly CLAY wi	ith low coh	hle	Water	Backfill	_
			100							-		content. Sand is fine fine to coarse. Cobb	to coarse. G	ravel is subangu	lar to subr				2.5 —
23.10 23.60 - 23.9	5 B8		100							-		23.40m to 24.50m: Dark b fine to coarse of mixed lith	rown very silty gra ologies predomina	velly fine to coarse SA antly limestone.	IND. Gravel is	subangular		23	3.5 —
24.40 24.60	D7									-								24	4.0 —
24.95 - 25.40	0 C5		100							-								25	5.0 —
26.00 26.10	D8					-				-								26	6.0 —
26.70 - 27.10	0 B9		90						39.91	26.70	-a - 0° 0 - a	Very stiff dark grey s Sand is fine to coars coarse. Cobbles are	e. Gravel is su	ıbangular to sub					7.0 —
27.60			-															27	7.5 —
			90							-								28	8.5 —
29.10										[9.0
		a	TCR	SCF	RQD		Ļ												_
Struck at (m) C		Strikes Time (min)	Rose	e to (m) lr		tion p		cavated by oundwate			d during drilling.							
Casing D	Details Diam (mm)	Core	Barro	el	-														
2.50 36.60	200 150	Flush	Т	ermi	inatio	on Re	eason							Last U	odate	ed I	n		
		W	ater		Т	ermir	nated	at scl	heduled d	epth.						10/06	/2022	AC	iS

CAUSEWAY —GEOTECH										ct No.	Borehole ID BH111			
											Client's Rep Ramboll Consulting Engineers			
Method Rotary Drilling Rotary Coring		Comacchio 405			0.0		2.5	se (m) 50 6.60	716507.31 E		Final Depth: 36.60 m Start Date: 09/03/2022 Driller: MW	Sheet 5 of 6 Scale: 1:40		
							Casing	Water	743276.32 N		Elevation: 66.61 mOD End Date: 09/03/2022 Logger: RS	FINAL		
Depth (m)	Samples /	Field Records	TCR	SCR	RQD	FI	Depth	Depth (m)	Level mOD	Depth (m)	Legend Description Legend Very stiff dark grey sandy gravelly CLAY with low cobble content.	Backfill		
9.70 - 30.10 0.20 0.60	B10		90						36.01	30.60	Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded. Dark grey sandy very clayey subangular GRAVEL with medium cottontent. Sand is fine to coarse. Cobbles are subangular. (Weathered bedrock)	30.0		
2.10			100	64	60				34.06	32.55	Medium strong thickly laminated dark grey LIMESTONE. Largely unweathered: possibly slightly closer fracture spacing. Discontinuities: 1. 0 to 30 degree bedding fractures, medium spaced (40/320/520 planar, smooth.	33.0		
33.60										-		33.5		
3.90 - 34.10	C6									-				
4.09 - 34.36			100	100	96	3				- - - - -		34.0 34.5		
34.88 - 35.03	C7									-				
5.10										-		35.0		
5.80 - 36.00	C8		100	97	89					- - - - - - -		35.5 36.0		
										-				
			TCR	SCR	RQD	FI								
		Strikes				ema	rks							
		Time (min)							avated by oundwater		20m. ter added during drilling.			
To (m) Dia	etails am (mm)	Core		el										
2.50	200	Sr Sr	(6L											
36.60	150	Flush	Flush Type Termination						ason		Lat	st Updated		
		Wa	Te	ermir	ated a	t sch	neduled de	epth.	1	0/06/2022 AG				

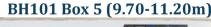
	7								Proje	ct No.	Project	: Name: DAA Airf	ield Under	oass			Boreh	ole ID			
	C	AUS	E	W	A	Y			21-1	L 21 9	Client: DAA							BH111			
			GEC	TC	EC	Н					Client's Rep Ramboll Consulting Engineers										
Meth	hod	Plant	Used]	Тор	(m)	Base	(m)	Coord	inates							Sheet 6 of 6				
			0.	0.00 2.50 2.50 36.60			716507.31 E		Final Depth: 36.60 m Start Date: 09/03/2022 Driller: MW					MW	Scale: 1:40						
NOtal y t	Cornig	сотпасстіо 405			2.	2.30 30.00		.60	743276.32 N		Elevation: 66.61 mOD		End Date: 09/03/2022		Logger:	RS	FIN	FINAL			
Depth (m)	Samples	/ Field Records	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend		Des	cription	'	Water	Back	fill			
.60									30.01	36.60		Medium strong thic unweathered: possi	kly laminated	dark grey LIMES	TONE. Large						
										-		Discontinuities:	,	·	•	1					
										-		1. 0 to 30 degree be planar, smooth.	edding fractur	es, medium spac	ced (40/320)	/520)		37.0			
										-		pranal) sinostin	End of Bore	hole at 36.60m							
										-											
										_								37.5			
										-								20.4			
										<u> </u>								38.			
										[
										-								38.			
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			705	SCR	POT	ļ .	-			[-	\dashv			
	Water	Strikes	ICR	JOCK	Ц_	Rema	ırke														
k at (m)		Time (min)	Rose	e to (r	_			oit exc	avated by	Kilwex to	1.20m.										
												ed during drilling.									
	Details	Core	Barr	el																	
(m) 2.50	Diam (mm) 200	SI	K6L																		
6.60	150	Flush	ı Typ	e	T	ermi	inatio	on Re	ason							Last Upda	ted				
	l .	Flush Type Water					Termination Reason Last U Terminated at scheduled depth. 10/00														



APPENDIX C CORE PHOTOGRAPHS









BH101 Box 6 (11.20-12.70m)





BH101 Box 12 (20.20-21.70m)





BH101 Box 13 (21.70-23.20m)



BH101 Box 14 (23.30-24.70m)



BH101 Box 15 (24.70-26.20m)



BH101 Box 16 (26.20-27.70m)





BH102 Box 06 (11.50-13.0m)









DAA Airfield Underpass



BH102 Box 13 (22.0-23.50m)

Report No.: 21-1219









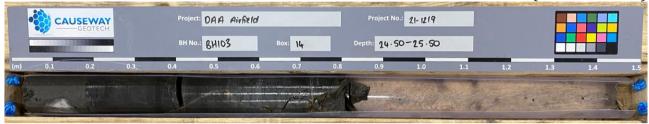


BH103 Box 12 (21.50-23.00m)





BH103 Box 13 (23.00-24.50m)



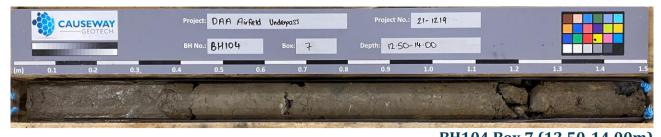
BH103 Box 14 (24.50-25.50m)



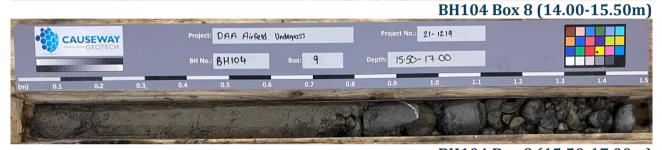


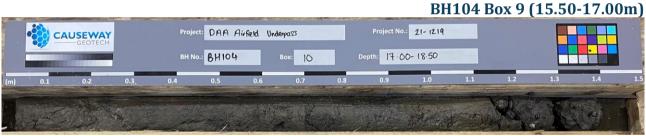
BH104 Box 6 (11.00-12.50m)















BH104 Box 12 (20.00-21.50m)





BH104 Box 13 (21.50-23.00m)



BH104 Box 14 (23.00-24.50m)



BH104 Box 15 (24.50-26.00m)



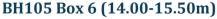
BH104 Box 16 (26.00-27.50m)



BH104 Box 17 (27.50-29.00m)











BH105 Box 12 (23.00-24.50m)





BH105 Box 13 (24.50-26.00m)

Project DAP Airfield

Project No.: 21-12.19

BH No.: BH105

Box: IL

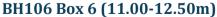
Depth: 26.00-27.00

Depth: 1.2 1.3 1.4 1.5

BH105 Box 14 (26.00-27.00m)







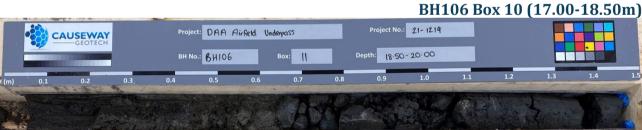














BH106 Box 12 (20.00-21.50m)



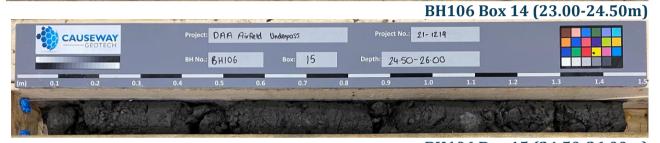


BH106 Box 13 (21.50-23.00m)

Project: DAA Airfield Underpass Project No.: 21- 1219

BH No.: 6H106 Box: 14 Depth: 23.00-24.50

(m) 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5



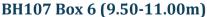




BH106 Box 17 (27.50-29.00m)



















DAA Airfield Underpass

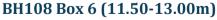
Report No.: 21-1219



BH107 Box 19 (28.50-30.00m)







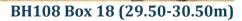




BH108 Box 12 (20.50-22.00m)











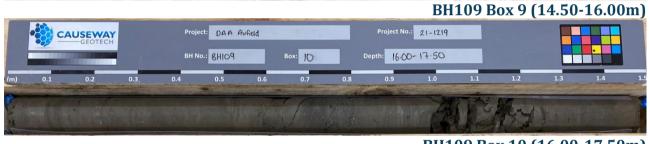
BH109 Box 6 (10.00-11.50m)











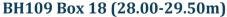




BH109 Box 12 (19.00-20.50m)











BH109 Box 19 (29.50-31.00m)

Project: DAA AirAud

Project No.: 21-1219

BH No.: 8HIO9

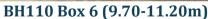
Box: 90

Depth: 31-00-32-50

BH109 Box 20 (31.00-32.50m)











BH110 Box 7 (11.20-12.70m)



BH110 Box 8 (12.70-14.20m)



BH110 Box 9 (14.20-15.70m)



BH110 Box 10 (16.00-17.00m)



BH110 Box 11 (17.00-18.50m)



BH110 Box 12 (18.50-20.00m)











BH110 Box 19 (29.00-30.50m)



BH110 Box 20 (30.50-32.00m)





BH111 Box 1 (2.50-3.60m)

CAUSEWAY
GEOTECH
BH No.: BH II Box: 2 Depth: 3.60 \$5.10

O.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5







BH111 Box 5 (8.10-9.60m)





BH111 Box 6 (9.60-11.10m)

Project: DAA

Project No.: 21-1619.

BH No.: BH No.: BH No.: 7 Depth: 11.10 & 12.60







BH111 Box 10 (15.60-17.10m)





BH111 Box 11 (17.10-18.60m)

BH111 Box 12 (18.60-20.10m)



BH111 Box 16 (24.60-26.10m)





BH111 Box 17 (26.10-27.60m)

Project: DAA Aufield Underposs Project No.: 21-1219.

BH No.: 11 Box: 18 Depth: 27.60-29.10

[M] 0.1 1.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5









BH111 Box 22 (33.60-35.10m)





APPENDIX D

PUMP TEST DATA
(PROVIDED ELECTRONICALLY TO THE CLIENT)





APPENDIX E GEOTECHNICAL LABORATORY TEST RESULTS





HEAD OFFICE Causeway Geotech Ltd

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Registered in Northern Ireland. Company Number: NI610766

REGIONAL OFFICE Causeway Geotech (IRL) Ltd

Unit 1 Fingal House Stephenstown Industrial Estate Balbriggan, Co Dublin, Ireland, K32 VR66 **ROI**: +353 (0)1 526 7465

Registered in Ireland. Company Number: 633786

www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS LABORATORY TEST REPORT

12 May 2022

Project Name:	DAA Airfield Underpass Ground Investigation		
Project No.:	21-1219		
Client:	DAA		
Engineer:	Ramboll Consulting Engineers		

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 10/04/2022 and 12/05/2022.

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: DAA Airfield Underpass 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	8
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	8
SOIL	Bulk and dry density by Linear Measurement Method	BS 1377-2: 1990: Cl 7.2	8
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	15
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	8
SOIL	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4: 1990: Cl 3.3 & 3.4	2
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	2
SOIL	Consolidation properties in oedometer - Using 5 pressures (up to 5 days total duration)	BS 1377-5: 1990: Cl 3: 1	1
SOIL	Undrained shear strength – triaxial compression without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 8	6
ROCK	Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985	10
ROCK	Uniaxial Compressive Strength (UCS)*	ISRM Suggested Methods -Rock Characterization Testing and Monitoring, Ed. E T Brown - 1981	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 Pro Soils Limited (UKAS 4043)	Effective shear strength consolidated-undrained triaxial compression test with measurement of pore pressure (up to 4 days)	BS 1377-8:1990	3
	Extra over days (more than initial 4 days)		0
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	Organic Matter Content		4
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite C		3
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite D		3



Summary of Classification Test Results

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

								'						
		Sar	nple	ı		Dens		W	Passing	LL	PL	PI	Particle	Casagrande
Hole No.	Ref	Тор	Base	Туре	Soil Description	bulk	dry	%	425μm %	%	%	%	density Mg/m3	Classification
BH101	1	4.60	4.85	В	Brown sandy gravelly silty CLAY with cobbles.	Mg/m	1.66	4.8	68	24 -1pt	15	9	Mg/III3	CL
BH101	2	8.50	8.80	В	Brown sandy gravelly silty CLAY	2.48	2.28	7.0	76	28 -1pt	13	15		CL
BH101	5	19.10	19.50	В	Brown sandy slightly gravelly silty CLAY	2.08	1.72	21.0	76	26 -1pt	16	10		CL
BH110	1	2.50	3.50	В	Brown sandy slightly gravelly silty CLAY	2.03	1.61	26.0	81	38 -1pt	19	19		CI
BH110	2	8.20	8.55	В	Brown sandy gravelly silty CLAY	2.29	2.07	11.0	64	29 -1pt	14	15		CL
BH110	4	16.25	16.55	В	Brown sandy gravelly silty CLAY	2.26	2.06	9.4	77	28 -1pt	14	14		CL
BH111	1	2.50	3.50	В	Brown sandy gravelly silty CLAY	2.13	1.96	7.1	73	28 -1pt	14	14		CL
BH111	2	6.25	6.60	В	Brown sandy gravelly silty CLAY	2.32	2.15	2.3	58	28 -1pt	15	13		CL

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

1pt - single point test

wi - immersion in water

LAB 01R Version 5

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

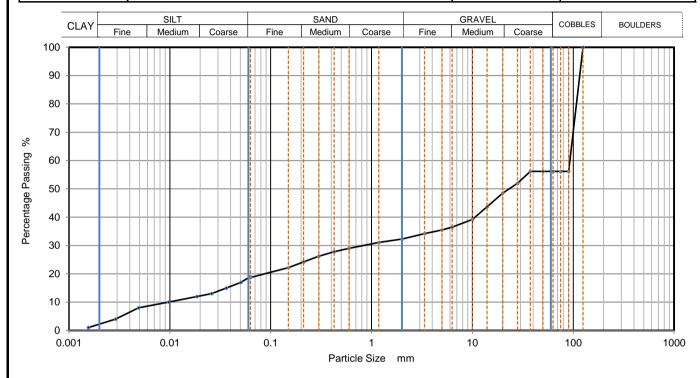
Date Printed
Approved By

05/05/2022 00:00



Stephen.Watson

CALISE	CAUSEWAY PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219		
GEO	ОТЕСН	PARTICLE SIZE DISTRIBUTION				Borehole/Pit No.	BH101
Site Name		DAA Airfield Under	pass Ground Investig	ation	Sample No.	1	
Soil Description	on	Brown sandy gravelly	silty CLAY with cobbles	Depth, m	4.60		
Specimen Ref	ference	8	8 Specimen 4.6 m			Sample Type	В
Test Method		BS1377:Part 2:1990,	clauses 9.2 and 9.5		KeyLAB ID	Caus202204067	



Siev	/ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	56	0.05065	17
75	56	0.03625	15
63	56	0.02594	13
50	56	0.01855	12
37.5	56	0.00969	10
28	52	0.00490	8
20	49	0.00289	4
14	44	0.00155	1
10	39		
6.3	37		
5	36		
3.35	34		
2	32		
1.18	31		
0.6	29	Particle density	(assumed)
0.425	28	2.65	Mg/m3
0.3	26		
0.212	24		
0.15	22		
0.063	19		

Dry Mass of sample, g	5844

Sample Proportions	% dry mass
Cobbles	43.8
Gravel	23.9
Sand	13.6
Silt	16.4
Clay	2.3

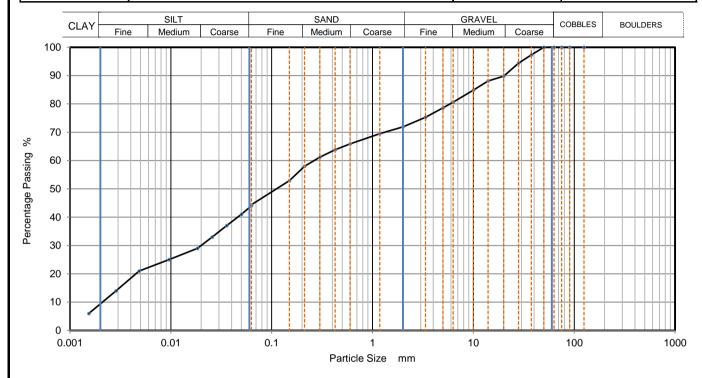
Grading Analysis		
D100	mm	125
D60	mm	92.6
D30	mm	0.822
D10	mm	0.0104
Uniformity Coefficient		8900
Curvature Coefficient		0.7

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





CAUSEWAY	DADTICI E CIZE DICTDIDI ITIONI			Job Ref	21-1219	
—— GEOTECH	PARTICLE SIZE DISTRIBUTION				Borehole/Pit No.	BH101
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation				2
Soil Description	Brown sandy gravelly silty CLAY				Depth, m	8.50
Specimen Reference	Specimen 8.5 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus202204068



Siev	ving	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	44
90	100	0.05002	41
75	100	0.03581	37
63	100	0.02563	33
50	100	0.01834	29
37.5	97	0.00958	25
28	94	0.00485	21
20	90	0.00286	14
14	88	0.00154	6
10	85		
6.3	81		
5	79		
3.35	75		
2	72		
1.18	70		
0.6	66	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	61		_
0.212	58		
0.15	53		
0.063	44		

Dry Mass of sample, g	6149
	_

Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	28.1	
Sand	27.6	
Silt	35.2	
Clay	9.1	

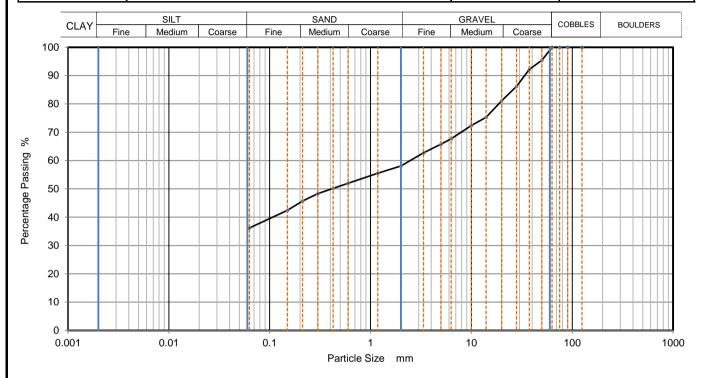
Grading Analysis		
D100	mm	
D60	mm	0.263
D30	mm	0.0201
D10	mm	0.00216
Uniformity Coefficient		120
Curvature Coefficient		0.71

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PANI	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH101	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	11.90	
Specimen Reference	2 Specimen 11.9 m			Sample Type	В	
Test Method	thod BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022040610	



Sieving		Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	92		
28	86		
20	81		
14	75		
10	72		
6.3	68		
5	66		
3.35	63		
2	58		
1.18	56		
0.6	52		
0.425	50		
0.3	48		
0.212	46		
0.15	42		
0.063	36		

Dry Mass of sample, g	5062

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.9
Sand	22.0
Fines < 0.063 mm	36.0

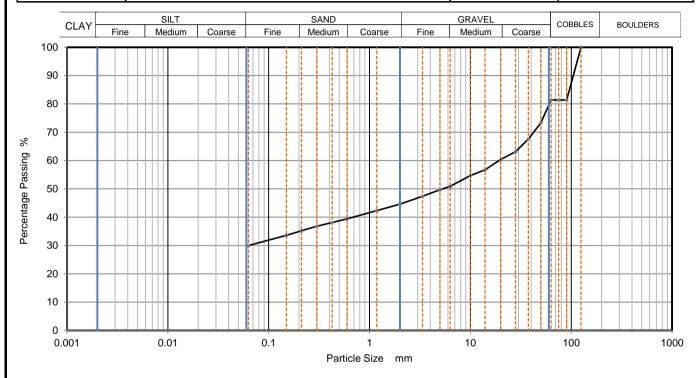
Grading Analysis		
D100	mm	
D60	mm	2.47
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PANII	ARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH101	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	15.00	
Specimen Reference	2 Specimen 15 m			Sample Type	В	
Test Method	Method BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022040611	



Sieving		Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	81		
75	81		
63	81		
50	73		
37.5	68		
28	63		
20	60		
14	57		
10	55		
6.3	51		
5	50		
3.35	47		
2	45		
1.18	42		
0.6	39		
0.425	38		
0.3	37		
0.212	35		
0.15	34		
0.063	30		

Dry Mass of sample, g	7813

Sample Proportions	% dry mass
Cobbles	18.6
Gravel	36.8
Sand	14.6
Fines < 0.063 mm	30.0

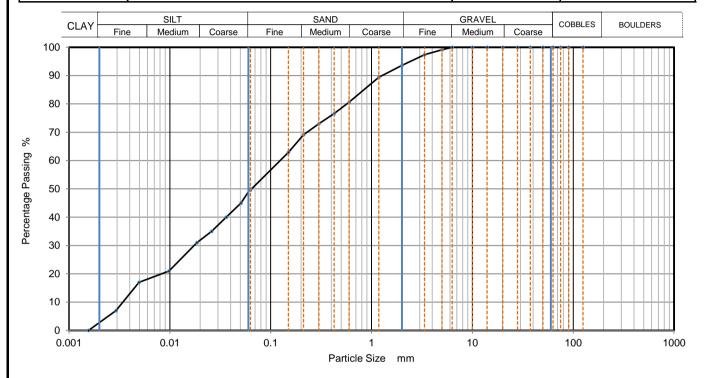
Grading Analysis		
D100	mm	125
D60	mm	19.3
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	CAUSEWAY PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
—— GEOTECH	PANI	ICLE SIZE DIS	INIBOTION		Borehole/Pit No.	BH101
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Brown sandy slightly gravelly silty CLAY			Depth, m	19.10	
Specimen Reference	8	8 Specimen 19.1 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clau	uses 9.2 and 9.5			KeyLAB ID	Caus2022040613



Siev	/ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	50
90	100	0.05065	45
75	100	0.03625	40
63	100	0.02594	35
50	100	0.01855	31
37.5	100	0.00980	21
28	100	0.00495	17
20	100	0.00292	7
14	100	0.00156	0
10	100		
6.3	100		
5	99		
3.35	97		
2	94		
1.18	89		
0.6	81	Particle density	(assumed)
0.425	77	2.65	Mg/m3
0.3	73		
0.212	69		
0.15	63		
0.063	50		

Dry Mass of sample, g	209
	- 4

Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	6.4		
Sand	44.0		
Silt	46.8		
Clay	2.8		

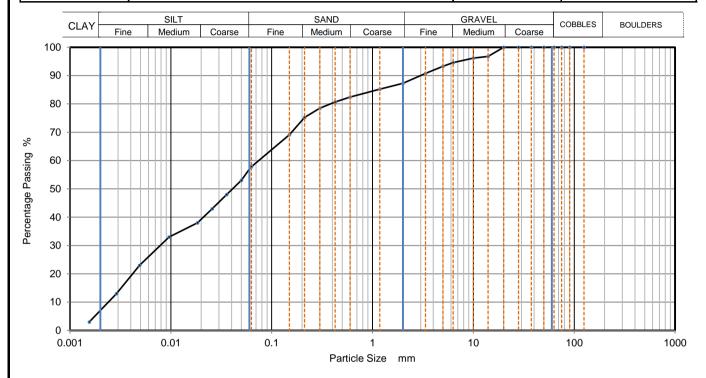
Grading Analysis		
D100	mm	
D60	mm	0.124
D30	mm	0.0177
D10	mm	0.00344
Uniformity Coefficient		36
Curvature Coefficient		0.74

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





CAUSEWAY	CALISEWAY DARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
— GEOTECH	PANII	PARTICLE SIZE DISTRIBUTION -			Borehole/Pit No.	BH110
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	1
Soil Description	Brown sandy slightly gravelly silty CLAY			Depth, m	2.50	
Specimen Reference	10	Specimen 2.5 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clau	ses 9.2 and 9.5			KeyLAB ID	Caus2022040614



Sie	ving	Sedim	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	58
90	100	0.05002	53
75	100	0.03581	48
63	100	0.02563	43
50	100	0.01834	38
37.5	100	0.00958	33
28	100	0.00490	23
20	100	0.00289	13
14	97	0.00155	3
10	96		
6.3	95		
5	93		
3.35	91		
2	87		
1.18	85		
0.6	82	Particle density	(assumed)
0.425	81	2.65	Mg/m3
0.3	79		_
0.212	75][
0.15	69]	
0.063	58	1	

Dry Mass of sample, g	505
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	12.7
Sand	29.5
Silt	51.2
Clay	6.6

Grading Analysis		
D100	mm	
D60	mm	0.0748
D30	mm	0.00802
D10	mm	0.00247
Uniformity Coefficient		30
Curvature Coefficient		0.35

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

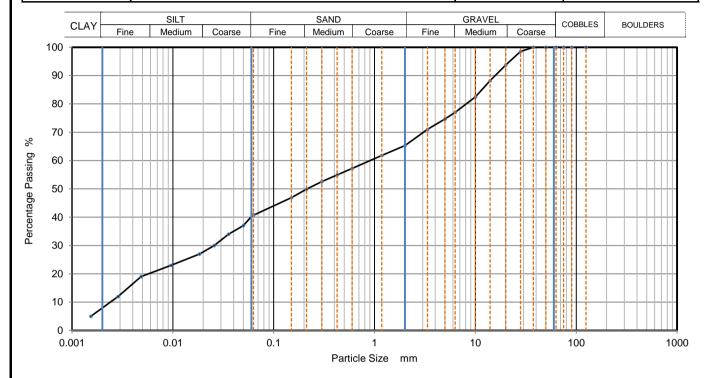




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10122

CAUSEWAY	DARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
—— GEOTECH	PANII	PARTICLE SIZE DISTRIBUTION -			Borehole/Pit No.	BH110
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	2
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	8.20	
Specimen Reference	8	8 Specimen 8.2 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clau	ses 9.2 and 9.5			KeyLAB ID	Caus2022040616



Siev	ving	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	41
90	100	0.05002	37
75	100	0.03581	34
63	100	0.02563	30
50	100	0.01834	27
37.5	100	0.00958	23
28	99	0.00485	19
20	94	0.00286	12
14	88	0.00154	5
10	83		
6.3	77		
5	75		
3.35	71		
2	65		
1.18	62		
0.6	57	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	53		
0.212	50		
0.15	47		
0.063	41		

Dry Mass of sample, g	4719

Sample Proportions % dry mass		
Cobbles	0.0	
Gravel	34.7	
Sand	24.6	
Silt	32.4	
Clay	8.3	

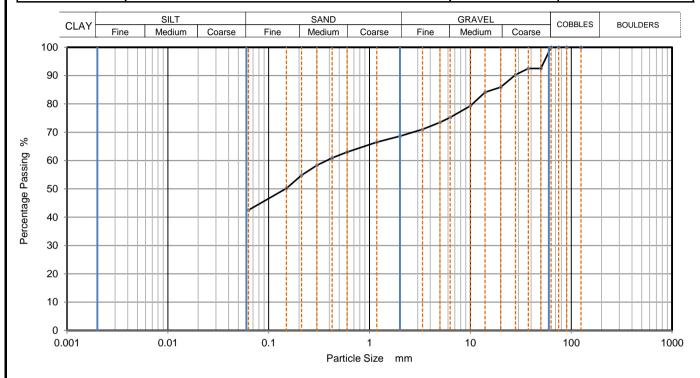
Grading Analysis		
D100	mm	
D60	mm	0.909
D30	mm	0.0254
D10	mm	0.00232
Uniformity Coefficient		390
Curvature Coefficient		0.31

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH110		
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	11.50	
Specimen Reference	2 Specimen 11.5 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022040617	



Sieving		Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	93		
37.5	93		
28	90		
20	86		
14	84		
10	79		
6.3	75		
5	74		
3.35	71		
2	69		
1.18	67		
0.6	63		
0.425	61		
0.3	58		
0.212	55		
0.15	50		
0.063	43		

Dry Mass of sample, g	6128
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Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	31.4		
Sand	26.1		
Fines < 0.063 mm	42.0		

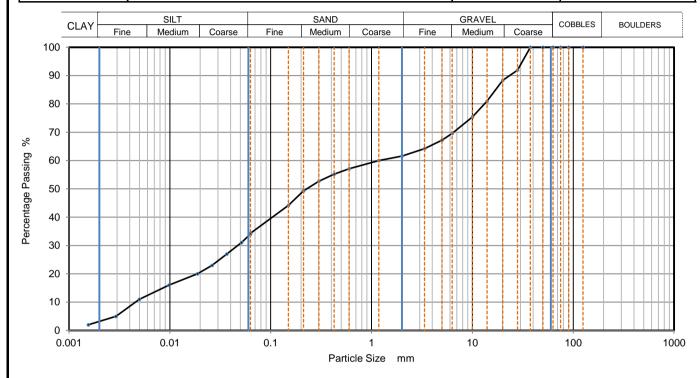
Grading Analysis		
D100	mm	
D60	mm	0.378
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH110		
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	16.25	
Specimen Reference	8 Specimen 16.25 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022040619	



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	34
90	100	0.05127	31
75	100	0.03668	27
63	100	0.02624	23
50	100	0.01877	20
37.5	100	0.00980	16
28	92	0.00498	11
20	88	0.00292	5
14	81	0.00155	2
10	75		
6.3	70		
5	67		
3.35	64		
2	62		
1.18	60		
0.6	57	Particle density	(assumed)
0.425	55	2.65	Mg/m3
0.3	53		_
0.212	49		
0.15	44		
0.063	34		

Dry Mass of sample, g	4072
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Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	38.4	
Sand	27.3	
Silt	31.0	
Clay	3.3	

Grading Analysis		
D100	mm	
D60	mm	1.17
D30	mm	0.0481
D10	mm	0.00459
Uniformity Coefficient		260
Curvature Coefficient		0.43

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

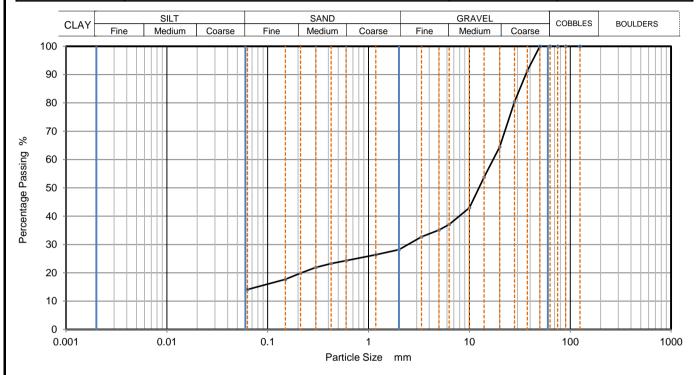




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10122

CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PANII	ICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH110	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	18.80	
Specimen Reference	2 Specimen 18.8 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022040621	



Sieving		Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	91		
28	80		
20	65		
14	54		
10	43		
6.3	37		
5	35		
3.35	33		
2	28		
1.18	26		
0.6	24		
0.425	23		
0.3	22		_
0.212	20]	
0.15	18		
0.063	14		

Dry Mass of sample, g	4320
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	71.8
Sand	14.0
Fines < 0.063 mm	14.0

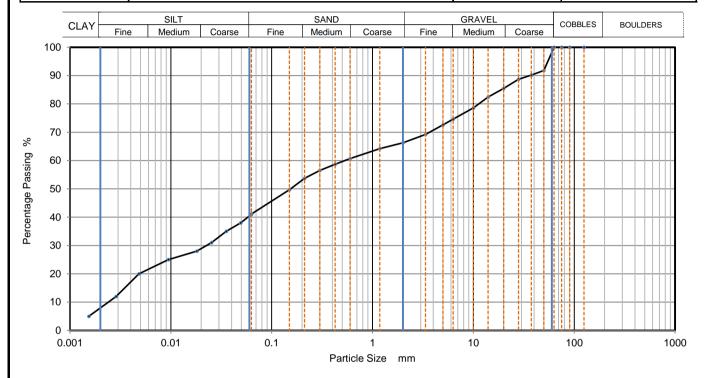
Grading Analysis		
D100	mm	
D60	mm	17.2
D30	mm	2.47
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH	PANI	ICLE SIZE DISTRIBUTION -		Borehole/Pit No.	BH111	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	1
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	2.50	
Specimen Reference	10 Specimen 2.5 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus2022040622



Siev	/ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	41
90	100	0.04939	38
75	100	0.03537	35
63	100	0.02532	31
50	92	0.01813	28
37.5	90	0.00947	25
28	89	0.00482	20
20	86	0.00286	12
14	82	0.00154	5
10	79		
6.3	75		
5	73		
3.35	69		
2	66		
1.18	64		
0.6	61	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	57		
0.212	54	1	
0.15	50	1	
0.063	41	1	

Dry Mass of sample, g	6145
1 5	0/ 1

Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	33.7		
Sand	25.2		
Silt	33.4		
Clay	7.7		

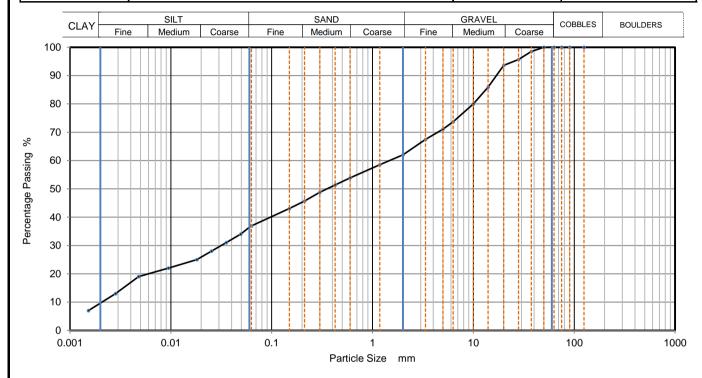
Grading Analysis		
D100	mm	
D60	mm	0.533
D30	mm	0.0223
D10	mm	0.00248
Uniformity Coefficient		210
Curvature Coefficient		0.38

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PANI	ICLE SIZE DIS	LE SIZE DISTRIBUTION		Borehole/Pit No.	BH111
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	2
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	6.25	
Specimen Reference	8 Specimen 6.25 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus2022040623



Sievi	ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	37
90	100	0.04939	34
75	100	0.03537	31
63	100	0.02532	28
50	100	0.01813	25
37.5	99	0.00947	22
28	96	0.00479	19
20	94	0.00283	13
14	86	0.00152	7
10	80		
6.3	74		
5	71		
3.35	68		
2	62		
1.18	59		
0.6	54	Particle density	(assumed)
0.425	51	2.65	Mg/m3
0.3	49		
0.212	46	1	
0.15	43	1	
0.063	37	1	

Dry Mass of sample, g	6524
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Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	38.0	
Sand	25.2	
Silt	26.8	
Clay	10.0	

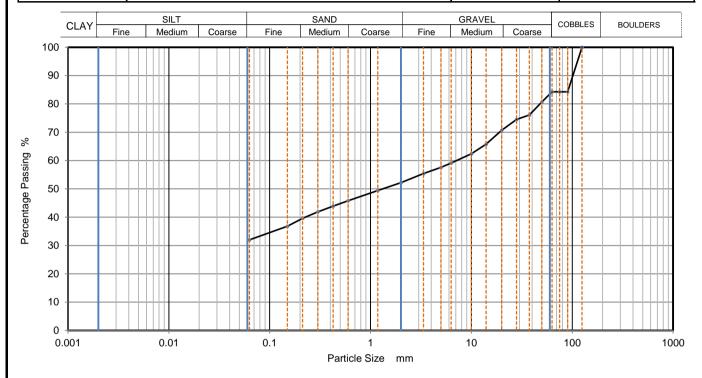
Grading Analysis		
D100	mm	
D60	mm	1.48
D30	mm	0.0316
D10	mm	0.002
Uniformity Coefficient		740
Curvature Coefficient		0.34

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





CAUSEWAY	DAE	DARTICLE CIZE DISTRIBUTION		Job Ref	21-1219	
—— GEOTECH	PAR	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH111
Site Name	DAA Airfield Under	PAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Brown sandy gravelly	Brown sandy gravelly silty CLAY			Depth, m	9.70
Specimen Reference	2	2 Specimen 9.7 m			Sample Type	В
Test Method	BS1377:Part 2:1990, (BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022040625



Siev	/ing	Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	84		
75	84		
63	84		
50	81		
37.5	76		
28	75		
20	71		
14	66		
10	62		
6.3	59		
5	58		
3.35	55		
2	52		
1.18	49		
0.6	46		
0.425	44		
0.3	42		
0.212	40		
0.15	37		
0.063	32		

Dry Mass of sample, g	5954
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Sample Proportions	% dry mass		
Cobbles	15.7		
Gravel	32.0		
Sand	20.3		
Fines <0.063mm	32.0		

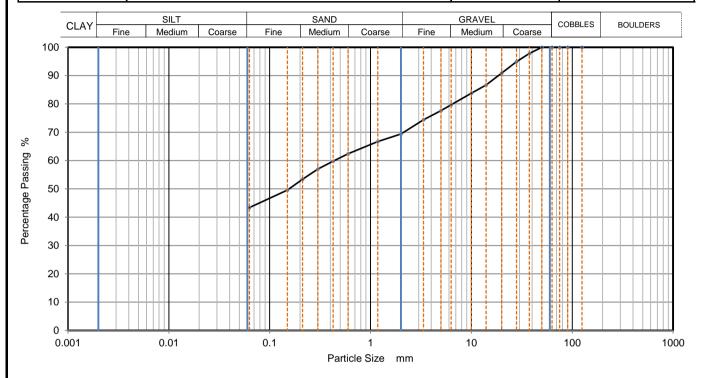
Grading Analysis		
D100	mm	125
D60	mm	7.15
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	DARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH111	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	12.80	
Specimen Reference	2 Specimen Depth 12.8 m			Sample Type	В	
Test Method	S1377:Part 2:1990, clause 9.2				KeyLAB ID	Caus2022040626



Sieving		Sedimen	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	95		
20	91		
14	87		
10	84		
6.3	80		
5	78		
3.35	74		
2	69		
1.18	67		
0.6	62		
0.425	60		
0.3	57		
0.212	53		
0.15	50		
0.063	43		

Dry Mass of sample, g	6121
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Sample Proportions	% dry mass			
Cobbles	0.0			
Gravel	30.6			
Sand	26.0			
Fines < 0.063mm	43.0			

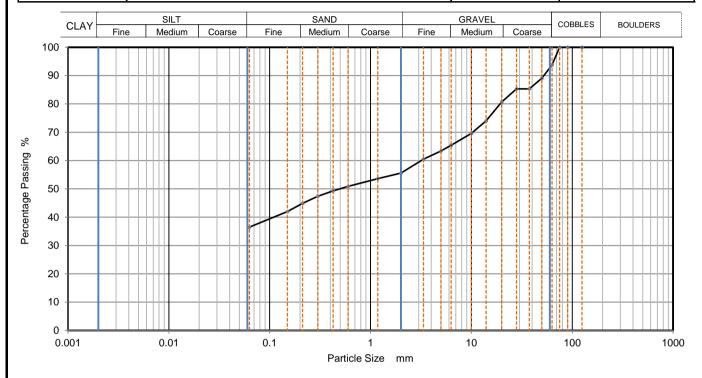
Grading Analysis		
D100	mm	
D60	mm	0.434
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	DADT	PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219
—— GEOTECH	PANI				Borehole/Pit No.	BH111
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Brown sandy gravelly silty CLAY			Depth, m	16.25	
Specimen Reference	2 Specimen 16.25 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID	Caus2022040628



Sie	Sieving		entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	94		
50	89		
37.5	85		
28	85		
20	81		
14	74		
10	70		
6.3	65		
5	63		
3.35	61		
2	56		
1.18	54		
0.6	51		
0.425	49		
0.3	47		
0.212	45		
0.15	42		
0.063	37		

Dry Mass of sample, g	6614
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Sample Proportions	% dry mass
Cobbles	6.2
Gravel	38.1
Sand	19.1
Fines <0.063mm	37.0

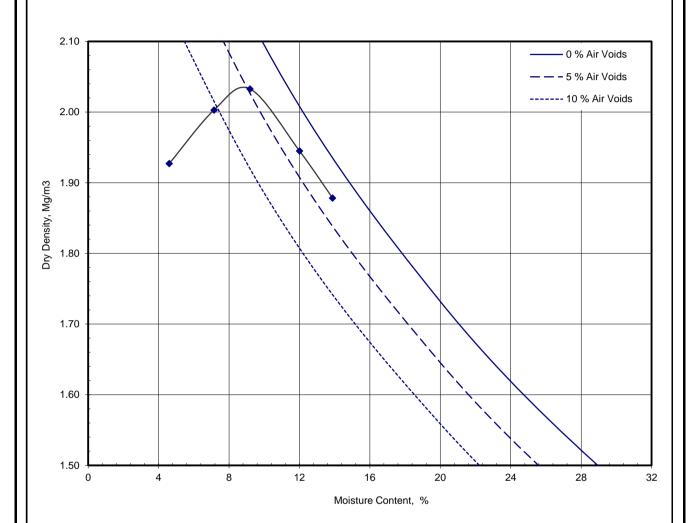
Grading Analysis		
D100	mm	
D60	mm	3.17
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	Dry Densi	Dry Density / Moisture Content Relationship		Job Ref		21-121	9
—— GEOTECH		Light Compaction		Borehol	e / Pit No	Pit No BH101	
Site Name	DAA Airfield Underpass Ground Investigation			Sample	No	2	
Soil Description	Brown sandy gravelly silty CLAY			Depth		8.50	m
Specimen Ref.	11 Specimen Depth m		n Sample	Туре	В		
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Keylab l	D	Caus20220	4068



Preparation		Material used was air dried
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	2
Material Retained on 20.0 mm Sieve	%	6
Particle Density - Assumed	Mg/m³	2.65

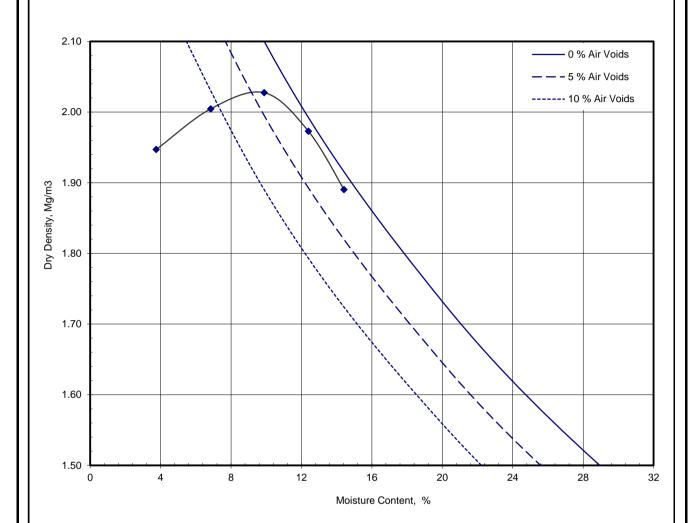
Maximum Dry Density	Mg/m³	2.03	
Optimum Moisture Content	%	9.2	

Approved

Stephen.Watson



CALISEWAY	Dry Density	Moisture Content Relationship Light Compaction		/ Moisture Content Relationship		Job Ref	21-1219	9
CAUSEWAY —— GEOTECH				Borehole / Pit No	BH111			
Site Name	DAA Airfie	DAA Airfield Underpass Ground Investigation			Sample No	1		
Soil Description	Brown sandy gravelly silty CLAY				Depth	2.50	m	
Specimen Ref.	11	Specimen Depth m		Sample Type	В			
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer				Keylab ID	Caus202204	10622	



Preparation		Material used was air dried
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	1
Material Retained on 20.0 mm Sieve	%	13
Particle Density - Assumed	Mg/m³	2.65

Maximum Dry Density	Mg/m³	2.03	
Optimum Moisture Content	%	9.9	

Approved

Stephen.Watson

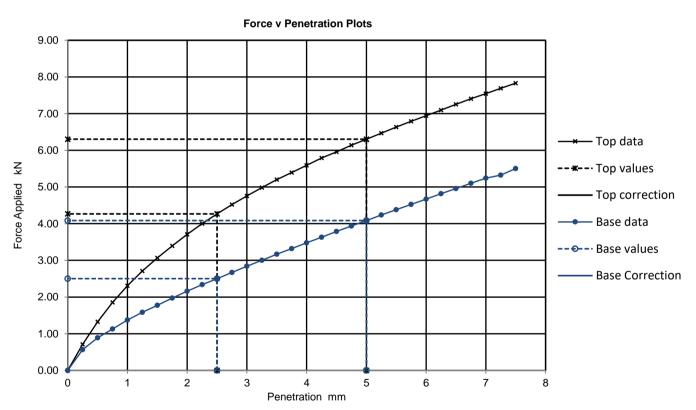
Remarks



CAUSEWAY	California Bearing Ratio (CBR)	Job Ref	21-1219		
GEOTECH	California Bearing Ratio (CBR)	mornia bearing Ratio (CBR)			
Site Name	DAA Airfield Underpass Ground Investigation	Sample No.	2		
Soil Description	Brown sandy gravelly silty CLAY	Brown sandy gravelly silty CLAY			
Specimen Reference	Specimen Depth	m	Sample Type	В	
Specimen Description	Brown sandy gravelly silty CLAY	KeyLAB ID	Caus202204068		
Test Method	BS1377 : Part 4 : 1990, clause 7		CBR Test Number	1	

Specimen Preparation

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm 9 Material retained on 20mm sieve removed % Dry density after soaking Mg/m3 Initial Specimen details 2.10 Mg/m3 4.5 Bulk density Surcharge applied kg Dry density 1.94 Mg/m3 kPa Moisture content 8 %



Results CBR Values, % Curve correction 2.5mm 5mm Highest Average applied 32.0 32.0 32.0 TOP No BASE No 19.0 20.0 20.0

Moisture Content
%
8
8

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson



LAB 11R - Version 6

CAUSEWAY	California Bearing R	Patio (CRP)	Job Ref	21-1219
GEOTECH	California Bearing N	tatio (CBK)	Borehole/Pit No.	BH111
Site Name	DAA Airfield Underpass Ground Investig	ation	Sample No.	1
Soil Description	Brown sandy gravelly silty CLAY		Depth m	2.50
Specimen Reference	Specimen Depth	Sample Type	В	
Specimen Description	Brown sandy gravelly silty CLAY		KeyLAB ID	Caus2022040622
Test Method	BS1377 : Part 4 : 1990, clause 7		CBR Test Number	1

Specimen Preparation

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm Material retained on 20mm sieve removed 15 % Dry density after soaking Mg/m3

Initial Specimen details Bulk density 2.13 Mg/m3 Surcharge applied 4.5 kg
Dry density 1.96 Mg/m3 3 kPa
Moisture content 9 %

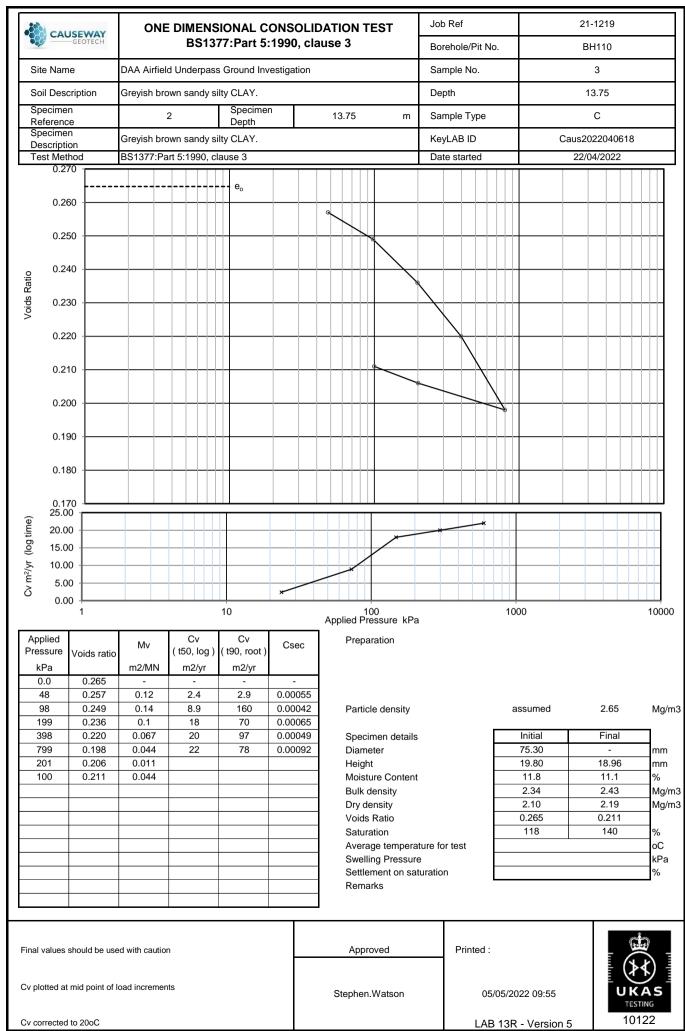
Force v Penetration Plots 5.00 4.50 4.00 3.50 Top data Force Applied kN -· Top values 3.00 - Top correction 2.50 Base data 2.00 -•-- Base values 1.50 Base Correction 1.00 0.50 0.00 6 Penetration mm

Results CBR Values, % Moisture Curve Content correction 2.5mm Highest Average 5mm applied % 15.0 17.0 17.0 TOP No 9 17.0 BASE No 17.0 17.0 17.0

General remarks	Test specific remarks	Approved
	Average result may be reported if within 10% of the mean CBR value of top and base.	

UKAS
TESTING

LAB 11R - Version 6



	Unconsolidate	ed Undrain	ed Triaxi	ial		Job Re	of.			21-1219		_	
CAUSEWAY ——GEOTECH	Compression	Borehole/Pit No.				BH101		-					
Site Name	of pore pressure - single specimen Borehole/Pit No. DAA Airfield Underpass Ground Investigation Sample No.									2			
Soil Description	Greyish brown sandy					Depth				10.90		1	
Specimen Reference	2	Specimen Depth	10.	.95	m	Sample	e Type			С		1	
Specimen Description	Very stiff greyish bro		ly gravelly si	Ity CLAY.		KeyLA	B ID		Cau	us202204	1069	1	
Test Method	BS1377 : Part 7 : 19	90, clause 8, sir	ngle specime	en		Date o	f test		C	4/05/202	22	_	
	Test Number								mm mm Mg/m3 % Mg/m3 %/min kPa % kPa				
		Undrained She Mode of Failure	_	cu	Ŀ		669 mpound		kPa ½(σ1 - σ3)	Т		
Deviator Stress v A	xial Strain												
3,000													
2,500													
ded Deviator Stress, kPa													
Street													
Deviate 2000		••••		• •		-	•			•			
1,000 -													
Soo to to to to to to to to to to to to t													
0													
0 1	2 3 4	5 6		8 9 Strain %	1	0 1	1 12		13	14 1	5 16	ô	
Mohr Circles						1						ļ	
1250 -									Deviator s for area c membran	hange ar	nd		
									membran	o choolo			
1000 -									Mohr circ interpreta	tion is no		d	
£ 750 -			_						by BS137 This is pro	ovided fo	r		
Shear Strength kPa								information only.					
/													
250													
	500 750 1000	1250 1500 Normal Stre	esses kPa	000 2250			750 300	00					
Remarks	Remarks Approved Stephen.Watson						Printed 05/05/2022 09:57 UK			KAS	İ		
	LAB 15R - \							n 5)122	ı	

4.5	Unconsolidate	ed Undraine	ed Triaxi	al	1	Job Ref		21-1219
CAUSEWAY GEOTECH	Compression			-	Borehole/Pit	: No	BH101	
Site Name	of pore pressu	3						
	·				+	Sample No.		
Soil Description Specimen	Greyish brown sandy	Specimen	1		-	Depth		17.55
Reference	2	Depth	17.		1	Sample Typ	e	С
Specimen Description	Very stiff greyish bro			•		KeyLAB ID		Caus2022040612
Test Method	BS1377 : Part 7 : 199	90, clause 8, sin	igle specime	en .		Date of test		04/05/2022
	Test Number Length Diameter Bulk Density Moisture Content Dry Density					1 184.5 105.6 1.88 21 1.56		mm mm Mg/m3 % Mg/m3
	Rate of Strain					3.0		-]%/min
	Cell Pressure At failure	Axial Strain Deviator Stress Undrained She Mode of Failure	ar Strength,			350 2.1 1124 562 Compou	nd	kPa % kPa kPa ½(σ1-σ3)f
Deviator Stress v A	xial Strain							
1,200	p-4							
1,000 •					_			
ν 800 -		bara .						
Stress			***	0 0 0	•	-	•	
ed Deviator Stress kPa 009 000 000 000 000 000 000 000 000 00								
g 400	/							
l sed								
S 200								
0 0	1 2	3		<u> </u>	5		6	7 8
	1 2	3		Strain %	J		U	7 0
Mohr Circles							\neg	Deviator stress corrected
1250							_	for area change and membrane effects
1000								Mohr circles and their
KPa								interpretation is not covered by BS1377.
# 750 +	#5 750 · · · · · · · · · · · · · · · · · · ·							This is provided for information only.
Shear Strength kPa			-					
1 · 1 /								
250								
0 250	500 750 1000	1250 1500	1750 2	000 2250	250	00 2750	3000	(Andrews)
	000 700 1000	Normal Stre	sses kPa	000 ZZ0U		rinted	5000	$\overline{\mathbb{Q}}$
Remarks	Remarks Approved Stephen.Watson						09:57	UKAS
			26		L	AB 15R - Ve	rsion 5	10122

	_				1		1			
CALISEWAY	Unconsolidate Compression			Job Ref			21-1219			
CAUSEWAY ——GEOTECH	of pore pressi			Borehole	/Pit No.		BH110			
Site Name	DAA Airfield Underp	ass Ground Inve	stigation		Sample No.		1			
Soil Description	Greyish brown sand		silty CLAY.		Depth			2.85		
Specimen Reference	2	Specimen Depth	2.85	5 m	Sample 1	уре		С		
Specimen Description	Firm greyish brown s	sandy slightly gra	avelly silty CL	AY.	KeyLAB I	ID		s202204061	15	
Test Method	BS1377 : Part 7 : 19	90, clause 8, sin	gle specimen	l	Date of te	est	(04/05/2022		
	Test Number Length	mm								
	Diameter				210 105	5.4	mm			
	Bulk Density Moisture Content				3.7		Mg/m3 %			
	Dry Density				1.2		Mg/m3			
	Rate of Strain Cell Pressure				4.		%/min kPa			
	At failure	Axial Strain			16		%			
		Deviator Stress			10 5		kPa	~1 -0.\r		
		Undrained She Mode of Failure		eu	Comp		KPa ½(σ1 - σ3)f		
Deviator Stress v A	Axial Strain						=			
120									\neg	
100		•	0 (*						
	96666666666666666666666666666666666666									
ω 80 -	8									
Stres										
Corrected Deviator Stress kPa										
d D 40										
rrecte.										
S 20										
0										
0 2	4 6 8	10 12	14 16 Axial St		20 22	24	26	28 30	32	
Mohr Circles										
125							for area o	stress correct change and	cted	
125							membrar	ie effects		
100								les and their		
А В							by BS137		overed	
Shear Strength kPa	## 75						This is prinformation	ovided for on only.		
20 ar St								·		
• •										
25		 								
0								ختر	Ďi.	
0 25	50 75 100	125 150 Normal Stre	175 20 sses kPa	0 225	250 275	300				
Remarks	Remarks Approved					Printed				
	Stephen.Watson						05/05/2022 09:57 UKAS TESTING			
			27		LAB 15R -	Version 5		1012	22	

	Unconsolidate	ed Undrain	ed Triaxi	ial	<u> </u>	Job Ref			21-1219	1
CAUSEWAY ——GEOTECH	Compression	Compression Test without measurement								
Site Name	 	of pore pressure - single specimen Borehole/Pit No. DAA Airfield Underpass Ground Investigation Sample No.								
Soil Description	Greyish brown sand	y slightly gravell	y silty CLAY			Depth			17.85	
Specimen Reference	2	Specimen Depth	17.	.85	m	Sample Ty	_′ ре		С	
Specimen Description	Stiff greyish brown s		avelly silty Cl	LAY.		KeyLAB I)	Cau	s2022040	620
Test Method	BS1377 : Part 7 : 19	90, clause 8, sir	ngle specime	en		Date of tes	st	(04/05/2022	2
	Test Number 1 Length 210.0 Diameter 104.4 Bulk Density 2.09 Moisture Content 12 Dry Density 1.86 Rate of Strain 4.0									
	Cell Pressure At failure	Axial Strain			-	360 16.4	4	kPa %		
		Deviator Stress Undrained She	ear Strength,		F	672 336)	kPa kPa ½(σ1 - σ3)f	
Davieter Street v. /	Avial Cárain	Mode of Failur	е		L	Compo	ound	<u></u>		
Deviator Stress v A	Axiai Strain									
1,000										
· I I										
008 x										
ië 600 •		•				•				
cted Deviator Stress kPa										
O 200 - 200										
0 2	4 6 8	10 12		16 18	2	0 22	24	26	28 30) 32
Mohr Circles			Axial	Strain %						
500									stress cor change and ne effects	
დ 400 -									les and th	
Shear Strength kPa	300								77. ovided for	
Strenç									on only.	
Shear S										
100										
0 100	200 300 400	500 600	700 8	300 900	10	000 1100	1200			<u> </u>
Remarks	Normal Stresses kPa Remarks Approved Printed							_	()	★)
			Stephen	.Watson		05/05/202	2 09:57		UK	STING
	LAB 15R - Version 5								10	122

	_					
CAUSEWAY GEOTECH	Unconsolidate Compression			Job Ref	21-1219	
GEOTECH	of pore pressi	o. BH111				
Site Name	DAA Airfield Underpa	ass Ground Inve	stigation		Sample No.	2
Soil Description	Greyish brown sandy		silty CLAY.		Depth	8.55
Specimen Reference	2	Specimen Depth	8.5	55 m	Sample Type	С
Specimen Description	Very stiff greyish bro	wn sandy slightly	y gravelly sil	ty CLAY.	KeyLAB ID	Caus2022040624
Test Method	BS1377 : Part 7 : 19	90, clause 8, sin	gle specime	n	Date of test	05/05/2022
	Test Number Length Diameter Bulk Density Moisture Content Dry Density Rate of Strain Cell Pressure At failure	mm mm Mg/m3 % Mg/m3 %/min kPa %				
		Deviator Stress			840	kPa
		Undrained She Mode of Failure	-	cu	420 Brittle	kPa ½(σ1 - σ3)f
Deviator Stress v A	xial Strain					_
1,200						
1,000						
s 800 •			_	+ •		
. Stre					2	
/iato 600 -						9
ed Deviator Stress kPa 009 • 008						
l rect						
S 200						
0 0	1 2	3		4	5 6	7 8
	1 2	3		Strain %	3 0	7 0
Mohr Circles	T T T	1 1				1
500						Deviator stress corrected for area change and membrane effects
400 +						Mohr circles and their interpretation is not covered
Shear Strength kPa						by BS1377. This is provided for
y 200						information only.
Shear					\setminus	
100						
0						*
	200 300 400	500 600 Normal Stre		900	1000 1100 12	
Remarks Approved Pr						57 IIKAS
<u> </u>			Stephen.	vvatson	05/05/2022 09:	TESTING
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	I									
CAUSEWAY ——GEOTECH	Unconsolidate Compression				Job	Ref			21-1219	
GEOTECH	of pore press				Воі	ehole/Pit	No.		BH111	
Site Name	DAA Airfield Underp	ass Ground Inve	stigation		Saı	mple No.			3	
Soil Description	Greyish brown sand		silty CLAY.		Dej	oth			14.37	
Specimen Reference	2	Specimen Depth	14.	37 i	m Sai	mple Type	!	С		
Specimen Description	Very stiff greyish bro			-		/LAB ID		Caus2022040627		
Test Method	BS1377 : Part 7 : 19	90, clause 8, sin	gle specime	en	Dat	e of test			04/05/2022	2
	Test Number Length Diameter Bulk Density Moisture Content Dry Density					1 210.0 104.9 2.26 8 2.10		mm mm Mg/m3 % Mg/m3		
	Rate of Strain Cell Pressure					4.0 300		%/min kPa		
	At failure Axial Strain 13.1									
	Deviator Stress, $(\sigma 1 - \sigma 3)f$ 1805 Undrained Shear Strength, cu 903							kPa kPa ½((σ1 - σ3)f	
		Mode of Failure	9			Brittle		1		
Deviator Stress v A	Axial Strain									
2,500										
± ω2,000 •										
Stre		2000	•	•	-		-	•		
eviato	ممممع									
cted Deviator Stress, kPa										
Come 500										
0 1	2 3 4	5 6		8 9	10	11	12	13	14 15	5 16
Mohr Circles			Axial S	Strain %						
1250								Deviator stress corrected for area change and membrane effects		
0001									cles and th	
달 750								by BS13		
Stren								informati		
Shear Strength kPa			1							
250										
0 250	500 750 1000	1250 1500 Normal Stre		000 2250	2500	2750	3000			
Remarks]	UK	(AS
	LAB 15R - Version 5									122

	AUSEW GEOTE			Point Load Strength Index Tests Summary of Results														
Project No. 2	1-1219			Proje	ct Nam	е	D	AA Ai	rfield l	Jnder	pass G	round I	nvestiç	gation				
Borehole	Sa	mple		Spe	cimen	6.17		Type ISRM	alid (Y/N)		Dime	nsions		Force P	Equivalent diameter, De	Point Strengtl		Remarks (including
No.	Depth m	Ref.	Туре	Ref.	Depth m	Rock Type	Type (D, A, I, B)	Direction (L, P or U)	Failure Valid (Y/N)	Lne	W	Dps	Dps'	kN	a Equivale	Is MPa	Is(5 0) _{MPa}	water content if measured)
BH101	22.35	5	С	2	22.35	LIMESTONE	D	U	YES	83.2	100.1	100.1	99.0	9.3	99.5	0.9	1.3	
BH101	24.97	5	С	2	24.97	LIMESTONE	D	U	YES	95.3	100.8	100.8	99.0	0.4	99.9	0.0	0.1	
BH101	25.65	5	С	3	25.65	LIMESTONE	Α	U	YES		100.3	94.0	89.0	9.5	106.6	0.8	1.2	
BH101	26.20	5	С	2	26.20	LIMESTONE	А	U	YES		100.3	92.0	84.0	7.2	103.6	0.7	0.9	
BH110	27.62	5	С	2	27.62	LIMESTONE	Α	U	YES		100.1	97.0	91.0	3.4	107.7	0.3	0.4	
BH110	29.50	5	С	2	29.50	LIMESTONE	D	U	YES	102.2	100.3	100.3	96.0	14.7	98.1	1.5	2.1	
BH110	31.30	5	С	2	31.30	LIMESTONE	Α	U	YES		99.9	97.0	92.0	16.5	108.2	1.4	2.0	
BH111	33.90	5	С	2	33.90	LIMESTONE	D	U	YES	82.9	100.8	100.8	98.0	12.3	99.4	1.2	1.7	
BH111	34.88	5	С	2	34.88	LIMESTONE	D	U	YES	72.3	101.0	101.0	99.0	11.1	100.0	1.1	1.5	
BH111	35.80	5	С	2	35.80	LIMESTONE	Α	U	YES		100.7	94.0	90.0	10.9	107.4	0.9	1.3	
Direction L - parallel to pland P - perpendicular t U - unknown or ran Dimensions Dps - Distance bet Dps' - at failure (s Lne - Length from	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								P									
Detailed legend fo	W - Width of shortest dimension perpendicular to load, P Date Printed Approved By 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.								JKAS TESTING 10122									



UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

		San	nple			S Dir	pecime mensior	n ns2	Bulk	Water	Uniaxi	al Compre	ession3				
Hole No.	Ref	Тор	Base	Туре	Rock Type	Dia.	Length mm	H/D	Density2 Mg/m3	Content 1 %	Condition	Mode of failure	UCS MPa	Remarks			
BH101	5	25.65	26.08	С	LIMESTONE	100.3	206.3	2.1	2.76	1.1	as received	S	19.5				
BH111	5	34.10	34.36	С	LIMESTONE	101.0	206.1	2.0	2.71	1.1	as received	F	20.5				
Notes 1	ISRM p	987 test 1,	water cor	ntent at	105 ± 3 oC, specimen a	as tested f	or UCS	Notes 1 ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS Mode of failure:									

S - Single shear

MS - multiple shear

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

AC - Axial cleavage

F - Fragmented

above notes apply unless annotated otherwise in the remarks				
Test Specification	Date Printed	Approved By	Table	
International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007	05/05/2022 00:00		sheet	1
		Stephen.Watson		1



LABORATORY REPORT



4043

Contract Number: PSL22/2906

Report Date: 12 May 2022

Client's Reference: 21-1219

Client Name: Causeway Geotech

8 Drumahiskey Road

Ballymoney Co.Antrim BT53 7QL

For the attention of: Stephen Watson

Contract Title: DAA Airfield Underpass Ground Investigation

Date Received: 22/4/2022
Date Commenced: 22/4/2022
Date Completed: 12/5/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins R Berriman S Royle
(Director) (Quality Manager) (Laboratory Manager)

(Director) (Quality Manager) (Laboratory Manager)

L Knight S Eyre D Burton
(Senior Technician) (Senior Technician) (Advanced Testing Manager)

Page 1 of

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Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642

e-mail: rberriman@prosoils.co.uk awatkins@prosoils.co.uk

Consolidated Undrained

Summary Report

Sample Details	Depth Description Type			tly sandy CLAY entation.	1 .
sketch showing specimen location in original sample	Initial Sample Length Initial Sample Diameter Initial Sample Weight Initial Bulk Density Particle Density	Lo Do Wo Po Ps	(mm) (mm) (gr) (Mg/m3) (Mg/m3)	211.0 104.7 4047.0 2.23 2.66	
Initial Conditions				Stage 1	2
Initial Cell Pressure		σзі	(kPa)	980	
Initial Back Pressure		U bi	(kPa)	850	
Membrane Thickness		mь	(mm)	0.600	
Displacement Input		LIP	(mm)	CH 2	
Load Input		N IP	(N)	CH 1	
Pore Water Pressure Input		u pwp	(kPa)	CH 3	
Sample Volume		٧	(cc)	CH 2	
Initial Moisture		ωί	(%)	7.83	
Initial Dry Density		ρdi	(Mg/m3)	2.07	
Initial Voids Ratio		e i		0.288	
Initial Degree of Saturation		Si	(%)	72	
B Value		В	-	0.96	
Final Conditions					
Final Moisture		ωf	(%)	8.98	
Final Dry Density		ρdf	(Mg/m3)	2.08	
Final Voids Ratio		ef	•	0.280	
Final Degree of Saturation		Sf	(%)	85.4	
5.11011				Stage 1 Max. Dev.	2
Failure Criteria				Stress	
Strain At Failure Stress At Failure		ξ f	(%)	15.02	
Minor Stress At Failure		(ʊ1-ʊɜː ʊɜ'	(kPa) (kPa)	943.0 349.6	
Major Stress At Failure		σ3'	(kPa) (kPa)	349.6 1292.6	
Principal Stress Ratio At Failure		σ1'/σ3'	(NI a)	3.697	
Notes		-,0		0.001	



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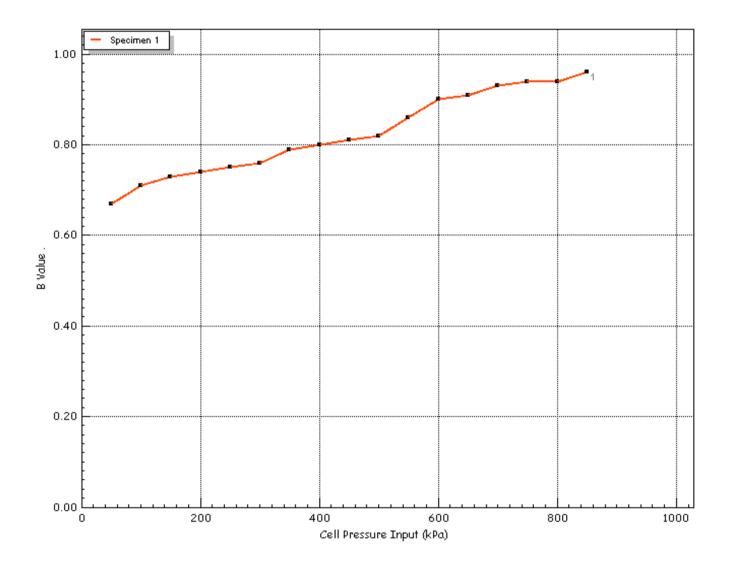
. 奥 .	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH101 6.25-6.60m C1 06/05/2022
.(≯∢).≣		DAA Airfield Underpass Ground	Borehole	BH101
	Jobfile	Investigation	Sample	6.25-6.60m
U K A S TESTING	Client	Causeway Geotech	Depth	6.25-6.60m
4043			-	



Consolidated Undrained

Saturation Plots

Saturation Method			Stepped	
Cell Pressure Input	σ	(kPa)	850	
Pore Water Pressure Input	u pwp	(kPa)	842	
B Value	В	•	0.96	



_ de _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH101 6.25-6.60m C1 06/05/2022	
· (**)	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH101 6.25-6.60m	
TESTING 4043	Client	Causeway Geotech	Depth	6.25-6.60m	-

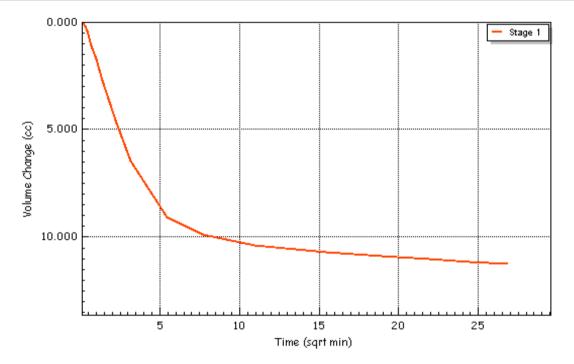


Consolidated Undrained

Consolidation Plots

σз	(IrDa)	000
_	(kPa)	980
и ы	(kPa)	850
u pwp	(kPa)	921
		Radial+One End

PWP Dissipation %	U%	(%)	100.00
Volumetric Strain	εν%	(%)	0.62
Corrected Length	Lc	(mm)	210.6
Corrected Area	Αc	(cm2)	85.74
Corrected Volume	Vc	(cc)	1805.380
T100 Time to Failure	t 100	(min)	25.58
Consolidation	cv	(m2/year)	8.849
Compressibility	m v	(m2/MN)	0.088
Test Time	t F	(h:m:s)	02:00:00
Estimated Strain to Failure	ε%	(%)	5.0
Shear Machine Speed	dг	(mm/min)	0.08774
Notes			

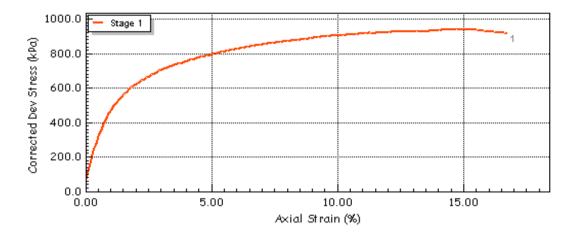


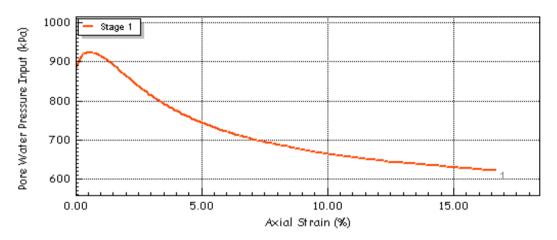
da	Test Method	BS1377-8 : 1990 : Clause 7	Test Name	BH101 6.25-6.60m C1
- 1			Test Date	06/05/2022
. (>4).	Site Reference	DAA Airfield Underpass Ground	Borehole	BH101
	Jobfile	Investigation	Sample	6.25-6.60m
U K A S TESTING	Client	Causeway Geotech	Depth	6.25-6.60m
4043				

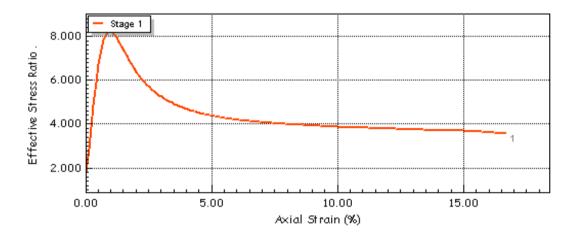


Consolidated Undrained

Shear Stage Plots





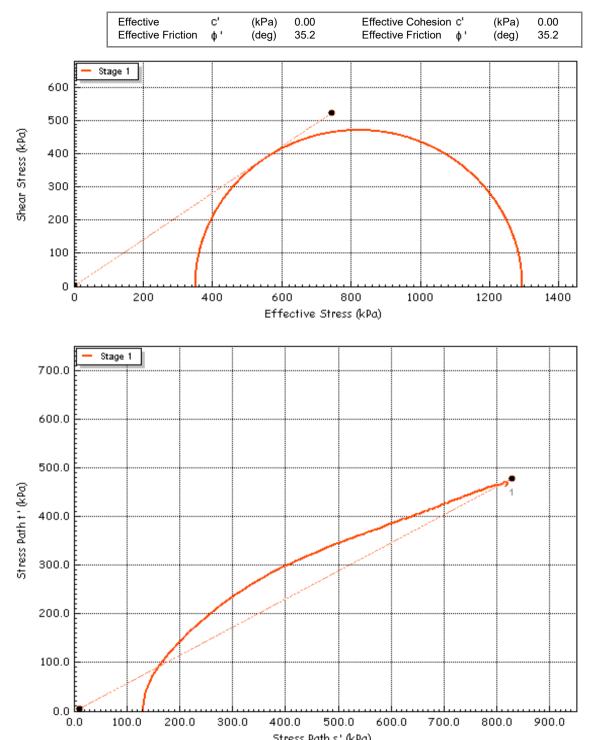


· 奥 -	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH101 6.25-6.60m C1 06/05/2022
· (**) <u>*</u>	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH101 6.25-6.60m
U K A S TESTING	Client	Causeway Geotech	Depth	6.25-6.60m
4043			'	



Consolidated Undrained

Shear Stage Plots



_ 曲 _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH101 6.25-6.60m C1 06/05/2022
· [**]	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH101 6.25-6.60m
UKAS TESTING 4043	Client	Causeway Geotech	Depth	6.25-6.60m

Stress Path s' (kPa)



Consolidated Undrained

Summary Report

Sample Details	Depth Description Type	8.80-9.10m Brown very gravelly slightly sandy CLAY. Undisturbed, vertical orientation.			
sketch showing specimen location in original sample	Initial Sample Length Initial Sample Diameter Initial Sample Weight Initial Bulk Density Particle Density	Lo Do Wo Po Ps	(mm) (mm) (gr) (Mg/m3) (Mg/m3)	211.0 105.0 3939.0 2.16 2.66	
Initial Conditions				Stage 1	2
Initial Cell Pressure		σ3i	(kPa)	980	
Initial Back Pressure		U bi	(kPa)	800	
Membrane Thickness		mь	(mm)	0.600	
Displacement Input		L IP	(mm)	CH 2	
Load Input		N IP	(N)	CH 1	
Pore Water Pressure Input		и рюр	(kPa)	CH 3	
Sample Volume		٧	(cc)	CH 2	
Initial Moisture		ωi	(%)	10	
Initial Dry Density		ρdi	(Mg/m3)	1.96	
Initial Voids Ratio		e i	•	0.358	
Initial Degree of Saturation		Si	(%)	75	
B Value		В	-	1.00	
Final Conditions					
Final Moisture		ωf	(%)	11	
Final Dry Density		ρdf	(Mg/m3)	2.04	
Final Voids Ratio		ef	•	0.307	
Final Degree of Saturation		Sf	(%)	96.0	
				Stage 1 Max. Dev.	2
Failure Criteria				Stress	
Strain At Failure		δ f	(%)	20.00	
Stress At Failure		(σ1-σ3)	` ,	139.6	
Minor Stress At Failure		σ3'	(kPa)	56.0	
Major Stress At Failure		σ1' σ4'/σο'	(kPa)	195.6	
Principal Stress Ratio At Failure		σ1'/σ3'		3.493	
Notes					



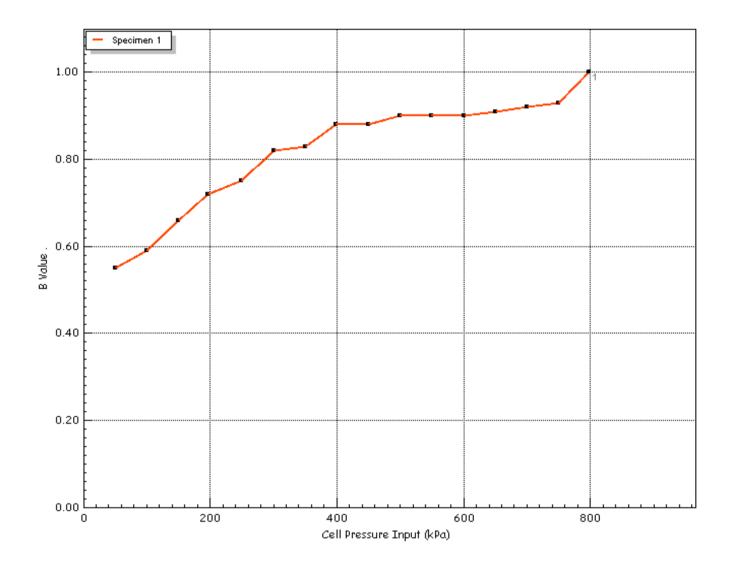
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· (≯∢) -		DAA Airfield Underpass Ground	Borehole	BH110
=	Jobfile	Investigation	Sample	8.80-9.10m
UKAS TESTING	Client	Causeway Geotech	Depth	8.80-9.10m
4043				



Consolidated Undrained

Saturation Plots

Saturation Method			Stepped	
Cell Pressure Input	σ	(kPa)	798	
Pore Water Pressure Input	u pwp	(kPa)	785	
B Value	В	•	1.00	



_ de _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH110 8.80-9.10m C2 06/05/2022	
· (**)	Jobfile Client	DAA Airfield Underpass Ground Investigation	Borehole Sample Depth	BH110 8.80-9.10m 8.80-9.10m	
4043	Cilent	Causeway Geotech	Deptil	0.00-9.10111	

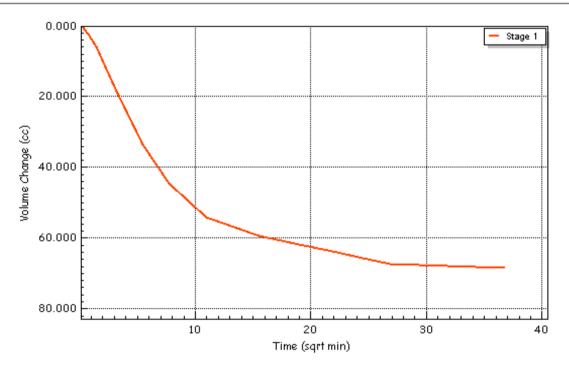


Consolidated Undrained

Consolidation Plots

Initial Conditions				
Initial Cell Pressure	σз	(kPa)	980	
Initial Back Pressure	и ы	(kPa)	800	
Pore Water Pressure Input	и рмр	(kPa)	954	
Drainage Method			Radial+One End	

WP Dissipation %	U%	(%)	100.00
olumetric Strain	εν%	(%)	3.74
orrected Length	Lc	(mm)	208.4
orrected Area	Αc	(cm2)	84.43
orrected Volume	٧c	(cc)	1758.646
00 Time to Failure	t 100	(min)	90.67
onsolidation	cv	(m2/year)	2.511
ompressibility	m v	(m2/MN)	0.243
est Time	t F	(h:m:s)	02:43:12
stimated Strain to Failure	ε%	(%)	5.0
near Machine Speed	dг	(mm/min)	0.06384
tes		, ,	

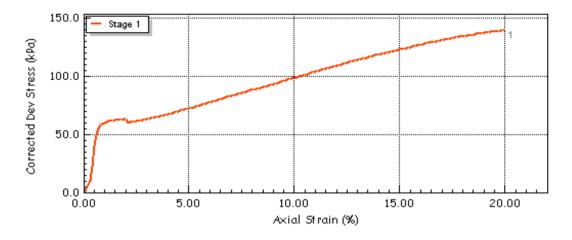


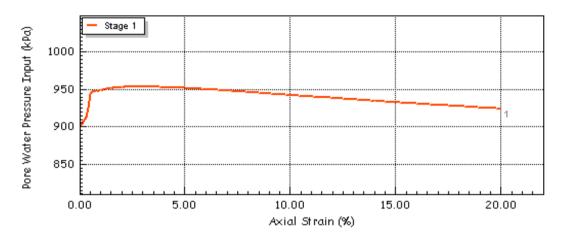
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- 🗯 -			Test Date	06/05/2022
. (\$4).		DAA Airfield Underpass Ground	Borehole	BH110
	Jobfile	Investigation	Sample	8.80-9.10m
U K A S TESTING	Client	Causeway Geotech	Depth	8.80-9.10m
4043			•	

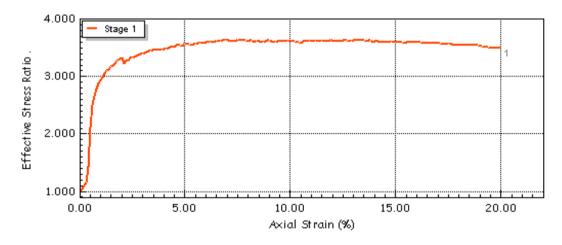


Consolidated Undrained

Shear Stage Plots





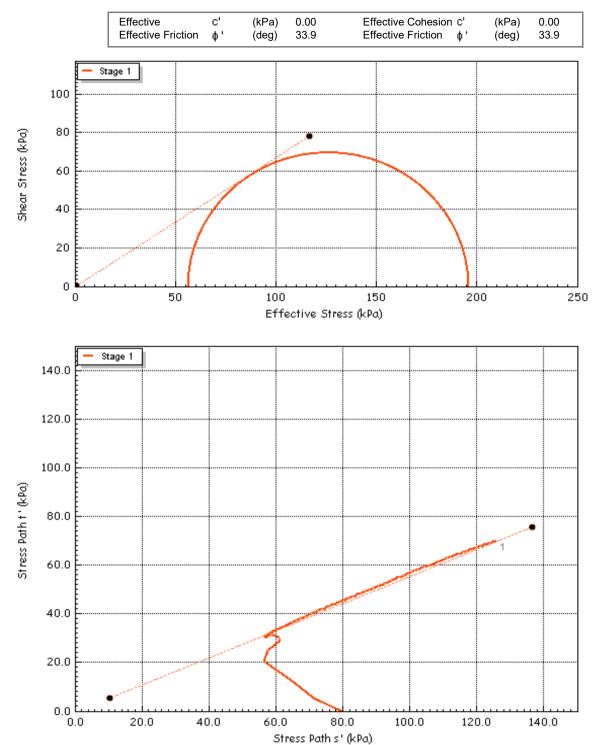


_ de _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH110 8.80-9.10m C2 06/05/2022
· (**)	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH110 8.80-9.10m
U K A S TESTING	Client	Causeway Geotech	Depth	8.80-9.10m



Consolidated Undrained

Shear Stage Plots



<u></u>	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH110 8.80-9.10m C2 06/05/2022
· (**) •	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH110 8.80-9.10m
UKAS TESTING 4043	Client	Causeway Geotech	Depth	8.80-9.10m



Consolidated Undrained

Summary Report

Sample Details	Depth Description Type	3.80-4.10m Grey very gravelly very sandy CLAY. Undisturbed, vertical orientation.			
sketch showing specimen location in original sample	Initial Sample Length Initial Sample Diameter Initial Sample Weight Initial Bulk Density Particle Density	Lo Do Wo po ps	(mm) (mm) (gr) (Mg/m3) (Mg/m3)	211.5 105.4 4122.6 2.23 2.66	
Initial Conditions				Stage 1	2
Initial Cell Pressure		σ3i	(kPa)	530	
Initial Back Pressure		U bi	(kPa)	450	
Membrane Thickness		mь	(mm)	0.600	
Displacement Input		LIP	(mm)	CH 2	
Load Input		N IP	(N)	CH 1	
Pore Water Pressure Input		u pwp	(kPa)	CH 3	
Sample Volume		٧	(cc)	CH 2	
Initial Moisture		ωί	(%)	8.95	
Initial Dry Density		ρdi	(Mg/m3)	2.05	
Initial Voids Ratio		e i		0.297	
Initial Degree of Saturation		Si	(%)	80	
B Value		В		0.95	
Final Conditions					
Final Moisture		ωf	(%)	8.88	
Final Dry Density		ρdf	(Mg/m3)	2.07	
Final Voids Ratio		ef		0.286	
Final Degree of Saturation		Sf	(%)	82.6	
				Stage 1 Max. Dev.	2
Failure Criteria				Stress	
Strain At Failure		ε f (σ.4. σ.ο.)	(%)	18.91	
Stress At Failure		(σ1-σ3)		492.6	
Minor Stress At Failure Major Stress At Failure		σ3' σ1'	(kPa) (kPa)	211.0 703.6	
Principal Stress Ratio At Failure		σ1'/σ3'	(NFa)	3.335	
Notes		-,,-3		0.000	



ΡI	as	tic

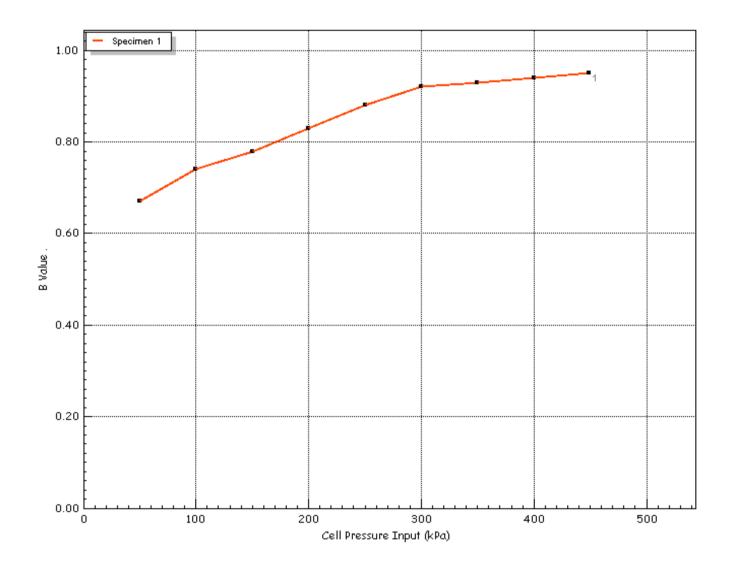
. 奥 .	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH111 3.80-4.10m C1 06/05/2022
. (≯∢).≣		DAA Airfield Underpass Ground	Borehole	BH111
	Jobfile	Investigation	Sample	3.80-4.10m
U K A S TESTING	Client	Causeway Geotech	Depth	3.80-4.10m
4043			·	



Consolidated Undrained

Saturation Plots

Saturation Method			Stepped	
Cell Pressure Input	σ	(kPa)	449	
Pore Water Pressure Input	U pwp	(kPa)	439	
B Value	В		0.95	



_ 奥 _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH111 3.80-4.10m C1 06/05/2022	
· (**)	Jobfile Client	DAA Airfield Underpass Ground Investigation Causeway Geotech	Borehole Sample Depth	BH111 3.80-4.10m 3.80-4.10m	
4043			<u> </u>		-

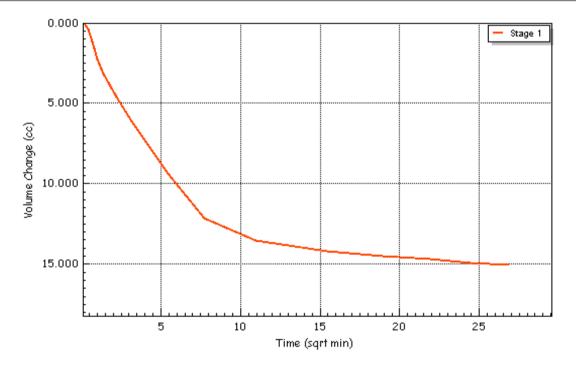


Consolidated Undrained

Consolidation Plots

σз	(kPa)	530	
и ы	(kPa)	450	
и рюр	(kPa)	512	
		Radial+One End	
	иы	иы (кРа)	и bi (kPa) 450 и рwр (kPa) 512

PWP Dissipation %	U%	(%)	100.00
Volumetric Strain	εν%	(%)	0.82
Corrected Length	Lc	(mm)	210.9
Corrected Area	Αc	(cm2)	86.78
Corrected Volume	Vс	(cc)	1830.318
Γ100 Time to Failure	t 100	(min)	65.01
Consolidation	cv	(m2/year)	3.529
Compressibility	mγ	(m2/MN)	0.132
Test Time	t F	(h:m:s)	02:00:00
Estimated Strain to Failure	ε%	(%)	5.0
Shear Machine Speed	dι	(mm/min)	0.08789

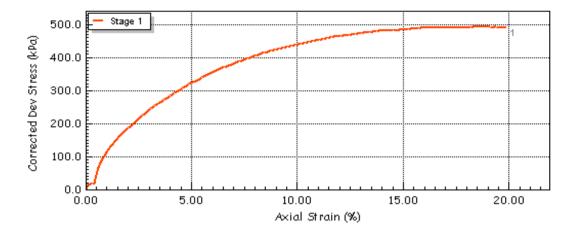


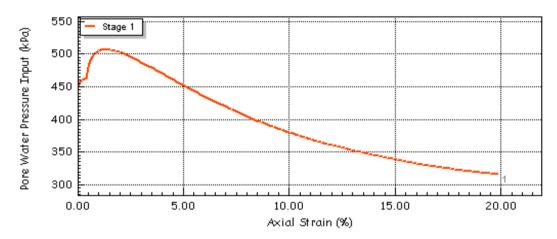
ch	Test Method	BS1377-8 : 1990 : Clause 7	Test Name	BH111 3.80-4.10m C1
- 🗯 –			Test Date	06/05/2022
. (\$4).		DAA Airfield Underpass Ground	Borehole	BH111
	Jobfile	Investigation	Sample	3.80-4.10m
U K A S TESTING	Client	Causeway Geotech	Depth	3.80-4.10m
4043			·	

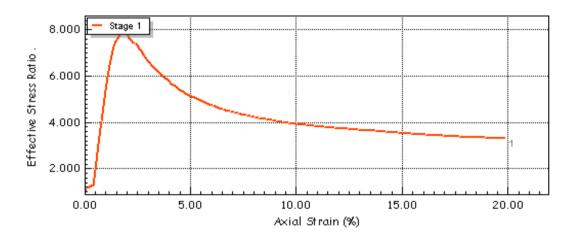


Consolidated Undrained

Shear Stage Plots





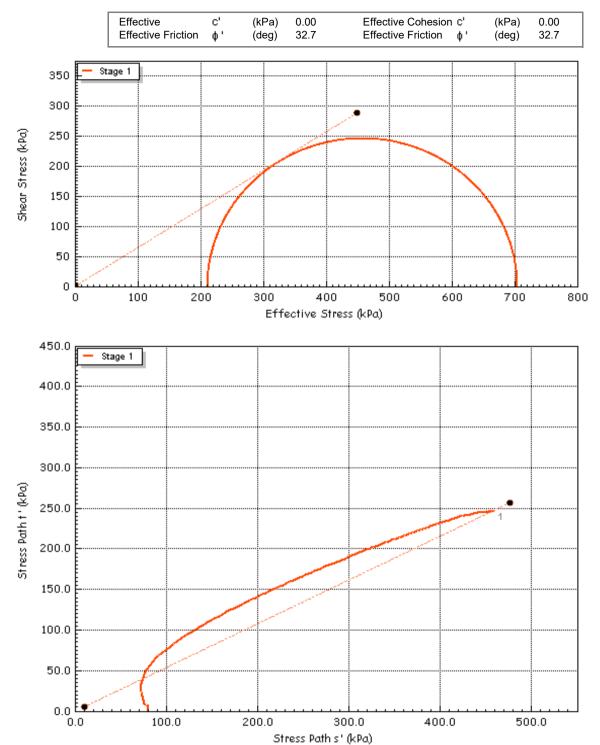


_ (c)	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH111 3.80-4.10m C1 06/05/2022
· (**) <u>*</u>	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH111 3.80-4.10m
U K A S TESTING	Client	Causeway Geotech	Depth	3.80-4.10m
4043			-	



Consolidated Undrained

Shear Stage Plots



_ (b)	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH111 3.80-4.10m C1 06/05/2022	
· (**) <u> </u>	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH111 3.80-4.10m	
UKAS TESTING 4043	Client	Causeway Geotech	Depth	3.80-4.10m	





Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Amended Report

Report No.: 22-14852-2

Initial Date of Issue: 26-Apr-2022 Date of Re-Issue: 12-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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

Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister

Project 1`-1219 DAA Airfield Underpass

Quotation No.: Date Received: 21-Apr-2022

Order No.: COLM HURLEY Date Instructed: 21-Apr-2022

No. of Samples: 10

Turnaround (Wkdays): 16 Results Due: 13-May-2022

Date Approved: 12-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: 1`-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Che	mtest J	ob No.:	22-14852	22-14852	22-14852	22-14852	22-14852	22-14852	22-14852	22-14852	22-14852
Quotation No.:	(Chemte	st Sam	ple ID.:	1415021	1415022	1415023	1415024	1415025	1415026	1415027	1415028	1415029
Order No.: COLM HURLEY		Clie	nt Samp	le Ref.:	2	3	4	5	1	2	3	4	1
		Sa	ample Lo	ocation:	BH101	BH101	BH101	BH101	BH110	BH110	BH110	BH110	BH111
			Sampl	е Туре:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top De	pth (m):	2.7	4.2	6.1	8.4	1.2	2.2	7.2	7.8	2.5
			Date Sa	ampled:	15-Apr-2022	15-Apr-2022	15-Apr-2022	15-Apr-2022	15-Apr-2022	15-Apr-2022	15-Apr-2022	15-Apr-2022	15-Apr-2022
Determinand	Accred.	SOP	Units	LOD									
Moisture	N	2030	%	0.020	8.1	14	5.9	9.0	6.3	21	9.4	9.5	21
рН	U	2010		4.0	8.0	8.2			8.8	8.3			
pH (2.5:1)	N	2010		4.0			9.0	9.1			8.7	7.9	8.1
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010			0.042	0.022			0.033	0.084	0.042
Total Sulphur	U	2175	%	0.010			0.27				0.16		0.061
Sulphate (Acid Soluble)	U	2430	%	0.010		·	0.032				0.037		0.030
Organic Matter	U	2625	%	0.40	0.88	0.69			0.74	2.6			

Results - Soil

Project: 1`-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Chemtest Job No.:				
Quotation No.:	(Chemte	st Sam	ple ID.:	1415030	
Order No.: COLM HURLEY		Clie	nt Samp	le Ref.:	1	
		Sa	ample Lo	ocation:	BH111	
			Sampl	е Туре:	SOIL	
			Top De	oth (m):	4.3	
		Date Sampled:				
Determinand	Accred.	SOP	Units	LOD		
Moisture	N	2030	%	0.020	7.1	
рН	U	2010		4.0		
pH (2.5:1)	N	2010		4.0	8.6	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.13	
Total Sulphur	U	2175	%	0.010		
Sulphate (Acid Soluble)	U	2430	%	0.010		
Organic Matter	U	2625	%	0.40		

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	рН	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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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: <u>customerservices@chemtest.com</u>



LABORATORY RESTRICTION REPORT

Project Reference	21-1219	То	Colm Hurley
Project Name	DAA Airfield Underpass Ground Investigation	Position	Project Manager
1 Tojout Hame	27 V V Milliold Officer pass Ground III Vestigation	From	Stephen Watson
TR reference	21-1219 /	Position	Laboratory 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				Test				
Number	Number	Depth	Туре	Type	Reason for Restriction	Required Action		
		(m)						
BH110	1	2.50- 3.50	В	Dry Density / WC Relationship (2.5kg rammer)	Insufficient material	Priority given to classification testing		
BH110	1	2.50- 3.50	В	California Bearing Ratio (CBR)	Insufficient material	Priority given to classification testing		

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

Laboratory Signature	Project Manager Signature
Stephen Watson	Colm Hurley
Date	Date
25 April 2022	25 April 2022



HEAD OFFICE Causeway Geotech Ltd

8 Drumahiskey Road Ballymoney Co. Antrim, N. Ireland, BT53 7QL **NI:** +44 (0)28 276 66640

> Registered in Northern Ireland. Company Number: NI610766

REGIONAL OFFICE Causeway Geotech (IRL) Ltd

Unit 1 Fingal House Stephenstown Industrial Estate Balbriggan, Co Dublin, Ireland, K32 VR66 **ROI:** +353 (0)1 526 7465

> Registered in Ireland. Company Number: 633786

www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS LABORATORY TEST REPORT

30 May 2022

Project Name: DAA Airfield Underpass Ground Investigation					
Project No.:	21-1219				
Client:	DAA				
Engineer:	Ramboll Consulting Engineers				

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 10/05/2022 and 30/05/2022.

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: DAA Airfield Underpass 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	7
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	7
SOIL	Bulk and dry density by Linear Measurement Method	BS 1377-2: 1990: Cl 7.2	8
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	25
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	14
SOIL	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4: 1990: Cl 3.3 & 3.4	3
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	4
SOIL	Consolidation properties in oedometer - Using 5 pressures (up to 5 days total duration)	BS 1377-5: 1990: Cl 3: 1	2
SOIL	Undrained shear strength – triaxial compression without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 8	5
ROCK	Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985	11
ROCK	Uniaxial Compressive Strength (UCS)*	ISRM Suggested Methods -Rock Characterization Testing and Monitoring, Ed. E T Brown - 1981	3

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 Pro Soils Limited (UKAS 4043)	Effective shear strength consolidated-undrained triaxial compression test with measurement of pore pressure (up to 4 days)	BS 1377-8:1990	2
	Extra over days (more than initial 4 days)		0
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	Organic Matter Content		8
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite D		8



Summary of Classification Test Results

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

		Sar	nple			Dens		W	Passing	LL	PL	PI	Particle	Casagrande
Hole No.	Ref	Тор	Base	Туре	Soil Description	bulk Mg/m	dry	%	425μm %	%	%	%	density Mg/m3	Classification
BH104	2	6.40	7.40	В	Greyish brown sandy gravelly silty CLAY with cobbles.	2.12	1.88	7.2	66	29 -1pt	15	14	Mg/IIIO	CL
BH104	3	11.95	12.50	В	Greyish brown sandy gravelly silty CLAY.	2.39	2.19	7.3	69	30 -1pt	15	15		CL
BH106	7	9.50	10.50	В	Greyish brown sandy slightly gravelly silty CLAY.	2.18	1.98	12.0	64	30 -1pt	15	15		CL
BH106	20	19.40	20.40	В	Greyish brown sandy gravelly silty CLAY with some cobbles.	2.54	2.23	6.3	61	33 -1pt	17	16		CL
BH107	4	12.00	13.00	В	Brownish grey sandy gravelly silty CLAY with some cobbles.	2.03	1.83	6.9	74	29 -1pt	15	14		CL
BH107	6	14.60	15.60	В	Greyish brown sandy gravelly silty CLAY with cobbles.	2.20	1.98	6.2	71	30 -1pt	14	16		CL
BH108	4	13.35	14.35	В	Greyish brown sandy gravelly silty CLAY.	2.26	2.02	11.0	71	29 -1pt	14	15		CL

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

1pt - single point test

wi - immersion in water

LAB 01R Version 5

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



Stephen.Watson

•	CAUSEWAY GEOTECH
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Density Tests - Summary of Results

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

		Sar	nple			Linea	r Measure	ement	Imme	ersion in	water	Wate	r displace	ement	
Hole No.	Ref	Тор	Base	Туре	Soil Description	Bulk density Mg/m3	Dry density Mg/m3	w %	Bulk density	Dry density Mg/m3	w %	Bulk density Mg/m3	Dry density Mg/m3	w %	Remarks
BH104	2	6.40	7.40	В	Greyish brown sandy gravelly silty CLAY with cobbles.	2.12	1.88	13	grc	g,c	,,,	gc	g,c	, ,	
BH104	3	11.95	12.50	В	Greyish brown sandy gravelly silty CLAY.	2.39	2.19	9							
BH104	13	20.25	20.55	В	Grey sandy silty CLAY.	2.01	1.75	15							
BH106	7	9.50	10.50	В	Greyish brown sandy slightly gravelly silty CLAY.	2.18	1.98	10							
BH106	20	19.40	20.40	В	Greyish brown sandy gravelly silty CLAY with some cobbles.	2.54	2.23	14							
BH107	4	12.00	13.00	В	Brownish grey sandy gravelly silty CLAY with some cobbles.	2.03	1.83	11							
BH107	6	14.60	15.60	В	Greyish brown sandy gravelly silty CLAY with cobbles.	2.20	1.98	11							
BH108	4	13.35	14.35	В	Greyish brown sandy gravelly silty CLAY.	2.26	2.02	12							
LAB 03R - Version 5															

Tests carried out in accordance with BS1377:Part2:1990 and the following clauses unless annotated otherwise Water displacement

Notes

clause 7.2 Linear measurement

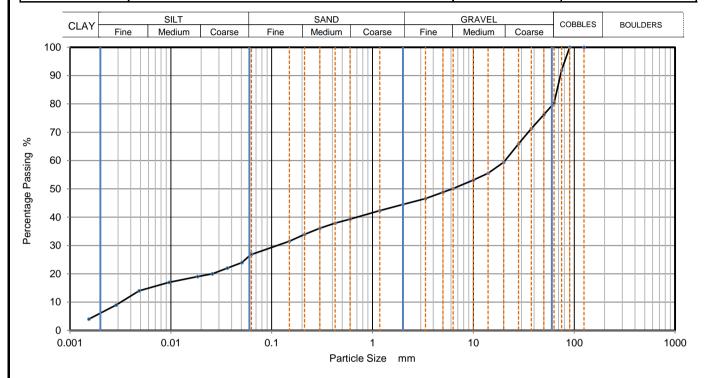
Immersion in water clause 7.3 Date Printed Approved By

25/05/2022

Stephen.Watson

clause 7.4

CAUSEWAY	DARTI	CLE SIZE DIST	FRIBLITION	Job Ref	21-1219	
—— GEOTECH	PANII	CLE SIZE DIST	IKIBUTION	Borehole/Pit No.	BH104	
Site Name	DAA Airfield Underpas	s Ground Investig	ation	Sample No.	2	
Soil Description	Greyish brown sandy gra	velly silty CLAY with	cobbles.		Depth, m	6.40
Specimen Reference	8	Specimen Depth	6.4	m	Sample Type	В
Test Method	BS1377:Part 2:1990, clau	ses 9.2 and 9.5		KeyLAB ID	Caus2022051010	



Siev	ving	Sedimentation				
Particle Size mm	% Passing	Particle Size mm	% Passing			
125	100	0.06300	27			
90	100	0.05065	24			
75	92	0.03625	22			
63	80	0.02579	20			
50	76	0.01834	19			
37.5	71	0.00958	17			
28	66	0.00485	14			
20	59	0.00286	9			
14	56	0.00154	4			
10	53					
6.3	50					
5	49					
3.35	47					
2	45					
1.18	42					
0.6	39	Particle density	(assumed)			
0.425	38	2.65	Mg/m3			
0.3	36		_			
0.212	34					
0.15	32					
0.063	27					

Dry Mass of sample, g	9342

Sample Proportions	% dry mass
Cobbles	19.7
Gravel	35.8
Sand	17.7
Silt	20.8
Clay	6.0

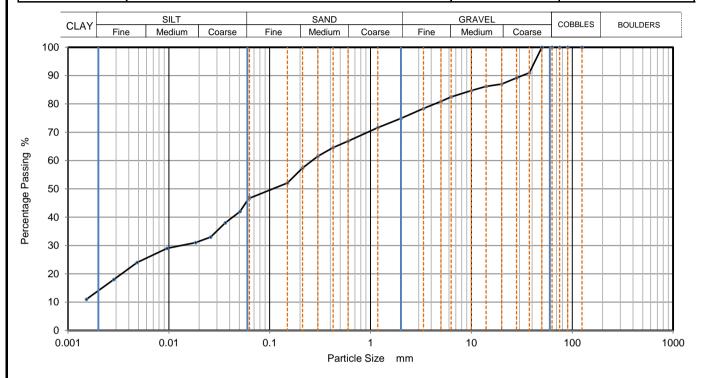
Grading Analysis		
D100	mm	
D60	mm	20.6
D30	mm	0.114
D10	mm	0.00319
Uniformity Coefficient		6500
Curvature Coefficient		0.2

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219	
GEOTECH	PAN	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	11.95
Specimen Reference	8 Specimen 11.95 m		Sample Type	В	
Test Method	d BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051012



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	47
90	100	0.05065	42
75	100	0.03625	38
63	100	0.02594	33
50	100	0.01845	31
37.5	91	0.00958	29
28	89	0.00485	24
20	87	0.00284	18
14	86	0.00152	11
10	85		
6.3	83		
5	81		
3.35	78		
2	75		
1.18	72		
0.6	67	Particle density	(assumed)
0.425	65	2.65	Mg/m3
0.3	62		
0.212	57		
0.15	52		
0.063	47		

Dry Mass of sample, g	4606
mple Proportions	% dry mass
hhles	0.0

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	25.1
Sand	28.2
Silt	32.7
Clay	14.0

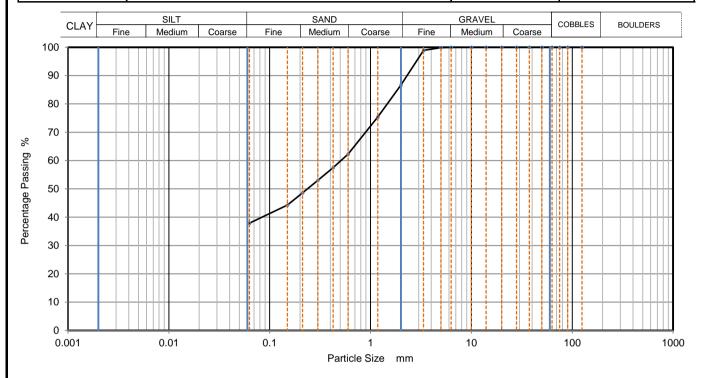
Grading Analysis		
D100	mm	
D60	mm	0.265
D30	mm	0.0132
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219	
—— GEOTECH	PAN	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpass Ground Investigation		Sample No.	4	
Soil Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Depth, m	12.50
Specimen Reference	2 Specimen 12.5 m		Sample Type	В	
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022051013



Sieving		Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	87		
1.18	75		
0.6	62		
0.425	58		
0.3	53		
0.212	49]	
0.15	44	1	
0.063	38		

Dry Mass of sample, g	221
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	13.3
Sand	48.8
Fines < 0.063 mm	38.0

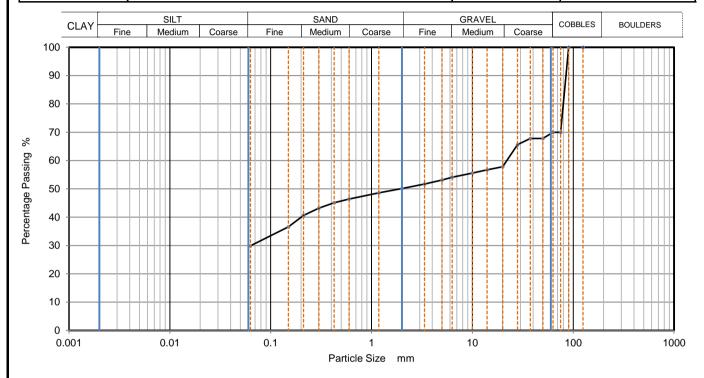
Grading Analysis		
D100	mm	
D60	mm	0.508
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219	
—— GEOTECH	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Depth, m	12.80
Specimen Reference	2 Specimen 12.8 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022051014



Siev	/ing	Sedimer	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	70		
63	70		
50	68		
37.5	68		
28	66		
20	58		
14	57		
10	56		
6.3	54		
5	53		
3.35	52		
2	50		
1.18	49		
0.6	46		
0.425	45		
0.3	43		
0.212	41		
0.15	37		
0.063	30		

Dry Mass of sample, g	7388

Sample Proportions	% dry mass	
Cobbles	30.0	
Gravel	19.9	
Sand	20.2	
Fines < 0.063 mm	30.0	

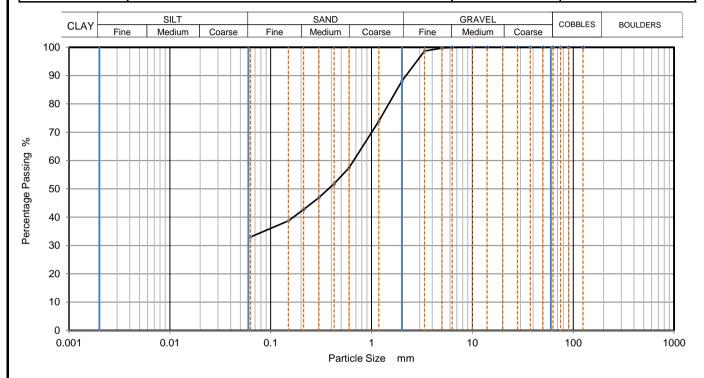
Grading Analysis		
D100	mm	
D60	mm	22
D30	mm	0.0642
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219	
—— GEOTECH	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	9
Soil Description	Grey slightly gravelly clayey fine to coarse SAND.			Depth, m	15.50
Specimen Reference	2 Specimen 15.5 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022051015



Sie	ving	Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	88		
1.18	74		
0.6	58		
0.425	52		
0.3	47		_
0.212	43]	
0.15	39		
0.063	33		

Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	11.9	
Sand	55.0	
Fines <0.063mm	33.0	

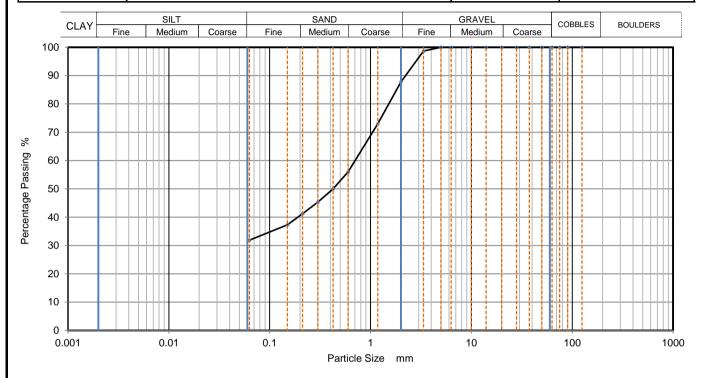
Grading Analysis		
D100	mm	
D60	mm	0.666
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	DARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
GEOTECH GEOTECH	PANI	RTICLE SIZE DISTRIBUTION -		Borehole/Pit No.	BH104	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	11
Soil Description	Grey slightly gravelly clayey fine to coarse SAND.			Depth, m	17.00	
Specimen Reference	2 Specimen 17 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	use 9.2			KeyLAB ID	Caus2022051016



Sie	ving	Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	88		
1.18	73		
0.6	56		
0.425	50		
0.3	45		
0.212	41]	
0.15	37		
0.063	32		

Dry Mass of sample, g	223

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	12.2
Sand	55.9
Fines <0.063mm	32.0

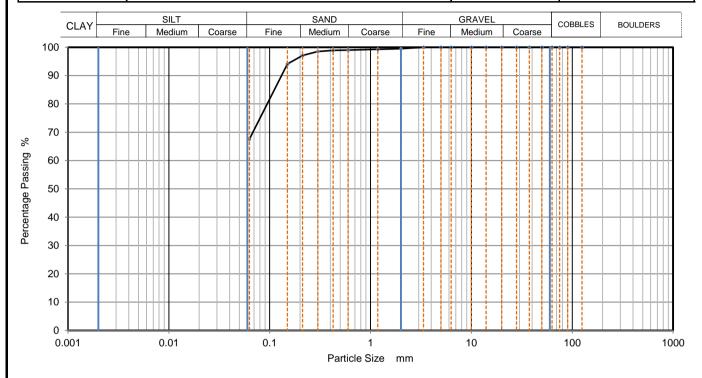
Grading Analysis		
D100	mm	
D60	mm	0.704
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	CAUSEWAY PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
GEOTECH GEOTECH	PANI	ICLE SIZE DIST	TRIBUTION		Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	13
Soil Description	Grey sandy silty CLAY.			Depth, m	20.25	
Specimen Reference	4 Specimen 20.25 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clau	use 9.2		·	KeyLAB ID	Caus2022051018



Sie	ving	Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	99		
0.425	99		
0.3	99		_
0.212	97]	
0.15	94]	
0.063	68		

Dry Mass of sample, g	220
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	0.5
Sand	31.9
Fines <0.063mm	68.0

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

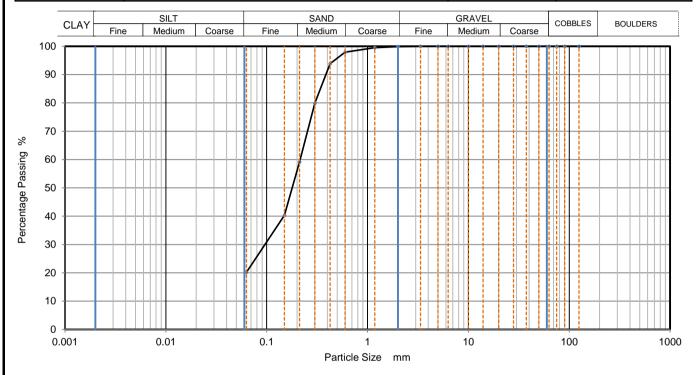
Preparation and testing in accordance with BS1377-2:1990 unless noted below





LAB 05R - Version 5

CAUSEWAY	PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
—— GEOTECH	PANII	CLE SIZE DIST	ISTRIBUTION		Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	41
Soil Description	Grey clayey fine to coarse SAND.			Depth, m	22.55	
Specimen Reference	2 Specimen 22.55 m			Sample Type	D	
Test Method	BS1377:Part 2:1990, claus	se 9.2			KeyLAB ID	Caus2022051019



Siev	/ing	Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	94		
0.3	80		
0.212	59]	
0.15	40]	
0.063	20		

Dry Mass of sample, g	210

Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	0.1	
Sand	79.7	
Fines <0.063mm	20.0	

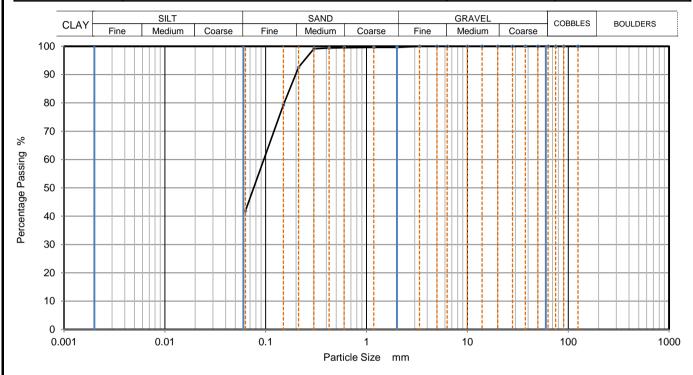
Grading Analysis		
D100	mm	
D60	mm	0.215
D30	mm	0.0963
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH104		
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	18
Soil Description	Grey clayey fine to coarse SAND.			Depth, m	25.05	
Specimen Reference	2 Specimen 25.05 m			Sample Type	В	
Test Method	thod BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022051020	



Sieving		Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	99		
0.212	93]	
0.15	79]	
0.063	42		

Dry Mass of sample, g	210

Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	0.4	
Sand	57.7	
Fines < 0.063 mm	42.0	

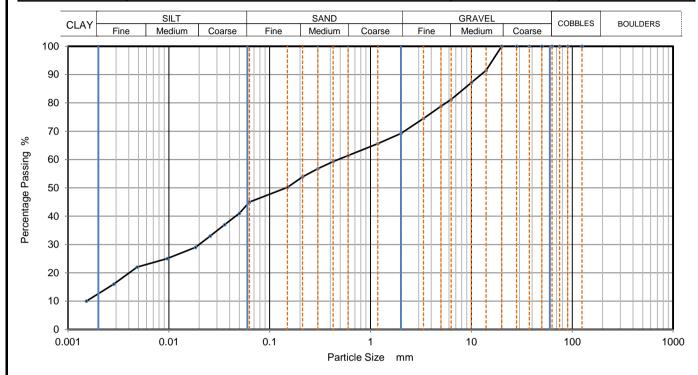
Grading Analysis		
D100	mm	
D60	mm	0.0959
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219	
—— GEOTECH			Borehole/Pit No.	BH106	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation		Sample No.	7
Soil Description	Greyish brown sandy slightly gravelly silty CLAY.			Depth, m	9.50
Specimen Reference	8 Specimen 9.5 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051022



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	45
90	100	0.05002	41
75	100	0.03581	37
63	100	0.02563	33
50	100	0.01834	29
37.5	100	0.00958	25
28	100	0.00485	22
20	100	0.00284	16
14	92	0.00152	10
10	87		
6.3	81		
5	79		
3.35	75		
2	69		
1.18	66		
0.6	61	Particle density	(assumed)
0.425	59	2.65	Mg/m3
0.3	57		
0.212	54	1	
0.15	50	1	
0.063	45		

Dry Mass of sample, g	502

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	30.8
Sand	24.2
Silt	32.6
Clay	12.4

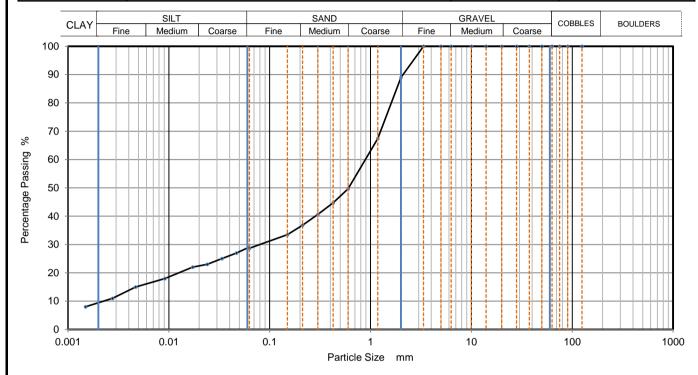
Grading Analysis		
D100	mm	
D60	mm	0.477
D30	mm	0.0194
D10	mm	0.00156
Uniformity Coefficient		310
Curvature Coefficient		0.51

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





CAUSEWAY	EWAY PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH	PANII	PARTICLE SIZE DISTRIBUTION -		Borehole/Pit No.	BH106	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	8
Soil Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Depth, m	12.50	
Specimen Reference	2 Specimen 12.5 m			Sample Type	В	
Test Method	<u> </u>			KeyLAB ID	Caus2022051024	



Sieving		Sedimentation		
Particle Size mm	% Passing	Particle Size mm	% Passing	
125	100	0.06199	29	
90	100	0.04677	27	
75	100	0.03355	25	
63	100	0.02405	23	
50	100	0.01724	22	
37.5	100	0.00913	18	
28	100	0.00468	15	
20	100	0.00277	11	
14	100	0.00149	8	
10	100			
6.3	100			
5	100			
3.35	100			
2	89			
1.18	67			
0.6	50	Particle density	(assumed)	
0.425	45	2.65	Mg/m3	
0.3	41		_	
0.212	37			
0.15	34			
0.063	29			

Dry Mass of sample, g	212
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Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	11.0		
Sand	60.3		
Silt	19.2		
Clay	9.5		

Grading Analysis		
D100	mm	
D60	mm	0.889
D30	mm	0.0796
D10	mm	0.00219
Uniformity Coefficient		410
Curvature Coefficient		3.3

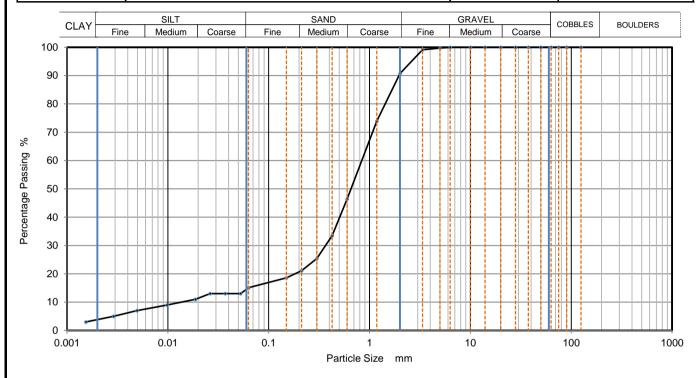
Preparation and testing in accordance with BS1377-2:1990 unless noted below





LAB 05R - Version 5

CAUSEWAY	CAUSEWAY PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
GEOTECH	PANI	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH106	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	10
Soil Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Depth, m	14.00	
Specimen Reference	2 Specimen 14 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus2022051025



Sievi	ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.05248	13
75	100	0.03711	13
63	100	0.02624	13
50	100	0.01877	11
37.5	100	0.00980	9
28	100	0.00495	7
20	100	0.00289	5
14	100	0.00154	3
10	100		
6.3	100		
5	100		
3.35	99		
2	91		
1.18	74		
0.6	46	Particle density	(assumed)
0.425	34	2.65	Mg/m3
0.3	25		
0.212	21		
0.15	19	1	
0.063	15	1	

Dry Mass of sample, g	214
·	

Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	9.3		
Sand	75.6		
Silt	11.2		
Clay	3.9		

Grading Analysis		
D100	mm	
D60	mm	0.838
D30	mm	0.365
D10	mm	0.0133
Uniformity Coefficient		63
Curvature Coefficient		12

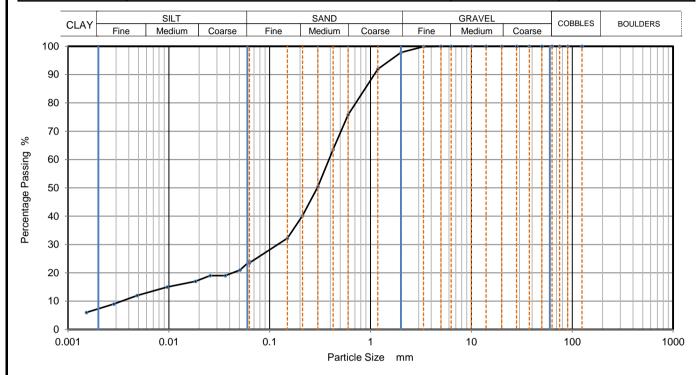
Preparation and testing in accordance with BS1377-2:1990 unless noted below





LAB 05R - Version 5

CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH	PANII	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH106	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	13
Soil Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Depth, m	16.00	
Specimen Reference	2 Specimen 16 m			Sample Type	В	
Test Method				KeyLAB ID	Caus2022051026	



Sievi	Sieving		entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	24
90	100	0.05065	21
75	100	0.03625	19
63	100	0.02563	19
50	100	0.01834	17
37.5	100	0.00958	15
28	100	0.00485	12
20	100	0.00284	9
14	100	0.00152	6
10	100		
6.3	100		
5	100		
3.35	100		
2	98		
1.18	92		
0.6	76	Particle density	(assumed)
0.425	64	2.65	Mg/m3
0.3	50		
0.212	40	1	
0.15	32	1	
0.063	24	1	

Dry Mass of sample, g	202

Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	2.2		
Sand	74.3		
Silt	16.4		
Clay	7.1		

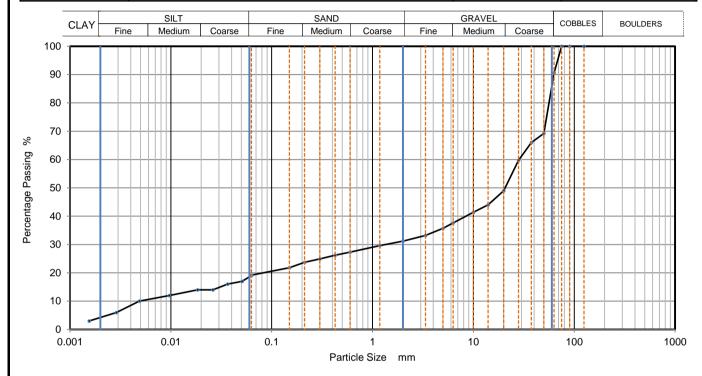
Grading Analysis		
D100	mm	
D60	mm	0.386
D30	mm	0.121
D10	mm	0.00336
Uniformity Coefficient		120
Curvature Coefficient		11

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





CAUSEWAY	DARTICLE CIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH106	
Site Name	DAA Airfield Underp	DAA Airfield Underpass Ground Investigation			Sample No.	20
Soil Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Depth, m	19.40	
Specimen Reference	Specimen 19.4 m		Sample Type	В		
Test Method	3S1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051028	



Sievi	Sieving		entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	19
90	100	0.05097	17
75	100	0.03649	16
63	91	0.02611	14
50	69	0.01846	14
37.5	66	0.00965	12
28	60	0.00488	10
20	49	0.00288	6
14	44	0.00155	3
10	41		
6.3	38		
5	36		
3.35	33		
2	31		
1.18	30		
0.6	27	Particle density	(assumed)
0.425	26	2.65	Mg/m3
0.3	25		
0.212	24		
0.15	22		
0.063	19	1	

Dry Mass of sample, g	6519

Sample Proportions	% dry mass	
Cobbles	9.4	
Gravel	59.4	
Sand	12.0	
Silt	14.9	
Clay	4.3	

Grading Analysis		
D100	mm	
D60	mm	28.4
D30	mm	1.35
D10	mm	0.00484
Uniformity Coefficient		5900
Curvature Coefficient		13

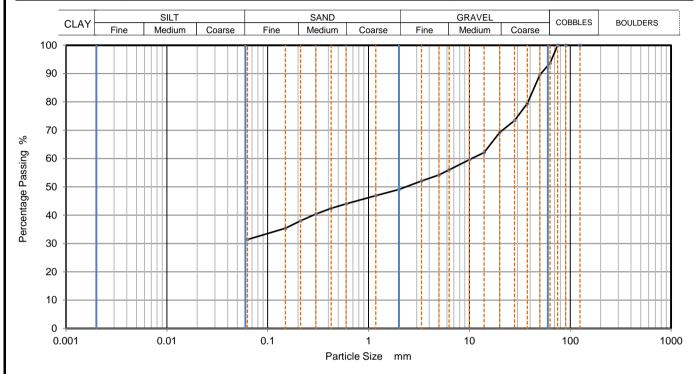
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CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH107		
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Greyish brown sandy gravelly silty CLAY with some cobbles.			Depth, m	6.60	
Specimen Reference	2 Specimen 6.6 m		Sample Type	В		
Test Method	3S1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022051030	



Siev	/ing	Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	94		
50	90		
37.5	80		
28	73		
20	69		
14	62		
10	60		
6.3	56		
5	54		
3.35	52		
2	49		
1.18	47		
0.6	44		
0.425	42		
0.3	40		
0.212	38		
0.15	35		
0.063	31		

Dry Mass of sample, g	5428
'	

Sample Proportions	% dry mass
Cobbles	6.3
Gravel	44.6
Sand	17.7
Fines <0.063mm	31.0

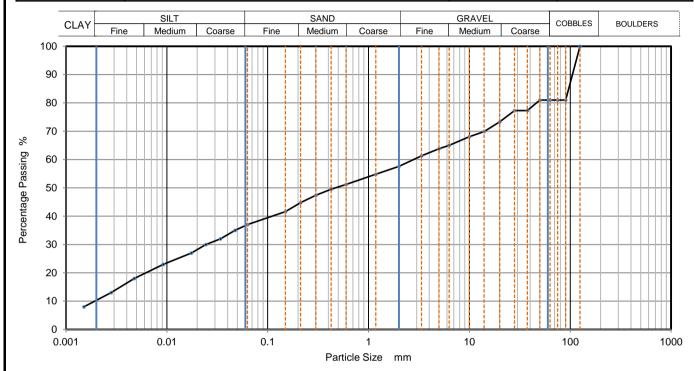
Grading Analysis		
D100	mm	
D60	mm	10.6
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH107		
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Brownish grey sandy gravelly silty CLAY with some cobbles.			Depth, m	12.00	
Specimen Reference	8 Specimen 12 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051032	



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06290	37
90	81	0.04744	35
75	81	0.03401	32
63	81	0.02437	30
50	81	0.01746	27
37.5	77	0.00925	23
28	77	0.00474	18
20	73	0.00280	13
14	70	0.00150	8
10	68		
6.3	65		
5	64		
3.35	61		
2	58		
1.18	55		
0.6	51	Particle density	(assumed)
0.425	50	2.65	Mg/m3
0.3	47		_
0.212	45		
0.15	42		
0.063	37		

Dry Mass of sample, g	7111

Sample Proportions	% dry mass
Cobbles	19.0
Gravel	23.4
Sand	20.6
Silt	26.5
Clay	10.5

Grading Analysis		
D100	mm	125
D60	mm	2.78
D30	mm	0.0249
D10	mm	0.00186
Uniformity Coefficient		1500
Curvature Coefficient		0.12

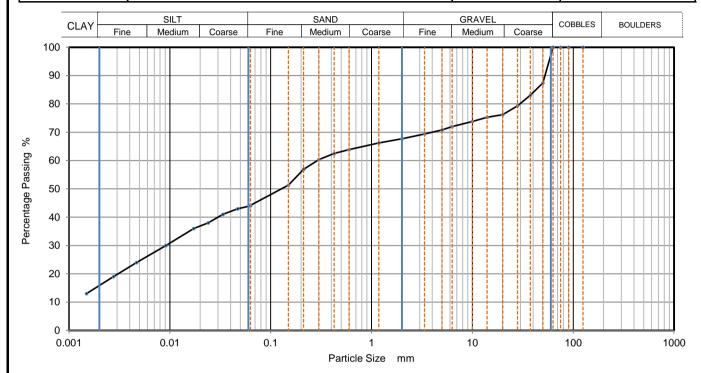
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CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PANI	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH107	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	13.00	
Specimen Reference	2 Specimen 13 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051034	



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06290	44
90	100	0.04711	43
75	100	0.03355	41
63	100	0.02405	38
50	87	0.01724	36
37.5	83	0.00913	30
28	79	0.00468	24
20	76	0.00277	19
14	75	0.00149	13
10	74		
6.3	72		
5	71		
3.35	69		
2	68		
1.18	66		
0.6	64	Particle density	(assumed)
0.425	63	2.65	Mg/m3
0.3	60		
0.212	57		
0.15	51		
0.063	44		

Dry Mass of sample, g	5361

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.3
Sand	23.4
Silt	28.7
Clay	15.6

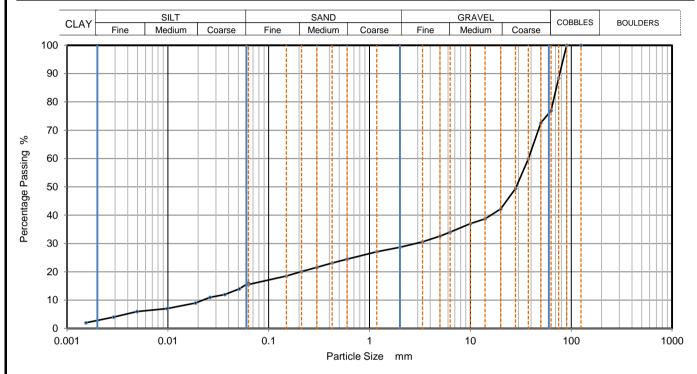
Grading Analysis		
D100	mm	
D60	mm	0.292
D30	mm	0.00919
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	SEWAY PARTICLE SIZE DISTRIBUTION -			Job Ref	21-1219	
—— GEOTECH	PANII	LE SIZE DISTRIBUTION -		Borehole/Pit No.	BH107	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	6
Soil Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Depth, m	14.60	
Specimen Reference	8 Specimen 14.6 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, claus	ses 9.2 and 9.5			KeyLAB ID	Caus2022051036



Siev	ving	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	16
90	100	0.05127	14
75	88	0.03668	12
63	77	0.02624	11
50	73	0.01877	9
37.5	60	0.00980	7
28	49	0.00495	6
20	42	0.00289	4
14	39	0.00154	2
10	37		
6.3	34		
5	33		
3.35	31		
2	29		
1.18	27		
0.6	25	Particle density	(assumed)
0.425	23	2.65	Mg/m3
0.3	22		
0.212	20		
0.15	19		
0.063	16		

Dry Mass of sample, g	7905	
Sample Proportions	% dry mass	
	00.4	

Sample Proportions	% dry mass		
Cobbles	23.1		
Gravel	48.2		
Sand	13.2		
Silt	12.4		
Clay	3.1		

Grading Analysis		
D100	mm	
D60	mm	37.6
D30	mm	2.87
D10	mm	0.0232
Uniformity Coefficient		1600
Curvature Coefficient		9.4

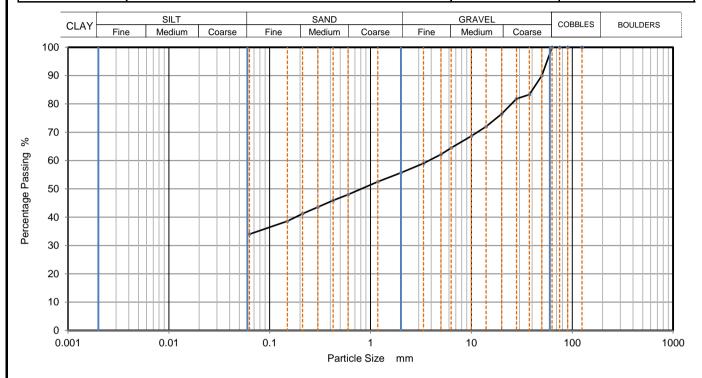
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CAUSEWAY	DARTICI E CIZE DISTRIBUTION			Job Ref	21-1219	
—— GEOTECH	PANI	TICLE SIZE DISTRIBUTION -		Borehole/Pit No.	BH107	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	8
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	18.00	
Specimen Reference	2 Specimen 18 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	nuse 9.2			KeyLAB ID	Caus2022051038



Siev	Sieving		ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	90		
37.5	83		
28	82		
20	77		
14	72		
10	69		
6.3	65		
5	62		
3.35	59		
2	56		
1.18	53		
0.6	48		
0.425	46		
0.3	44		
0.212	41		
0.15	39		
0.063	34		

Dry Mass of sample, g	4301
·	

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	44.3
Sand	21.7
Fines <0.063mm	34.0

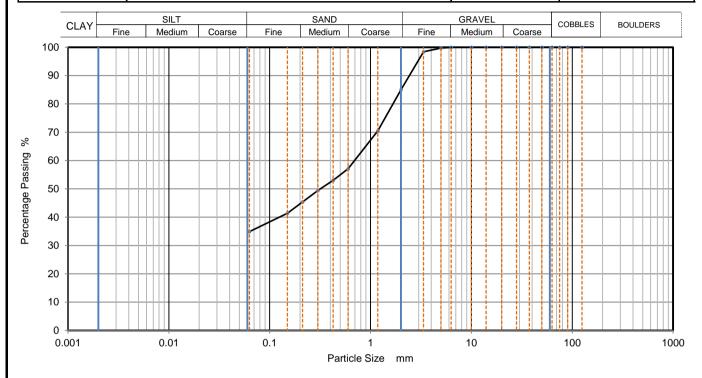
Grading Analysis		
D100	mm	
D60	mm	3.78
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	EWAY PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
—— GEOTECH	PAN	TICLE SIZE DIST	LE SIZE DISTRIBUTION -		Borehole/Pit No.	BH107
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	9
Soil Description	Greyish brown slightly gravelly clayey fine to coarse SAND.			Depth, m	19.30	
Specimen Reference	2 Specimen 19.3 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	nuse 9.2			KeyLAB ID	Caus2022051039



Sie	ving	Sedime	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	98		
2	85		
1.18	71		
0.6	57		
0.425	53		
0.3	49		
0.212	45]	
0.15	41		
0.063	35		

Dry Mass of sample, g	209

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	15.0
Sand	50.1
Fines <0.063mm	35.0

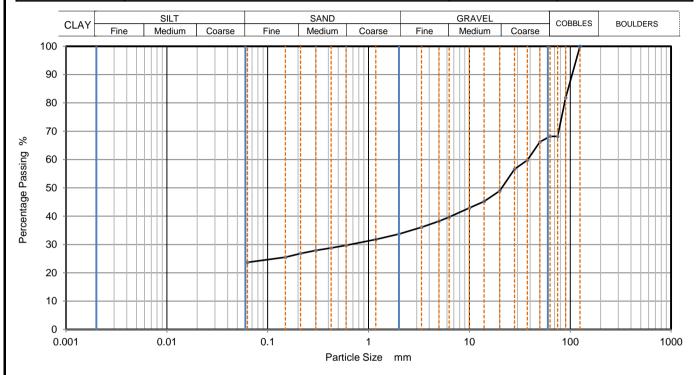
Grading Analysis		
D100	mm	
D60	mm	0.694
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH107		
Site Name	DAA Airfield Underpass Ground Investigation				Sample No.	10
Soil Description	Greyish brown sandy gravelly silty CLAY with cobbles.			Depth, m	20.20	
Specimen Reference	2 Specimen 20.2 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022051040	



Siev	Sieving		ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	82		
75	68		
63	68		
50	66		
37.5	60		
28	57		
20	49		
14	45		
10	43		
6.3	40		
5	38		
3.35	36		
2	34		
1.18	32		
0.6	30		
0.425	29		
0.3	28		
0.212	27		
0.15	26		
0.063	24		

Dry Mass of sample, g	7676

Sample Proportions	% dry mass
Cobbles	31.8
Gravel	34.5
Sand	10.0
Fines < 0.063 mm	24.0

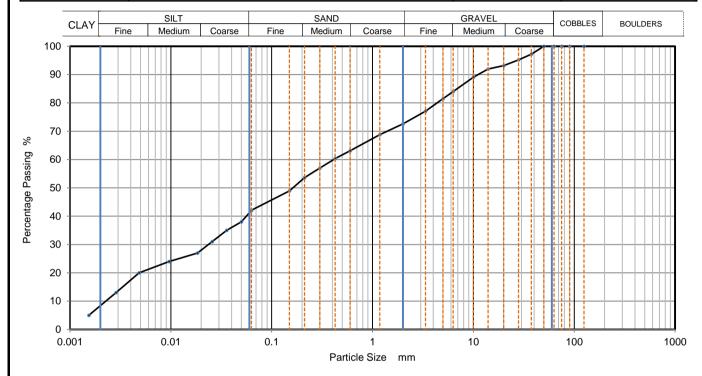
Grading Analysis		
D100	mm	125
D60	mm	37.8
D30	mm	0.667
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219	
—— GEOTECH			Borehole/Pit No.	BH108	
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	1
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	4.00
Specimen Reference	6 Specimen 4 m Depth		Sample Type	В	
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051041



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.05002	38
75	100	0.03581	35
63	100	0.02563	31
50	100	0.01834	27
37.5	97	0.00958	24
28	95	0.00485	20
20	93	0.00286	13
14	92	0.00154	5
10	89		
6.3	84		
5	82		
3.35	77		
2	73		
1.18	69		
0.6	63	Particle density	(assumed)
0.425	60	2.65	Mg/m3
0.3	57		
0.212	54		
0.15	49		
0.063	42		

Dry Mass of sample, g	3181

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.4
Sand	30.5
Silt	33.5
Clay	8.6

Grading Analysis		
D100	mm	
D60	mm	0.412
D30	mm	0.0231
D10	mm	0.00225
Uniformity Coefficient		180
Curvature Coefficient		0.58

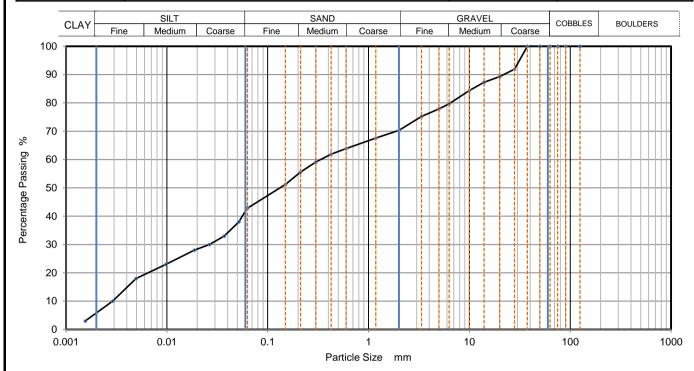
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CAUSEWAY	PARTICLE SIZE DISTRIBUTION -			Job Ref	21-1219	
—— GEOTECH				Borehole/Pit No.	BH108	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	13.35	
Specimen Reference	8	8 Specimen 13.35 m			Sample Type	В
Test Method	BS1377:Part 2:1990, clau	S1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051044



Sievi	ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	43
90	100	0.05188	38
75	100	0.03711	33
63	100	0.02639	30
50	100	0.01877	28
37.5	100	0.00980	23
28	92	0.00495	18
20	89	0.00290	10
14	87	0.00155	3
10	84		
6.3	80		
5	78		
3.35	75		
2	70		
1.18	68		
0.6	64	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	59		
0.212	56	1	
0.15	51	1	
0.063	43	1	

Dry Mass of sample, g	3400		
Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	29.7		
Sand	27.5		
Silt	37.2		

Grading Analysis		
D100	mm	
D60	mm	0.334
D30	mm	0.0256
D10	mm	0.00289
Uniformity Coefficient		120
Curvature Coefficient		0.68

Clay

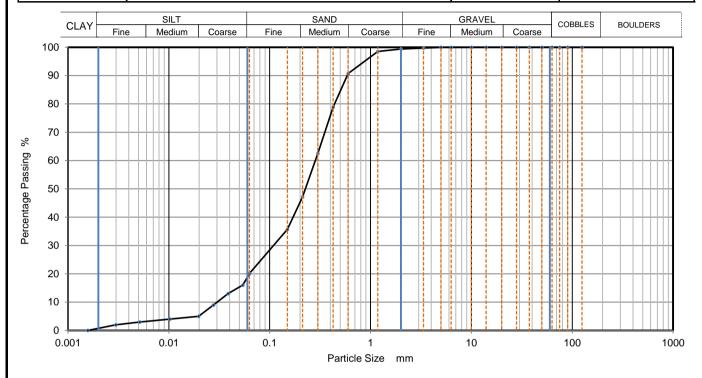
Preparation and testing in accordance with BS1377-2:1990 unless noted below





5.6

CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH			Borehole/Pit No.	BH108		
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Greyish brown clayey fine to ocarse SAND.			Depth, m	14.50	
Specimen Reference	2	2 Specimen 14.5 m			Sample Type	В
Test Method	BS1377:Part 2:1990, cla	S1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051045



Siev	ving	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	20
90	100	0.05405	16
75	100	0.03864	13
63	100	0.02761	9
50	100	0.01973	5
37.5	100	0.01024	4
28	100	0.00514	3
20	100	0.00297	2
14	100	0.00157	0
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	91	Particle density	(assumed)
0.425	79	2.65	Mg/m3
0.3	63		_
0.212	47		
0.15	36		
0.063	20		

Dry Mass of sample, g	228
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Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	0.6		
Sand	79.4		
Silt	19.3		
Clay	0.7		

Grading Analysis		
D100	mm	
D60	mm	0.283
D30	mm	0.109
D10	mm	0.0299
Uniformity Coefficient		9.5
Curvature Coefficient		1.4

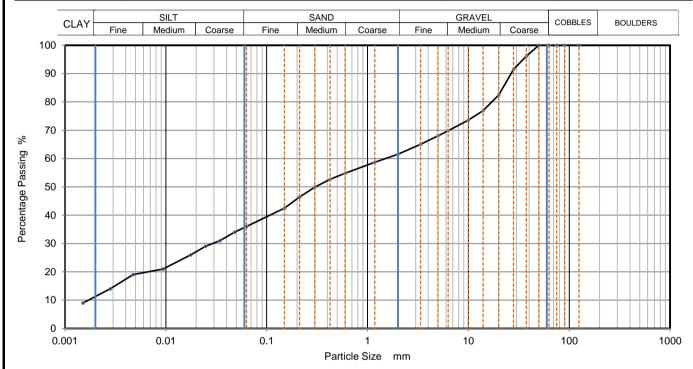
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CAUSEWAY	PARTICLE SIZE DISTRIBUTION -			Job Ref	21-1219	
—— GEOTECH				Borehole/Pit No.	BH108	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	6
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	15.40	
Specimen Reference	2	2 Specimen 15.4 m			Sample Type	В
Test Method	BS1377:Part 2:1990, claus	S1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus2022051046



Siev	Sieving		entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	36
90	100	0.04810	34
75	100	0.03447	31
63	100	0.02470	29
50	100	0.01769	26
37.5	96	0.00936	21
28	92	0.00474	19
20	82	0.00280	14
14	77	0.00150	9
10	74		
6.3	70		
5	68		
3.35	65		
2	62		
1.18	59		
0.6	55	Particle density	(assumed)
0.425	53	2.65	Mg/m3
0.3	50		
0.212	46		
0.15	43		
0.063	36		

Dry Mass of sample, g	4398

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	38.5
Sand	25.5
Silt	25.0
Clay	11.0

Grading Analysis		
D100	mm	
D60	mm	1.51
D30	mm	0.03
D10	mm	0.00177
Uniformity Coefficient		850
Curvature Coefficient		0.34

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

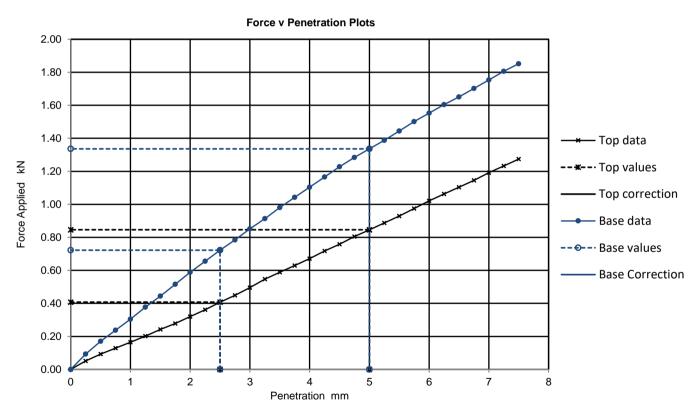




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CALISEWAY	California Bearing Ratio (CBR)		Job Ref	21-1219
CAUSEWAY	Camornia Bearing Natio (CBN)		Borehole/Pit No.	BH104
Site Name	DAA Airfield Underpass Ground Investigation		Sample No.	1
Soil Description	Greyish brown sandy gravelly silty CLAY.		Depth m	4.00
Specimen Reference	Specimen m Depth		Sample Type	В
Specimen Description	Greyish brown sandy gravelly silty CLAY.		KeyLAB ID	Caus202205109
Test Method	BS1377 : Part 4 : 1990, clause 7		CBR Test Number	1

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm Material retained on 20mm sieve removed 24 % Dry density after soaking Mg/m3 Initial Specimen details 2.26 4.5 Bulk density Mg/m3 Surcharge applied kg Dry density 2.06 Mg/m3 kPa Moisture content 10 %



Results CBR Values, % Moisture Curve Content correction 2.5mm 5mm Highest Average applied % 4.2 TOP No 3.1 4.2 10 BASE No 5.5 6.7 6.7 10

General remarks	Test specific remarks	Approved
	Average result may be reported if within 10% of the mean CBR value of top and base.	

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CAUSEWAY	California Bearing Ratio (CBR)	Job Ref	21-1219
GEOTECH	California Bearing Natio (CDN)	Borehole/Pit No.	BH106
Site Name	DAA Airfield Underpass Ground Investigation	Sample No.	6
Soil Description	Greyish brown sandy gravelly silty CLAY.	Depth m	4.30
Specimen Reference	Specimen m Depth	Sample Type	В
Specimen Description	Greyish brown sandy gravelly silty CLAY.	KeyLAB ID	Caus2022051021
Test Method	BS1377 : Part 4 : 1990, clause 7	CBR Test Number	1

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm Material retained on 20mm sieve removed 44 % Dry density after soaking Mg/m3 Initial Specimen details 2.25 4.5 Bulk density Mg/m3 Surcharge applied kg Dry density 2.02 Mg/m3 kPa

12

%

Force v Penetration Plots 0.70 0.60 0.50 Top data Force Applied kN -· Top values 0.40 - Top correction Base data 0.30 - •-- Base values 0.20 Base Correction 0.10 0.00 3 6 Penetration mm

Results Moisture CBR Values, % Curve Content correction 2.5mm 5mm Highest Average applied % 1.6 12 TOP No 1.3 1.6 BASE No 1.7 2.2 2.2 11

Moisture content

General remarks	Test specific remarks	Approved
	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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LAB 11R - Version 6

CAUSEWAY	California Bearing Ratio (CBR)		Job Ref	21-1219	
GEOTECH	Californ	ia bearing r	tallo (CBR)	Borehole/Pit No.	BH107
Site Name	DAA Airfield Underpass Ground Investigation		Sample No.	2	
Soil Description	Brownish grey sandy gravelly silty CLAY.		Depth m	3.50	
Specimen Reference		Specimen m Depth		Sample Type	В
Specimen Description	Brownish grey sandy gravelly silty CLAY.		KeyLAB ID	Caus2022051029	
Test Method	BS1377 : Part 4 : 1990	, clause 7		CBR Test Number	1

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm Material retained on 20mm sieve removed 18 % Dry density after soaking Mg/m3 2.19 4.5 Initial Specimen details Bulk density Mg/m3 Surcharge applied kg Dry density 2.01 Mg/m3 kPa

9

%

Force v Penetration Plots 5.00 4.50 4.00 3.50 Top data Force Applied kN -· Top values 3.00 - Top correction 2.50 Base data 2.00 - •-- Base values 1.50 Base Correction 1.00 0.50 0.00 6 Penetration mm

Results CBR Values, % Moisture Curve Content correction 2.5mm Highest Average 5mm applied 16.0 18.0 TOP No 18.0 BASE No 13.0 14.0 14.0

Moisture content

General remarks	Test specific remarks	Approved
	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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%

CALISEWAY	California Bearing Ratio (CBR)	Job Ref	21-1219
CAUSEWAY	Camornia Bearing Ratio (CBR)	Borehole/Pit No.	BH108
Site Name	DAA Airfield Underpass Ground Investigation	Sample No.	1
Soil Description	Greyish brown sandy gravelly silty CLAY.	Depth m	4.00
Specimen Reference	Specimen n	Sample Type	В
Specimen Description	Greyish brown sandy gravelly silty CLAY.	KeyLAB ID	Caus2022051041
Test Method	BS1377 : Part 4 : 1990, clause 7	CBR Test Number	1

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm Material retained on 20mm sieve removed 16 % Dry density after soaking Mg/m3 2.26 4.5 Initial Specimen details Bulk density Mg/m3 Surcharge applied kg Dry density 2.06 Mg/m3 kPa

10

%

Force v Penetration Plots 3.50 3.00 2.50 Top data Force Applied kN -· Top values 2.00 - Top correction Base data 1.50 - •-- Base values Base Correction 1.00 0.50 0.00 6 3 Penetration mm

Results Moisture CBR Values, % Curve Content correction 2.5mm Highest Average 5mm applied % 7.1 9.2 TOP No 9.2 10 10.0 BASE No 8.9 11.0 11.0

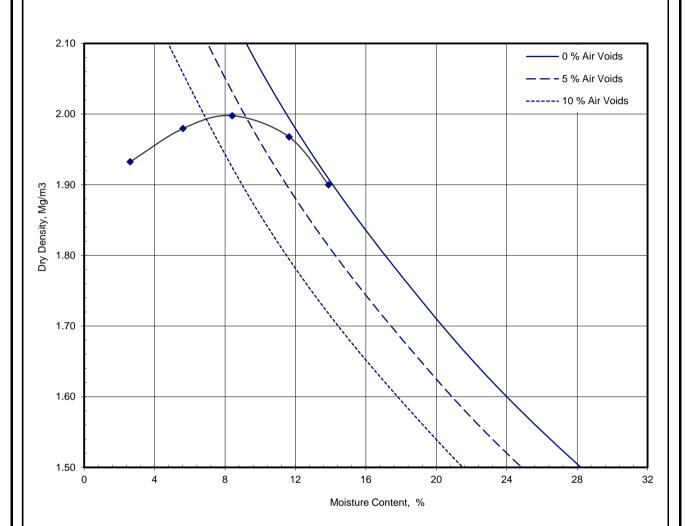
Moisture content

General remarks	Test specific remarks	Approved
	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen.Watson

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CALISEWAY	Dry Density / Moisture Content Relationship		Job Ref	21-121	9	
CAUSEWAY		Light Compacti	Light Compaction	Borehole / Pit No	BH104	ļ
Site Name	DAA Airfield Underpass Ground Investigation			Sample No	1	
Soil Description	Greyish brown sandy gravelly silty CLAY.		Depth	4.00	m	
Specimen Ref.	3 Specimen Depth m		Sample Type	В		
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	Caus20220	5109



Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	18
Material Retained on 20.0 mm Sieve	%	24
Particle Density - Assumed	Mg/m³	2.60

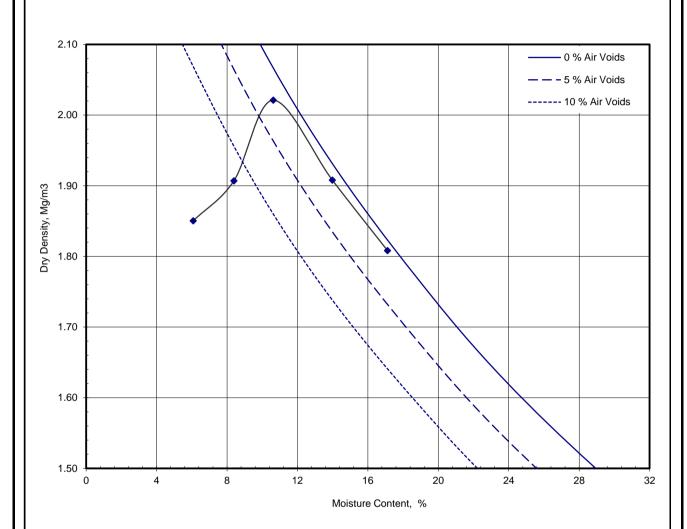
Maximum Dry Density	Mg/m³	2.00
Optimum Moisture Content	%	8.4

Approved Non-Standard

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10122

CAUSEWAY	Dry Dens	ity / Moisture Content Relationship		Jo	ob Ref	21-1219		
—— GEOTECH		Light Compacti	on	В	orehole / Pit No	BH10	7	
Site Name	DAA Ai	DAA Airfield Underpass Ground Investigation				2		
Soil Description	Bro	Brownish grey sandy gravelly silty CLAY.			epth	3.50	m	
Specimen Ref.	3	Specimen Depth	Specimen Depth m			В		
Test Method	BS137	7:Part 4:1990, clause 3.3	, 2.5kg rammer	K	eylab ID	Caus2022051029		



Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	11
Material Retained on 20.0 mm Sieve	%	18
Particle Density - Assumed	Mg/m³	2.65

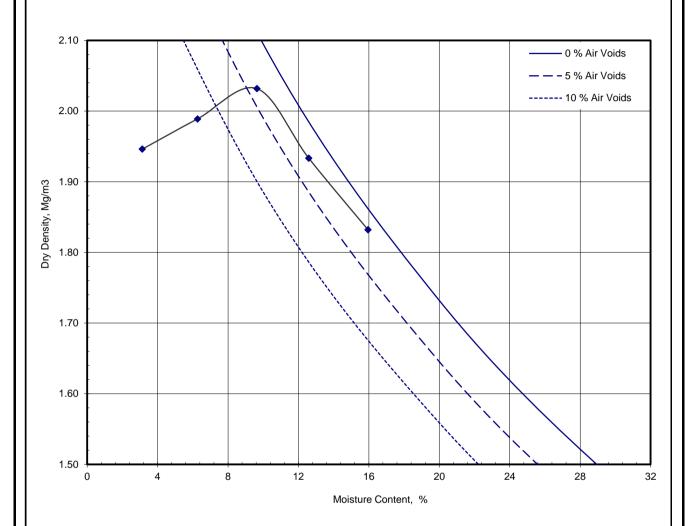
Maximum Dry Density	Mg/m³	2.02	
Optimum Moisture Content	%	11	

Approved Non-Standard

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CALISEWAY	Dry Dens	ity / Moisture Conte	ent Relationship	Job Ref	21-1219		
CAUSEWAY		Light Compacti	on	Borehole / Pit No	BH108	3	
Site Name	DAA A	irfield Underpass Groun	Sample No	1			
Soil Description	Gre	Greyish brown sandy gravelly silty CLAY.			4.00	m	
Specimen Ref.	4	Specimen Depth	r	n Sample Type	В		
Test Method	BS13	77:Part 4:1990, clause 3.4	, 2.5kg rammer	Keylab ID	Caus202205	51041	



Preparation		Material used was air dried
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	8
Material Retained on 20.0 mm Sieve	%	16
Particle Density - Assumed	Mg/m³	2.65

Maximum Dry Density	Mg/m³	2.03	
Optimum Moisture Content	%	9.6	

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ement		Borehole/Pit No. Sample No. Depth	BH104 21
		'	
		Depth	44.45
		200	11.45
Specimen 11.50 m		Sample Type	U
CLAY.		KeyLAB ID	Caus2022051011
BS1377 : Part 7 : 1990, clause 8, single specimen			21/05/2022
	CLAY.	CLAY.	CLAY. KeyLAB ID

Test Number
Length
Diameter
Bulk Density
Moisture Content
Dry Density

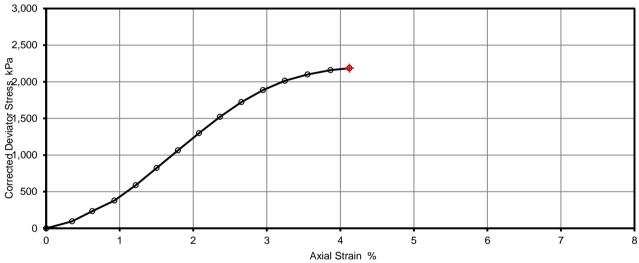
Rate of Strain Cell Pressure At failure

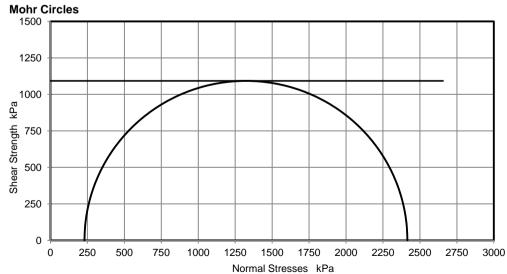
Axial Strain Deviator Stress, (σ 1 - σ 3)f Undrained Shear Strength, cu Mode of Failure

UNDISTURBED	
1	
210.1	mm
105.1	mm
2.26	Mg/m3
8	%
2.09	Mg/m3

4.0	%/min
230	kPa
4.1	%
2185	kPa
1093	kPa ½(σ1 - σ3)f

Deviator Stress v Axial Strain





Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks

No failure defined. Maximum capacity of load ring met.

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Stephen.Watson

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CAUSEWAY GEOTECH	Unconsolidate Compression				t	Job R				21-1219	
———GEOTECH	of pore pressu					Boreh	ole/Pit N	0.		BH104	
Site Name	DAA Airfield Underpa	ass Ground Inve	estigation			Samp	le No.			22	
Soil Description	Grey sandy slightly ξ	Grey sandy slightly gravelly silty CLAY.					l		19.20		
Specimen Reference	3	Specimen Depth	19	.25	m	Samp	le Type			U	
Specimen Description	Very stiff grey sandy	slightly gravelly	silty CLAY.			KeyLA	AB ID		Cau	s2022051	1017
Test Method	BS1377 : Part 7 : 19	90, clause 8, sir	ngle specim	en		Date of	of test		2	23/05/202	2
	Sample Condition Test Number Length Diameter Bulk Density Moisture Content Dry Density						1 210.0 105.4 2.29 9 2.11	ΞD	mm mm Mg/m3 % Mg/m3		
	Rate of Strain Cell Pressure At failure	Axial Strain Deviator Stress Undrained She Mode of Failure	ar Strength			Co	4.0 380 17.2 1459 729 ompound		%/min kPa % kPa kPa ½(σ1 - σ3)i	
Deviator Stress v A	xial Strain					_					
5,000											
2,500											
82,000 Pd 000 Pd											
<i>y</i> 2,000 1											
Street											
oi,500		0-0-0	-	0 0							
1,000 1											
et et et et et et et et et et et et et e	P										
Correction 500 Figure 200											
0 2	4 6 8	10 12	14	10 10		20 2	22 2	4	26	28 3	
Mohr Circles	1 0 0	10 12		16 18 Strain %		20 2		"]	Deviator :		
1250									for area of membran		d
1000									Mohr circ	ition is no	
Shear Strength kPa				+ +				1	by BS137 This is pr		r
Strer									information		
500								1			
·			/								
250			1								
0 250	500 750 1000	1250 1500	1750 2	2000 225	0 2	500 2	750 30	000			
Remarks		Normal Stre	esses kPa Approved			Printed					*()
ivements				n.Watson			/2022 12	:21		UH	CAS STING
						LAB 15I	R - Versi	on 5		10	122

CALISEWAY	Unconsolidate Compression		Job Ref	21-1219				
GEOTECH	of pore pressi		Borehole/Pit No.	BH106				
Site Name	DAA Airfield Underp	ass Ground Inves	Sample No.	40				
Soil Description	Greyish brown sand	y slightly gravelly		Depth	17.95			
Specimen Reference	2	Specimen Depth	17.95	m	Sample Type	U		
Specimen Description	Very stiff greyish bro	wn sandy slightly		KeyLAB ID	Caus2022051027			
Test Method	BS1377 : Part 7 : 19	90, clause 8, sing	le specimen		Date of test	23/05/2022		

Sample Condition Test Number Length Diameter Bulk Density Moisture Content Dry Density

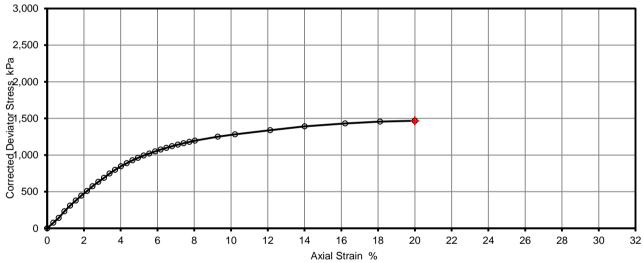
Rate of Strain Cell Pressure At failure

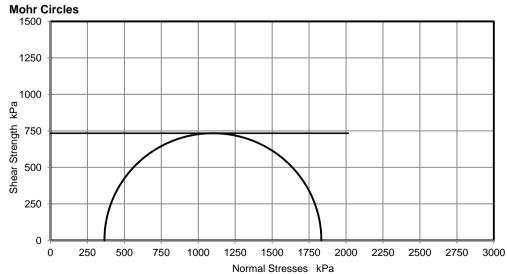
Axial Strain Deviator Stress, (σ 1 - σ 3)f Undrained Shear Strength, cu Mode of Failure

UNDISTURBED	
1	
210.0	mm
104.3	mm
2.27	Mg/m3
9	%
2.08	Mg/m3
	-

4.0	%/min
365	kPa
20.0	%
1468	kPa
734	kPa ½(σ1 - σ3)f

Deviator Stress v Axial Strain





Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Rem<u>arks</u>

No faliure defined. Testing terminated at 20% axial strain.

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	Unconsolidate			Job Ref	21-1219					
CAUSEWA GEOTECH	of pore pression		ut measuremen specimen	it	Borehole/Pit No.	BH108				
Site Name	DAA Airfield Underpa	ass Ground Inve	stigation		Sample No.	28				
Soil Description	Greyish brown sandy	gravelly silty Cl	LAY.		Depth	5.85				
Specimen Reference	2	Specimen Depth	5.85	Sample Type	U					
Specimen Description	Very stiff greyish bro	wn sandy gravel	lly silty CLAY.		KeyLAB ID	Caus2022051042				
Test Method	BS1377 : Part 7 : 19	90, clause 8, sin	gle specimen		Date of test	23/05/2022				
	Sample Condition Test Number Length Diameter Bulk Density Moisture Content Dry Density				UNDISTURBED 1 210.0 104.6 2.28 10 2.08	mm mm Mg/m3 % Mg/m3				
	Rate of Strain				4.0					
	Cell Pressure	Axial Strain			120	kPa				
	At failure	14.0 845 423 Compound	% kPa kPa ½(σ1-σ3)f							
eviator Stress v	Axial Strain									
,200										
,000										
800					•	•				
600										
800 - 600 - 400 -										
400										
200										
0 1	2 3 4	5 6	7 8 9 Axial Strain %		10 11 12	13 14 15 10				
ohr Circles										
500						Deviator stress corrected for area change and membrane effects				
400		+				Mohr circles and their				
200						interpretation is not covered by BS1377. This is provided for information only.				
200										
0										
0 100 Remarks	200 300 400	500 600 Normal Stre		0 1	000 1100 1200 Printed					
Remarks			Approved Stephen.Watson		25/05/2022 12:21	UKAS TESTING				
					LAB 15R - Version	10122				

CALISEWAY		ated Undraine on Test withou	Job Ref	21-1219				
GEOTECH GEOTECH	•	sure - single	Borehole/Pit No.	BH108				
Site Name	DAA Airfield Unde	erpass Ground Inves	Sample No.	29				
Soil Description	Greyish brown sa	ndy gravelly silty CL/	AY.	Depth	18.30			
Specimen Reference	3	Specimen Depth	m	Sample Type U				
Specimen Description	Very stiff greyish	orown sandy gravelly	silty CLAY.		KeyLAB ID	Caus2022051047		
Test Method	BS1377 : Part 7 :	1990, clause 8, sing	le specimen		Date of test 23/05/2022			

Sample Condition Test Number Length Diameter Bulk Density Moisture Content Dry Density

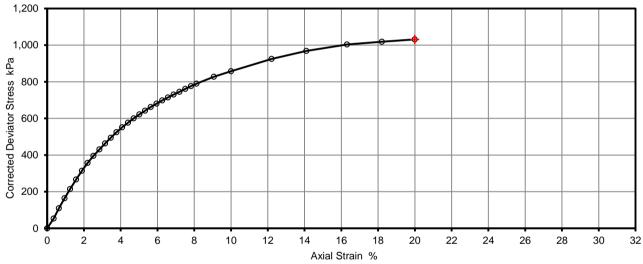
Rate of Strain Cell Pressure At failure

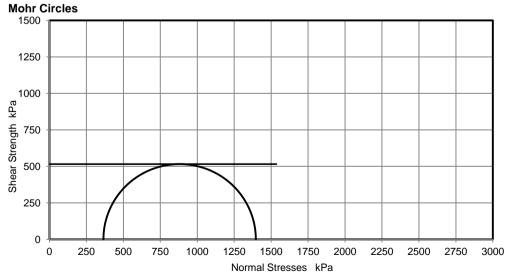
Axial Strain
Deviator Stress, (σ 1 - σ 3)f
Undrained Shear Strength, cu
Mode of Failure

UNDISTURBED	
1	
210.0	mm
105.1	mm
2.30	Mg/m3
10	%
2.10	Mg/m3

4.0	%/min
365	kPa
20.0	%
1031	kPa
516	kPa ½(σ1-σ3)f

Deviator Stress v Axial Strain





Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Rem<u>arks</u>

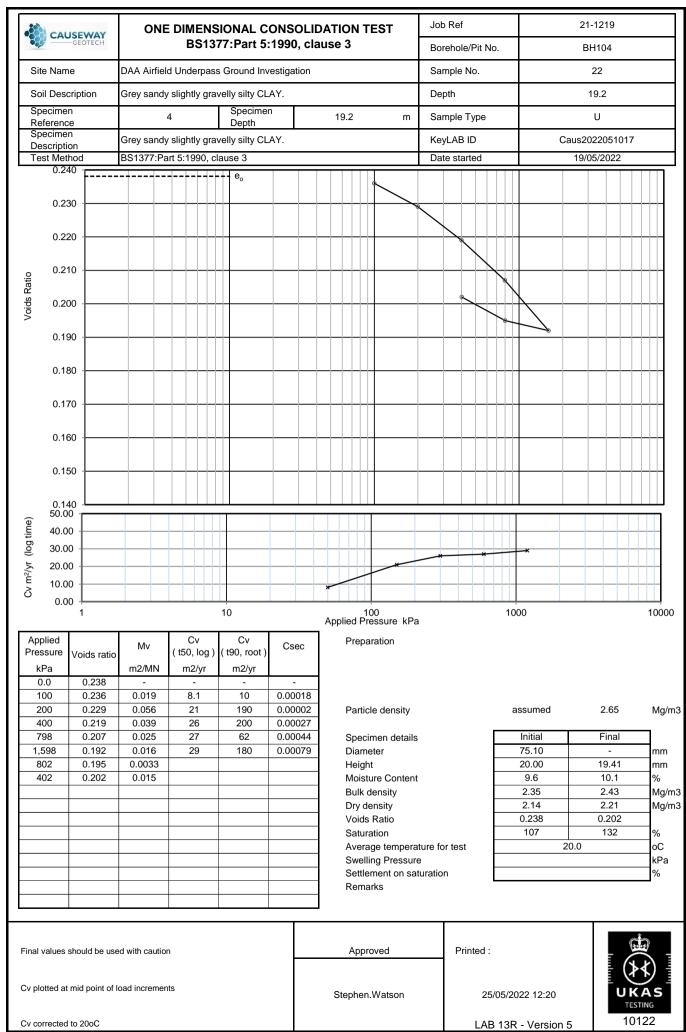
No failure defined. Testing terminated at 20% axial strain.

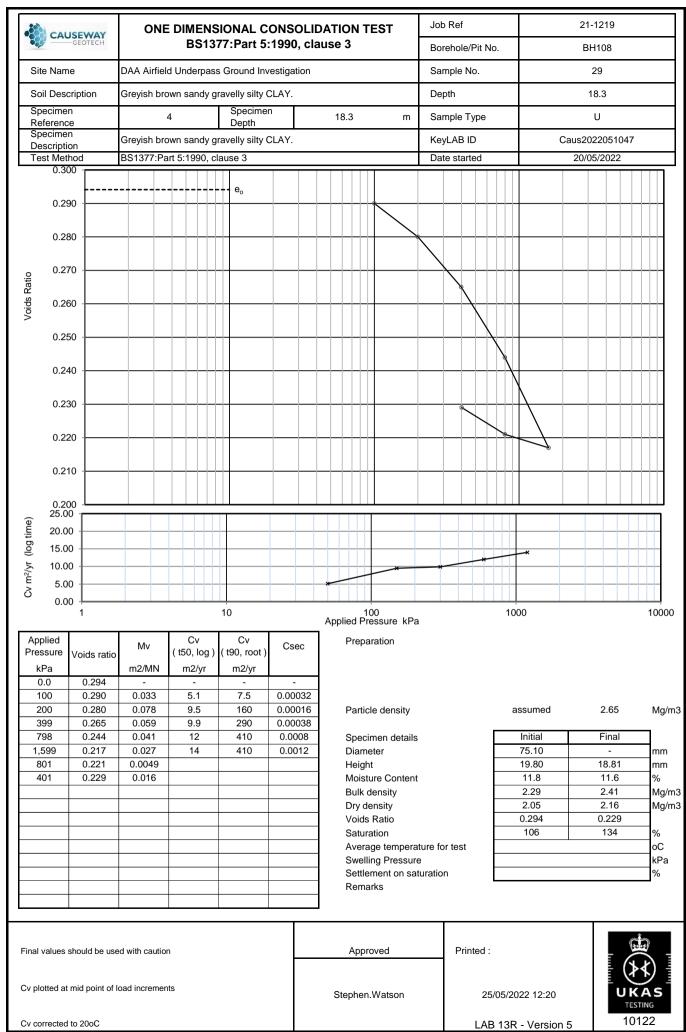
Approved
Stephen.Watson

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	AUSEW	AV		Point Load Strength Index Tests															
	GEOTE			Desia	Summar Project Name								ry of Results						
Project No. 2	1-1219			Proje	ct Name	9	D	AA Ai	rfield l	Jnder	pass Ground Investigation								
Borehole	Sa	Sample		Spe	cimen	Dadi Tara	Test Type see ISRM		lid (Y/N)		Dimensions			Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including	
No.	Depth	Ref.	Туре	Ref.	Depth	Rock Type	Type (D, A, I, B)	Direction (L, P or U)	Failure Valid (Y/N)	Lne	W	Dps	Dps'			Is	Is(5 0)	water content if measured)	
BH104	m 27.45	24	С	1	m 27.45	LIMESTONE	A	U	NO	mm	mm 100.5	mm 52.0	mm 48.0	kN 9.2	mm 78.4	MPa 1.5	MPa 1.8		
BH104	27.83	25	С	1	27.83	LIMESTONE	A	U	YES		99.9	81.0	80.0	5.2	100.9		0.7		
						LIMESTONE				404.0									
BH104	28.20	23	С	1	28.20	LIMESTONE	D	U	NO	121.3		100.6	97.0	16.4	98.8	1.7	2.3		
BH104	28.70	26	С	1	28.70	LIMESTONE	D	U	YES	67.4	100.2	100.2	98.0	12.2	99.1	1.2	1.7		
BH106	26.40	2	С	1	26.40	LIMESTONE	D	U	NO	79.2	100.3	100.3	97.0	8.3	98.6	0.9	1.2		
BH106	27.50	3	С	1	27.50	LIMESTONE	D	U	YES	65.4	98.4	98.4	96.0	8.3	97.2	0.9	1.2		
BH106	27.95	4	С	1	27.95		A	U	NO		100.3	87.0	78.0	6.6	99.8	0.7	0.9		
BH107	29.60	1	С	1	29.60	LIMESTONE	Α	U	YES		101.2	62.0	54.0	11.4	83.4	1.6	2.1		
BH108	29.05	1	С	1	29.05	LIMESTONE	Α	U	YES		101.3	102.0	93.0	6.2	109.5	0.5	0.7		
BH108	29.60	1	С	1	29.60	LIMESTONE	D	U	YES	85.4	100.5	10.5	98.0	13.5	99.2	1.4	1.9		
BH108	29.85	1	С	1	29.85	LIMESTONE	D	U	YES	78.3	101.4	101.4	100.0	5.8	100.7	0.6	0.8		
Direction L - parallel to plane	D - Diametral, A - Axial, I - Irregular Lump, B - Block Diametral Axial Direction L - parallel to planes of weakness								_	Block Irregular lump									
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									D _{ps}										
Test performed in	accordance	with IS	SRM S	uggest	ed Metho	ds : 2007, unless note	ed othe	rwise			Date F	Printed		Appro	ved B				
Detailed legend fo Size factor, F = (D				ised or	ı ISRM, is	shown above.					30)/05/20	22				Į	JKAS TESTING	
(2	-,					LA		R - V	ersior	า 5				Steph	nen.V	Vatson		10122	



UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

		Sar	nple			S Dir	pecime mensior	sions2 Bulk Wa		Water	Uniaxi			
Hole No.	Ref	Тор	Base	Туре	Rock Type	Dia.	Length mm	H/D	Density2 Mg/m3	Content 1 %	Condition	Mode of failure	UCS MPa	Remarks
BH106	1	28.15	28.45	С	LIMESTONE	100.7	186.2	1.8	2.69	0.9	as received	F	48.2	
BH107	1	29.80	30.05	С	LIMESTONE	100.2	198.0	2.0	2.69	0.9	as received	F	67.0	
BH108	1	29.30	29.60	С	LIMESTONE	101.4	200.5	2.0	2.73	0.9	as received	F	37.6	
Notes	10014								-					

1 ISRM p87 test 1, water content at 105 \pm 3 oC, specimen as tested for UCS

Mode of failure :

MS - multiple shear S - Single shear

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

AC - Axial cleavage F - Fragmented

above notes apply unless annotated otherwise in the remarks Test Specification Date Printed Approved By Table International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007 30/05/2022 sheet Stephen.Watson



LABORATORY **REPORT**



Contract Number: PSL22/3409

Report Date: 26 May 2022

Client's Reference: 21-1219

Client Name: Causeway Geotech

8 Drumahiskey Road

Ballymoney Co.Antrim **BT53 7QL**

For the attention of: Stephen Watson

Contract Title: DAA Airfield Underpass Ground Investigation

Date Received: 12/5/2022 Date Commenced: 12/5/2022 Date Completed: 26/5/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins R Berriman S Royle

(Director) (Quality Manager) (Laboratory Manager)

L Knight S Eyre D Burton

(Senior Technician) (Senior Technician) (Advanced Testing Manager)

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e-mail: rberriman@prosoils.co.uk awatkins@prosoils.co.uk

Page 1 of

Consolidated Undrained

Summary Report

Sample Details	Depth Description Type		n velly slightly s d, vertical ori		
sketch showing specimen location in original sample	Initial Sample Length Initial Sample Diameter Initial Sample Weight Initial Bulk Density Particle Density	Lo Do Wo Po Ps	(mm) (mm) (gr) (Mg/m3) (Mg/m3)	211.0 105.1 4116.0 2.25 2.66	
Initial Conditions				Stage 1	2
Initial Cell Pressure		σ3i	(kPa)	700	
Initial Back Pressure		U bi	(kPa)	500	
Membrane Thickness		mь	(mm)	0.600	
Displacement Input		LIP	(mm)	CH 2	
Load Input		N IP	(N)	CH 4	
Pore Water Pressure Input		u pwp	(kPa)	CH 3	
Sample Volume		٧	(cc)	CH 2	
Initial Moisture		ωί	(%)	9.09	
Initial Dry Density		ρdi	(Mg/m3)	2.06	
Initial Voids Ratio		e i		0.291	
Initial Degree of Saturation		Si	(%)	83	
B Value		В		0.96	
Final Conditions					
Final Moisture		ωf	(%)	8.93	
Final Dry Density		ρdf	(Mg/m3)	2.09	
Final Voids Ratio		ef		0.274	
Final Degree of Saturation		Sf	(%)	86.6	
				Stage 1 Max. Dev.	2
Failure Criteria				Stress	
Strain At Failure		εf	(%)	11.70	
Stress At Failure		(01-03)	(kPa)	1363.8	
Minor Stress At Failure		σ3'	(kPa)	606.0	
Major Stress At Failure		σ1'	(kPa)	1969.8	
Principal Stress Ratio At Failure		σ1'/σ3'		3.251	
Notes					



		4:-
r	as	716

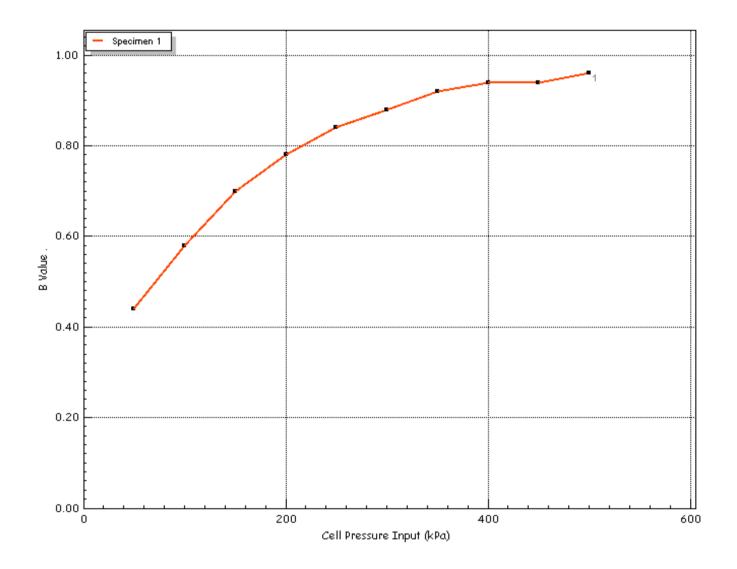
_ (b)	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH107 9.70-9.95m U27 19/05/2022
· (≯4) ·		DAA Airfield Underpass Ground	Borehole	BH107
	Jobfile	Investigation	Sample	9.70-9.95m U27
U K A S TESTING	Client	Causeway	Depth	9.70-9.95m
4043			-	



Consolidated Undrained

Saturation Plots

Saturation Method			Stepped	
Cell Pressure Input	σ	(kPa)	500	
Pore Water Pressure Input	u pwp	(kPa)	487	
B Value	В	•	0.96	



<u></u>	Test Method	BS1377-8 : 1990 : (Clause 7	Test Name Test Date	BH107 9.70-9.95m U27 19/05/2022	
UKAS TESTING	Jobfile Client		derpass Ground igation	Borehole Sample Depth	BH107 9.70-9.95m U27 9.70-9.95m	
4043						

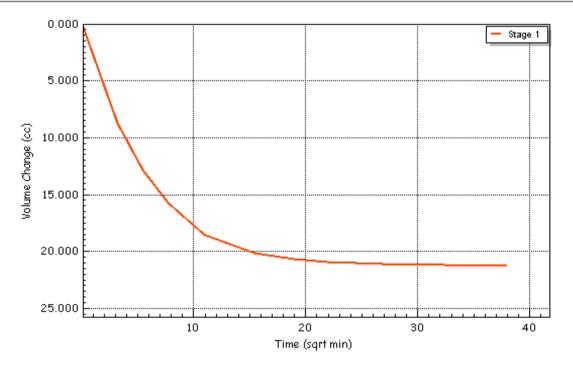


Consolidated Undrained

Consolidation Plots

Initial Conditions				
Initial Cell Pressure	σ3	(kPa)	700	
Initial Back Pressure	и ы	(kPa)	500	
Pore Water Pressure Input	и рмр	(kPa)	674	
Drainage Method			Radial+One End	

1.16) 210.2) 86.08 1809.266
86.08
,
1809.266
58.83
year) 3.877
MN) 0.067
(s) 02:00:00
5.0
/min) 0.08758

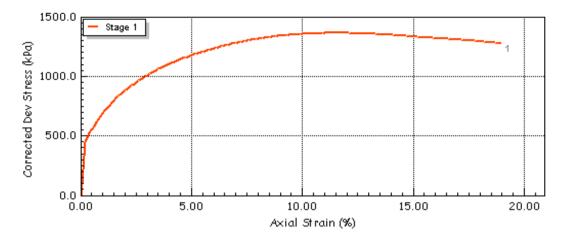


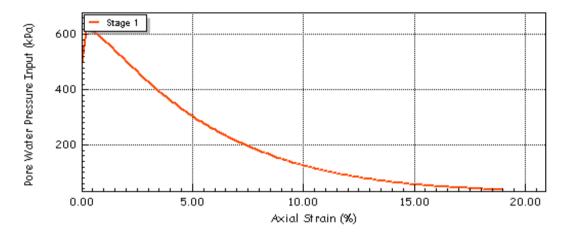
ch	Test Method	BS1377-8 : 1990 : Clause 7	Test Name	BH107 9.70-9.95m U27
- 🗯 –			Test Date	19/05/2022
. (\$4).		DAA Airfield Underpass Ground	Borehole	BH107
	Jobfile	Investigation	Sample	9.70-9.95m U27
U K A S TESTING	Client	Causeway	Depth	9.70-9.95m
4043				

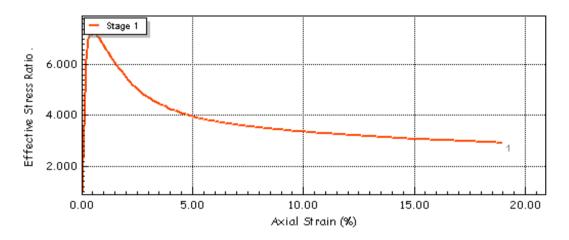


Consolidated Undrained

Shear Stage Plots





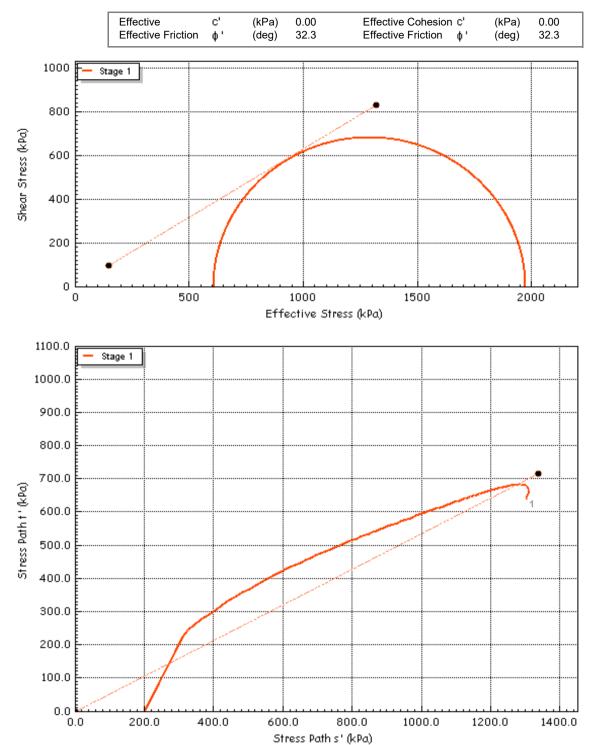


_ (c)	Test Method	BS1377-8 : 1990 : CI	ause 7	Test Name Test Date	BH107 9.70-9.95m U27 19/05/2022
· (**) <u>*</u>	Jobfile	DAA Airfield Und Investiç	•	Borehole Sample	BH107 9.70-9.95m U27
U K A S TESTING	Client	Causeway		Depth	9.70-9.95m
4043					



Consolidated Undrained

Shear Stage Plots



_ (b) _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH107 9.70-9.95m U27 19/05/2022
· (*\dag{*})	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH107 9.70-9.95m U27
U K A S TESTING	Client	Causeway	Depth	9.70-9.95m



Consolidated Undrained

Summary Report

Sample Details	Depth Description Type		5m ary of soil de d, vertical ori	•	
sketch showing specimen location in original sample	Initial Sample Length Initial Sample Diameter Initial Sample Weight Initial Bulk Density Particle Density	LO Do Wo Po Ps	(mm) (mm) (gr) (Mg/m3) (Mg/m3)	211.0 103.8 3993.0 2.24 2.66	
Initial Conditions				Stage 1	2
Initial Cell Pressure		σ3i	(kPa)	560	
Initial Back Pressure		Uы	(kPa)	300	
Membrane Thickness		mь	(mm)	0.600	
Displacement Input		L IP	(mm)	CH 2	
Load Input		NIP	(N)	CH 1	
Pore Water Pressure Input		и рюр	(kPa)	CH 3	
Sample Volume		٧	(cc)	CH 6	
Initial Moisture		ωį	(%)	10	
Initial Dry Density		ρdi	(Mg/m3)	2.03	
Initial Voids Ratio		e i		0.310	
Initial Degree of Saturation		Si	(%)	87	
B Value		В		0.97	
Final Conditions					
Final Moisture		ωf	(%)	9.87	
Final Dry Density		ρdf	(Mg/m3)	2.09	
Final Voids Ratio		ef		0.274	
Final Degree of Saturation		Sf	(%)	95.7	
				Stage 1	2
Failure Criteria				Max. Dev. Stress	
Strain At Failure		εf	(%)	15.24	
Stress At Failure		οτ (σ1-σ3)	` ,	1388.6	
Minor Stress At Failure		σ3'	(kPa)	538.0	
Major Stress At Failure		σ1'	(kPa)	1926.6	
Principal Stress Ratio At Failure		σ1'/σ3'	(Al a)	3.581	
Notes		-,0		0.001	



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-	'as	

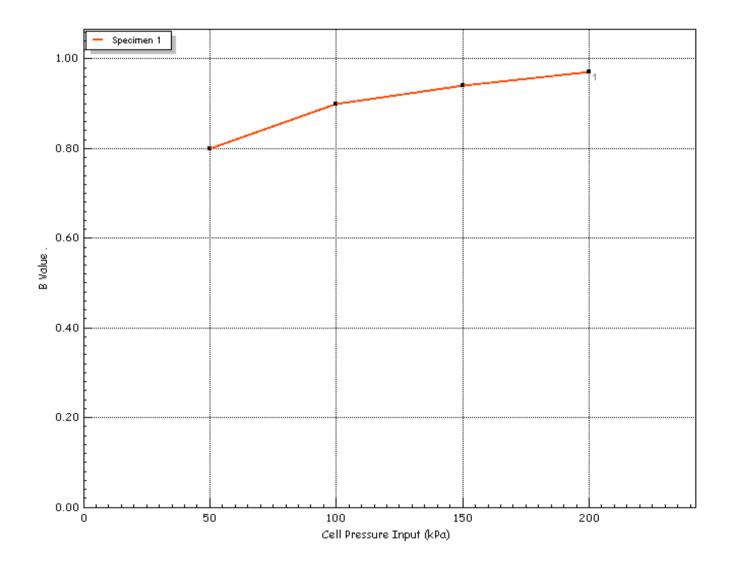
_ de _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH107 13.20-13.45m U26 19/05/2022
. (≯≮).≣		DAA Airfield Underpass Ground	Borehole	BH107
	Jobfile	Investigation	Sample	13.20-13.45m U26
U K A S TESTING	Client	Causeway	Depth	13.20-13.45m
4043			-	



Consolidated Undrained

Saturation Plots

Saturation Method			Stepped	
Cell Pressure Input	σ	(kPa)	200	
Pore Water Pressure Input	и рмр	(kPa)	186	
B Value	В		0.97	



. 奥 -	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH107 13.20-13.45m U26 19/05/2022	
· (}<	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH107 13.20-13.45m U26	
UKAS TESTING	Client	Causeway	Depth	13.20-13.45m	
4043			•		

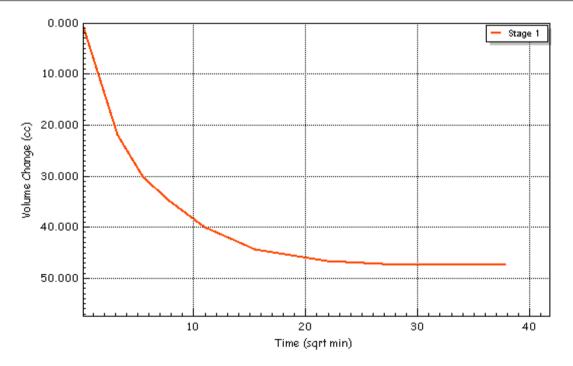


Consolidated Undrained

Consolidation Plots

Initial Conditions				
Initial Cell Pressure	σз	(kPa)	560	
Initial Back Pressure	и ы	(kPa)	300	
Pore Water Pressure Input	и рюр	(kPa)	545	
Drainage Method			Radial+One End	

PWP Dissipation %	U%	(%)	100.00
Volumetric Strain	εν%	(%)	2.65
Corrected Length	Lc	(mm)	209.1
Corrected Area	Ac	(cm2)	83.12
Corrected Volume	٧c	(cc)	1738.139
t100	t 100	(min)	46.41
Consolidation	cv	(m2/year)	4.794
Compressibility	mγ	(m2/MN)	0.108
Test Time	t F	(h:m:s)	02:00:00
Estimated Strain to Failure	ε%	(%)	5.0
Shear Machine Speed	dг	(mm/min)	0.08714
Notes			

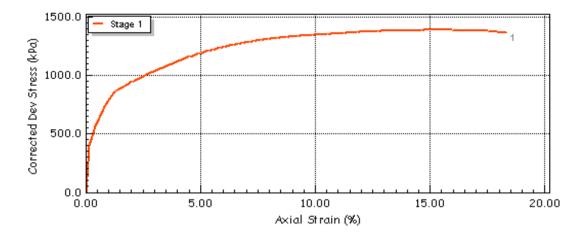


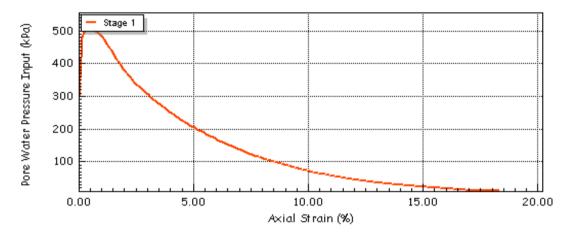
ය්ක	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH107 13.20-13.45m U26 19/05/2022
UKAS UKAS 4043	Jobfile Client	DAA Airfield Underpass Ground Investigation Causeway	Borehole Sample Depth	BH107 13.20-13.45m U26 13.20-13.45m

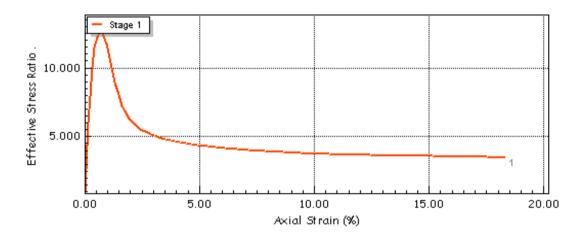


Consolidated Undrained

Shear Stage Plots





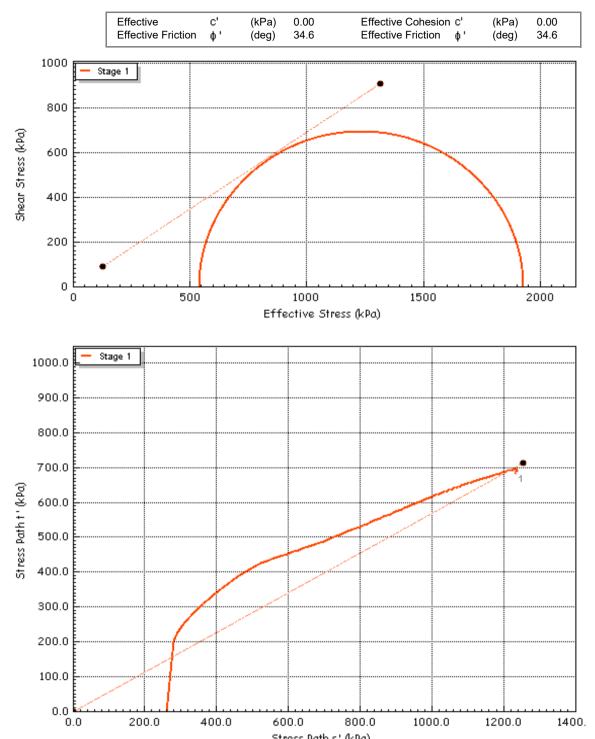


_ (c)	Test Method	BS1377-8 : 1990 : Clau	se 7	Test Name Test Date	BH107 13.20-13.45m U26 19/05/2022
· (**) <u>*</u>	Jobfile	DAA Airfield Under Investigat		Borehole Sample	BH107 13.20-13.45m U26
U KAS TESTING	Client	Causeway		Depth	13.20-13.45m
4043					



Consolidated Undrained

Shear Stage Plots



<u></u>	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH107 13.20-13.45m U26 19/05/2022
· (**) <u> </u>	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH107 13.20-13.45m U26
U KAS TESTING	Client	Causeway	Depth	13.20-13.45m

Stress Path s' (kPa)





Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-18277-1

Initial Date of Issue: 24-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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

Stephen Watson Stuart Abraham Thomas McAllister

Project 21-1219 DAA Airfield Underpass

Quotation No.: Date Received: 17-May-2022

Order No.: Date Instructed: 17-May-2022

No. of Samples: 10

Turnaround (Wkdays): 7 Results Due: 25-May-2022

Date Approved: 24-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: 21-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Cher	ntest Jo	ob No.:	22-18277	22-18277	22-18277	22-18277	22-18277	22-18277	22-18277	22-18277
Quotation No.:	(Chemte	st Sam	ple ID.:	1430305	1430306	1430307	1430308	1430309	1430310	1430311	1430312
Order No.:		Clier	nt Samp	le Ref.:	2	3	7	1	25	8	18	19
		Sa	ımple Lo	ocation:	BH104	BH104	BH106	BH108	BH106	BH106	BH107	BH107
			Sample	е Туре:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Dep	oth (m):	6.40	11.95	9.50	4.00	9.50	12.50	13.00	14.60
			Date Sa	ampled:	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022	16-May-2022
Determinand	Accred.	SOP	Units	LOD								
Moisture	N	2030	%	0.020	8.5	6.9	7.8	8.5	6.1	20	8.1	8.4
pH (2.5:1)	N	2010		4.0	9.2	9.3			9.2	9.1	9.0	9.0
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.044	< 0.010			0.043	0.023	0.021	0.049
Total Sulphur	U	2175	%	0.010	0.15	0.13			0.17	0.35	0.063	0.055
Chloride (Water Soluble)	U	2220	g/l	0.010	< 0.010	< 0.010			0.012	< 0.010	< 0.010	< 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.034	0.026			0.027	0.037	0.015	0.021
Organic Matter	U	2625	%	0.40	0.60	0.76	0.59	1.4				

Results - Soil

Project: 21-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Che	mtest Jo	ob No.:	22-18277	22-18277
Quotation No.:	Chemtest Sample ID.:				1430313	1430314
Order No.:		Clie	nt Samp	le Ref.:	3	5
		Sa	ample Lo	ocation:	BH108	BH108
			Sampl	е Туре:	SOIL	SOIL
			Top Dep	oth (m):	13.00	14.50
		Date Sampled:			16-May-2022	16-May-2022
Determinand	Accred.	SOP	Units	LOD		
Moisture	N	2030	%	0.020	16	17
pH (2.5:1)	N	2010		4.0	9.2	9.4
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.059	0.018
Total Sulphur	U	2175	%	0.010	0.16	0.15
Chloride (Water Soluble)	U	2220	g/l	0.010	< 0.010	< 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.028	0.020
Organic Matter	U	2625	%	0.40		

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	рН	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.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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: <u>customerservices@chemtest.com</u>



LABORATORY RESTRICTION REPORT

Project Reference 21-1219					То	Colm Hurley
Project Name DAA Airfield Underpass GI			nderpass GI	Position	Project Manager	
reference			21-1219	/ G02		Joseph Nicholl Laboratory Quality Manage
ng sample(s	s) and test(s) are re	estricted as detailed below	w. Could you please complete the		
	Sample		Test		T	
Number	Depth (m)	Туре	Туре	Reason for Restricti	on	Required Action
6	4.30	В	Dry density/ moisture content			
25	27.83	С	ucs	Too bady fractured	d	Carry out point load
	reference ng sample(s laboratory. Number	ect Name reference Ing sample(s) and test(state to the laboratory. Sample Number Depth (m) 6 4.30	reference Ing sample(s) and test(s) are relaboratory. Sample Number Depth (m) 6 4.30 B	reference 21-1219 Ing sample(s) and test(s) are restricted as detailed belor laboratory. Sample Test Type Type	reference 21-1219 / G02 Ing sample(s) and test(s) are restricted as detailed below. Could you please complete the laboratory. Sample Test Type Reason for Restriction	Position From Position reference 21-1219 / G02 Required Action Required Action Reason for Restriction 6 4.30 B Depth (m) Dry density/ moisture content Position From Position Required Action Action Reason for Restriction >10% retained on 37.5mm sieve >30% retained on 20mm sive

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

Laboratory Signature	Project Manager Signature
Joseph Nicholl	Colm Hurley
Date 18 May 2022	Date



HEAD OFFICE Causeway Geotech Ltd

NI: +44 (0)28 276 66640

Registered in Northern Ireland. Company Number: NI610766

REGIONAL OFFICE Causeway Geotech (IRL) Ltd

Unit 1 Fingal House Stephenstown Industrial Estate Balbriggan, Co Dublin, Ireland, K32 VR66 **ROI**: +353 (0)1 526 7465

Registered in Ireland. Company Number: 633786

www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS LABORATORY TEST REPORT

31 May 2022

Project Name:	DAA Airfield Underpass Ground Investigation			
Project No.:	21-1219			
Client:	DAA			
Engineer:	Ramboll Consulting Engineers			

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 10/05/2022 and 31/05/2022.

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: DAA Airfield Underpass 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	7
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	7
SOIL	Bulk and dry density by Linear Measurement Method	BS 1377-2: 1990: Cl 7.2	7
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	11
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	10
SOIL	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4: 1990: Cl 3.3 & 3.4	2
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	2
SOIL	Consolidation properties in oedometer - Using 5 pressures (up to 5 days total duration)	BS 1377-5: 1990: Cl 3: 1	1
	Extra over days (more than initial 5 days)		2
SOIL	Undrained shear strength – triaxial compression without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 8	2
ROCK	Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985	5

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 Pro Soils Limited (UKAS 4043)	Effective shear strength consolidated-undrained triaxial compression test with measurement of pore pressure (up to 4 days)	BS 1377-8:1990	1
	Extra over days (more than initial 4 days)		0
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	Organic Matter Content		2
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite D		4



Summary of Classification Test Results

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

211		Sar	nple			Dens	1	w	Passing	LL	PL	PI	Particle	
Hole No.	Ref	Тор	Base	Туре	Soil Description	bulk	dry		425µm				density	Casagrande Classification
BH105	4	12.95	13.95	В	Greyish brown sandy gravelly silty CLAY.	Mg/m	1.98	11.0	67	% 28 -1pt	15	13	Mg/m3	CL
BH105	5	17.00	18.10	В	Greyish brown sandy gravelly silty CLAY.	1.97	1.81	8.4	67	29 -1pt	16	13		CL
BH105	8	24.30	25.30	В	Greyish brown sandy gravelly silty CLAY.	2.10	1.88	8.2	71	30 -1pt	17	13		CL
BH109	2	3.50	4.50	В	Greyish brown sandy gravelly silty CLAY.	2.36	2.13	6.7	61	29 -1pt	16	13		CL
BH109	3	7.70	8.70	В	Greyish brown sandy gravelly silty CLAY.	2.19	2.02	7.8	70	27 -1pt	14	13		CL
BH109	4	11.70	12.70	В	Greyish brown sandy gravelly silty CLAY.	2.17	1.95	10.0	82	26 -1pt	14	12		CL
BH109	5	14.90	15.90	В	Greyish brown slightly gravelly silty fine to coarse SAND.	2.17	1.91	14.0	100	20 -1pt	16	4		ML

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

LAB 01R Version 5

Key Date Printed Approved By Density test Liquid Limit Particle density Linear measurement unless : 4pt cone unless : sp - small pyknometer 31/05/2022 wd - water displacement cas - Casagrande method gj - gas jar wi - immersion in water 1pt - single point test



CAUSEWAY	
----------	--

Density Tests - Summary of Results

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

									•			0			
		Sar	nple			Linea	r Measur	ement	Imme	ersion in	water	Wate	r displace	ement	
Hole No.	Ref	Тор	Base	Туре	Soil Description		Dry density	w	Bulk density	Dry density	w	Bulk density	Dry density	w	Remarks
BH105	4	12.95	13.95	В	Greyish brown sandy gravelly silty CLAY.	Mg/m3	Mg/m3	13	Mg/m3	Mg/m3	%	Mg/m3	Mg/m3	%	
BH105	5	17.00	18.10	В	Greyish brown sandy gravelly silty CLAY.	1.97	1.81	9							
BH105	8	24.30	25.30	В	Greyish brown sandy gravelly silty CLAY.	2.10	1.88	12							
BH109	2	3.50	4.50	В	Greyish brown sandy gravelly silty CLAY.	2.36	2.13	11							
BH109	3	7.70	8.70	В	Greyish brown sandy gravelly silty CLAY.	2.19	2.02	9							
BH109	4	11.70	12.70	В	Greyish brown sandy gravelly silty CLAY.	2.17	1.95	11							
BH109	5	14.90	15.90	В	Greyish brown slightly gravelly silty fine to coarse SAND.	2.17	1.91	14							
egend	w	moisture	content	of the	density test specimen	•	-		•				LAB	03R	- Version 5

Notes

Tests carried out in accordance with BS1377:Part2:1990 and the following clauses unless annotated otherwise

Linear measurement clause 7.2

Water displacement

Immersion in water clause 7.3

Date Printed Appro

31/05/2022

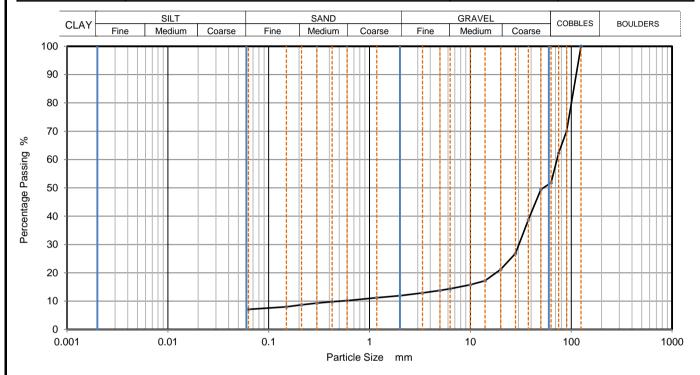
Approved By



Stephen.Watson

clause 7.4

CAUSEWAY	DADTI	Job Ref	21-1219			
—— GEOTECH	PANII	CLE SIZE DIST	INIBOTION	Borehole/Pit No.	BH105	
Site Name	DAA Airfield Underpas	s Ground Investig	ation	Sample No.	2	
Soil Description	Greyish brown sandy slig	htly clayey subangu	lar fine to coarse GRAVEL.	Depth, m	5.00	
Specimen Reference	2 Specimen 5 m				Sample Type	В
Test Method	BS1377:Part 2:1990, clau	se 9.2		KeyLAB ID	Caus202205111	



Siev	/ing	Sedimentation						
Particle Size mm	% Passing	Particle Size mm	% Passing					
125	100							
90	70							
75	62							
63	52							
50	49							
37.5	39							
28	27							
20	21							
14	17							
10	16							
6.3	14							
5	14							
3.35	13							
2	12							
1.18	11							
0.6	10							
0.425	10][
0.3	9							
0.212	9]						
0.15	8]						
0.063	7							

Dry Mass of sample, g	8569

Sample Proportions	% dry mass				
Cobbles	48.2				
Gravel	39.9				
Sand	4.8				
Fines < 0.063mm	7.0				

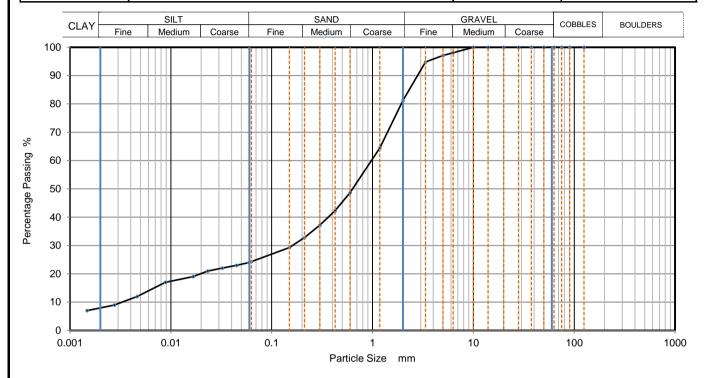
Grading Analysis		
D100	mm	125
D60	mm	72.2
D30	mm	30.3
D10	mm	0.502
Uniformity Coefficient		140
Curvature Coefficient		25

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





CAUSEWAY	CALISEWAY DARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PANII	PARTICLE SIZE DISTRIBUTION -		Borehole/Pit No.	BH105	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Grey slightly gravelly clayey fine to coarse SAND.			Depth, m	8.00	
Specimen Reference	2 Specimen 8 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clau	ses 9.2 and 9.5			KeyLAB ID	Caus202205112



Sievi	ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05942	24
90	100	0.04491	23
75	100	0.03226	22
63	100	0.02316	21
50	100	0.01662	19
37.5	100	0.00883	17
28	100	0.00462	12
20	100	0.00275	9
14	100	0.00147	7
10	100		
6.3	98		
5	97		
3.35	95		
2	81		
1.18	64		
0.6	49	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	37		
0.212	33	1	
0.15	29	1	
0.063	24	1	

Dry Mass of sample, g	211
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.8
Sand	56.8
Silt	16.0
Clay	8.4

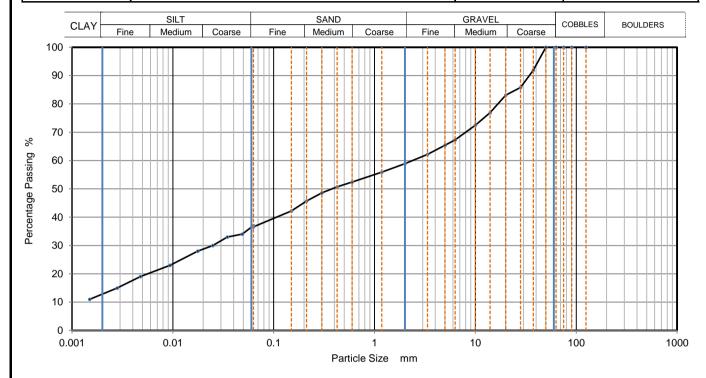
Grading Analysis		
D100	mm	
D60	mm	0.975
D30	mm	0.161
D10	mm	0.00307
Uniformity Coefficient		320
Curvature Coefficient		8.7

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
GEOTECH	PANI	ICLE SIZE DIS	LE SIZE DISTRIBUTION			BH105
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	12.95	
Specimen Reference	5 Specimen 12.95 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus202205113



Siev	ving	Sedimentation		
Particle Size mm	% Passing	Particle Size mm	% Passing	
125	100	0.06300	37	
90	100	0.04875	34	
75	100	0.03470	33	
63	100	0.02485	30	
50	100	0.01769	28	
37.5	92	0.00936	23	
28	86	0.00476	19	
20	83	0.00280	15	
14	77	0.00150	11	
10	73			
6.3	67			
5	65			
3.35	62			
2	59			
1.18	56			
0.6	52	Particle density	(assumed)	
0.425	51	2.65	Mg/m3	
0.3	49			
0.212	46	1		
0.15	42	1		
0.063	37	11		

Dry Mass of sample, g	3489		
ample Proportions	% dry mass		
Cobbles	0.0		
Prayol	41.1		

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.1
Sand	22.3
Silt	23.9
Clay	12.7

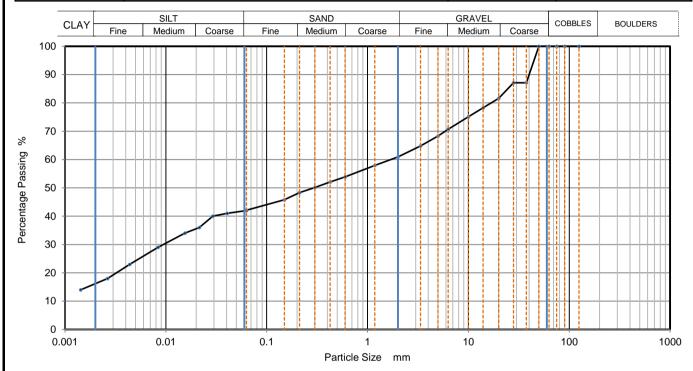
Grading Analysis		
D100	mm	
D60	mm	2.38
D30	mm	0.0254
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	DADTICI E CIZE DISTRIBUITIONI		Job Ref	21-1219		
—— GEOTECH	PANII	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH105
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	5
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	17.00	
Specimen Reference	5 Specimen 17 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clau	ses 9.2 and 9.5			KeyLAB ID	Caus202205114



Siev	ving	Sedim	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	42
90	100	0.04065	41
75	100	0.02929	40
63	100	0.02146	36
50	100	0.01543	34
37.5	87	0.00835	29
28	87	0.00439	23
20	82	0.00264	18
14	78	0.00143	14
10	75		
6.3	71		
5	68		
3.35	65		
2	61		
1.18	58		
0.6	54	Particle density	(assumed)
0.425	52	2.65	Mg/m3
0.3	50		_
0.212	48]	
0.15	46]	
0.063	42		

Dry Mass of sample, g	3457
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	39.1
Sand	18.8
Silt	26.0
Clay	16.1

Grading Analysis		
D100	mm	
D60	mm	1.7
D30	mm	0.00917
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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

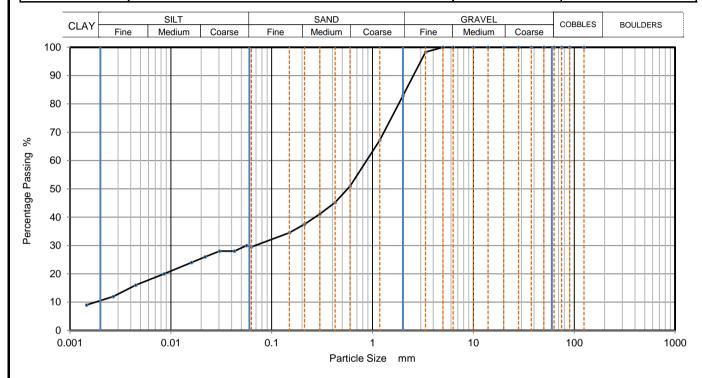




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CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219
GEOTECH			Borehole/Pit No.	BH105
Site Name	DAA Airfield Underpass Ground Investigation		Sample No.	6
Soil Description	Greyish brown clayey fine to coarse SAND.		Depth, m	18.10
Specimen Reference	2 Specimen 18.1 m		Sample Type	В
Test Method BS1377:Part 2:1990, clauses 9.2 and 9.5		KeyLAB ID	Caus202205115	



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05639	30
90	100	0.04269	28
75	100	0.03046	28
63	100	0.02191	26
50	100	0.01600	24
37.5	100	0.00858	20
28	100	0.00448	16
20	100	0.00269	12
14	100	0.00146	9
10	100		
6.3	100		
5	100		
3.35	98		
2	83		
1.18	67		
0.6	51	Particle density	(assumed)
0.425	45	2.65	Mg/m3
0.3	41		_
0.212	38		
0.15	35		
0.063	30		

Dry Mass of sample, g	217

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	17.1
Sand	53.4
Silt	18.6
Clay	10.9

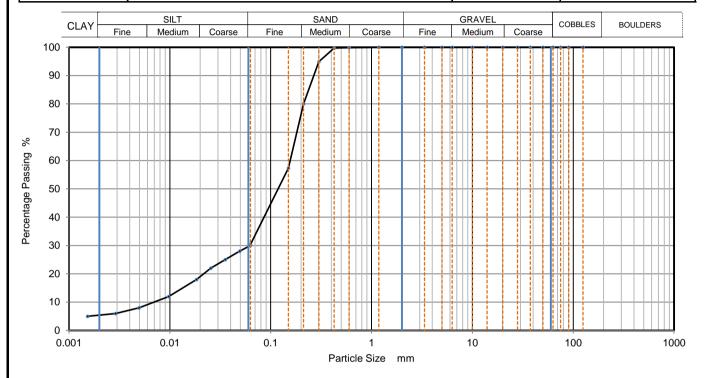
Grading Analysis		
D100	mm	
D60	mm	0.874
D30	mm	0.0687
D10	mm	0.0017
Uniformity Coefficient		510
Curvature Coefficient		3.2

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219	
GEOTECH			Borehole/Pit No.	BH105	
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	7
Soil Description	Greyish brown clayey fine to coarse SAND.		Depth, m	22.75	
Specimen Reference	2 Specimen 22.75 m		Sample Type	В	
Test Method BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202205116	



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04939	28
75	100	0.03537	25
63	100	0.02548	22
50	100	0.01834	18
37.5	100	0.00974	12
28	100	0.00495	8
20	100	0.00289	6
14	100	0.00153	5
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/m3
0.3	95		
0.212	80		
0.15	57		
0.063	30		

Sample Proportions	% dry mass	
Cobbles	0.0	
Gravel	0.0	
Cond	CO 7	

209

Dry Mass of sample, g

Gravel	0.0
Sand	69.7
Silt	24.9
Clay	5.4
-	
Grading Analysis	

Grading Analysis		
D100	mm	
D60	mm	0.156
D30	mm	0.0609
D10	mm	0.00657
Uniformity Coefficient		24
Curvature Coefficient		3.6

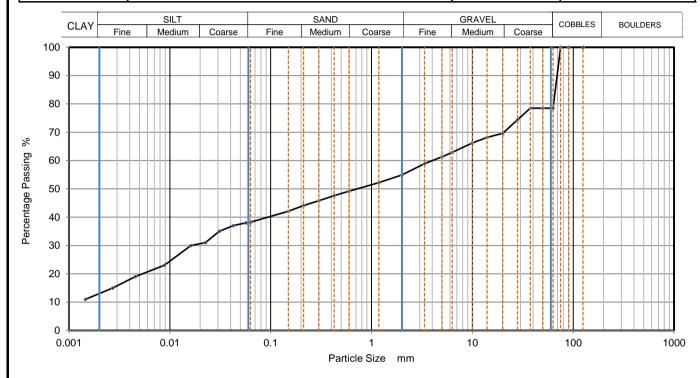
Remarks

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
GEOTECH	PAN	KTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH105
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	8
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	24.30	
Specimen Reference	5 Specimen 24.3 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	nuses 9.2 and 9.5			KeyLAB ID	Caus202205117



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.05672	38
90	100	0.04254	37
75	100	0.03086	35
63	79	0.02253	31
50	79	0.01618	30
37.5	79	0.00878	23
28	74	0.00454	19
20	70	0.00270	15
14	68	0.00146	11
10	66		
6.3	63		
5	61		
3.35	59		
2	55		
1.18	52		
0.6	49	Particle density	(assumed)
0.425	48	2.65	Mg/m3
0.3	46		
0.212	44		
0.15	42		
0.063	38		

Dry Mass of sample, g	3492

Sample Proportions	% dry mass
Cobbles	21.5
Gravel	23.6
Sand	16.7
Silt	25.1
Clay	13.1

Grading Analysis		
D100	mm	
D60	mm	4.04
D30	mm	0.0177
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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

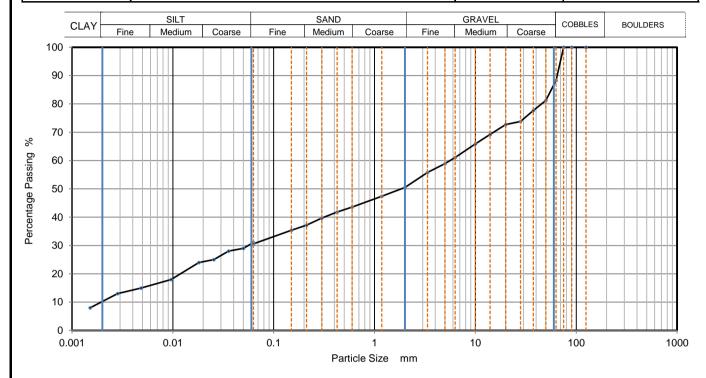




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CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
GEOTECH	PANI	TICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH109
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	2
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	3.50	
Specimen Reference	5 Specimen 3.5 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus2022051111



Sievi	ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	31
90	100	0.05002	29
75	100	0.03559	28
63	88	0.02548	25
50	81	0.01813	24
37.5	78	0.00958	18
28	74	0.00485	15
20	73	0.00283	13
14	69	0.00151	8
10	66		
6.3	61		
5	59		
3.35	56		
2	51		
1.18	47		
0.6	44	Particle density	(assumed)
0.425	42	2.65	Mg/m3
0.3	40		
0.212	37	1	
0.15	35	1	
0.063	31	1	

Dry Mass of sample, g	4565

Sample Proportions % dry mass		
Cobbles	11.7	
Gravel	37.8	
Sand	19.9	
Silt	20.4	
Clay	10.2	

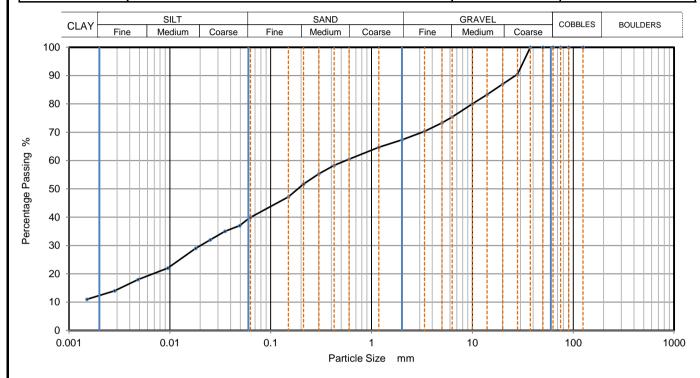
Grading Analysis		
D100	mm	
D60	mm	5.62
D30	mm	0.0568
D10	mm	0.00194
Uniformity Coefficient		2900
Curvature Coefficient		0.3

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





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -		Job Ref	21-1219		
—— GEOTECH	PANI	KTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH109	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	7.70	
Specimen Reference	5 Specimen 7.7 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, cla	uses 9.2 and 9.5			KeyLAB ID	Caus2022051113



Sievi	ng	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.04939	37
75	100	0.03515	35
63	100	0.02517	32
50	100	0.01802	29
37.5	100	0.00953	22
28	91	0.00485	18
20	87	0.00283	14
14	83	0.00150	11
10	80		
6.3	75		
5	73		
3.35	70		
2	67		
1.18	65		
0.6	61	Particle density	(assumed)
0.425	58	2.65	Mg/m3
0.3	55		
0.212	52		
0.15	47		
0.063	40	1	

Dry Mass of sample, g	4032

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	32.7
Sand	27.5
Silt	27.2
Clay	12.6

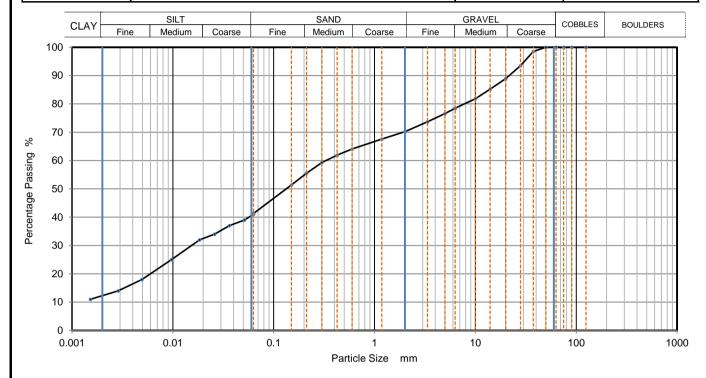
Grading Analysis		
D100	mm	
D60	mm	0.552
D30	mm	0.0206
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





CAUSEWAY	DARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
GEOTECH	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH109	
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation			Sample No.	4
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	11.70	
Specimen Reference	5 Specimen 11.7 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID	Caus2022051115



Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	41
90	100	0.05127	39
75	100	0.03647	37
63	100	0.02594	34
50	100	0.01845	32
37.5	99	0.00969	25
28	94	0.00493	18
20	89	0.00287	14
14	85	0.00152	11
10	82		
6.3	79		
5	77		
3.35	74		
2	70		
1.18	68		
0.6	64	Particle density	(assumed)
0.425	62	2.65	Mg/m3
0.3	59		
0.212	56		
0.15	51		
0.063	41		

Dry Mass of sample, g	3672
·	

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	29.8
Sand	28.8
Silt	28.9
Clay	12.5

Grading Analysis		
D100	mm	
D60	mm	0.33
D30	mm	0.0151
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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

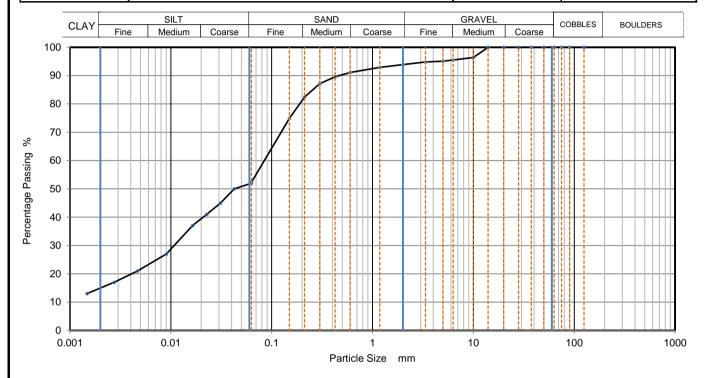




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CAUSEWAY	PARTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
GEOTECH			Borehole/Pit No.	BH109		
Site Name	DAA Airfield Underpa	DAA Airfield Underpass Ground Investigation		Sample No.	5	
Soil Description	Greyish brown slightly gravelly silty fine to coarse SAND.			Depth, m	14.90	
Specimen Reference	5 Specimen 14.9 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5				KeyLAB ID	Caus2022051116



	_	П	
Sieving		Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	52
90	100	0.04254	50
75	100	0.03111	45
63	100	0.02270	41
50	100	0.01642	37
37.5	100	0.00902	27
28	100	0.00465	21
20	100	0.00273	17
14	100	0.00147	13
10	96		
6.3	96		
5	95		
3.35	95		
2	94		
1.18	93		
0.6	91	Particle density	(assumed)
0.425	90	2.65	Mg/m3
0.3	87		
0.212	82	1	
0.15	75	1	
0.063	52	1	

Dry Mass of sample, g	225
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Sample Proportions % dry mass	
Cobbles	0.0
Gravel	6.1
Sand	41.6
Silt	37.2
Clay	15.1

Grading Analysis		
D100	mm	
D60	mm	0.0847
D30	mm	0.0109
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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





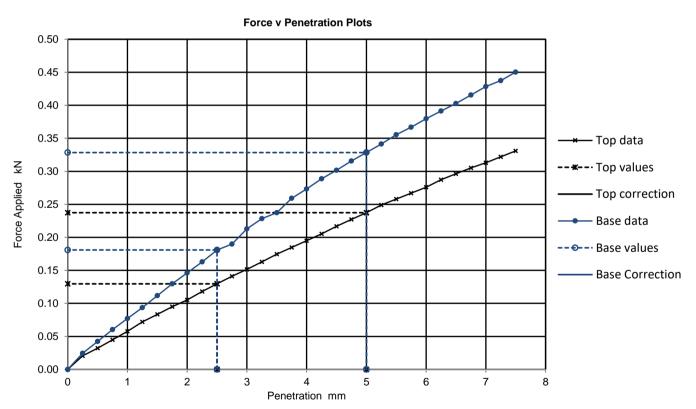
CALISEWAY	CAUSEWAY California Bearing Ratio (CBR)		Job Ref	21-1219		
California Bearing Ratio (CBR)		Borehole/Pit No.	BH105			
Site Name	DAA Airfield Underpass Ground Investigation	Sample No.	1			
Soil Description	Greyish brown sandy gravelly silty CLAY.		- Greyish brown sandy gravelly silty CLAY.		Depth m	4.00
Specimen Reference	Specimen Depth	m	Sample Type	В		
Specimen Description	Greyish brown sandy gravelly silty CLAY.		KeyLAB ID	Caus202205110		
Test Method	BS1377 : Part 4 : 1990, clause 7		CBR Test Number	1		

Specimen Preparation

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer Time to surface days Amount of swell recorded mm Material retained on 20mm sieve removed 24 % Dry density after soaking Mg/m3 Initial Specimen details 2.26 4.5 Bulk density Mg/m3 Surcharge applied kg Dry density 2.03 Mg/m3 kPa

11

%



Results Moisture CBR Values, % Curve Content correction 2.5mm 5mm Highest Average applied % 1.2 11 TOP No 1.0 1.2 BASE No 1.4 1.6 1.6 11

Moisture content

General remarks	Test specific remarks	Approved
	Average result may be reported if within 10% of the mean CBR value of top and base.	

UKAS TESTING

LAB 11R - Version 6

California Bearing Ratio (CBR)		Job Ref	21-1219	
		Borehole/Pit No.	BH109	
Site Name	DAA Airfield Underpass Ground Investigation	Sample No.	1	
Soil Description	Greyish brown sandy gravelly silty CLAY.	Depth m	2.50	
Specimen Reference	Specimen m Depth	Sample Type	В	
Specimen Description	Greyish brown sandy gravelly silty CLAY.	KeyLAB ID	Caus202205118	
Test Method	BS1377 : Part 4 : 1990, clause 7	CBR Test Number	1	

Specimen Preparation

Condition REMOULDED Soaking details Not soaked Details Period of soaking days Recompacted with specified standard effort using 2.5kg rammer

Time to surface days Amount of swell recorded mm

15 Dry density after soaking Material retained on 20mm sieve removed % Mg/m3

Initial Specimen details Bulk density 2.00 Mg/m3 Surcharge applied 4.5 kg kPa

Dry density 1.62 Mg/m3 Moisture content 23 %

Force v Penetration Plots 0.07 0.06 0.05 Top data Force Applied kN - Top values 0.04 - Top correction Base data 0.03 - •-- Base values Base Correction 0.02 0.01 0.00 6 Penetration mm

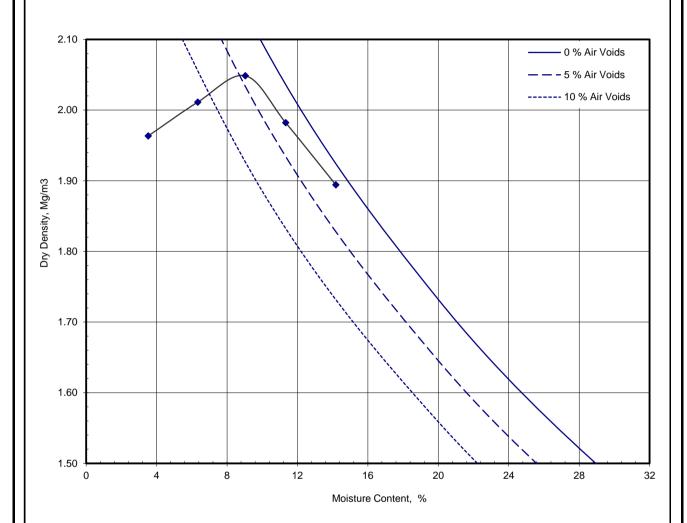
Results	Curve		CBR Va	lues, %		Moisture
	correction	2.5mm	5mm	Highest	Avorago	Content
	applied	2.311111	Jillill	riignest	Average	%
TOP	No	0.2	0.2	0.2	0.2	23
BASE	No	0.2	0.2	0.2	0.2	23

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	



LAB 11R - Version 6

CAUSEWAY	Dry Dens	sity / Moisture Conte	ent Relationship	Job Ref	21-1219	9
GEOTECH		Light Compact	ion	Borehole / Pit No	BH105	;
Site Name	DAA A	irfield Underpass Groun	Sample No	1		
Soil Description				Depth	4.00	m
Specimen Ref.	3	Specimen Depth	m	Sample Type	Туре В	
Test Method	BS13	77:Part 4:1990, clause 3.3	Keylab ID	Caus202205110		



Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	17
Material Retained on 20.0 mm Sieve	%	24
Particle Density - Assumed	Mg/m³	2.65

Maximum Dry Density	Mg/m³	2.05	
Optimum Moisture Content	%	9	

Approved

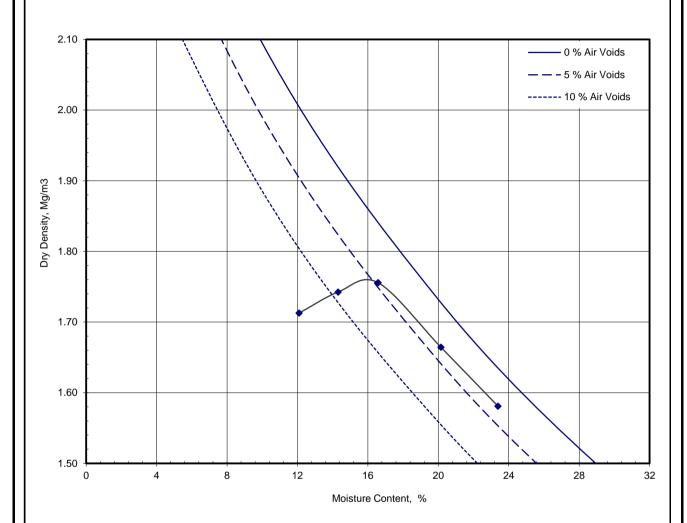
Stephen.Watson



LAB 08R - Version 5

Remarks

CAUSEWAY	Dry Dens	sity / Moisture Conte	ent Relationship		Job Ref	21-121	9
Light Compaction		Borehole / Pit No	BH109				
Site Name	DAA A	Airfield Underpass Groun	Sample No	1			
Soil Description					Depth	2.50	m
Specimen Ref.	3	Specimen Depth		m	Sample Type	В	
Test Method	BS13	77:Part 4:1990, clause 3.3		Keylab ID	Caus202205118		



Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	5
Material Retained on 20.0 mm Sieve	%	15
Particle Density - Assumed	Mg/m³	2.65

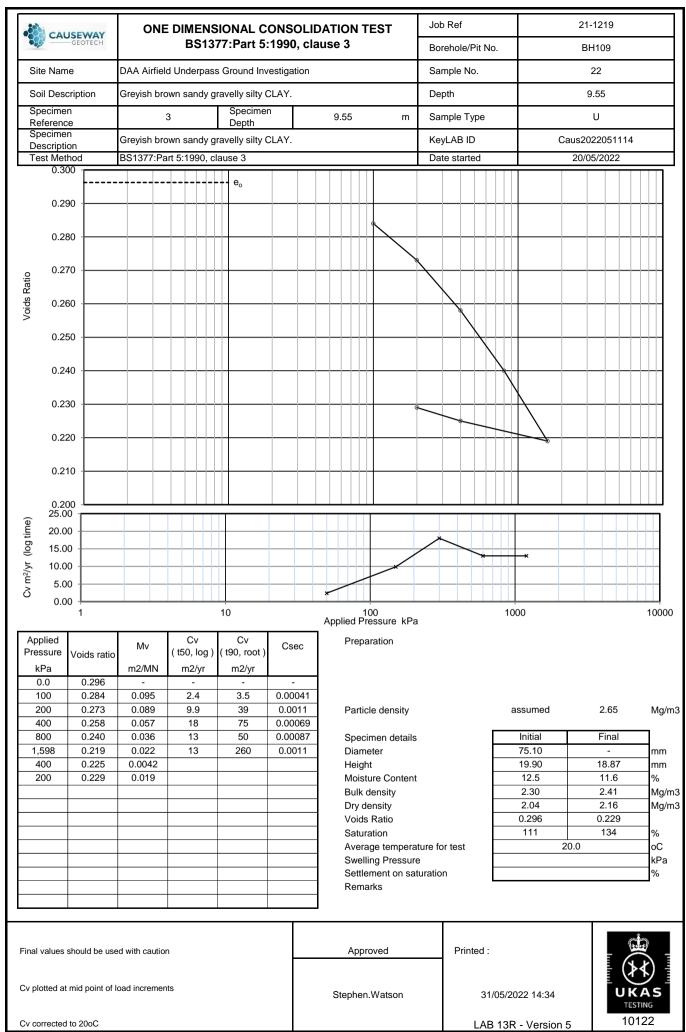
Maximum Dry Density	Mg/m³	1.76	
Optimum Moisture Content	%	17	

Approved Remarks

UKAS
TESTING
10122

Stephen.Watson

LAB 08R - Version 5



***	Unconsolidated Undrained Triaxial	Job Ref	21-1219
CAUSEWAY —— GEOTECH	Compression Test without measurement of pore pressure - single specimen	Borehole/Pit No.	BH109
Site Name	DAA Airfield Underpass Ground Investigation	Sample No.	22
Soil Description	Greyish brown sandy gravelly silty CLAY.	Depth	9.55
Specimen Reference	4 Specimen 9.60 m	Sample Type	U
Specimen Description	Stiff greyish brown sandy gravelly silty CLAY.	KeyLAB ID	Caus2022051114
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen	Date of test	26/05/2022
	Sample Condition Test Number	UNDISTURBED 1	
	Length Diameter	210.0 105.3	mm
	Bulk Density	2.28	mm Mg/m3
	Moisture Content Dry Density	12 2.05	% Mg/m3
	Rate of Strain	4.0	%/min
	Cell Pressure	200	kPa
	At failure Axial Strain Deviator Stress, (σ1 - σ3)f	16.8 361	% kPa
	Undrained Shear Strength, cu	181	kPa ½(σ1 - σ3)f
	Mode of Failure	Compound	
Deviator Stress v A	Axial Strain		
500			
ည် တ 400 •			
tress			
ू 300 -			
d Deviator Stress kPa	per properties and the state of		
100 Correcte			
o [/			
0 2	4 6 8 10 12 14 16 18 Axial Strain %	20 22 24	26 28 30 32
Mohr Circles			Deviator atrace corrected
250			Deviator stress corrected for area change and membrane effects
ප <u>200</u>			Mohr circles and their interpretation is not covered
Shear Strength kPa			by BS1377. This is provided for
treng		\setminus	information only.
S 100		+	
		\	
50			
0			
	100 150 200 250 300 350 400 450 Normal Stresses kPa	500 550 600	
Remarks	Approved	Printed	
	Stephen.Watson	31/05/2022 14:40	UKAS TESTING
		LAB 15R - Version 5	10122

Unconsolidated Undrained Triaxial Compression Test without measure				ont	Job Ref	21-1219		
——GEOTECH	•	essure - single specimen			Borehole/Pit No.	BH109		
Site Name	DAA Airfield Unde	erpass Ground Investi	Sample No.	23				
Soil Description	Greyish brown sa	ndy gravelly silty CLA		Depth	16.70			
Specimen Reference	3	Specimen Depth	I ' I 16/5 m I		Sample Type	U		
Specimen Description	Stiff greyish brow	n sandy gravelly silty	CLAY.		KeyLAB ID	Caus2022051117		
Test Method	BS1377 : Part 7 :	1990, clause 8, single		Date of test	26/05/2022			

Sample Condition Test Number Length Diameter **Bulk Density** Moisture Content Dry Density

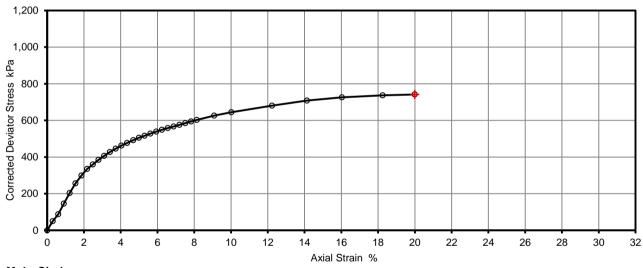
Rate of Strain Cell Pressure At failure

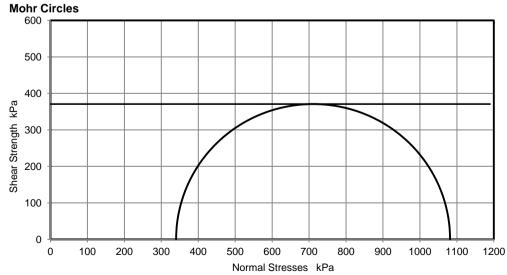
Axial Strain Deviator Stress, (σ 1 - σ 3)f Undrained Shear Strength, cu Mode of Failure

UNDISTURBED	
1	
210.1	mm
105.8	mm
2.08	Mg/m3
12	%
1.85	Mg/m3

	%/min
340	kPa
20.0	%
742	kPa
371	kPa ½(σ1 - σ3)f

Deviator Stress v Axial Strain





Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks

No failure defined. Testing terminated at 20% axial strain.

Approved Stephen.Watson

31/05/2022 14:40

Printed

LAB 15R - Version 5



10122

	ALICE\A/	AV					Poi	int L	oac	l Str	reng	th In	dex	Test	s			
	AUSEW. GEOTE										ry of							
Project No. 2	1-1219			Proje	ct Name	9	D	AA Ai	rfield l	Jnder	pass G	round I	nvestiç	gation				
Borehole	Sa	mple		Spe	ecimen	6.1.7		Type ISRM	alid (Y/N)		Dime	nsions		Force P	Equivalent diameter, De	Point Strengtl		Remarks (including
No.	Depth	Ref.	Туре	Ref.	Depth	Rock Type	Type (D, A, I, B)	Direction (L, P or U)	Failure Valid (Y/N)	Lne	W	Dps	Dps'		Equivale	Is	Is(5 0)	water content if measured)
PUMOS	m	00		0	m	LIMESTONE			VEO	mm	mm	mm	mm	kN	mm	MPa	MPa	
BH105	25.90	23	С	2	25.90	LIMESTONE	A	U	YES		100.5	80.0	71.0	13.3	95.3	1.5	2.0	
BH105	26.20	23	С	2	26.20		D	U	YES	59.4	100.4	100.4	98.0	11.1	99.2	1.1	1.5	
BH109	31.68	23	С	2	31.68	LIMESTONE	D	U	YES	72.3	101.5	101.5	100.0	5.6	100.7	0.6	0.8	
BH109	31.80	23	С	2	31.80	LIMESTONE	Α	U	YES		101.8	81.0	80.0	1.2	101.8	0.1	0.2	
BH109	32.00	23	С	2	32.00	LIMESTONE	Α	U	YES		101.2	74.0	72.0	1.3	96.3	0.1	0.2	
Test Type D - Diametral, A - A	Axial, I - Irre	egular L	_ump,	B - Blo	ck Dia	ametral P		Axial 	P			Bloc	k F			Irregula	ar lump	,
L - parallel to plane P - perpendicular t U - unknown or rar Dimensions Dps - Distance bet	to planes of ndom	weakn			D _{ps}	•	D _{ps}	w w		L _n	ne 🚾	W	†	Ţ	D _{ps}	7/	<u></u>	P D _{ps}
Dps' - at failure (see Lne - Length from W - Width of sho	ee ISRM no platens to r	ote 6) nearest	free e	nd		ne !										4	W ₁ 	
											Date F	Printed		Appro	ved B			a la constant de la c
						ds: 2007, unless note	ed othe	rwise										(≯ ≮) ▮
Detailed legend for Size factor, F = (D				sed or	n ISRM, is	s shown above.					31	/05/20	22				į	JKAS TESTING
. (,					L/		R - V	ersior	า 5				Steph	nen.W	Vatson		10122



LABORATORY REPORT



4043

Contract Number: PSL22/3407

Report Date: 26 May 2022

Client's Reference: 21-1219

Client Name: Causeway Geotech

8 Drumahiskey Road

Ballymoney Co.Antrim BT53 7QL

For the attention of: Stephen Watson

Contract Title: DAA Airfield Underpass Ground Investigation

Date Received: 12/5/2022
Date Commenced: 12/5/2022
Date Completed: 26/5/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins R Berriman S Royle

(Director) (Quality Manager) (Laboratory Manager)

L Knight S Eyre D Burton
(Senior Technician) (Senior Technician) (Advanced Testing Manager)

Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe,

Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642

e-mail: rberriman@prosoils.co.uk awatkins@prosoils.co.uk

Consolidated Undrained

Summary Report

Sample Details	Depth Description Type	4.25-4.50m Brown gravelly slightly sandy CLAY. Undisturbed, vertical orientation.						
sketch showing specimen location in original sample	Initial Sample Length Initial Sample Diameter Initial Sample Weight Initial Bulk Density Particle Density	Lo Do Wo Po Ps	(mm) (mm) (gr) (Mg/m3) (Mg/m3)	211.0 104.9 4266.0 2.34 2.66				
Initial Conditions				Stage 1	2			
Initial Cell Pressure Initial Back Pressure		σзі U ы	(kPa) (kPa)	630 550				
Membrane Thickness		mь	(mm)	0.600				
Displacement Input Load Input Pore Water Pressure Input Sample Volume		L IP N IP u pwp V	(mm) (N) (kPa) (cc)	CH 2 CH 1 CH 3 CH 2				
Initial Moisture		ωi	(%)	7.56				
Initial Dry Density Initial Voids Ratio		ρdi e į	(Mg/m3)	2.17 0.223				
Initial Degree of Saturation		Si	(%)	90				
B Value		В		0.96				
Final Conditions								
Final Moisture		ωf	(%)	7.72				
Final Dry Density		ρdf	(Mg/m3)	2.21				
Final Voids Ratio		ef	•	0.204				
Final Degree of Saturation		Sf	(%)	100.0 Stage 1 Max. Dev.	2			
Failure Criteria			•	Stress				
Strain At Failure		εf	(%)	6.30				
Stress At Failure		(σ1-σ3)	(kPa)	393.7				
Minor Stress At Failure		σ3'	(kPa)	129.0				
Major Stress At Failure		σ1'	(kPa)	522.7				
Principal Stress Ratio At Failure		σ1'/σ3'		4.052				
Notes								



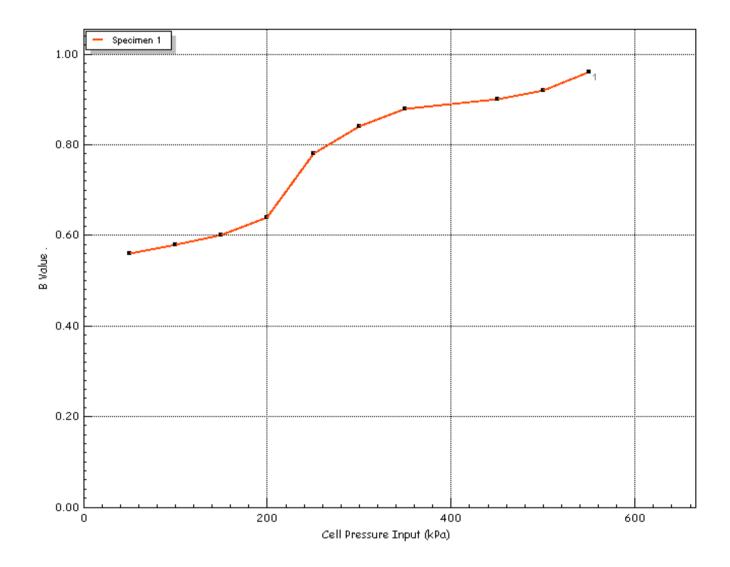
. 奥 .	Test Method	BS1377-8 : 1990 : Clause 7		Test Name Test Date	BH109 4.25-4.50m 19/05/2022	
. (≯≮) -		DAA Airfield Underpass	Ground	Borehole	BH109	
	Jobfile	Investigation		Sample	4.25-4.50m	
U K A S TESTING	Client	Causeway		Depth	4.25-4.50m	
4043			-			



Consolidated Undrained

Saturation Plots

Saturation Method			Stepped	
Cell Pressure Input	σ	(kPa)	550	
Pore Water Pressure Input	и рмр	(kPa)	528	
B Value	В		0.96	



_ de _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH109 4.25-4.50m 19/05/2022	
· (**) •	Jobfile	DAA Airfield Underpass Grou Investigation	nd Borehole Sample	BH109 4.25-4.50m	
UKAS TESTING	Client	Causeway	Depth	4.25-4.50m	
4043					

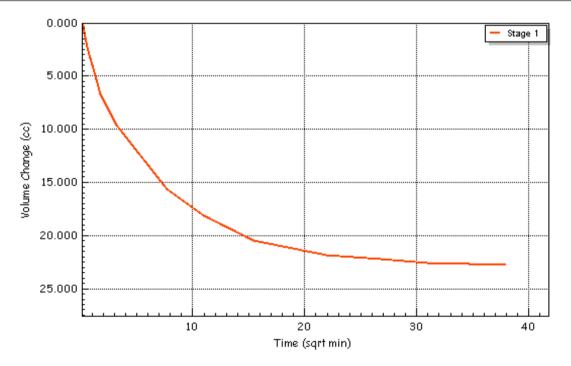


Consolidated Undrained

Consolidation Plots

σз	(kPa)	630	
и ы	(kPa)	550	
и рюр	(kPa)	606	
		Radial+One End	
	иы	u bi (kPa)	u bi (kPa) 550 u _{рwp} (kPa) 606

PWP Dissipation %	U%	(%)	100.00
Volumetric Strain	εν%	(%)	1.25
Corrected Length	Lc	(mm)	210.1
Corrected Area	Αc	(cm2)	85.71
Corrected Volume	Vс	(cc)	1800.806
100	t 100	(min)	66.24
Consolidation	cv	(m2/year)	3.430
Compressibility	m v	(m2/MN)	0.223
Test Time	t F	(h:m:s)	02:00:00
Estimated Strain to Failure	ε%	(%)	5.0
Shear Machine Speed	dг	(mm/min)	0.08755
Notes			

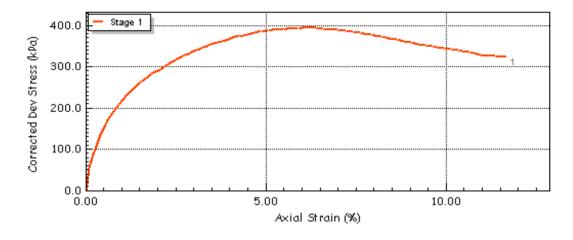


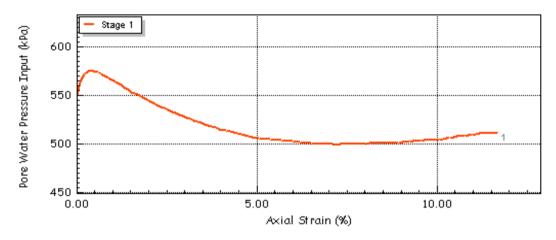
ch	Test Method	BS1377-8 : 1990 : Clause 7	Test Name	BH109 4.25-4.50m
- 🗯 -			Test Date	19/05/2022
. (\$4).		DAA Airfield Underpass Ground	Borehole	BH109
	Jobfile	Investigation	Sample	4.25-4.50m
U K A S TESTING	Client	Causeway	Depth	4.25-4.50m
4043				

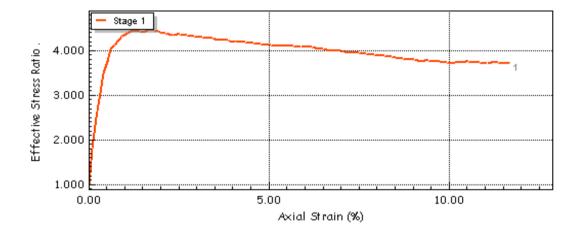


Consolidated Undrained

Shear Stage Plots





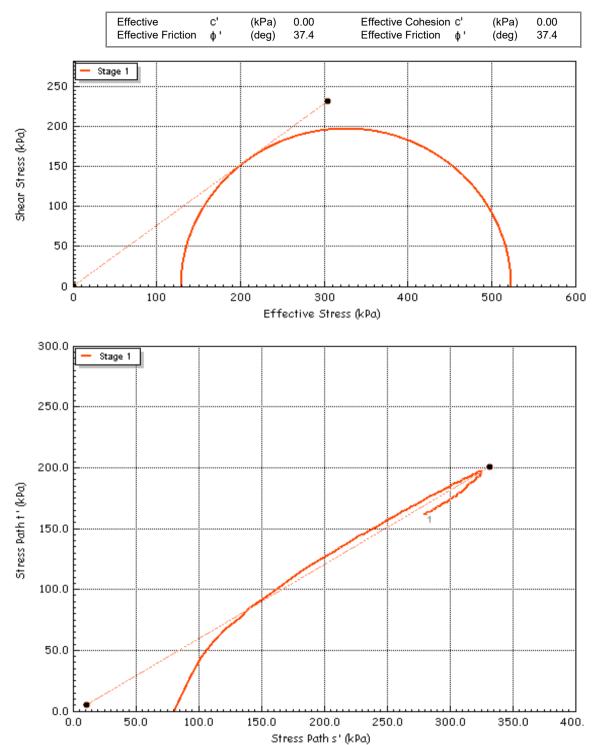


_ db _	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH109 4.25-4.50m 19/05/2022	
· (**) <u>*</u>	Jobfile	DAA Airfield Underpass Grou Investigation	nd Borehole Sample	BH109 4.25-4.50m	
UKAS TESTING	Client	Causeway	Depth	4.25-4.50m	
4043			,		



Consolidated Undrained

Shear Stage Plots



_ (c)	Test Method	BS1377-8 : 1990 : Clause 7	Test Name Test Date	BH109 4.25-4.50m 19/05/2022
· [**]	Jobfile	DAA Airfield Underpass Ground Investigation	Borehole Sample	BH109 4.25-4.50m
UKAS TESTING 4043	Client	Causeway	Depth	4.25-4.50m





eurofins Chemtest

Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-18273-1

Initial Date of Issue: 24-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

Colm Hurley
Darren O'Mahony
Gabriella Horan
Joe Gervin
John Cameron0
Lucy Newland
Martin Gardiner
Matthew Gilbert
Neil Haggan
Paul Dunlop
Sean Ross
Stephen Franey

Stephen Franey Stephen Watson Stuart Abraham Thomas McAllister

Project 21-1219 DAA Airfield Underpass

Quotation No.: Date Received: 17-May-2022

Order No.: Date Instructed: 17-May-2022

No. of Samples: 4

Turnaround (Wkdays): 7 Results Due: 25-May-2022

Date Approved: 24-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: 21-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Che	mtest Jo	b No.:	22-18273	22-18273	22-18273	22-18273
Quotation No.:		Chemte	st Sam	ole ID.:	1430289	1430290	1430291	1430292
Order No.:		Clie	nt Samp	le Ref.:	2	3	11	12
		Sa	ample Lo	cation:	BH105	BH105	BH109	BH109
			Sample	е Туре:	SOIL	SOIL	SOIL	SOIL
			Top Dep	oth (m):	5.0	8.0	2.5	3.5
			Date Sa	ımpled:	16-May-2022	16-May-2022	16-May-2022	16-May-2022
Determinand	Accred.	SOP	Units	LOD				
Moisture	N	2030	%	0.020	6.4	14	18	11
pH (2.5:1)	N	2010		4.0	9.7	9.8	9.2	9.4
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.13	0.11	< 0.010	0.023
Total Sulphur	U	2175	%	0.010	0.45	0.29	0.10	0.049
Chloride (Water Soluble)	U	2220	g/l	0.010	0.012	0.010	< 0.010	< 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010	0.023	0.039	0.076	0.023
Organic Matter	U	2625	%	0.40			1.3	0.45

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	рН	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.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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



HEAD OFFICE Causeway Geotech Ltd

8 Drumahiskey Road Ballymoney Co. Antrim, N. Ireland, BT53 7QL NI: +44 (0)28 276 66640

> Registered in Northern Ireland. Company Number: NI610766

REGIONAL OFFICE Causeway Geotech (IRL) Ltd

Unit 1 Fingal House Stephenstown Industrial Estate Balbriggan, Co Dublin, Ireland, K32 VR66 **ROI**: +353 (0)1 526 7465

> Registered in Ireland. Company Number: 633786

www.causewaygeotech.com

8 June 2022

SOIL AND ROCK SAMPLE ANALYSIS LABORATORY TEST REPORT

Project Name:	DAA Airfield Underpass Ground Investigation
Project No.:	21-1219
Client:	DAA
Engineer:	Ramboll Consulting Engineers

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 26/05/2022 and 08/06/2022.

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: DAA Airfield Underpass Ground Investigation

Report Reference: Schedule 4 - 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	3
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	3
SOIL	Bulk and dry density by Linear Measurement Method	BS 1377-2: 1990: Cl 7.2	3
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	7
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	2
SOIL	Dry density/moisture content relationship (2.5 kg rammer)	BS 1377-4: 1990: Cl 3.3 & 3.4	1
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	1
SOIL	Undrained shear strength – triaxial compression without measurement of pore pressure (loads from 0.12 to 24 kN)	BS 1377-7: 1990: Cl 8	1
ROCK	Point load index	ISRM Commission on Testing Methods. Suggested Method for Determining Point Load Strength 1985	2
ROCK	Uniaxial Compressive Strength (UCS)*	ISRM Suggested Methods -Rock Characterization Testing and Monitoring, Ed. E T Brown - 1981	1

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)	pH Value of Soil		1
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	Organic Matter Content		1
SOIL – Subcontracted to Eurofins Chemtest Ltd (UKAS 2183)	BRE Test - Suite D		1



Summary of Classification Test Results

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

Hole No.		Sar	mple	1	Soil Description	Dens bulk	ity dry	W	Passing 425µm	LL	PL	PI	Particle density	Casagrande
Hole No.	Ref	Тор	Base	Туре	Soil Description	Mg/m	ļ	%	%	%	%	%	Mg/m3	Classification
BH102	2	5.00	13.00	В	Greyish brown sandy gravelly silty CLAY.		2.31	9.2	80	21 -1pt	14	7		CL
BH102	7	16.40	20.25	В	Greyish brown sandy silty CLAY.	1.99	1.65	19.0	97	25 -1pt	19	6		ML/CL
BH103	4	11.25	13.15	В	Grey sandy gravelly silty CLAY.	2.22	2.04	9.4	62	28 -1pt	15	13		CL
All tasts nerfor	ull tests performed in accordance with BS1377:1990 unless specified otherwise LAB 01R Version 5					01R Version 5								

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

LAB 01R Version 5

Key

Density test Liquid Limit Particle density

Linear measurement unless: 4pt cone unless: sp - small pyknometer

1pt - single point test

wd - water displacement wi - immersion in water

cas - Casagrande method

gj - gas jar

Date Printed

Approved By

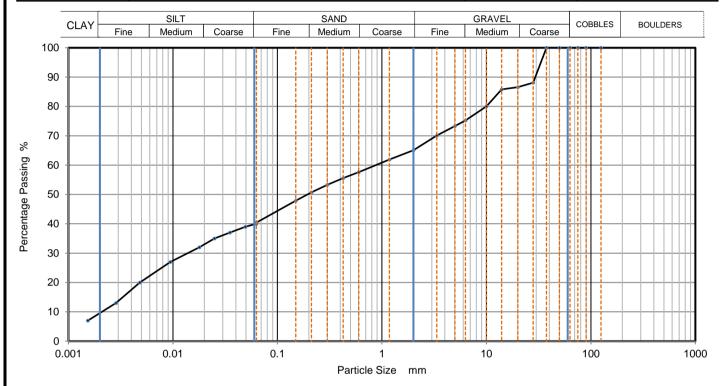
06/08/2022 00:00



10122

Stephen.Watson

CAUSEWAY	PARTICLE SIZE DISTRIBUTION -			Job Ref	21-1219	
—— GEOTECH	PARII	TICLE SIZE DISTRIBUTION			Borehole/Pit No.	BH102
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation				2
Soil Description	Greyish brown sandy gravelly silty CLAY.			Depth, m	5.00	
Specimen Reference	10 Specimen 5 m			Sample Type	В	
Test Method	3S1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202205237	



Sieving		Sedim	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	40
90	100	0.04935	39
75	100	0.03513	37
63	100	0.02500	35
50	100	0.01791	32
37.5	100	0.00942	27
28	88	0.00482	20
20	87	0.00285	13
14	86	0.00153	7
10	80		
6.3	75		
5	73		
3.35	70		
2	65		
1.18	62		
0.6	58	Particle density	(assumed)
0.425	56	2.65	Mg/m3
0.3	53		
0.212	51		
0.15	48		
0.063	40		

Dry Mass of sample, g	2928
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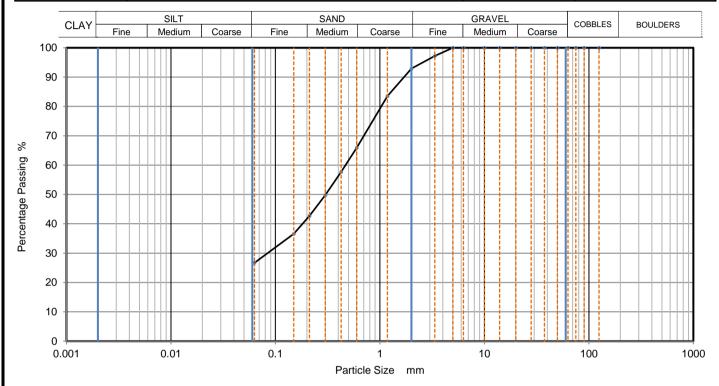
Sample Proportions	% dry mass
Cobbles	0.0
Gravel	34.9
Sand	24.7
Silt	30.8
Clay	9.6

Grading Analysis		
D100	mm	
D60	mm	0.875
D30	mm	0.0139
D10	mm	0.00207
Uniformity Coefficient		420
Curvature Coefficient		0.11





CAUSEWAY	DARTI	PARTICLE SIZE DISTRIBUTION -			Job Ref	21-1219
—— GEOTECH	PARII				Borehole/Pit No.	BH102
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation				3
Soil Description	Greyish brown clayey fine to coarse SAND.			Depth, m	13.00	
Specimen Reference	3 Specimen 13 m			Sample Type	В	
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus202205238	



Siev	Sieving		ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	97		
2	93		
1.18	84		
0.6	66		
0.425	58	1	
0.3	50		
0.212	43]	
0.15	37]	
0.063	27		

	_
Dry Mass of sample, g	211

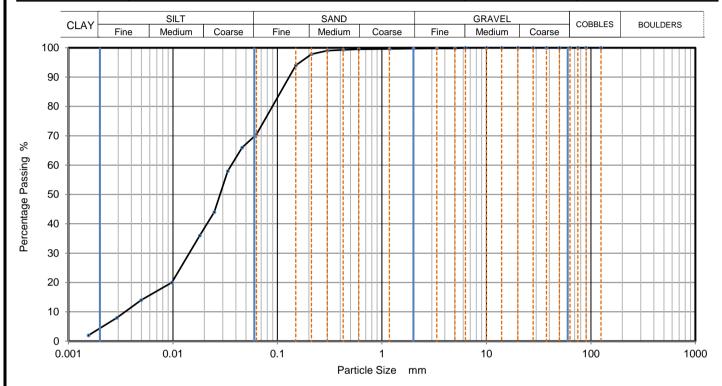
Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.1
Sand	66.2
Fines < 0.063mm	27.0

Grading Analysis		
D100	mm	
D60	mm	0.468
D30	mm	0.0841
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		





CAUSEWAY	PARTICLE SIZE DISTRIBUTION -			Job Ref	21-1219	
GEOTECH				Borehole/Pit No.	BH102	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	7
Soil Description	Greyish brown sandy silty CLAY.			Depth, m	16.40	
Specimen Reference	Specimen 16.4 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clau	ses 9.2 and 9.5			KeyLAB ID	Caus202205239



Siev	/ing	Sedimo	entation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06086	70
90	100	0.04596	66
75	100	0.03348	58
63	100	0.02484	44
50	100	0.01802	36
37.5	100	0.00976	20
28	100	0.00496	14
20	100	0.00291	8
14	100	0.00156	2
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density	(assumed)
0.425	99	2.65	Mg/m3
0.3	99		
0.212	98		
0.15	94		
0.063	70		

Dry Mass of sample, g	241

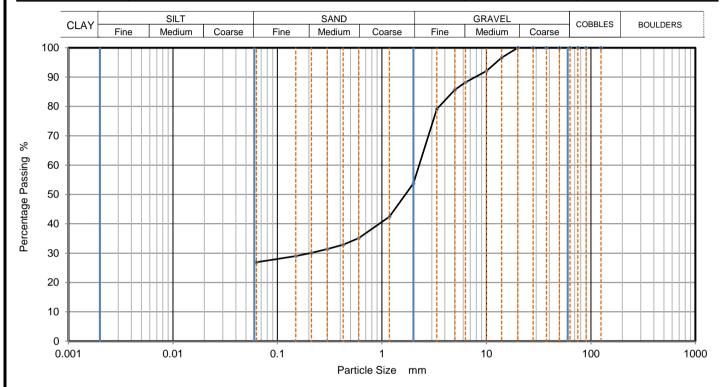
Sample Proportions	% dry mass		
Cobbles	0.0		
Gravel	0.3		
Sand	29.3		
Silt	66.0		
Clay	4.4		

Grading Analysis		
D100	mm	
D60	mm	0.0358
D30	mm	0.0142
D10	mm	0.00346
Uniformity Coefficient		10
Curvature Coefficient		1.6





CAUSEWAY	DARTICI E CIZE DISTRIBUTION			Job Ref	21-1219	
—— GEOTECH	PARTICLE SIZE DISTRIBUTION		Borehole/Pit No.	BH103		
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	2
Soil Description	Grey slightly gravelly slightly clayey fine to coarse SAND.			Depth, m	4.90	
Specimen Reference	Specimen 4.9 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clau	se 9.2			KeyLAB ID	Caus2022052313



Siev	ving	Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	92		
6.3	88		
5	86		
3.35	79		
2	54		
1.18	42		
0.6	35		
0.425	33	1	
0.3	31		
0.212	30		
0.15	29]	
0.063	27		

Dry Mass of sample, g	505
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Sample Proportions	% dry mass
Cobbles	0.0
Gravel	46.2
Sand	26.9
Fines < 0.063mm	27.0

Grading Analysis		
D100	mm	
D60	mm	2.27
D30	mm	0.208
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

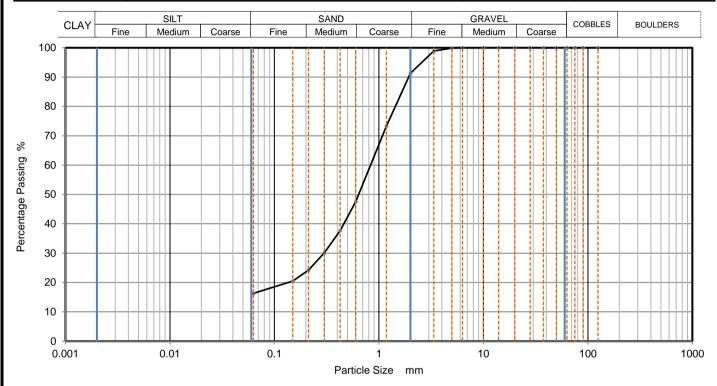
Preparation and testing in accordance with BS1377-2:1990 unless noted below





LAB 05R - Version 5

CAUSEWAY	PARTICLE SIZE DISTRIBUTION			Job Ref	21-1219	
GEOTECH	PARII	ICLE 21ZE DISTRIBUTION		Borehole/Pit No.	ВН103	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	3
Soil Description	Grey slightly gravelly slightly clayey fine to coarse SAND.			Depth, m	9.50	
Specimen Reference	3 Specimen 9.5 m		Sample Type	В		
Test Method	BS1377:Part 2:1990, clau	se 9.2			KeyLAB ID	Caus2022052314



Siev	Sieving		ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	91		
1.18	73		
0.6	48		
0.425	38		
0.3	30		
0.212	24		
0.15	21]	
0.063	16		

Dry Mass of sample, g	238
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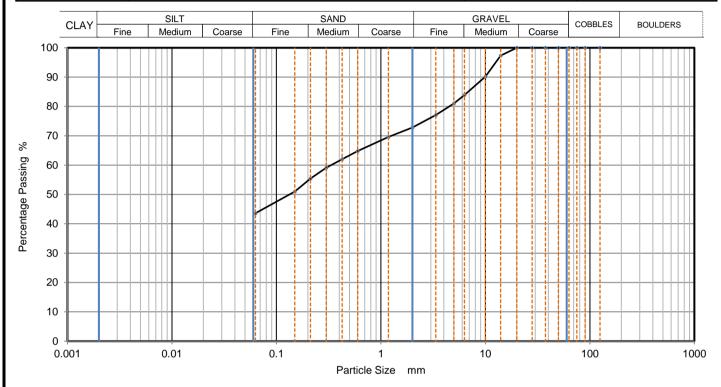
Sample Proportions % dry mass		
Cobbles	0.0	
Gravel	8.7	
Sand	74.9	
Fines < 0.063mm	16.0	

Grading Analysis		
D100	mm	
D60	mm	0.833
D30	mm	0.298
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		





CAUSEWAY	DADTICLE SIZE DISTRIBUTION		Job Ref	21-1219		
—— GEOTECH	PARII	PARTICLE SIZE DISTRIBUTION -			Borehole/Pit No.	ВН103
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	4	
Soil Description	Grey sandy gravelly silty CLAY.			Depth, m	11.25	
Specimen Reference	Specimen 11.25 m			Sample Type	В	
Test Method	Method BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022052315	



Siev	ving	Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	90		
6.3	84		
5	81		
3.35	77		
2	73		
1.18	70		
0.6	65		
0.425	62		
0.3	59		_
0.212	55		
0.15	51		
0.063	44		

Dry Mass of sample, g	506
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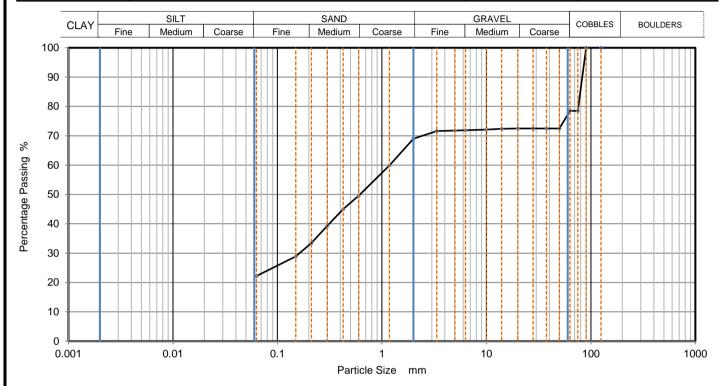
Sample Proportions	% dry mass
Cobbles	0.0
Gravel	27.2
Sand	29.2
Fines < 0.063mm	44.0

Grading Analysis		
D100	mm	
D60	mm	0.335
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		





CAUSEWAY	DARTICIE CIZE DICTRIBUTIONI		Job Ref	21-1219		
GEOTECH	PARTICLE SIZE DISTRIBUTION			Borehole/Pit No.	ВН103	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			Sample No.	6
Soil Description	Grey slightly gravelly slightly clayey fine to coarse SAND.			Depth, m	16.90	
Specimen Reference	3 Specimen 16.9 m			Sample Type	В	
Test Method	d BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2022052317	



Sieving		Sedime	ntation
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	79		
63	79		
50	73		
37.5	73		
28	73		
20	73		
14	72		
10	72		
6.3	72		
5	72		
3.35	72		
2	69		
1.18	60		
0.6	50		
0.425	45	1	
0.3	39		
0.212	34]	
0.15	29]	
0.063	22		

Dry Mass of sample, g	5165

Sample Proportions	% dry mass
Cobbles	21.5
Gravel	9.5
Sand	46.8
Fines < 0.063mm	22.0

Grading Analysis		
D100	mm	
D60	mm	1.19
D30	mm	0.163
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		





California Bearing Ratio (CBR)		Job Ref	21-1219		
GEOTECH	California Bearing Ratio (CBR)		Borehole/Pit No.	BH102	
Site Name	DAA Airfield Underpas	DAA Airfield Underpass Ground Investigation			1
Soil Description	Dark brown sandy slightly gravelly silty CLAY.		Depth m	4.00	
Specimen Reference	Specimen m Depth		Sample Type	В	
Specimen Description	Dark brown sandy slightly gravelly silty CLAY.		KeyLAB ID	Caus202205236	
Test Method	BS1377 : Part 4 : 1990), clause 7		CBR Test Number	1

Specimen Preparation

Condition REMOULDED Soaking details Not soaked

Details Period of soaking days Recompacted with specified standard effort using 2.5kg

Time to surface days Amount of swell recorded $\mathsf{m}\mathsf{m}$

0 % Dry density after soaking Material retained on 20mm sieve removed Mg/m3

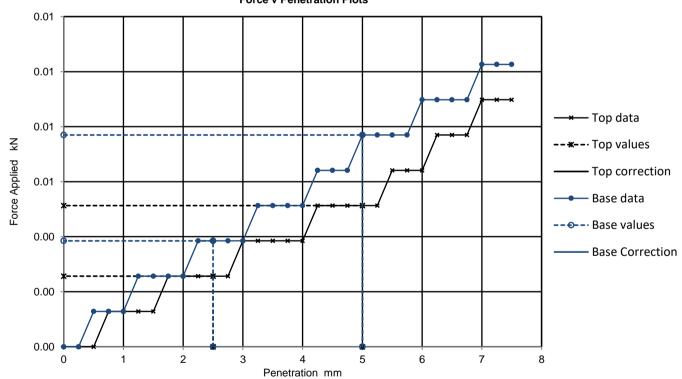
Initial Specimen details Bulk density 1.79 Mg/m3 Surcharge applied 4.5 kg 1.34

Mg/m3

Moisture content 34 %

Dry density

Force v Penetration Plots



Results

TOP BASE

Curve		lues, %		
correction applied	2.5mm	5mm	Highest	Average
No	0.0	0.0	0.0	
Nο	0.0	0.0	0.0	

Moisture Content	
%	
34	
36	

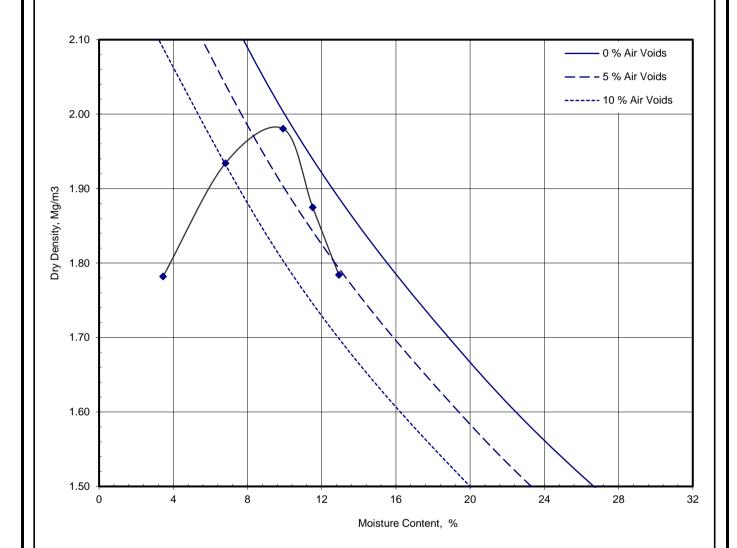
General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and	
	base.	



10122

kPa

CAUSEWAY	Dry Density	Moisture Content Relationship Light Compaction		nsity / Moisture Content Relationship		21-1219	,
CAUSEWAY				Borehole / Pit No	No BH102		
Site Name	DAA Airfield Underpass Ground Investigation				Sample No	1	
Soil Description	Dark brown sandy slightly gravelly silty CLAY.				Depth	4.00	m
Specimen Ref.	5	Specimen Depth	n	n	Sample Type	В	
Test Method	BS1377:Pa	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer			Keylab ID	Caus202205	5236



Preparation		Material used was air dried
Mould Type		1 LITRE
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	0
Particle Density - Assumed	Mg/m³	2.50

Maximum Dry Density	Mg/m³	1.98
Optimum Moisture Content	%	9.9

Remarks

Approved

Stephen.Watson



Unconsolidated Undrained Triaxial Compression Test without measurement			Job Ref	21-1219		
GEOTECH	of pore pressu			111	Borehole/Pit No.	BH103
Site Name	DAA Airfield Underpass Ground Investigation			Sample No.	22	
Soil Description	Brownish grey sandy slightly gravelly silty CLAY.			Depth	16.10	
Specimen Reference	3	Specimen Depth	16.15	m	Sample Type	U
Specimen Description	Stiff brownish grey sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2022052316	
Test Method	BS1377 : Part 7 : 199	90, clause 8, sinç	gle specimen		Date of test	07/06/2022

Sample Condition Test Number Length Diameter Bulk Density Moisture Content Dry Density

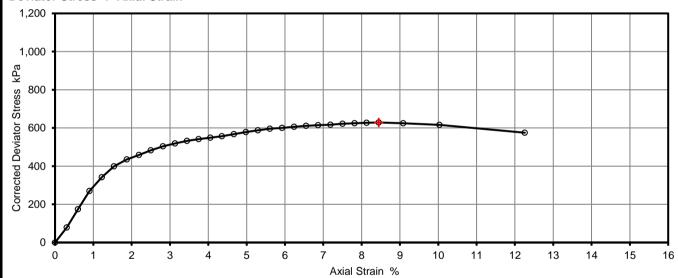
Rate of Strain Cell Pressure At failure

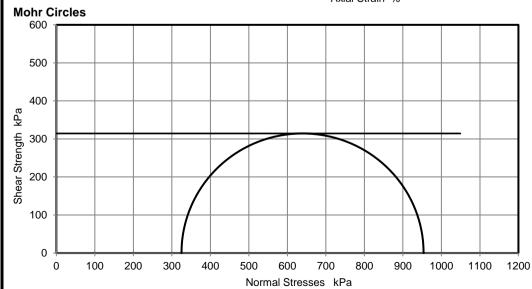
Axial Strain Deviator Stress, (σ 1 - σ 3)f Undrained Shear Strength, cu Mode of Failure

UNDISTURBED	l
1	l
210.0	mm
105.0	mm
2.30	Mg/m3
9	%
2.11	Mg/m3

4.0	%/min
325	kPa
8.4	%
629	kPa
314	kPa ½(σ1 - σ3)f
Compound	

Deviator Stress v Axial Strain





Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks

Stephen.Watson

Approved

Printed

08/06/2022 11:43

LAB 15R - Version 5



10122

CAUSEWAY GEOTECH				Point Load Strength Index Tests Summary of Results														
Project No.				Proje	ect Nam	e					-							
2	1-1219				DAA Airfield Underpass Ground Investigation													
Borehole	Sample		Specimen		Deals Time	Test Type see ISRM		Failure Valid (Y/N)		Dimen		nsions		Equivalent diameter, De	Point Load Strength Index		Remarks (including	
No.	Depth	Ref.	Туре	Ref.	Depth	Rock Type	Type (D, A, I, B)	Direction (L, P or U)	Failure V	Lne		Dps	Dps'			Is	Is(5 0)	water content if measured)
BH102	m 23.05	6	С	3	m 23.05	LIMESTONE	D	U	YES	mm 91.1	mm 100.7	mm 100.7	mm 99.0	kN 9.0	mm 99.8	MPa 0.9	MPa 1.2	
						LIMESTONE												
BH103	24.75	6	С	3	24.75	LINESTONE	D	U	YES	116.2	101.5	101.5	100.0	20.7	100.7	2.0	2.8	
Test Type D - Diametral, A - Direction L - parallel to plan P - perpendicular U - unknown or ra Dimensions Dps - Distance be Dps' - at failure (s Lne - Length from W - Width of sho	es of weakr to planes of ndom tween plate see ISRM no platens to r	ness weakr ns (pla ote 6) nearest	ness aten se	paratio	D _{ps} D _{ps} L	ametral P	D _{ps} ↓	Axial	P	L _r	ne 🖈	Bloo	k		D _{ps}		ar lump	D _{ps}
				_							Date F	Printed		Appro	ved B	<u>_</u>		
						ods : 2007, unless notos s shown above.	ed othe	rwise			06/08	3/2022	00:00					≯ ⊀) ▮
	tize factor, F = (De/50)0.45 for all tests.																	
						L/	AB 17	K - V	ersio	n 5				Stepl	nen.V	Vatson	1	10122



UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Project No.

Project Name

21-1219

DAA Airfield Underpass Ground Investigation

Sampl		nple			Specimen Dimensions ²			Bulk	Water	Uniaxial Compression ³				
Hole No.	Ref	Тор	Base	Туре	Rock Type	Dia.	Length mm	H/D	Density ² Mg/m ³	Content ¹ %	Condition	Mode of failure	UCS MPa	Remarks
BH102	6	23.40	23.50	С	LIMESTONE	100.8	199.7	2.0	2.72	0.7	as received	F	86.2	

- 1 ISRM p87 test 1, water content at 105 \pm 3 $^{\circ}$ C, specimen as tested for UCS
- 2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density
- 3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

S - Single shear

MS - multiple shear

AC - Axial cleavage

F - Fragmented

117				
Test Specification	Date Printed	Approved By	Table	
International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007	08/06/2022			1
			sheet	
		Stephen.Watson		1



eurofins

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Chemtest

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-19763-1

Initial Date of Issue: 31-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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

Stephen Watson
Stuart Abraham
Thomas McAllister

Project 21-1219 DAA Airfield Underpass

Quotation No.: Date Received: 26-May-2022

Order No.: Date Instructed: 26-May-2022

No. of Samples: 2

Turnaround (Wkdays): 7 Results Due: 07-Jun-2022

Date Approved: 31-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: 21-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Che	ntest J	ob No.:	22-19763	22-19763	
Quotation No.:	(Chemte	st Sam	ple ID.:	1436873	1436874	
Order No.:		Clie	nt Samp	le Ref.:	1	1	
		Sa	ample Lo	ocation:	BH102	BH103	
			Sampl	е Туре:	SOIL	SOIL	
			Top Dep	oth (m):	4	4	
				25-May-2022	25-May-2022		
Determinand	Accred.	SOP	Units	LOD			
Moisture	N	2030	%	0.020	33	16	
pH (2.5:1)	N	2010		4.0	11.3	11.2	
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010	< 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.20	0.15	
Total Sulphur	U	2175	%	0.010	0.34	0.32	
Chloride (Water Soluble)	U	2220	g/l	0.010	0.013	< 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	
Sulphate (Acid Soluble)	U	2430	%	0.010	0.040	0.030	
Organic Matter	U	2625	%	0.40	1.2	1.4	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	рН	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.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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

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	21-1219	21-1219			Colm Hurley		
Project Name DAA Airfield Underpass GI				Position	Project Manager		
1 Toject Ivaille	Project Name BAA Aimeid Onderpass Gr		From	Joseph Nicholl			
TR reference	TR reference 21-1219 / G04			·			
				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	5	Sample		Test		
	Number	Depth	Туре		Reason for Restriction	Required Action
BH102	10	(m) 23.05	U	UU Triaxial	LIMESTONE	CANCEL
BH102	9	23.40	U	UU Triaxial	LIMESTONE	CANCEL
BH103	1	4.00	В	CBR	Insufficient material to conduct test	CANCEL
BH103	1	4.00	В	Dry density/ moisture content	Insufficient material to conduct test	CANCEL

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

Laboratory Signature	Project Manager Signature	
Joseph Nicholl	Colm Hurley	
Date 24 May 2022	Date	



APPENDIX F ENVIRONMENTAL LABORATORY TEST RESULTS



Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-12231-1

Initial Date of Issue: 12-Apr-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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

Stuart Abraham Thomas McAllister

Project DAA Airfield Underpass

Quotation No.: Q18-13245 Date Received: 31-Mar-2022

Order No.: Date Instructed: 04-Apr-2022

No. of Samples: 2

Turnaround (Wkdays): 7 Results Due: 12-Apr-2022

Date Approved: 12-Apr-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: DAA Airfield Underpass

Client: Causeway Geotech Ltd				ob No.:	22-12231	22-12231
Quotation No.: Q18-13245	(st Sam		1402848	1402850
		Sa	ample Lo	ocation:	BH110	BH110
			Sampl	e Type:	SOIL	SOIL
			Top De	oth (m):	2.60	7.65
		Date Sampled:			29-Mar-2022	29-Mar-2022
			Asbest	os Lab:	NEW-ASB	NEW-ASB
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	24	2.5
pH	U	2010		4.0	8.3	9.1
Arsenic	U	2450	mg/kg	1.0	12	14
Barium	Ü	2450	,	10	120	85
Cadmium	Ü	2450	mg/kg	0.10	2.2	0.92
Chromium	Ü	2450	mg/kg	1.0	27	10
Molybdenum	U	2450	mg/kg	2.0	3.2	3.6
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0
Copper	U	2450		0.50	42	12
Mercury	Ü	2450	mg/kg	0.10	0.27	0.12
Nickel	Ü	2450	mg/kg		45	20
Lead	Ü	2450	mg/kg	0.50	65	9.8
Selenium	Ü	2450)	0.20	1.1	3.3
Zinc	Ü	2450	mg/kg		120	33
Chromium (Trivalent)	N	2490	mg/kg	1.0	27	10
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	4.2	0.72
Aliphatic TPH >C5-C6	N	2680		1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680		1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680			< 10	< 10

Results - Soil

Project: DAA Airfield Underpass

Client: Causeway Geotech Ltd	Chemtest Job No.:			22-12231	22-12231	
Quotation No.: Q18-13245	(Chemte	st Sam	ple ID.:	1402848	1402850
		Sa	ample Lo	cation:	BH110	BH110
			Sampl	е Туре:	SOIL	SOIL
			Top Dep		2.60	7.65
			Date Sa	ampled:	29-Mar-2022	29-Mar-2022
			Asbest	os Lab:	NEW-ASB	NEW-ASB
Determinand	Accred.	SOP	Units	LOD		
Benzene	U	2760	μg/kg	1.0	< 1.0	1.3
Toluene	U	2760	μg/kg	1.0	< 1.0	3.5
Ethylbenzene	U	2760	μg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	μg/kg	1.0	< 1.0	< 1.0
o-Xylene	U	2760	μg/kg	1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	μg/kg	1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	0.57	< 0.10
Anthracene	U	2800	mg/kg	0.10	0.13	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	0.23	< 0.10
Pyrene	U	2800	mg/kg	0.10	0.30	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	0.19	< 0.10
Chrysene	U	2800	mg/kg	0.10	0.16	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: DAA Airfield Underpass

Project: DAA Airfield Underpass							
Chemtest Job No:	22-12231				Landflll \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1402848					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH110					hazardous	Hazardous
Top Depth(m):	2.60				Inert Waste	waste in non-	Waste
Bottom Depth(m):					Landfill	hazardous	Landfill
Sampling Date:	29-Mar-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	4.2	3	5	6
Loss On Ignition	2610	U	%	11			10
Total BTEX	2760	U	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1		
TPH Total WAC	2670	U	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН	2010	U		8.3		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.0090		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0022	0.022	0.5	2	25
Barium	1455	U	0.026	0.26	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0053	0.053	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.012	0.12	0.5	10	30
Nickel	1455	U	0.0023	0.024	0.4	10	40
Lead	1455	U	0.0006	0.0058	0.5	10	50
Antimony	1455	U	0.0027	0.027	0.06	0.7	5
Selenium	1455	U	0.0006	0.0055	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.6	16	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	6.6	66	1000	20000	50000
Total Dissolved Solids	1020	N	120	1200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1		-
Dissolved Organic Carbon	1610	U	8.9	89	500	800	1000

Solid Information				
Dry mass of test portion/kg	0.090			
Moisture (%)	24			

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: DAA Airfield Underpass

Project: DAA Airfield Underpass							
Chemtest Job No:	22-12231				Landfill \	Waste Acceptanc	e Criteria
Chemtest Sample ID:	1402850					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH110					hazardous	Hazardous
Top Depth(m):	7.65				Inert Waste	waste in non-	Waste
Bottom Depth(m):					Landfill	hazardous	Landfill
Sampling Date:	29-Mar-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.72	3	5	6
Loss On Ignition	2610	U	%	1.1			10
Total BTEX	2760	U	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1		
TPH Total WAC	2670	U	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH	2010	U		9.1		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.058		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance l	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0005	0.0050	0.5	2	25
Barium	1455	U	0.034	0.34	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0015	0.015	2	50	100
Mercury	1455	U	0.00009	0.00086	0.01	0.2	2
Molybdenum	1455	U	0.012	0.12	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0018	0.019	0.06	0.7	5
Selenium	1455	U	0.022	0.22	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	4.9	49	800	15000	25000
Fluoride	1220	U	0.17	1.7	10	150	500
Sulphate	1220	U	27	270	1000	20000	50000
Total Dissolved Solids	1020	N	98	980	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information				
Dry mass of test portion/kg	0.090			
Moisture (%)	2.5			

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	determination by inductively coupled plasma
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	рН	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21- C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Test Methods

SOP	Title	Parameters included	Method summary
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-12969-1

Initial Date of Issue: 14-Apr-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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

Stephen Franey
Stephen Watson
Stuart Abraham
Thomas McAllister

Project 21-12231 DAA Airfields Underpass

Quotation No.: Q18-13245 Date Received: 06-Apr-2022

Order No.: Date Instructed: 06-Apr-2022

No. of Samples: 2

Turnaround (Wkdays): 8 Results Due: 19-Apr-2022

Date Approved: 14-Apr-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: 21-12231 DAA Airfields Underpass

Client: Causeway Geotech Ltd	Chemtest Job No.:				22-12969	22-12969
Quotation No.: Q18-13245	(st Sam		1406469	1406470
		Sa	ample Lo	BH101	BH101	
				e Type:	SOIL	SOIL
			Top Dep	, ,	4.30	5.55
			Date Sa		03-Apr-2022	03-Apr-2022
			Asbest	os Lab:	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	9.8	5.0
рН	U	2010		4.0	9.1	9.3
Arsenic	U	2450	mg/kg	1.0	20	23
Barium	U		mg/kg	10	87	79
Cadmium	U		mg/kg	0.10	1.6	1.3
Chromium	U	-	mg/kg	1.0	19	17
Molybdenum	U	2450		2.0	4.1	3.4
Antimony	N		mg/kg	2.0	2.0	< 2.0
Copper	U	2450	mg/kg	0.50	27	27
Mercury	U	2450	mg/kg	0.10	0.12	0.19
Nickel	U		mg/kg	0.50	44	36
Lead	U		mg/kg	0.50	22	22
Selenium	U		mg/kg	0.20	2.3	1.4
Zinc	U		mg/kg	0.50	65	88
Chromium (Trivalent)	N	2490		1.0	19	17
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	0.55	0.72
Aliphatic TPH >C5-C6	N		mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N		mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U		mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U		mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U		mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680		1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N		mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N		mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N		mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U		mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	Ü		mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N		mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N		mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N		mg/kg	10.0	< 10	< 10

Results - Soil

Project: 21-12231 DAA Airfields Underpass

Client: Causeway Geotech Ltd		Chemtest Job No.:				22-12969
Quotation No.: Q18-13245	(st Sam		1406469	1406470
		Sa	ample Lo		BH101	BH101
				е Туре:	SOIL	SOIL
			Top Dep		4.30	5.55
			Date Sa	ampled:	03-Apr-2022	03-Apr-2022
				os Lab:	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Benzene	U	2760	μg/kg	1.0	< 1.0	< 1.0
Toluene	U	2760	μg/kg	1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	μg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	μg/kg	1.0	< 1.0	< 1.0
o-Xylene	U	2760	μg/kg	1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	μg/kg	1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	0.89
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	3.0
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	0.86
Fluorene	U	2800	mg/kg	0.10	< 0.10	1.4
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	3.7
Anthracene	U	2800	mg/kg	0.10	< 0.10	0.52
Fluoranthene	U	2800	mg/kg	0.10	0.14	2.1
Pyrene	U	2800	mg/kg	0.10	0.15	2.6
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	0.51
Chrysene	U	2800	mg/kg	0.10	< 0.10	0.46
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.55
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.21
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	0.56
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	17
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 118	U	2815		0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: 21-12231 DAA Airfields Underpass

Project: 21-12231 DAA Airfields U	<u>Jnaerpass</u>						
Chemtest Job No:	22-12969				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1406469					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH101					hazardous	Hazardous
Top Depth(m):	4.30				Inert Waste	waste in non-	Waste
Bottom Depth(m):					Landfill	hazardous	Landfill
Sampling Date:	03-Apr-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.55	3	5	6
Loss On Ignition	2610	U	%	1.7			10
Total BTEX	2760	U	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1		
TPH Total WAC	2670	U	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH	2010	U		9.1		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.069		To evaluate	To evaluate
Eluate Analysis		10:1 Eluate		10:1 Eluate	luate Limit values for com		eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 l/kg
Arsenic	1455	U	0.0005	0.0049	0.5	2	25
Barium	1455	U	0.048	0.48	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0048	0.048	0.5	10	70
Copper	1455	U	0.0028	0.028	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.012	0.12	0.5	10	30
Nickel	1455	U	0.0032	0.032	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0014	0.014	0.06	0.7	5
Selenium	1455	U	0.021	0.21	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	3.5	35	800	15000	25000
Fluoride	1220	U	0.35	3.5	10	150	500
Sulphate	1220	U	27	270	1000	20000	50000
Total Dissolved Solids	1020	N	98	970	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.1	< 50	500	800	1000

Solid Information					
Dry mass of test portion/kg	0.090				
Moisture (%)	9.8				

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 21-12231 DAA Airfields Underpass

Project: 21-12231 DAA Airfields U							
Chemtest Job No:	22-12969				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1406470					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH101					hazardous	Hazardous
Top Depth(m):	5.55				Inert Waste	waste in non-	Waste
Bottom Depth(m):					Landfill	hazardous	Landfill
Sampling Date:	03-Apr-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.72	3	5	6
Loss On Ignition	2610	U	%	1.9			10
Total BTEX	2760	U	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1		
TPH Total WAC	2670	U	mg/kg	170	500		
Total (Of 17) PAH's	2800	N	mg/kg	17	100		
рН	2010	U		9.3		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.10		To evaluate	To evaluate
Eluate Analysis		10:1 Eluate 10:1 Eluate		uate Limit values for compliance		e leaching test	
•			mg/l	mg/kg	using B	S EN 12457 at L/S	6 10 l/kg
Arsenic	1455	U	0.0009	0.0090	0.5	2	25
Barium	1455	U	0.006	0.056	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0057	0.057	0.5	10	70
Copper	1455	U	0.0024	0.025	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0011	0.011	0.5	10	30
Nickel	1455	U	0.0038	0.038	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0012	0.012	0.06	0.7	5
Selenium	1455	U	0.0016	0.016	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.3	13	800	15000	25000
Fluoride	1220	U	0.21	2.1	10	150	500
Sulphate	1220	U	1.7	17	1000	20000	50000
Total Dissolved Solids	1020	N	39	390	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1		
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information						
Dry mass of test portion/kg	0.090					
Moisture (%)	5.0					

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary		
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter		
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.		
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	determination by inductively coupled plasma		
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation		
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.		
2010	pH Value of Soils	рН	pH Meter		
2015	Acid Neutralisation Capacity	Acid Reserve	Titration		
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		
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry		
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.		
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.		
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.		
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.		
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID		
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21- C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Dichloromethane extraction / GCxGC FID detection		
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.		

Test Methods

SOP	Title	Parameters included	Method summary
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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

Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-13471-1

Initial Date of Issue: 19-Apr-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

Colm Hurley
Darren O'Mahony
Gabriella Horan
Joe Gervin
John Cameron
Lucy Newland
Martin Gardiner
Matthew Gilbert
Neil Haggan
Paul Dunlop
Sean Ross
Stephen Francy

Stephen Watson
Stuart Abraham
Thomas McAllister

Project 21-1219 DAA Airfield Underpass

Quotation No.: Q18-13245 Date Received: 08-Apr-2022

Order No.: Date Instructed: 11-Apr-2022

No. of Samples: 2

Turnaround (Wkdays): 5 Results Due: 19-Apr-2022

Date Approved: 19-Apr-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Results - Soil

Project: 21-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd			mtest J	22-13471	22-13471	
Quotation No.: Q18-13245	(st Sam		1408738	1408739
		Sa	ample Lo	BH111	BH111	
				e Type:	SOIL	SOIL
			Top De	, ,	3.00	9.50
			Date Sa	ampled:	05-Apr-2022	05-Apr-2022
			Asbest	os Lab:	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	1	1
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	7.4	7.0
рН	U	2010		4.0	9.4	8.9
Arsenic	U	2450	mg/kg	1.0	2.6	20
Barium	U	2450	,	10	29	110
Cadmium	U	2450	mg/kg	0.10	< 0.10	2.4
Chromium	U	2450	mg/kg	1.0	7.2	24
Molybdenum	U	2450	mg/kg	2.0	< 2.0	4.1
Antimony	N	2450	mg/kg	2.0	< 2.0	2.0
Copper	U	2450		0.50	59	30
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	85	49
Lead	U	2450	mg/kg	0.50	1.4	23
Selenium	U	2450	mg/kg	0.20	< 0.20	2.0
Zinc	U	2450	mg/kg	0.50	63	80
Chromium (Trivalent)	N	2490	mg/kg	1.0	7.2	24
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	0.21	0.58
Aliphatic TPH >C5-C6	N	2680		1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680		1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	Ū	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680		1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	Ü	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	Ü	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680		10.0	< 10	< 10

Results - Soil

Project: 21-1219 DAA Airfield Underpass

Client: Causeway Geotech Ltd		Chemtest Job No.:			22-13471	22-13471
Quotation No.: Q18-13245	(st Sam		1408738	1408739
		Sa	ample Lo		BH111	BH111
				e Type:	SOIL	SOIL
			Top Dep		3.00	9.50
			Date Sa		05-Apr-2022	05-Apr-2022
				os Lab:	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Benzene	U	2760		1.0	< 1.0	< 1.0
Toluene	U	2760	μg/kg	1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	μg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	μg/kg	1.0	< 1.0	< 1.0
o-Xylene	U	2760	μg/kg	1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	μg/kg	1.0	< 1.0	< 1.0
Naphthalene	U	2800		0.10	< 0.10	0.64
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	0.89
Acenaphthene	U	2800	9 9	0.10	< 0.10	2.7
Fluorene	U	2800		0.10	< 0.10	2.6
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	34
Anthracene	U	2800	mg/kg	0.10	< 0.10	9.0
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	57
Pyrene	U	2800		0.10	< 0.10	50
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	28
Chrysene	U	2800	mg/kg	0.10	< 0.10	25
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	30
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	11
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	28
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	15
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	3.2
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	15
Coronene	N	2800	0	0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800		2.0	< 2.0	310
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: 21-1219 DAA Airfield Underpass

Chemtest Job No:	22-13471				l andfill \	Waste Acceptanc	e Criteria
Chemtest Sample ID:	1408738				Landini	Limits	c ontena
Sample Ref:	1100700					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH111					hazardous	Hazardous
Top Depth(m):	3.00				Inert Waste	waste in non-	Waste
Bottom Depth(m):	0.00				Landfill	hazardous	Landfill
Sampling Date:	05-Apr-2022				Lanami	Landfill	Lanami
Determinand	SOP	Accred.	Units			Lanami	
Total Organic Carbon	2625	U	%	0.21	3	5	6
Loss On Ignition	2610	U	%	1.6			10
Total BTEX	2760	U	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1		
TPH Total WAC	2670	Ü	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH	2010	U	3 3	9.4		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.0040		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance	
			mg/l	mg/kg	using B	S EN 12457 at L/	S 10 l/kg
Arsenic	1455	U	0.0007	0.0067	0.5	2	25
Barium	1455	U	0.052	0.52	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0046	0.046	0.5	10	70
Copper	1455	U	0.0038	0.038	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.019	0.19	0.5	10	30
Nickel	1455	U	0.0043	0.043	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0025	0.025	0.06	0.7	5
Selenium	1455	U	0.049	0.49	0.1	0.5	7
Zinc	1455	U	0.006	0.057	4	50	200
Chloride	1220	U	9.6	96	800	15000	25000
Fluoride	1220	U	0.35	3.5	10	150	500
Sulphate	1220	U	31	310	1000	20000	50000
Total Dissolved Solids	1020	N	98	970	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.1	< 50	500	800	1000

Solid Information						
Dry mass of test portion/kg	0.090					
Moisture (%)	7.4					

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 21-1219 DAA Airfield Underpass

Chemtest Job No:	22-13471				L andfill \	Waste Acceptanc	e Criteria		
Chemtest Sample ID:	1408739				Landini	Limits	c ontena		
Sample Ref:	1400700					Stable, Non-			
Sample ID:						reactive			
Sample Location:	BH111					hazardous	Hazardous		
Top Depth(m):	9.50				Inert Waste	waste in non-	Waste		
Bottom Depth(m):	0.00				Landfill	hazardous	Landfill		
Sampling Date:	05-Apr-2022				Lanum	Landfill	Lanum		
Determinand	SOP	Accred.	Units			Landini			
Total Organic Carbon	2625	U	%	0.58	3	5	6		
Loss On Ignition	2610	U	%	2.3			10		
Total BTEX	2760	U	mg/kg	< 0.010	6				
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1				
TPH Total WAC	2670	U	mg/kg	< 10	500				
Total (Of 17) PAH's	2800	N N	mg/kg	310	100				
pH	2010	U	ilig/kg	8.9		>6			
Acid Neutralisation Capacity	2015	N N	mol/kg	0.052		To evaluate	To evaluate		
	2015	IN	10:1 Eluate	10:1 Eluate			To evaluate		
Eluate Analysis					Limit values for compliance leaching test using BS EN 12457 at L/S 10 I/kg				
Arsenic	1455	11	mg/l 0.0005	mg/kg 0.0050	0.5	2 2	25		
Barium	1455	U	0.0005	0.0050	20	100	300		
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	100	5		
	1455	U	_			·	70		
Conner	1455	U	0.0047 0.0031	0.047 0.031	0.5 2	10 50	100		
Copper		U				0.2	2		
Mercury Makindanum	1455	U	< 0.00005	< 0.00005	0.01		30		
Molybdenum	1455	U	0.013	0.13	0.5	10			
Nickel	1455		0.0034	0.034	0.4	10	40 50		
Lead	1455	U	< 0.0005	< 0.0005	0.5	10			
Antimony	1455	U	0.0006	0.0056	0.06	0.7	5 7		
Selenium	1455	U	0.018	0.18	0.1	0.5	•		
Zinc	1455	U	< 0.003	< 0.003	4	50	200		
Chloride	1220	U	3.0	30	800	15000	25000		
Fluoride	1220	U	0.23	2.3	10	150	500		
Sulphate	1220	U	11	110	1000	20000	50000		
Total Dissolved Solids	1020	N	65	650	4000	60000	100000		
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-		
Dissolved Organic Carbon	1610	U	22	220	500	800	1000		

Solid Information											
Dry mass of test portion/kg	0.090										
Moisture (%)	7.0										

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	determination by inductively coupled plasma
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	рН	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21- C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Test Methods

SOP	Title	Parameters included	Method summary				
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS				
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS				
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge				

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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



eurofins Chemtest

Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-17599-1

Initial Date of Issue: 20-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

Colm Hurley
Darren O'Mahony
Gabriella Horan
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Lucy Newland
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Matthew Gilbert
Neil Haggan
Paul Dunlop
Sean Ross
Stephen Franey

Stephen Watson Stuart Abraham Thomas McAllister

Project DAA Airfield

Quotation No.: Q18-13245 Date Received: 12-May-2022

Order No.: Date Instructed: 12-May-2022

No. of Samples: 11

Turnaround (Wkdays): 7 Results Due: 20-May-2022

Date Approved: 20-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL Tel: 01638 606070

Email: info@chemtest.com

Results - Leachate

Project: DAA Airfield

Client: Causeway Geotech Ltd	Chemtest Job No.:					22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599
Quotation No.: Q18-13245		(Chemte	st Sam	ple ID.:	1427259	1427260	1427261	1427262	1427263	1427264	1427265	1427266
Order No.:			Clie	nt Samp	le Ref.:	1	2	1	1	2	1	2	1
			Sa	ample Lo	ocation:	BH104	BH104	BH105	BH106	BH106	BH107	BH107	BH108
				Sample	е Туре:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Dep	oth (m):	4.00	9.50	8.90	4.00	9.50	2.00	7.60	8.70
			Bot	tom Dep	oth (m):	4.50	10.00	9.50	4.30	10.00	2.40	8.00	9.00
	Date Sampled:					11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
Determinand	Accred. SOP Type Units LOD												
Ammonium	U	1220	10:1	mg/l	0.050	0.24	0.19	0.12	0.21	0.20	0.15	0.20	0.18
Ammonium	N	1220	10:1	mg/kg	0.10	2.7	2.5	1.5	2.5	2.6	1.7	2.4	2.3

Results - Leachate

Project: DAA Airfield

Client: Causeway Geotech Ltd		Chemtest Job No.:		22-17599	22-17599	22-17599		
Quotation No.: Q18-13245		(Chemte	est Sam	ple ID.:	1427267	1427268	1427269
Order No.:			Clie	nt Samp	le Ref.:	2	1	2
			Sa	ample Lo	ocation:	BH108	BH109	BH109
				Sample	e Type:	SOIL	SOIL	SOIL
				Top Dep	oth (m):	9.70	4.50	8.70
			Bot	ttom Dep	oth (m):	10.00	5.00	9.00
				Date Sa	ampled:	11-May-2022	11-May-2022	11-May-2022
Determinand	Accred.	SOP	Type	Units	LOD			
Ammonium	J	1220	10:1	mg/l	0.050	0.13	0.14	0.26
Ammonium	N	1220	10:1	mg/kg	0.10	2.1	1.9	3.3

Results - Soil

Project: DAA Airfield

Client: Causeway Geotech Ltd		Che	mtest J	ob No.:	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599
Quotation No.: Q18-13245		Chemte	est Sam	ple ID.:	1427259	1427260	1427261	1427262	1427263	1427264	1427265	1427266	1427267
Order No.:		Clie	nt Samp	le Ref.:	1	2	1	1	2	1	2	1	2
		Sa	ample L	ocation:	BH104	BH104	BH105	BH106	BH106	BH107	BH107	BH108	BH108
			Sampl	e Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m): Bottom Depth (m): Date Sampled:		4.00	9.50	8.90	4.00	9.50	2.00	7.60	8.70	9.70	
				4.50	10.00	9.50	4.30	10.00	2.40	8.00	9.00	10.00	
				11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	
Determinand	Accred.	Accred. SOP Units LOD											
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	6.0	9.4	12	3.0	8.5	19	7.6	9.0	7.2
рН	М	2010		4.0	9.2	9.3	9.0	9.0	8.9	8.9	8.9	9.2	9.1
Boron (Hot Water Soluble)	М	2120	mg/kg	0.40	1.4	0.70	1.1	0.82	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sulphur (Elemental)	M	2180	mg/kg	1.0	110	140	8.1	7.1	6.0	8.1	7.4	1.1	1.3
Cyanide (Total)	М	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	15	13	12	9.1	6.9	10	12	11	11
Sulphate (Total)	U	2430	%	0.010	0.27	0.28	0.53	0.45	0.74	0.90	0.70	0.59	0.67
Arsenic	M	2455	mg/kg	0.5	5.9	5.7	50	12	9.3	10	12	8.1	7.8
Barium	M	2455	mg/kg	0	23	26	66	78	56	64	70	72	68
Cadmium	M	2455	mg/kg		0.36	0.30	1.2	1.5	1.0	1.1	1.3	0.98	1.2
Chromium	M	2455	mg/kg	0.5	11	11	9.5	14	11	9.9	11	14	14
Molybdenum	M	2455		0.5	0.9	0.9	1.8	2.8	2.2	2.3	2.5	2.8	2.9
Antimony	N	2455		2.0	< 2.0	< 2.0	5.8	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	M	2455	mg/kg	0.50	15	16	17	21	16	17	18	19	19
Mercury	M	2455	mg/kg	0.05	0.25	0.33	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	M	2455	mg/kg	0.50	13	13	23	33	24	26	27	31	30
Lead	M	2455		0.50	63	74	35	27	18	20	25	14	13
Selenium	M	2455	mg/kg	0.25	0.56	0.54	1.7	1.9	2.0	2.0	1.9	2.3	2.3
Zinc	М	2455	mg/kg	0.50	48	40	96	100	88	110	110	52	57
Chromium (Trivalent)	N	2490	mg/kg	1.0	11	11	9.5	14	11	9.9	11	14	14
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	1.8	1.8	0.96	0.85	0.84	0.66	0.64	0.47	0.67
Mineral Oil (TPH Calculation)	N	2670		10	< 10	49	110	< 10	40	73	< 10	120	61
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH > C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH > C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	6.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH > C21-C35	M	2680	mg/kg	1.0	< 1.0	49	99	< 1.0	40	73	< 1.0	120	61
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	49	110	< 5.0	40	73	< 5.0	120	61
Aromatic TPH >C5-C7	N N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Project: DAA Airfield													
Client: Causeway Geotech Ltd		Che	mtest J	ob No.:	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599
Quotation No.: Q18-13245	(Chemte	est Sam	ple ID.:	1427259	1427260	1427261	1427262	1427263	1427264	1427265	1427266	1427267
Order No.:		Clie	nt Samp	le Ref.:	1	2	1	1	2	1	2	1	2
		Sa	ample L	ocation:	BH104	BH104	BH105	BH106	BH106	BH107	BH107	BH108	BH108
			Sampl	е Туре:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top De	pth (m):	4.00	9.50	8.90	4.00	9.50	2.00	7.60	8.70	9.70
		Bot	ttom De	pth (m):	4.50	10.00	9.50	4.30	10.00	2.40	8.00	9.00	10.00
			Date Sa	ampled:	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
			Asbest		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Aromatic TPH >C8-C10	М	2680	mg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	М	2680	mg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	М	2680	mg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	150	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	70	92	< 1.0	72	< 1.0	< 1.0	87	82
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg		< 5.0	70	92	< 5.0	72	< 5.0	< 5.0	240	82
Total Petroleum Hydrocarbons	N	2680	mg/kg		< 10	120	200	< 10	110	73	< 10	360	140
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	μg/kg	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	μg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	μg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	μg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	μg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	M	2800	mg/kg		< 0.10	0.72	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	0.12	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	0.12	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
·	M	2800	mg/kg		< 0.10	0.18	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800			1.3	2.3		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		2800	mg/kg	0.10		0.59	< 0.10						
Anthracene	M		mg/kg	0.10	0.37		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	1.6	3.4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	1.5	3.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	0.83	1.5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	0.79	1.8	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg		1.1	1.8	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.28	0.63	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	0.94	1.5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	0.95	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	0.16	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	0.91	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg		8.7	20	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	•	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 118	U	2815		0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Client: Causeway Geotech Ltd		Che	mtest J	ob No.:	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599	22-17599
Quotation No.: Q18-13245	(Chemte	est Sam	ple ID.:	1427259	1427260	1427261	1427262	1427263	1427264	1427265	1427266	1427267
Order No.:		Clie	nt Samp	ole Ref.:	1	2	1	1	2	1	2	1	2
		Sa	ample L	ocation:	BH104	BH104	BH105	BH106	BH106	BH107	BH107	BH108	BH108
			Sampl	e Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top De	pth (m):	4.00	9.50	8.90	4.00	9.50	2.00	7.60	8.70	9.70
		Bot	ttom De	pth (m):	4.50	10.00	9.50	4.30	10.00	2.40	8.00	9.00	10.00
			Date Sa	ampled:	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
			Asbest	os Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	М	2920	mg/kg	0.10	< 0.10	< 0.10	0.48	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Client: Causeway Geotech Ltd	Chemtest Job No.			ob No.:	22-17599	22-17599
Quotation No.: Q18-13245	(st Sam		1427268	1427269
Order No.:		Clie	nt Samp	le Ref.:	1	2
		Sa	ample Lo	ocation:	BH109	BH109
			Sampl	е Туре:	SOIL	SOIL
			Top Dep	` '	4.50	8.70
		Bot	tom Dep	, ,	5.00	9.00
			Date Sa		11-May-2022	11-May-2022
				os Lab:	DURHAM	DURHAM
Determinand	Accred. SOP Units LOD					
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	7.7	7.9
рН	М	2010		4.0	9.1	9.1
Boron (Hot Water Soluble)	М	2120		0.40	0.54	0.72
Sulphur (Elemental)	M	2180	mg/kg	1.0	1.3	< 1.0
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	9.2	9.3
Sulphate (Total)	U	2430	%	0.010	0.54	0.66
Arsenic	M	2455	mg/kg	0.5	6.8	6.9
Barium	М	2455	mg/kg	0	66	65
Cadmium	M	2455		0.10	0.74	0.75
Chromium	М	2455	0	0.5	12	13
Molybdenum	M	2455	mg/kg	0.5	2.6	2.4
Antimony	N	2455	mg/kg	2.0	< 2.0	< 2.0
Copper	M	2455		0.50	17	16
Mercury	M	2455	mg/kg	0.05	< 0.05	< 0.05
Nickel	M	2455	mg/kg	0.50	26	26
Lead	M	2455 2455	mg/kg	0.50 0.25	11	12 2.0
Selenium Zinc	M	2455	mg/kg mg/kg	0.25	1.9 42	44
Chromium (Trivalent)	N N	2490	mg/kg	1.0	12	13
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	0.60	0.40
Mineral Oil (TPH Calculation)	N	2670		10	42	< 10
Aliphatic TPH >C5-C6	N N	2680	ט	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680		1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	М	2680	mg/kg	1.0	42	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	42	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680		1.0	< 1.0	< 1.0

Client: Causeway Geotech Ltd	Chemtest Job No				22-17599	22-17599
Quotation No.: Q18-13245	(st Sam		1427268	1427269
Order No.:		Clie	nt Samp	le Ref.:	1	2
		Sa	ample Lo		BH109	BH109
			Sampl	e Type:	SOIL	SOIL
			Top Dep		4.50	8.70
		Bot	tom Dep	, ,	5.00	9.00
			Date Sa	_	11-May-2022	11-May-2022
			Asbest		DURHAM	DURHAM
Determinand	Accred.	SOP		LOD		
Aromatic TPH >C8-C10	М	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	М	2680	,	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	М	2680	0	1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	55	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	55	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	96	< 10
Benzene	M	2760	μg/kg	1.0	< 1.0	< 1.0
Toluene	M	2760	μg/kg	1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	μg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	μg/kg	1.0	< 1.0	< 1.0
o-Xylene	M	2760	μg/kg	1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760		1.0	< 1.0	< 1.0
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	N N	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	M	2800		0.10	< 0.10	< 0.10
Fluorene	M	2800	ט	0.10	< 0.10	< 0.10
Phenanthrene	M M	2800	mg/kg	0.10	< 0.10	< 0.10
Anthracene		2800	mg/kg mg/kg	0.10	< 0.10	< 0.10
Fluoranthene Pyrene	M M	2800 2800		0.10	< 0.10 < 0.10	< 0.10 < 0.10
Benzo[a]anthracene	M	2800	mg/kg mg/kg	0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800		0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 52	Ü	2815	mg/kg		< 0.010	< 0.010
PCB 90+101	U	2815			< 0.010	< 0.010
PCB 118	U	2815)		< 0.010	< 0.010
PCB 153	U		mg/kg		< 0.010	< 0.010

Client: Causeway Geotech Ltd	Chemtest Job No.:		:.oN do	22-17599	22-17599	
Quotation No.: Q18-13245	(Chemte	st Sam	ple ID.:	1427268	1427269
Order No.:		Clie	nt Samp	le Ref.:	1	2
	Sample Location				BH109	BH109
			Sample	е Туре:	SOIL	SOIL
			Top Dep	oth (m):	4.50	8.70
		Bot	tom Dep	5.00	9.00	
			Date Sa	11-May-2022	11-May-2022	
			Asbest	os Lab:	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10
Total Phenols	М	2920	mg/kg	0.10	< 0.10	< 0.10

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landflll \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427259					Limits	
Sample Ref:	1					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH104					hazardous	Hazardous
Top Depth(m):	4.00				Inert Waste	waste in non-	Waste
Bottom Depth(m):	4.50				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	1.8	3	5	6
Loss On Ignition	2610	М	%	3.6			10
Total BTEX	2760	М	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	8.7	100		
рН	2010	М		9.2		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.025		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0006	0.0056	0.5	2	25
Barium	1455	U	0.040	0.40	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0011	0.011	0.5	10	70
Copper	1455	U	0.0025	0.025	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.011	0.11	0.5	10	30
Nickel	1455	U	0.0012	0.012	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0015	0.015	0.06	0.7	5
Selenium	1455	U	0.016	0.16	0.1	0.5	7
Zinc	1455	U	0.005	0.048	4	50	200
Chloride	1220	U	2.3	23	800	15000	25000
Fluoride	1220	U	0.21	2.1	10	150	500
Sulphate	1220	U	40	400	1000	20000	50000
Total Dissolved Solids	1020	N	98	980	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	6.0

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427260					Limits	
Sample Ref:	2					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH104					hazardous	Hazardous
Top Depth(m):	9.50				Inert Waste	waste in non-	Waste
Bottom Depth(m):	10.00				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	1.8	3	5	6
Loss On Ignition	2610	М	%	4.1			10
Total BTEX	2760	М	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	120	500		
Total (Of 17) PAH's	2800	N	mg/kg	20	100		
рН	2010	М		9.3		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.057		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	6 10 l/kg
Arsenic	1455	U	0.0009	0.0090	0.5	2	25
Barium	1455	U	0.020	0.20	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0010	0.010	0.5	10	70
Copper	1455	U	0.0013	0.013	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.014	0.14	0.5	10	30
Nickel	1455	U	0.0009	0.0085	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0067	0.067	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	4.1	41	1000	20000	50000
Total Dissolved Solids	1020	N	59	580	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.6	86	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	9.4

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427261					Limits	
Sample Ref:	1					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH105					hazardous	Hazardous
Top Depth(m):	8.90				Inert Waste	waste in non-	Waste
Bottom Depth(m):	9.50				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	0.96	3	5	6
Loss On Ignition	2610	М	%	1.9			10
Total BTEX	2760	М	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	200	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH	2010	М		9.0		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.012		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
-			mg/l	mg/kg	using B	S EN 12457 at L/S	6 10 l/kg
Arsenic	1455	U	0.0007	0.0067	0.5	2	25
Barium	1455	U	0.045	0.45	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0008	0.0084	0.5	10	70
Copper	1455	U	0.0014	0.014	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0092	0.092	0.5	10	30
Nickel	1455	U	0.0011	0.011	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0009	0.0093	0.06	0.7	5
Selenium	1455	U	0.0071	0.071	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.4	14	800	15000	25000
Fluoride	1220	U	0.22	2.2	10	150	500
Sulphate	1220	U	8.8	88	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.6	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427262					Limits	
Sample Ref:	1					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH106					hazardous	Hazardous
Top Depth(m):	4.00				Inert Waste	waste in non-	Waste
Bottom Depth(m):	4.30				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	0.85	3	5	6
Loss On Ignition	2610	М	%	2.4			10
Total BTEX	2760	М	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН	2010	М		9.0		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.025		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0003	0.0029	0.5	2	25
Barium	1455	U	0.025	0.25	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0013	0.013	0.5	10	70
Copper	1455	U	0.0015	0.015	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.022	0.22	0.5	10	30
Nickel	1455	U	0.0016	0.016	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0017	0.017	0.06	0.7	5
Selenium	1455	U	0.039	0.39	0.1	0.5	7
Zinc	1455	U	0.003	0.034	4	50	200
Chloride	1220	U	14	140	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	61	610	1000	20000	50000
Total Dissolved Solids	1020	N	130	1300	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1		-
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information					
Dry mass of test portion/kg	0.090				
Moisture (%)	3.0				

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427263					Limits	
Sample Ref:	2					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH106					hazardous	Hazardous
Top Depth(m):	9.50				Inert Waste	waste in non-	Waste
Bottom Depth(m):	10.00				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	0.84	3	5	6
Loss On Ignition	2610	М	%	2.7			10
Total BTEX	2760	М	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	110	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН	2010	М		8.9		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.068		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
			mg/l	mg/kg	using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	0.0012	0.012	0.5	2	25
Barium	1455	U	0.082	0.82	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0009	0.0085	0.5	10	70
Copper	1455	U	0.0026	0.026	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0065	0.065	0.5	10	30
Nickel	1455	U	0.0009	0.0088	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0005	0.0055	0.06	0.7	5
Selenium	1455	U	0.015	0.15	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	4.1	41	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	11	110	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1		-
Dissolved Organic Carbon	1610	U	8.2	82	500	800	1000

Solid Information					
Dry mass of test portion/kg	0.090				
Moisture (%)	8.5				

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427264	1427264				Limits	
Sample Ref:	1					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH107					hazardous	Hazardous
Top Depth(m):	2.00				Inert Waste	waste in non-	Waste
Bottom Depth(m):	2.40				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	0.66	3	5	6
Loss On Ignition	2610	М	%	2.6			10
Total BTEX	2760	М	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	73	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH	2010	М		8.9		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.021		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leaching		eaching test
			mg/l		using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	0.0008	0.0082	0.5	2	25
Barium	1455	U	0.029	0.29	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0010	0.0099	0.5	10	70
Copper	1455	U	0.0043	0.043	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.022	0.22	0.5	10	30
Nickel	1455	U	0.0020	0.020	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0021	0.021	0.06	0.7	5
Selenium	1455	U	0.0006	0.0062	0.1	0.5	7
Zinc	1455	J	0.013	0.14	4	50	200
Chloride	1220	U	1.8	18	800	15000	25000
Fluoride	1220	U	0.27	2.7	10	150	500
Sulphate	1220	U	11	110	1000	20000	50000
Total Dissolved Solids	1020	N	98	970	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.3	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	19

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield								
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria	
Chemtest Sample ID:	1427265	1427265				Limits		
Sample Ref:	2					Stable, Non-		
Sample ID:						reactive		
Sample Location:	BH107					hazardous	Hazardous	
Top Depth(m):	7.60				Inert Waste	waste in non-	Waste	
Bottom Depth(m):	8.00				Landfill	hazardous	Landfill	
Sampling Date:	11-May-2022					Landfill		
Determinand	SOP	Accred.	Units					
Total Organic Carbon	2625	М	%	0.64	3	5	6	
Loss On Ignition	2610	М	%	3.1			10	
Total BTEX	2760	М	mg/kg	< 0.010	6			
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1			
TPH Total WAC	2670	М	mg/kg	< 10	500			
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100			
pH	2010	М		8.9		>6		
Acid Neutralisation Capacity	2015	N	mol/kg	0.026		To evaluate	To evaluate	
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leachi		eaching test	
			mg/l	mg/kg using BS EN 12457 at L			/S 10 I/kg	
Arsenic	1455	U	0.0006	0.0059	0.5	2	25	
Barium	1455	U	0.052	0.52	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70	
Copper	1455	U	0.0019	0.019	2	50	100	
Mercury	1455	U	0.00025	0.0025	0.01	0.2	2	
Molybdenum	1455	U	0.011	0.11	0.5	10	30	
Nickel	1455	U	0.0008	0.0081	0.4	10	40	
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50	
Antimony	1455	U	0.0011	0.011	0.06	0.7	5	
Selenium	1455	U	0.018	0.17	0.1	0.5	7	
Zinc	1455	U	< 0.003	< 0.003	4	50	200	
Chloride	1220	U	< 1.0	< 10	800	15000	25000	
Fluoride	1220	U	0.30	3.0	10	150	500	
Sulphate	1220	U	27	270	1000	20000	50000	
Total Dissolved Solids	1020	N	98	970	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-	
Dissolved Organic Carbon	1610	U	2.5	< 50	500	800	1000	

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	7.6

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield								
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria	
Chemtest Sample ID:	1427266	1427266				Limits		
Sample Ref:	1					Stable, Non-		
Sample ID:						reactive		
Sample Location:	BH108					hazardous	Hazardous	
Top Depth(m):	8.70				Inert Waste	waste in non-	Waste	
Bottom Depth(m):	9.00				Landfill	hazardous	Landfill	
Sampling Date:	11-May-2022					Landfill		
Determinand	SOP	Accred.	Units					
Total Organic Carbon	2625	М	%	0.47	3	5	6	
Loss On Ignition	2610	М	%	2.3			10	
Total BTEX	2760	М	mg/kg	< 0.010	6			
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1			
TPH Total WAC	2670	М	mg/kg	360	500			
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100			
pH	2010	М		9.2		>6		
Acid Neutralisation Capacity	2015	N	mol/kg	0.021		To evaluate	To evaluate	
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leaching		eaching test	
			mg/l	mg/kg using BS EN 12457 at			L/S 10 I/kg	
Arsenic	1455	U	0.0008	0.0081	0.5	2	25	
Barium	1455	U	0.037	0.37	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	0.0008	0.0083	0.5	10	70	
Copper	1455	U	0.0017	0.017	2	50	100	
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2	
Molybdenum	1455	U	0.011	0.11	0.5	10	30	
Nickel	1455	U	0.0008	0.0080	0.4	10	40	
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50	
Antimony	1455	U	0.0005	0.0054	0.06	0.7	5	
Selenium	1455	U	0.015	0.15	0.1	0.5	7	
Zinc	1455	U	< 0.003	< 0.003	4	50	200	
Chloride	1220	U	< 1.0	< 10	800	15000	25000	
Fluoride	1220	U	0.30	3.0	10	150	500	
Sulphate	1220	U	7.2	72	1000	20000	50000	
Total Dissolved Solids	1020	N	65	650	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-	
Dissolved Organic Carbon	1610	U	13	130	500	800	1000	

Solid Information				
Dry mass of test portion/kg	0.090			
Moisture (%)	9.0			

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield								
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria	
Chemtest Sample ID:	1427267	1427267				Limits		
Sample Ref:	2					Stable, Non-		
Sample ID:						reactive		
Sample Location:	BH108					hazardous	Hazardous	
Top Depth(m):	9.70				Inert Waste	waste in non-	Waste	
Bottom Depth(m):	10.00				Landfill	hazardous	Landfill	
Sampling Date:	11-May-2022					Landfill		
Determinand	SOP	Accred.	Units					
Total Organic Carbon	2625	М	%	0.67	3	5	6	
Loss On Ignition	2610	М	%	2.3			10	
Total BTEX	2760	М	mg/kg	< 0.010	6			
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1			
TPH Total WAC	2670	М	mg/kg	140	500			
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100			
рН	2010	М		9.1		>6		
Acid Neutralisation Capacity	2015	N	mol/kg	0.023		To evaluate	To evaluate	
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leachi		eaching test	
			mg/l	mg/kg using BS EN 12457 at L/S			3 10 l/kg	
Arsenic	1455	U	0.0004	0.0036	0.5	2	25	
Barium	1455	U	0.012	0.12	20	100	300	
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5	
Chromium	1455	U	0.0009	0.0092	0.5	10	70	
Copper	1455	U	0.0011	0.011	2	50	100	
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2	
Molybdenum	1455	U	0.0015	0.015	0.5	10	30	
Nickel	1455	U	0.0009	0.0089	0.4	10	40	
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50	
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5	
Selenium	1455	U	0.0026	0.026	0.1	0.5	7	
Zinc	1455	U	< 0.003	< 0.003	4	50	200	
Chloride	1220	U	< 1.0	< 10	800	15000	25000	
Fluoride	1220	U	0.12	1.2	10	150	500	
Sulphate	1220	U	1.6	16	1000	20000	50000	
Total Dissolved Solids	1020	N	39	390	4000	60000	100000	
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-	
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000	

Solid Information					
Dry mass of test portion/kg	0.090				
Moisture (%)	7.2				

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1427268				Limits		
Sample Ref:	1					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH109					hazardous	Hazardous
Top Depth(m):	4.50				Inert Waste	waste in non-	Waste
Bottom Depth(m):	5.00				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	0.60	3	5	6
Loss On Ignition	2610	М	%	2.5			10
Total BTEX	2760	M	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1		
TPH Total WAC	2670	M	mg/kg	96	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН	2010	M		9.1		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.028		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leach		eaching test
			mg/l	mg/kg	using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	0.0004	0.0043	0.5	2	25
Barium	1455	U	0.049	0.49	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0010	0.0099	0.5	10	70
Copper	1455	U	0.0017	0.017	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.013	0.13	0.5	10	30
Nickel	1455	U	0.0009	0.0091	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0020	0.020	0.06	0.7	5
Selenium	1455	U	0.030	0.30	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	4.9	49	800	15000	25000
Fluoride	1220	U	0.31	3.1	10	150	500
Sulphate	1220	U	23	230	1000	20000	50000
Total Dissolved Solids	1020	N	91	910	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.6	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	7.7

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-17599			Landfill \	Naste Acceptanc	e Criteria	
Chemtest Sample ID:	1427269					Limits	
Sample Ref:	2					Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH109					hazardous	Hazardous
Top Depth(m):	8.70				Inert Waste	waste in non-	Waste
Bottom Depth(m):	9.00				Landfill	hazardous	Landfill
Sampling Date:	11-May-2022					Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	0.40	3	5	6
Loss On Ignition	2610	М	%	2.7			10
Total BTEX	2760	M	mg/kg	< 0.010	6		
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	< 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН	2010	M		9.1		>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.0060		To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	•		
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0007	0.0073	0.5	2	25
Barium	1455	U	0.054	0.54	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0011	0.011	0.5	10	70
Copper	1455	U	0.0020	0.020	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.016	0.16	0.5	10	30
Nickel	1455	U	0.0010	0.010	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0010	0.010	0.06	0.7	5
Selenium	1455	U	0.022	0.22	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.1	11	800	15000	25000
Fluoride	1220	U	0.53	5.3	10	150	500
Sulphate	1220	U	17	170	1000	20000	50000
Total Dissolved Solids	1020	N	85	840	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.0	80	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	7.9

Waste Acceptance Criteria

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	рН	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3- band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21- C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Test Methods

SOP	Title	Parameters included	Method summary		
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS		
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS		
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1- Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.		
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge		

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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



eurofins Chemtest

Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-19134-1

Initial Date of Issue: 31-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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Stephen Watson Stuart Abraham Thomas McAllister

Project DAA Airfield

Quotation No.: Q21-25458 Date Received: 23-May-2022

Order No.: Date Instructed: 23-May-2022

No. of Samples: 5

Turnaround (Wkdays): 7 Results Due: 31-May-2022

Date Approved: 31-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL Tel: 01638 606070

Email: info@chemtest.com

Client: Causeway Geotech Ltd			mtest Jo		22-19134	22-19134	22-19134	22-19134	22-19134
Quotation No.: Q21-25458	(Chemtest Sample ID.:				1433815	1433816	1433817	1433818
		Sample Location:				BH102	BH103	BH103	BH103
		Sample Type:				SOIL	SOIL	SOIL	SOIL
			Top Dep	oth (m):	7.70	10.70	7.00	8.50	9.00
		Bot	tom Dep	oth (m):	8.00	11.00	7.30	8.80	9.30
			Asbest	os Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
АСМ Туре	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	12	8.1	16	24	0.36
Boron (Hot Water Soluble)	М	2120	mg/kg	0.40	[A] < 0.40	[A] < 0.40	[A] < 0.40	[A] < 0.40	[A] < 0.40
Sulphur (Elemental)	М	2180	mg/kg		[A] 5.5	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Sulphide (Easily Liberatable)	N	2325	mg/kg		[A] 7.3	[A] 10	[A] 9.4	[A] 12	[A] 5.6
Sulphate (Total)	U	2430	%	0.010	[A] 0.037	[A] 0.18	[A] 0.32	[A] 0.51	[A] 0.58
Arsenic	М	2455	mg/kg	0.5	6.0	9.5	5.1	6.8	2.3
Barium	М	2455	mg/kg	0	36	44	24	28	20
Cadmium	М	2455	mg/kg	0.10	0.77	0.85	0.68	0.95	0.33
Chromium	М	2455	mg/kg	0.5	10	7.8	6.6	7.8	2.4
Molybdenum	М	2455	mg/kg	0.5	1.4	1.3	1.5	1.7	1.4
Antimony	N	2455	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	М	2455	mg/kg	0.50	16	14	13	14	4.5
Mercury	М	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	М	2455	mg/kg		30	21	17	21	4.4
Lead	М	2455	mg/kg	0.50	13	20	9.5	11	6.0
Selenium	М	2455	mg/kg	0.25	1.4	1.0	1.2	1.4	< 0.25
Zinc	М	2455	mg/kg	0.50	52	46	66	110	15
Chromium (Trivalent)	N	2490	mg/kg	1.0	10	7.8	6.6	7.8	2.4
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	М	2625	%	0.20	[A] 0.29	[A] 0.70	[A] 0.59	[A] 0.77	[A] 1.0
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C12-C16	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Client: Causeway Geotech Ltd			ntest Jo		22-19134	22-19134	22-19134	22-19134	22-19134
Quotation No.: Q21-25458	(Chemtest Sample ID.:			1433814	1433815	1433816	1433817	1433818
		Sample Location:			BH102	BH102	BH103	BH103	BH103
			Sample		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Dep		7.70	10.70	7.00	8.50	9.00
		Bot	tom Dep	oth (m):	8.00	11.00	7.30	8.80	9.30
			Asbest	os Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
Aromatic TPH >C21-C35	М	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10
Benzene	М	2760	μg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	М	2760	μg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	М	2760	μg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	М	2760	μg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	М	2760	μg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	М	2760	μg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	М	2800	mg/kg	0.10	< 0.10	< 0.10	0.18	< 0.10	< 0.10
Pyrene	М	2800	mg/kg	0.10	< 0.10	< 0.10	0.17	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	М	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 52	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 90+101	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 118	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 153	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 138	U	2815		0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 180	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10
Total Phenols	М		mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-19134			Landfill \	Naste Acceptanc	e Criteria	
Chemtest Sample ID:	1433814					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH102					hazardous	Hazardous
Top Depth(m):	7.70				Inert Waste	waste in non-	Waste
Bottom Depth(m):	8.00				Landfill	hazardous	Landfill
Sampling Date:						Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	[A] 0.29	3	5	6
Loss on Ignition							10
Total BTEX	2760	М	mg/kg	[A] < 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	[A] < 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH						>6	
Acid Neutralisation Capacity						To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leaching to		eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0006	0.0062	0.5	2	25
Barium	1455	U	0.041	0.41	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0009	0.0087	0.5	10	70
Copper	1455	U	0.0030	0.030	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.026	0.26	0.5	10	30
Nickel	1455	U	0.0007	0.0069	0.4	10	40
Lead	1455	U	0.0011	0.011	0.5	10	50
Antimony	1455	U	0.0007	0.0070	0.06	0.7	5
Selenium	1455	U	0.0032	0.032	0.1	0.5	7
Zinc	1455	U	0.004	0.039	4	50	200
Chloride	1220	U	1.4	14	800	15000	25000
Fluoride	1220	U	0.48	4.8	10	150	500
Sulphate	1220	U	10	100	1000	20000	50000
Total Dissolved Solids	1020	N	91	910	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.1	71	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-19134				Landflll \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1433815					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH102					hazardous	Hazardous
Top Depth(m):	10.70				Inert Waste	waste in non-	Waste
Bottom Depth(m):	11.00				Landfill	hazardous	Landfill
Sampling Date:						Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	[A] 0.70	3	5	6
Loss on Ignition							10
Total BTEX	2760	М	mg/kg	[A] < 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		-
TPH Total WAC	2670	М	mg/kg	[A] < 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		-
рН						>6	
Acid Neutralisation Capacity						To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leaching t		eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	3 10 l/kg
Arsenic	1455	U	0.0006	0.0062	0.5	2	25
Barium	1455	U	0.056	0.56	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0009	0.0094	0.5	10	70
Copper	1455	U	0.0023	0.023	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0086	0.086	0.5	10	30
Nickel	1455	U	0.0005	0.0051	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0006	0.0060	0.06	0.7	5
Selenium	1455	U	0.010	0.10	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.8	18	800	15000	25000
Fluoride	1220	U	0.28	2.8	10	150	500
Sulphate	1220	U	9.7	97	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	8.1

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-19134				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1433816					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH103					hazardous	Hazardous
Top Depth(m):	7.00				Inert Waste	waste in non-	Waste
Bottom Depth(m):	7.30				Landfill	hazardous	Landfill
Sampling Date:						Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	[A] 0.59	3	5	6
Loss on Ignition							10
Total BTEX	2760	M	mg/kg	[A] < 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	M	mg/kg	[A] < 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН						>6	
Acid Neutralisation Capacity						To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values for compliance leaching		eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0011	0.011	0.5	2	25
Barium	1455	U	0.035	0.35	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0011	0.011	0.5	10	70
Copper	1455	U	0.0021	0.021	2	50	100
Mercury	1455	U	0.00026	0.0026	0.01	0.2	2
Molybdenum	1455	U	0.0092	0.092	0.5	10	30
Nickel	1455	U	0.0009	0.0094	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0016	0.016	0.06	0.7	5
Selenium	1455	U	0.011	0.11	0.1	0.5	7
Zinc	1455	U	0.003	0.028	4	50	200
Chloride	1220	U	22	220	800	15000	25000
Fluoride	1220	U	0.32	3.2	10	150	500
Sulphate	1220	U	15	150	1000	20000	50000
Total Dissolved Solids	1020	N	78	780	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.6	< 50	500	800	1000

Solid Information				
Dry mass of test portion/kg	0.090			
Moisture (%)	16			

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-19134				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1433817					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH103					hazardous	Hazardous
Top Depth(m):	8.50				Inert Waste	waste in non-	Waste
Bottom Depth(m):	8.80				Landfill	hazardous	Landfill
Sampling Date:						Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	[A] 0.77	3	5	6
Loss on Ignition							10
Total BTEX	2760	М	mg/kg	[A] < 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	[A] < 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
рН						>6	
Acid Neutralisation Capacity						To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance l	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	6 10 l/kg
Arsenic	1455	U	0.0012	0.012	0.5	2	25
Barium	1455	U	0.037	0.37	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0017	0.017	0.5	10	70
Copper	1455	U	0.0038	0.038	2	50	100
Mercury	1455	U	0.00029	0.0029	0.01	0.2	2
Molybdenum	1455	U	0.0083	0.083	0.5	10	30
Nickel	1455	U	0.0015	0.015	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0014	0.015	0.06	0.7	5
Selenium	1455	U	0.0092	0.092	0.1	0.5	7
Zinc	1455	U	0.007	0.074	4	50	200
Chloride	1220	U	2.3	23	800	15000	25000
Fluoride	1220	U	0.33	3.3	10	150	500
Sulphate	1220	U	11	110	1000	20000	50000
Total Dissolved Solids	1020	N	78	770	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	5.5	55	500	800	1000

Solid Information				
Dry mass of test portion/kg	0.090			
Moisture (%)	24			

Waste Acceptance Criteria

Project: DAA Airfield

Project: DAA Airfield							
Chemtest Job No:	22-19134				Landfill \	Naste Acceptanc	e Criteria
Chemtest Sample ID:	1433818					Limits	
Sample Ref:						Stable, Non-	
Sample ID:						reactive	
Sample Location:	BH103					hazardous	Hazardous
Top Depth(m):	9.00				Inert Waste	waste in non-	Waste
Bottom Depth(m):	9.30				Landfill	hazardous	Landfill
Sampling Date:						Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	М	%	[A] 1.0	3	5	6
Loss on Ignition							10
Total BTEX	2760	М	mg/kg	[A] < 0.010	6		
Total PCBs (7 Congeners)	2815	М	mg/kg	< 0.10	1		
TPH Total WAC	2670	М	mg/kg	[A] < 10	500		
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100		
pH						>6	
Acid Neutralisation Capacity						To evaluate	To evaluate
Eluate Analysis			10:1 Eluate	10:1 Eluate	Limit values	for compliance I	eaching test
			mg/l	mg/kg	using B	S EN 12457 at L/S	S 10 I/kg
Arsenic	1455	U	0.0003	0.0034	0.5	2	25
Barium	1455	U	0.012	0.12	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0014	0.014	0.5	10	70
Copper	1455	U	0.0017	0.017	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0073	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	0.0008	0.0078	0.06	0.7	5
Selenium	1455	U	0.0009	0.0090	0.1	0.5	7
Zinc	1455	U	0.003	0.032	4	50	200
Chloride	1220	U	1.1	11	800	15000	25000
Fluoride	1220	U	1.1	11	10	150	500
Sulphate	1220	U	3.7	37	1000	20000	50000
Total Dissolved Solids	1020	N	39	390	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information				
Dry mass of test portion/kg	0.090			
Moisture (%)	0.36			

Waste Acceptance Criteria

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1433814			BH102		А	Amber Glass 250ml
1433814			BH102		А	Amber Glass 60ml
1433814			BH102		А	Plastic Tub 500g
1433815			BH102		А	Amber Glass 250ml
1433815			BH102		A	Amber Glass 60ml
1433815			BH102		A	Plastic Tub 500g
1433816			BH103		А	Amber Glass 250ml
1433816			BH103		А	Amber Glass 60ml
1433816			BH103		А	Plastic Tub 500g
1433817			BH103		А	Amber Glass 250ml
1433817			BH103		А	Amber Glass 60ml
1433817			BH103		А	Plastic Tub 500g
1433818			BH103		А	Amber Glass 250ml
1433818			BH103		А	Amber Glass 60ml
1433818			BH103		А	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
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
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21- C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Test Methods

SOP	Title	Parameters included	Method summary
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	IPhanal Mathyinhanais Dimathyinhanais 1-	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key **UKAS** accredited MCERTS and UKAS accredited M Unaccredited Ν This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for S this analysis This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited SN for this analysis Т 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



eurofins Chemtest

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Tel: 01638 606070 Email: info@chemtest.com

Final Report

Report No.: 22-16300-1

Initial Date of Issue: 13-May-2022

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road

Balnamore Ballymoney County Antrim BT53 7QL

Contact(s): Carin Cornwall

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

Stuart Abraham
Thomas McAllister

Project DAA Airfield Underpass

Quotation No.: Q22-27411 Date Received: 03-May-2022

Order No.: Date Instructed: 03-May-2022

No. of Samples: 2

Turnaround (Wkdays): 7 Results Due: 11-May-2022

Date Approved: 13-May-2022 Subcon Results Due: 24-May-2022

Approved By:

Details: Stuart Henderson, Technical

Manager



Eurofins Chemtest Ltd Depot Road Newmarket CB8 0AL

Tel: 01638 606070

Email: info@chemtest.com

Results - Water

Project: DAA Airfield Underpass

Client: Causeway Geotech Ltd		(Chemte	st Job No.:	22-16300	22-16300
Quotation No.: Q22-27411		Chemtest Sample ID.:		1421449	1421450	
		Sample Location:			BH107	BH105
		Sample Type:		WATER	WATER	
			Top	Depth (m):	0.00	0.00
			Dat	e Sampled:	27-Apr-2022	28-Apr-2022
Determinand	Accred.	SOP	Units	LOD		
PFAS in Waters (Subcon)	SN			0.0200000	See Attached	See Attached
рН	U	1010		N/A	7.5	7.8
Ammonia (Free)	N	1220	mg/l	0.050	< 0.050	< 0.050
Ammonium	U	1220	mg/l	0.050	0.91	0.30
Sulphate	U	1220	mg/l	1.0	5.2	31
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050
Arsenic (Dissolved)	U	1455	μg/l	0.20	1.0	1.2
Boron (Dissolved)	U	1455	μg/l	10.0	37	55
Cadmium (Dissolved)	U	1455	μg/l	0.11	0.13	< 0.11
Chromium (Dissolved)	U	1455	μg/l	0.50	< 0.50	7.0
Copper (Dissolved)	U	1455	μg/l	0.50	3.2	2.2
Mercury (Dissolved)	U	1455	μg/l	0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	μg/l	0.50	5.7	2.9
Lead (Dissolved)	U	1455	μg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	μg/l	0.50	1.3	4.1
Zinc (Dissolved)	U	1455	μg/l	2.5	18	23
TPH >C6-C10	N	1670	μg/l	0.10	7.2	< 0.10
TPH >C10-C21	N	1670	μg/l	0.10	740	< 0.10
TPH >C21-C40	N	1670	μg/l	0.10	33	< 0.10
Total TPH >C6-C40	U	1670	μg/l	10	780	< 10
Naphthalene	U	1800	μg/l	0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	μg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	μg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	μg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	μg/l	0.10	< 0.10	< 0.10
Anthracene	U	1800	μg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1800	μg/l	0.10	< 0.10	< 0.10
Pyrene	U	1800	μg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	μg/l	0.10	< 0.10	< 0.10
Chrysene	U	1800	μg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	μg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	μg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	μg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	μg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	μg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	μg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	μg/l	2.0	< 2.0	< 2.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	рН	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	determination by inductively coupled plasma
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

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If you require extended retention of samples, please email your requirements to: customerservices@chemtest.com



Eurofins Chemtest Ltd Attn. Mr. J. King Depot Road 11 GB-CB8 0AL NEWMARKET GROOT BRITTANIE

Your reference : 22218

Our reference : Project 1349910

Validation Ref. : 1349910_certificaat_v1

Verificationcode : HTNS-XQJY-YKIM-YGIF
Enclosure(s) : 2 table(s) + 1 supplement(s)

Amsterdam, 13 May 2022

I hereby enclose the results of the laboratory tests that have been carried out on your request on the samples that you supplied to us.

I would like to point out to you that the results apply only to the samples supplied, such as these were presented for testing.

The research has been carried out according to the methods that are set out in the current accreditation certificate L086 and/or in the volume "Analysevoorschriften Eurofins Omegam". These protocols are, as far as possible, based on the NEN- EN- and/or ISO standards.

Do also note that the enclosed report may not be copied or reproduced in any way except in its entirety. I trust that we have completed your order as agreed and to your full satisfaction. If you have any questions reading this report, then please don't hesitate to contact our Customer Service.

Yours sincerely, On behalf of Eurofins Omegam,

BSc J. Tukker Production manager





				Table 1 01 2		
		CERTIFICATE				
Project code Your Project Description	: 1349910 : 22218					
Client		: Eurofins Chemtest Ltd				
Your Sample identification						
7169069 = 1421449						
7169070 = 1421450		DI 1407	DLIAOL			
		BH107	BH105			
Client sampling date	:	27/04/2022	28/04/2022			
Date of receipt	:	05/05/2022	05/05/2022			
Startdate Reference number	:	05/05/2022 7169069	05/05/2022 7169070			
Your Matrix	:	Water	Water			
Organic compounds - per- an	d nolyfluoroalky	Isubstances (PFAS)				
Perfluorinated carboxylic acids:		isabstances (i i Ao)				
PFBA	μg/l	< 0,03	< 0,02			
PFPeA	μg/l	< 0,02	< 0,02			
PFHxA	μg/l	< 0,02	< 0,02			
PFHpA	μg/l	< 0,02	< 0,02			
PFOA linear PFOA branched	μg/l	< 0,02	< 0,02 < 0,02			
PFNA	μg/l μg/l	< 0,02 < 0,02	< 0,02 < 0,02			
PFDA	μg/l	< 0,02	< 0,02			
PFUnDA	μg/l	< 0,02	< 0,02			
PFDoDA	μg/l	< 0,02	< 0,02			
PFTrDA	μg/l	< 0,02	< 0,02			
PFTeDA	μg/l	< 0,02	< 0,02			
PFHxDA PFODA	μg/l	< 0,02	< 0,02			
	μg/l	< 0,02	< 0,02			
Perfluorinated sulfonic acids: PFBS	ua/l	< 0,02	< 0,02			
PFPeS	μg/l μg/l	< 0,02	< 0,02			
PFHxS	μg/l	< 0,02	< 0,02			
PFHpS	μg/l	< 0,02	< 0,02			
PFOS linear	μg/l	< 0,02	< 0,02			
PFOS branched	μg/l	< 0,02	< 0,02			
PFDS	µg/l	< 0,02	< 0,02			
Perfluorinated alkyl substances						
4:2 FTS	μg/l	< 0,05	< 0,05			
6:2 FTS	μg/l	< 0,05 < 0,1	< 0,05 < 0,1			
8:2 FTS 10:2 FTS	μg/l μg/l	< 0,1 < 0,05	< 0,1 < 0,05			
PFOSA	μg/l	< 0,02	< 0,03			
Perfluorinated alkyl substances		·	·			
HPFHpA	μg/l	< 0,5	< 0,5			
4H-PFUnDA	μg/l	< 0,05	< 0,05			
8:2 FTUCA	μg/l	< 0,05	< 0,05			
9CI-PF3ONS (F53-B)	μg/l	< 0,02	< 0,02			
ADONA	μg/l	< 0,02	< 0,02			
EtFOSA EtFOSAA	μg/l	< 0,05 < 0,02	< 0,05 < 0,02			
MeFBSA	μg/l μg/l	< 0,02	< 0,02			
MeFOSAA	μg/l	< 0,02 < 0,1	< 0,02			
P37DMOA	μg/l	< 0,5	< 0,5			
PFBSA	μg/l	< 0,02	< 0,02			
MeFOSA	μg/l	< 0,05	< 0,05			
MeFBSAA	μg/l	< 0,02	< 0,02			
8:2 DiPAP	μg/l	< 0,1	< 0,1			
sum PFOA	μg/l	0,03	0,03			
sum PFOS	μg/l	0,03	0,03			

⁻ The frontpage and, where applicable, appendices of this document are integral parts of this certificate.
- Analyses marked with a 'Q' are part of the RvA accreditation certificate L086.

Verificationcode: HTNS-XQJY-YKIM-YGIF





Project code : 1349910 Your Project Description : 22218

Client : Eurofins Chemtest Ltd

Notes related to analyses

General comments

The following information has been provided by the client if applicable:

Project description, Sample identification, Client sampling date, Client Matrix, Sample depth, Pot number (Barcode), Field data, Field observations and sampling data. The client sampling date can affect the validity of the results.

Quantification of branched PFOS/POA is based on DIN 38414-14.

Summation of concentrations for group parameters

Summation is calculated according to AS3000 protocol, paragraph 2.5.2 and appendix 3.

Sample identification : 1421449 Reference number : 7169069

Results Note(s):

perfluorobutanoic acid

(PFBA):

- Raised reporting limit because of interference by the matrix.

Verificationcode: HTNS-XQJY-YKIM-YGIF Ref.: 1349910_certificaat_v1

⁻ The frontpage and, where applicable, appendices of this document are integral parts of this certificate.





Project code : 1349910 Your Project Description : 22218

Client : Eurofins Chemtest Ltd

Appendix Index PFAS

PFAS component Full name PFAS component

10:2 FTS 10:2 FTS (10:2 Fluorotelomer sulfonic acid) 4:2 FTS 4:2 FTS (4:2 Fluorotelomer sulfonic acid)

4H-PFUnDA 4H-PFUnDA (2H,2H,3H,3H-Perfluoroundecanoic acid)

6:2 FTS 6:2 FTS (6:2 Fluorotelomer sulfonic acid)
8:2 DiPAP 8:2 DiPAP (8:2 Fluorotelomer phosphate diester)
8:2 FTS 8:2 FTS (8:2 Fluorotelomer sulfonic acid)

8:2 FTUCA 8:2 FTUCA (8:2 Fluorotelomer unsaturated carboxylic acid)

9CI-PF3ONS (F53-B) 9CI-PF3ONS (F53-B) (9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid)

ADONA (ammonium 4,8-dioxa-3H-perfluorononanoate)

EtFOSA EtFOSA (N-ethyl perfluorooctanesulfonamide)

EtFOSAA (perfluorooctanesulfonylamide(N-ethyl)acetate)

HPFHpA (7H-perfluoroheptanoic acid)

MeFBSA (N-methylperfluorobutanesulfonylamide)

MeFBSAA MeFBSAA (perfluorobutanesulfonylamide(N-methyl)acetate)

MeFOSA (N-methyl perfluorooctanesulfonamide)

MeFOSAA MeFOSAA (N-methyl perfluorooctanesulfonamidoacetic acid)

P37DMOA (perfluoro-3,7-dimethyloctanoic acid)

PFBA (perfluorobutanoic acid) **PFBA** PFBS (perfluorobutanesulfonic acid) **PFBS PFBSA** PFBSA (perfluorobutanesulfonamide) PFDA (perfluorodecanoic acid) **PFDA PFDoDA** PFDoDA (perfluorododecanoic acid) **PFDS** PFDS (perfluorodecanesulfonic acid) **PFHpA** PFHpA (perfluoroheptanoic acid) **PFHpS** PFHpS (perfluoroheptanesulfonic acid) PFHxA (perfluorohexanoic acid) **PFHxA** PFHxDA (perfluorohexadecanoic acid) **PFHxDA** PFHxS (perfluorohexanesulfonic acid) **PFHxS PFNA** PFNA (perfluorononanoic acid)

PFOA branched
PFOA linear
PFOA linear (perfluorooctanoic acid)
PFODA (perfluorooctanoic acid)
PFODA (perfluorooctadecanoic acid)

PFOS branched (perfluorooctanesulfonic acid) PFOS branched PFOS linear PFOS lineair (perfluorooctanesulfonic acid) **PFOSA** PFOSA (perfluorooctanesulfonamide) PFPeA (perfluoropentanoic acid) **PFPeA** PFPeS (perfluoropentanesulfonic acid) **PFPeS** PFTeDA (perfluorotetradecanoic acid) **PFTeDA PFTrDA** PFTrDA (perfluorotridecanoic acid) **PFUnDA** PFUnDA (perfluoroundecanoic acid)

Verificationcode: HTNS-XQJY-YKIM-YGIF

⁻ The frontpage and, where applicable, appendices of this document are integral parts of this certificate.



Eurofins Chemtest Ltd Attn. Mr. J. King Depot Road 11 GB-CB8 0AL NEWMARKET GROOT BRITTANIE

Your reference : 22218

Our reference : Project 1349910 (concerns updated certificate)

Validation Ref. : 1349910_certificaat_v2 Verificationcode : HTNS-XQJY-YKIM-YGIF

Modification : 20/5 Monster omshriving aangepast van 1421449 naar 1421449/1421449 / BH107 en1421450

naar1421450 / BH105 Enclosure(s) : 2 table(s) + 1 supplement(s)

Amsterdam, 20 May 2022

I hereby enclose the results of the laboratory tests that have been carried out on your request on the samples that you supplied to us.

I would like to point out to you that the results apply only to the samples supplied, such as these were presented for testing.

The research has been carried out according to the methods that are set out in the current accreditation certificate L086 and/or in the volume "Analysevoorschriften Eurofins Omegam". These protocols are, as far as possible, based on the NEN- EN- and/or ISO standards.

Do also note that the enclosed report may not be copied or reproduced in any way except in its entirety. I trust that we have completed your order as agreed and to your full satisfaction. If you have any questions reading this report, then please don't hesitate to contact our Customer Service.

Yours sincerely, On behalf of Eurofins Omegam,

BSc J. Tukker Production manager





				Table 1 of 2
		CERTIFICATE		
Project code	: 1349910			
Your Project Description	: 22218			
Client	: Eurofins	Chemtest Ltd		
Your Sample identification				
7169069 = 1421449/BH107				
7169070 = 1421450/BH105		BH107	BH105	
Client sampling date	:	27/04/2022	28/04/2022	
Date of receipt	:	05/05/2022	05/05/2022	
Startdate	:	05/05/2022	05/05/2022	
Reference number Your Matrix	:	7169069	7169070	
Tour Matrix	•	Water	Water	
Organic compounds - per- and	d polyfluoroalky	substances (PFAS)		
Perfluorinated carboxylic acids:				
PFBA	μg/l	< 0,03	< 0,02	
PFPeA PFHxA	μg/l	< 0,02	< 0,02	
PFHxA PFHpA	μg/l μg/l	< 0,02 < 0,02	< 0,02 < 0,02	
PFOA linear	μg/l	< 0,02	< 0,02	
PFOA branched	μg/l	< 0,02	< 0,02	
PFNA	μg/l	< 0,02	< 0,02	
PFDA	μg/l	< 0,02	< 0,02	
PFUnDA	μg/l	< 0,02	< 0,02	
PFDoDA	μg/l	< 0,02	< 0,02	
PFTrDA PFTeDA	μg/l μg/l	< 0,02 < 0,02	< 0,02 < 0,02	
PFHxDA	μg/l	< 0,02 < 0,02	< 0,02	
PFODA	μg/l	< 0,02	< 0,02	
Perfluorinated sulfonic acids:	. 0	,	·	
PFBS	μg/l	< 0,02	< 0,02	
PFPeS	μg/l	< 0,02	< 0,02	
PFHxS	μg/l	< 0,02	< 0,02	
PFHpS	μg/l	< 0,02	< 0,02	
PFOS linear	μg/l	< 0,02	< 0,02	
PFOS branched	μg/l	< 0,02	< 0,02	
PFDS	μg/l	< 0,02	< 0,02	
Perfluorinated alkyl substances				
4:2 FTS	μg/l	< 0,05	< 0,05	
6:2 FTS	μg/l	< 0,05	< 0,05	
8:2 FTS 10:2 FTS	μg/l μg/l	< 0,1 < 0,05	< 0,1 < 0,05	
PFOSA	μg/l	< 0,03 < 0,02	< 0,03	
Perfluorinated alkyl substances		1 0,0=	,	
HPFHpA	μg/l	< 0,5	< 0,5	
4H-PFUnDA	μg/l	< 0,05	< 0,05	
8:2 FTUCA	μg/l	< 0,05	< 0,05	
9CI-PF3ONS (F53-B)	μg/l	< 0,02	< 0,02	
ADONA	μg/l	< 0,02	< 0,02	
EtFOSA	μg/l	< 0,05	< 0.05	
EtFOSAA MeFBSA	µg/l µg/l	< 0,02 < 0,02	< 0,02 < 0,02	
MeFOSAA	μg/l	< 0,02	< 0,02	
P37DMOA	μg/l	< 0,5	< 0,5	
PFBSA	μg/l	< 0,02	< 0,02	
MeFOSA	μg/l	< 0,05	< 0,05	
MeFBSAA	μg/l	< 0,02	< 0,02	
8:2 DiPAP	μg/l	< 0,1	< 0,1	
sum PFOA	μg/l	0,03	0,03	
sum PFOS	μg/I	0,03	0,03	

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Verificationcode: HTNS-XQJY-YKIM-YGIF





Project code : 1349910 Your Project Description : 22218

Client : Eurofins Chemtest Ltd

Notes related to analyses

General comments

The following information has been provided by the client if applicable:

Project description, Sample identification, Client sampling date, Client Matrix, Sample depth, Pot number (Barcode), Field data, Field observations and sampling data. The client sampling date can affect the validity of the results.

Quantification of branched PFOS/POA is based on DIN 38414-14.

Summation of concentrations for group parameters

Summation is calculated according to AS3000 protocol, paragraph 2.5.2 and appendix 3.

Sample identification : 1421449/BH107

Reference number : 7169069

Results Note(s):

perfluorobutanoic acid

(PFBA):

Raised reporting limit because of interference by the matrix.

Verificationcode: HTNS-XQJY-YKIM-YGIF Ref.: 1349910_certificaat_v2

⁻ The frontpage and, where applicable, appendices of this document are integral parts of this certificate.





Project code : 1349910 Your Project Description : 22218

Client : Eurofins Chemtest Ltd

Appendix Index PFAS

PFAS component Full name PFAS component

10:2 FTS 10:2 FTS (10:2 Fluorotelomer sulfonic acid) 4:2 FTS 4:2 FTS (4:2 Fluorotelomer sulfonic acid)

4H-PFUnDA 4H-PFUnDA (2H,2H,3H,3H-Perfluoroundecanoic acid)

6:2 FTS 6:2 FTS (6:2 Fluorotelomer sulfonic acid)
8:2 DiPAP 8:2 DiPAP (8:2 Fluorotelomer phosphate diester)
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9CI-PF3ONS (F53-B) 9CI-PF3ONS (F53-B) (9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid)

ADONA ADONA (ammonium 4,8-dioxa-3H-perfluorononanoate)
EtFOSA EtFOSA (N-ethyl perfluorooctanesulfonamide)

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PFOA branched
PFOA linear
PFOA linear (perfluorooctanoic acid)
PFODA (perfluorooctanoic acid)
PFODA (perfluorooctadecanoic acid)

PFOS branched (perfluorooctanesulfonic acid) PFOS branched PFOS linear PFOS lineair (perfluorooctanesulfonic acid) **PFOSA** PFOSA (perfluorooctanesulfonamide) PFPeA (perfluoropentanoic acid) **PFPeA** PFPeS (perfluoropentanesulfonic acid) **PFPeS** PFTeDA (perfluorotetradecanoic acid) **PFTeDA PFTrDA** PFTrDA (perfluorotridecanoic acid) **PFUnDA** PFUnDA (perfluoroundecanoic acid)

Verificationcode: HTNS-XQJY-YKIM-YGIF

⁻ The frontpage and, where applicable, appendices of this document are integral parts of this certificate.



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:

12/02/2022

Report Date:

14/02/2022

File Name:

0208.spt

Test Operator:

NPB

Instrumented Rod Data

Diameter d_r (mm):

54

Wall Thickness t_r (mm):

6.0

Assumed Modulus Ea (GPa): 200

64786

Accelerometer No.1: Accelerometer No.2:

64789

SPT Hammer Information

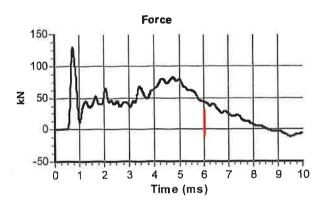
Hammer Mass m (kg): 63

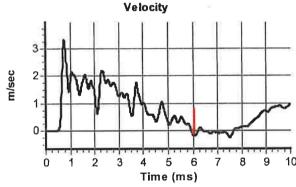
Falling Height h (mm): 760

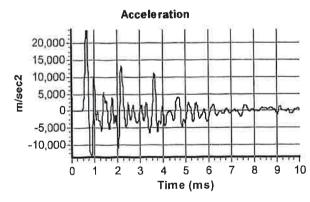
SPT String Length L (m): 12.0

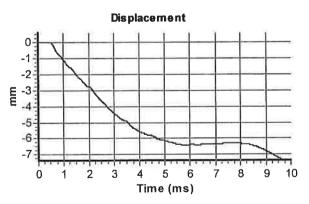
Comments / Location

CAUSEWAY









Calculations

Area of Rod A (mm2):

905

Theoretical Energy E_{theor} (J):

473

Measured Energy E_{meas}

(J): 357

Energy Ratio E_r (%):

76

Signed: N Burrows

Title:

FOC Manager

The recommended calibration interval is 12 months



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: 0643

Test Date:

12/02/2022

Report Date:

14/02/2022

File Name:

0643.spt

Test Operator:

NPB

Instrumented Rod Data

Diameter d_r (mm):

54

Wall Thickness t_r (mm):

6.0

Assumed Modulus Ea (GPa): 200

Accelerometer No.1:

64786

Accelerometer No.2:

64789

SPT Hammer Information

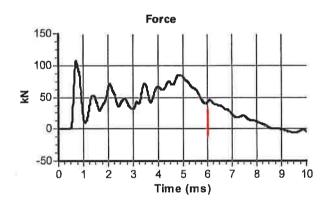
Hammer Mass m (kg): 63

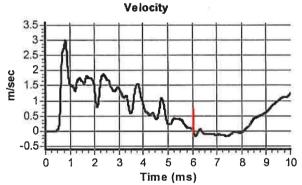
Falling Height h (mm): 760

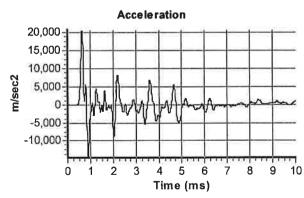
SPT String Length L (m): 12.0

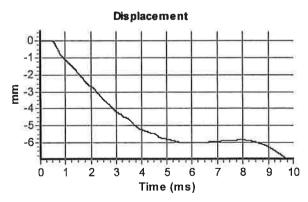
Comments / Location

CAUSEWAY









Calculations

Area of Rod A (mm2):

905

Theoretical Energy E_{theor} (J):

473

Measured Energy E_{meas} (.

(J): 340

Energy Ratio E_r (%):

72

Signed: N Burrows
Title: FOC Manager

The recommended calibration interval is 12 months



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

Report Date:

File Name:

Test Date:

12/02/2022

14/02/2022

1387.spt

1387

Test Operator:

SPT Hammer Ref:

NPB

Instrumented Rod Data

Diameter d_r (mm):

54

Wall Thickness t_r (mm):

6.0

Assumed Modulus Ea (GPa): 200

Accelerometer No.1:

64786

Accelerometer No.2:

64789

SPT Hammer Information

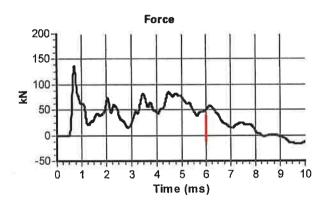
Hammer Mass m (kg): 63.0

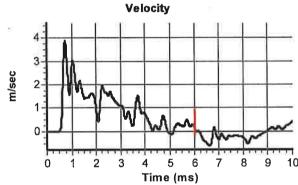
Falling Height h (mm): 760

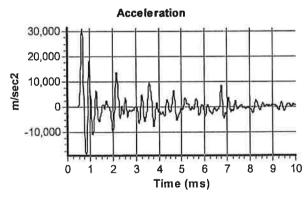
SPT String Length L (m): 12.0

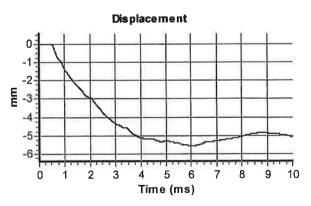
Comments / Location

CAUSEWAY









Calculations

Area of Rod A (mm2):

905

Theoretical Energy E_{theor} (J):

473

Measured Energy E_{meas}

(J): 308

Energy Ratio E_r (%):

65

Signed: N Burrows

Title:

FOC Manager

The recommended calibration interval is 12 months



APPENDIX G SPT HAMMER ENERGY MEASUREMENT REPORT

