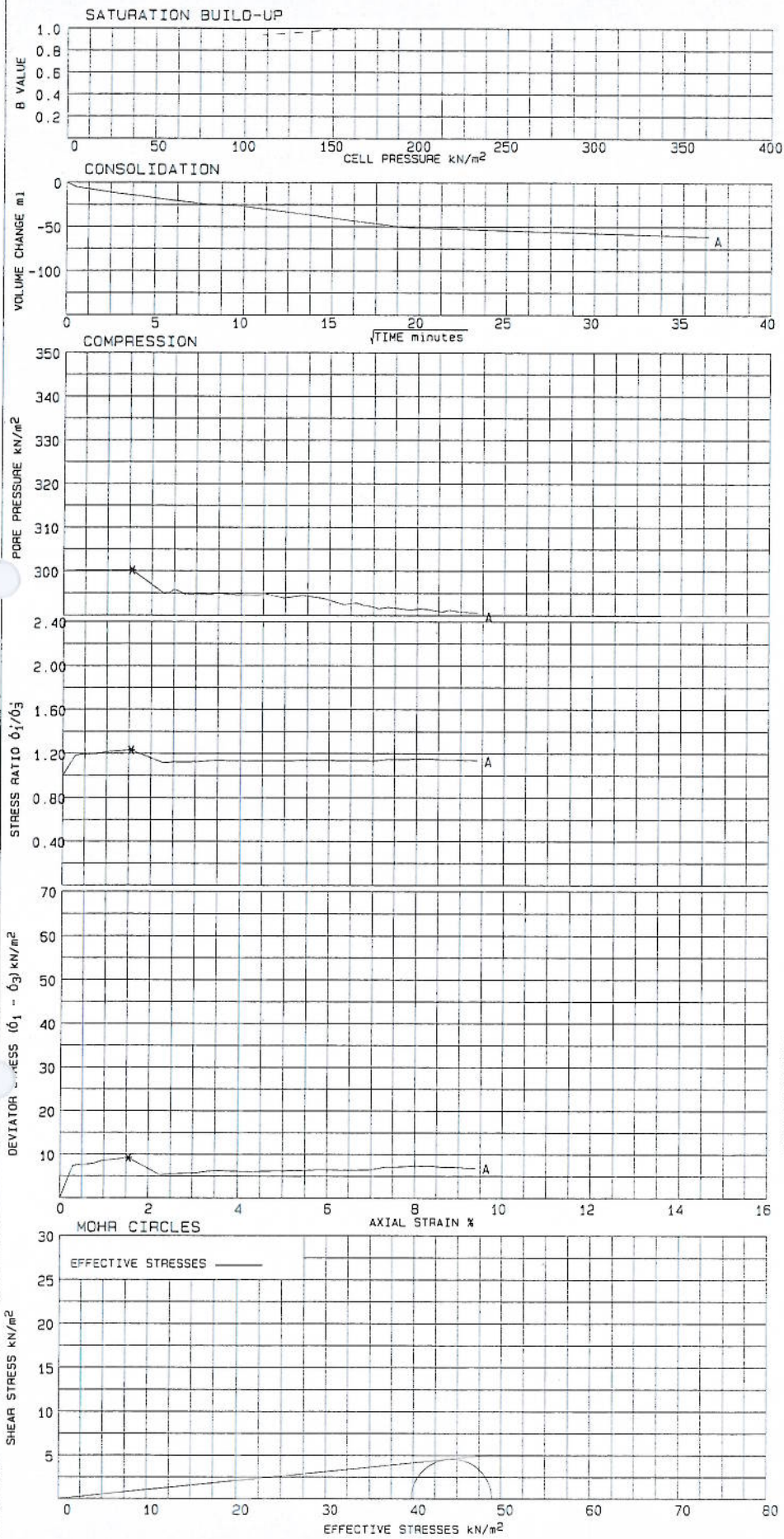


A.5.1.1.2

N6 Galway City Outer Bypass Contract 2 Gortatleva to Menlough

September to December 2003

A.5.1.1.2



SPECIMEN		A	B	C
INITIAL	Density Mg/m³	1.19		
	Moisture %	182		
	Dry Density Mg/m³	0.42		
AFTER CONSOLIDATION	Density Mg/m³	1.17		
	Moisture %	166		
	Dry Density Mg/m³	0.44		
SATURATION STAGE	Initial pwp	4		
	Saturated pwp		207	
	Final cell pressure	210		
	B value	1.00		
CONSOLIDATION STAGE	Cell Pressure	340		
	Back Pressure		300	
	Initial pwp		330	
	Final pwp		300	
	σ ₃ '		40	
pwp dissipation %	100			
COMPRESSION STAGE	Cell Pressure	340		
	Initial pwp		300	
	Initial σ ₃ '		40	
	Rate of strain % per hour		0.42	
FAILURE CONDITIONS AT PEAK DEVIATOR STRESS	Axial Strain %	1.6		
	(σ ₁ - σ ₃) _f	9		
	σ ₁ ' _f	49		
	σ ₃ ' _f	40		
	σ _f	300		
	A _f	0.02		
	(σ ₁ ' / σ ₃ ') _f	1.230		
MODE OF FAILURE				

SHEAR STRENGTH PARAMETERS C' ASSUMED ZERO	C'	0 kN/m²
	φ'	6°

NOTES
 Saturation by application of cell/back pressure increments of 50 kN/m² with a differential of 10 kN/m².
 Drainage during consolidation to top with vertical side drains fitted
 Stress/strain curves corrected for area change, side drains and .33 mm thick membrane

SOIL DESCRIPTION
 Soft brownish grey organic CLAY with fine rootlets and plant remains.

TYPE OF SPECIMEN UNDISTURBED

SPECIMEN DIMENSIONS 97.7 mm dia x 192.5 mm long

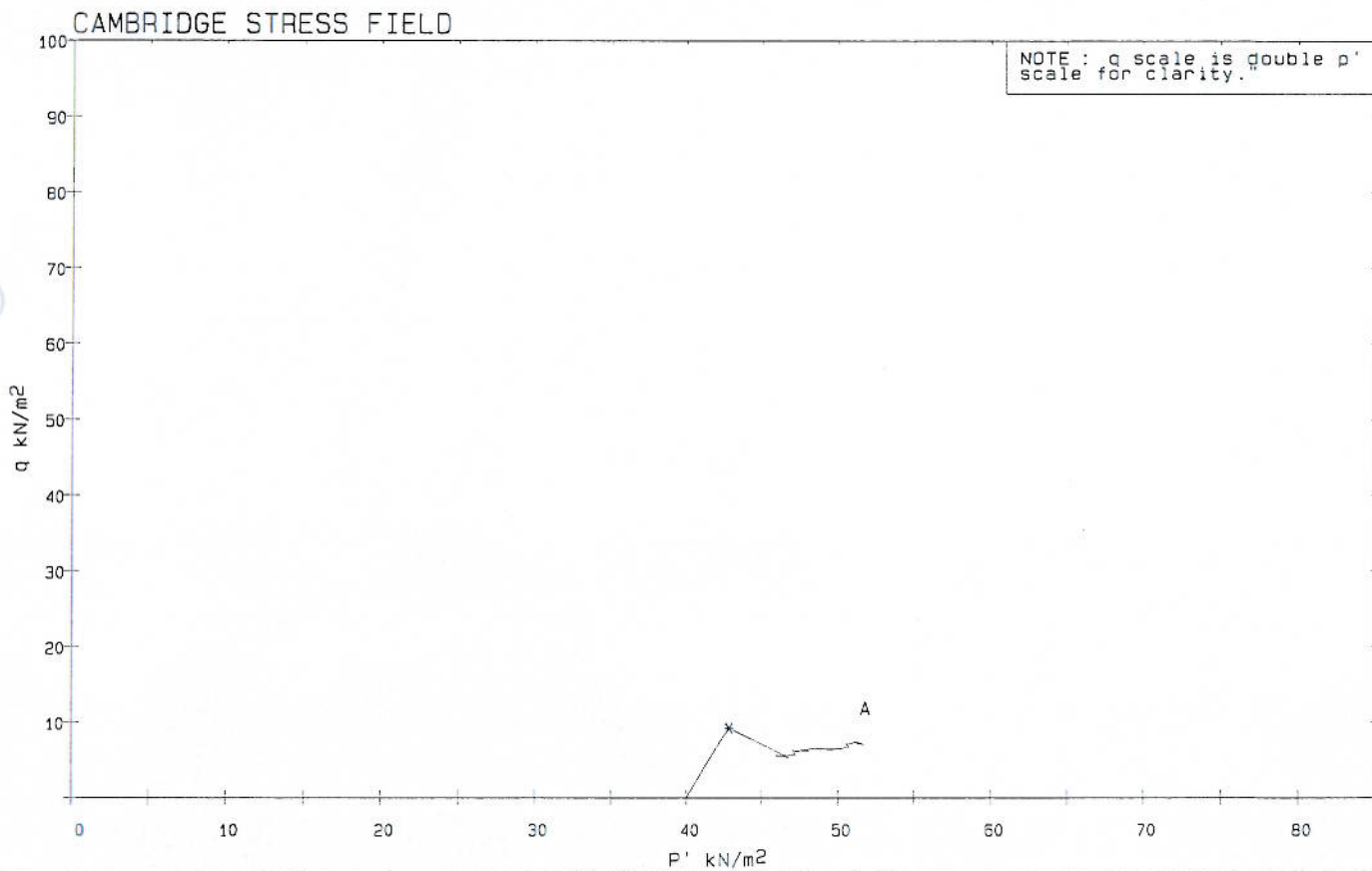
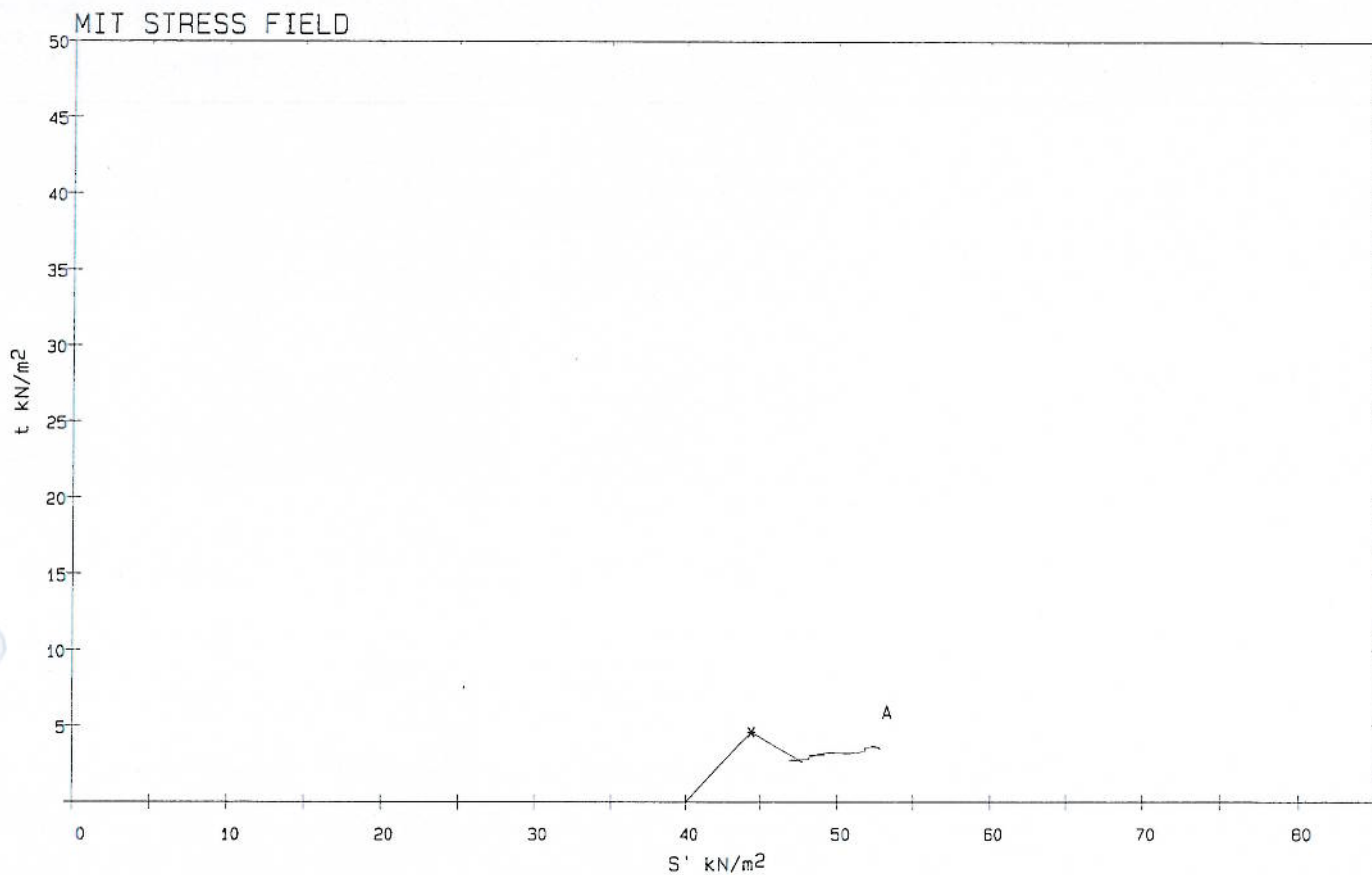
Test carried out to BS 1377 : Part 8 : 1990 : Test 7

Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure

Borehole No. 110 Depth 3.50-4.50m
 Sample No. P11

SLR 8.7A Soil Mechanics Location N6 GALWAY CITY OUTER BYPASS Loc. No. KC3210 Fig.

NOTE : Tested at rate of strain based on pore pressure equalisation at failure only.



Consolidated Undrained Triaxial Compression Test with measurement of Pore Pressure

Borehole No. .110

Depth 3.50-4.50m

Sample No. P11

SLR 8.7B Soil Mechanics

Location

N6 GALWAY CITY OUTER BYPASS

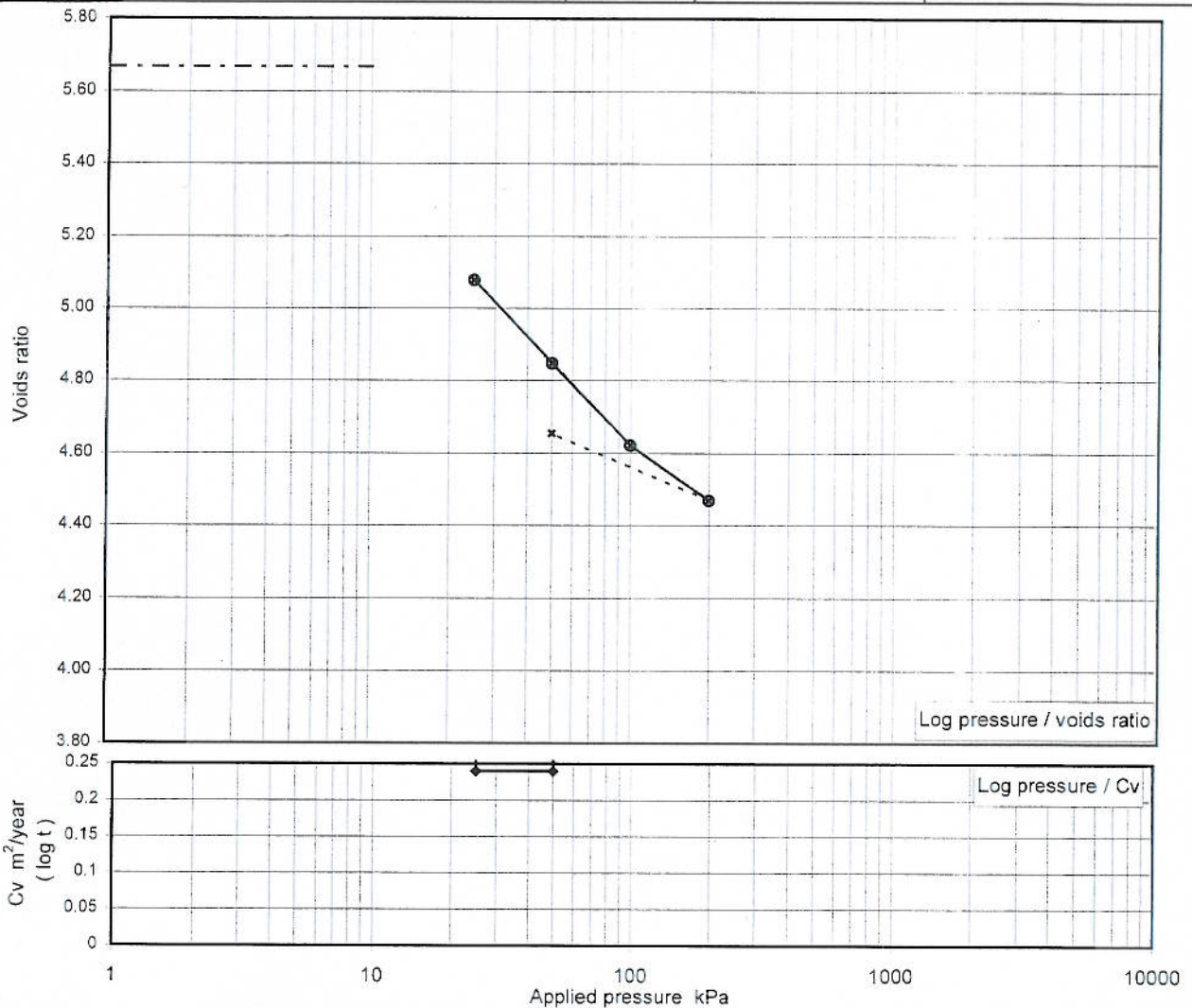
Loc. No. KC3210

Fig.

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377 : Part 5 : 1990 : clause 3

Project No	KC3210	Sample Details:	Hole No	BH110
Project Name	N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatieva to Menlough		Depth (m BGL)	3.5
			No	11
			Type	P
			ID	ESGN500077149



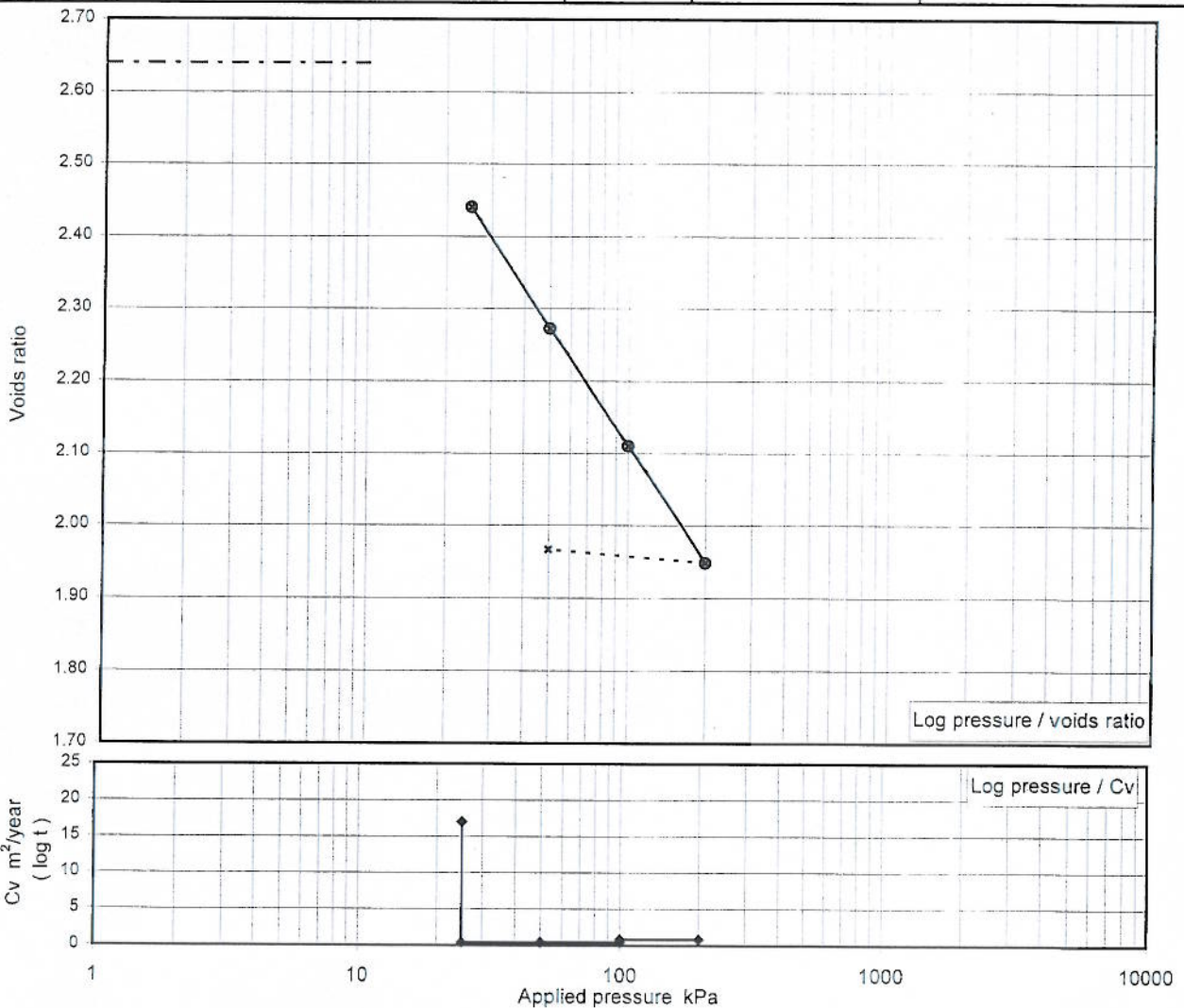
Soil description	Soft brownish grey organic CLAY with fine rootlets and plant remains.	Liquid limit %	
Preparation	Undisturbed	Plastic limit %	

Specimen details	Initial	Final		Applied Pressure kPa	Voids ratio	M _v m ² /MN	C _v (t _{50, log}) m ² /year	C _v (t _{90, root}) m ² /year
Particle density	2.65	assumed	Mg/m ³	0	5.6680	/	/	/
Diameter	74.88		mm	25	5.0783	3.537	0.46	0.49
Height	18.85	15.99	mm	50	4.8473	1.520	0.24	0.23
Voids ratio	5.668	4.655		100	4.6213	0.773	0.28	0.26
Moisture content	216	96	%	200	4.4685	0.272	0.41	0.45
Bulk density	1.26	0.92	Mg/m ³	50	4.6553	0.228	-	-
Dry density	0.40	0.47	Mg/m ³					
Saturation	101	54	%					
Average temperature for test	22		°C					
Swelling pressure	not measured		kPa					
Notes :								
Specimen taken	50 mm from base of sample							

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377 : Part 5 : 1990 : clause 3

Project No	KC3210	Sample Details:	Hole No	BH110
Project Name	N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough		Depth (m BGL)	6.5
			No	16
			Type	P
			ID	ESGN500077151



Soil description	Soft uncompact light grey slightly clayey SILT.	Liquid limit %	
Preparation	Undisturbed	Plastic limit %	

Specimen details	Initial		Final	M _v m²/MN	C _v (t _{50, log}) m²/year	C _v (t _{90, root}) m²/year
	Value	Value	Value			
Particle density	2.65	assumed				
Diameter	74.86					
Height	18.86	15.37				
Voids ratio	2.640	1.967				
Moisture content	106	52	%			
Bulk density	1.50	1.36	Mg/m³			
Dry density	0.73	0.89	Mg/m³			
Saturation	107	70	%			
Average temperature for test	22					
Swelling pressure	not measured			kPa		
Notes :						
Specimen taken	50 mm from base of sample					

Samples				Earthworks													
Hole	Depth	Type	Description	CBR Top	CBR Base	CBR Top w%	CBR Base w%	CBR Surch kg.	γ_b Mg/m ³	Comp Type	w% (Opt) <Nat>	γ_d (max) Mg/m ³	ρ_s Mg/m ³	% ret 20/37.5 mm	MCV		
TP22	1.50-2.00	B	Slightly sandy very gravelly CLAY	8.4	13	10	9.6	13.6	2.27	2.5kg	(9.5)	(2.14)	2.65	14/7.0			
				16	20	7.9	8.1	13.6	2.23	2.5kg	<10>	2.06					
				0.7	0.6	10	12	13.6	2.27	2.5kg	11	2.05					
				2.3	2.0	10.0	10	13.6	2.33	2.5kg	10	2.12					
				3.0	3.1	9.6	10.0	13.6	2.34	2.5kg	9.8	2.13					
				0.4	0.3	14	14	13.6	2.46	2.5kg	14	2.17					
									2.32	MCV	9.0	2.13				21	10.9
									2.34	MCV	7.8	2.17				21	17.3
									2.25	MCV	11	2.02				21	5.4
									2.29	MCV	9.7	2.08				21	11.8
					2.34	MCV	8.6	2.16	21	11.6							
TP23	1.00-1.50	B	Slightly sandy to sandy gravelly CLAY	3.3	4.4	11	11	13.6	2.25	2.5kg	(10)	(2.04)	2.65	9.1/3.9			
				23	21	8.8	10	13.6	2.21	2.5kg	<11>	2.02					
				28	37	5.6	5.0	13.6	2.02	2.5kg	5.3	1.92					
				0.3	0.2	13	12	13.6	2.21	2.5kg	12	1.97					
				0.1	0.1	15	15	13.6	2.19	2.5kg	15	1.91					
									2.28	MCV	9.9	2.08				13	9.0
									2.32	MCV	9.0	2.13				13	12.4
									2.16	MCV	6.1	2.04				13	13.4
									2.20	MCV	11	1.98				13	10.0
									2.20	MCV	14	1.93				13	1.4
TP96	0.50	B	Slightly sandy gravelly CLAY	1.2	1.0	13	14	13.6	2.30	2.5kg	(9.5)	(2.11)	2.65	10/9.4			
				24	28	6.5	6.5	13.6	2.19	2.5kg	<13>	2.03					
				5.2	2.2	8.1	8.1	13.6	2.26	2.5kg	6.5	2.06					
				0.3	0.8	12	11	13.6	2.29	2.5kg	8.1	2.09					
				1.9	2.5	9.1	10	13.6	2.31	2.5kg	11	2.06					
									2.31	2.5kg	9.6	2.11					
									2.15	MCV	12	1.93				20	7.8
									2.25	MCV	7.7	2.09				20	14.0
									2.30	MCV	8.1	2.12				20	15.4
									2.16	MCV	12	1.93				20	2.0
					2.26	MCV	7.6	2.10	20	13.2							
					2.25	MCV	7.8	2.09	20	12.0							
TP113	1.40	B	Slightly sandy gravelly CLAY	0.3	0.3	8.9	9.4	13.6	2.36	2.5kg		2.16		16			
TP125	1.50-1.70	B	Very clayey SAND and GRAVEL	7.5	13	8.1	9.5	13.6	2.34	2.5kg	(7.5)	(2.19)	2.65	6.4/3.6			
				45	56	5.4	5.4	13.6	2.28	2.5kg	<8.8>	2.15					
				0.5	0.6	9.6	9.7	13.6	2.34	2.5kg	5.4	2.17					
				0.1	0.2	11	10	13.6	2.34	2.5kg	9.7	2.14					
				21	27	5.6	6.7	13.6	2.30	2.5kg	11	2.08					
									2.31	2.5kg	6.1	2.18					
									2.38	MCV	8.1	2.20				10	11.2
									2.28	MCV	5.8	2.16				10	12.5
									2.35	MCV	7.8	2.18				10	4.0
									2.39	MCV	6.1	2.25				10	13.4
					2.30	MCV	9.9	2.09	10	1.0							

Remarks

Form 6/2

Laboratory - Compaction, CBR & MCV Summary

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

Contract

KC3210

Sheet



Exploration Associates

Samples				Earthworks											
Hole	Depth	Type	Description	CBR Top	CBR Base	CBR Top w%	CBR Base w%	CBR Surch kg.	γ_b Mg/m ³	Comp Type	w% (Opt) <Nat>	γ_d (max) Mg/m ³	ρ_s Mg/m ³	% ret 20/37.5 mm	MCV
TP128	0.20-0.30	B	Slightly sandy gravelly CLAY	14	18	8.5	8.5	13.6	1.90	2.5kg	(14)	(1.88)	2.65	9.9/	
				16	23	6.7	7.1	13.6	1.86	2.5kg	<8.5>	1.75		7.6	
				13	14	12	12	13.6	2.07	2.5kg	12	1.85			
				2.4	1.7	16	16	13.6	2.11	2.5kg	16	1.82			
				1.9	1.7	16	16	13.6	2.13	2.5kg	16	1.84			
									2.14	MCV	8.1	1.98		18	89.1
									2.10	MCV	11	1.89		18	12.6
									2.05	MCV	15	1.78		18	8.8
									2.10	MCV	14	1.83		18	10.0
									1.99	MCV	7.3	1.85		18	18.2
TP134	0.50-0.80	B	Clayey sandy GRAVEL	0.6	0.5	26	26	13.6	1.90	2.5kg	(20)	(1.67)	2.65	12/	
				3.9	4.9	21	21	13.6	2.00	2.5kg	<26>	1.51		58	
				6.1	12	19	19	13.6	1.95	2.5kg	19	1.64			
				14	14	19	19	13.6	1.97	2.5kg	19	1.65			
				10	12	16	16	13.6	1.79	2.5kg	16	1.54			
									2.17	MCV	11	1.95		69	5.1
									1.95	MCV	21	1.60		69	10.2
									1.99	MCV	19	1.67		69	11.6
									2.01	MCV	19	1.69		69	13.8
TP142	1.00-1.40	B	Slightly sandy very gravelly SILT	0.8	0.6	18	18	13.6	2.10	2.5kg	(13)	(1.91)	2.65	11/	
				9.9	7.2	13	13	13.6	2.15	2.5kg	<18>	1.77		37	
				16	24	9.7	9.7	13.6	2.06	2.5kg	9.7	1.88			
				34	34	6.1	7.3	13.6	1.98	2.5kg	6.7	1.86			
				17	14	12	10	13.6	1.98	2.5kg	11	1.78			
									2.11	MCV	13	1.86		48	11.2
									2.17	MCV	10	1.97		48	15.2
									2.16	MCV	11	1.94		48	11.4
									2.10	MCV	14	1.84		48	7.8

Remarks

Form 6/2

Laboratory - Compaction, CBR & MCV Summary

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleva to Menlough
Galway County Council

Contract

KC3210

Sheet



Exploration Associates

BH/TP	Depth	w%	Direct Shear Top (kpa)	Remoulded Shear Top (kpa)	Direct Shear Bottom (kpa)	Remoulded Shear Bottom (kpa)
TP11	0.10-0.40	19	6	4	8	2
TP11	0.10-0.40	17	12	6	14	7
TP11	0.10-0.40	14	36	18	34	12
TP11	0.10-0.40	9.5	NP	NP	41	16
TP11	0.10-0.40	8.4	NP	NP	NP	NP
TP15	0.70-0.80	9.7	116	46	140	8
TP15	0.70-0.80	7.8	240	8	290	12
TP15	0.70-0.80	11	12	4	40	16
TP15	0.70-0.80	13	4	0	4	0
TP15	0.70-0.80	7.5	210	28	224	32
TP20	1.50-2.00	11	38	2	30	4
TP20	1.50-2.00	9.1	236	44	156	32
TP20	1.50-2.00	13	4	0	4	0
TP20	1.50-2.00	13	0	0	0	0
TP22	1.50-2.00	10	140	30	250	36
TP22	1.50-2.00	8	96	12	184	16
TP22	1.50-2.00	11	28	4	20	4
TP22	1.50-2.00	10	340	32	200	16
TP22	1.50-2.00	9.8	196	28	144	32
TP23	1.00-1.50	11	62	14	76	12
TP23	1.00-1.50	9.6	170	90	168	38
TP23	1.00-1.50	5.3	216	16	224	60
TP23	1.00-1.50	12	24	4	20	4
TP23	1.00-1.50	15	4	0	4	0
TP96	0.50	13	22	12	34	20
TP96	0.50	6.5	NP	NP	NP	NP
TP96	0.50	8.1	70	16	98	26
TP96	0.50	11	23	7	17	5
TP96	0.50	9.6	40	16	42	20
TP128	0.20-0.30	8.5	NP	NP	NP	NP
TP128	0.20-0.30	6.9	NP	NP	NP	NP
TP128	0.20-0.30	12	NP	NP	NP	NP
TP128	0.20-0.30	16	44	15	42	14
TP128	0.20-0.30	16	72	30	70	30
TP142	1.00-1.40	18	44	12	54	10
TP142	1.00-1.40	13	58	20	110	24
TP142	1.00-1.40	9.7	NP	NP	NP	NP
TP142	1.00-1.40	6.7	NP	NP	NP	NP
TP142	1.00-1.40	11	NP	NP	NP	NP

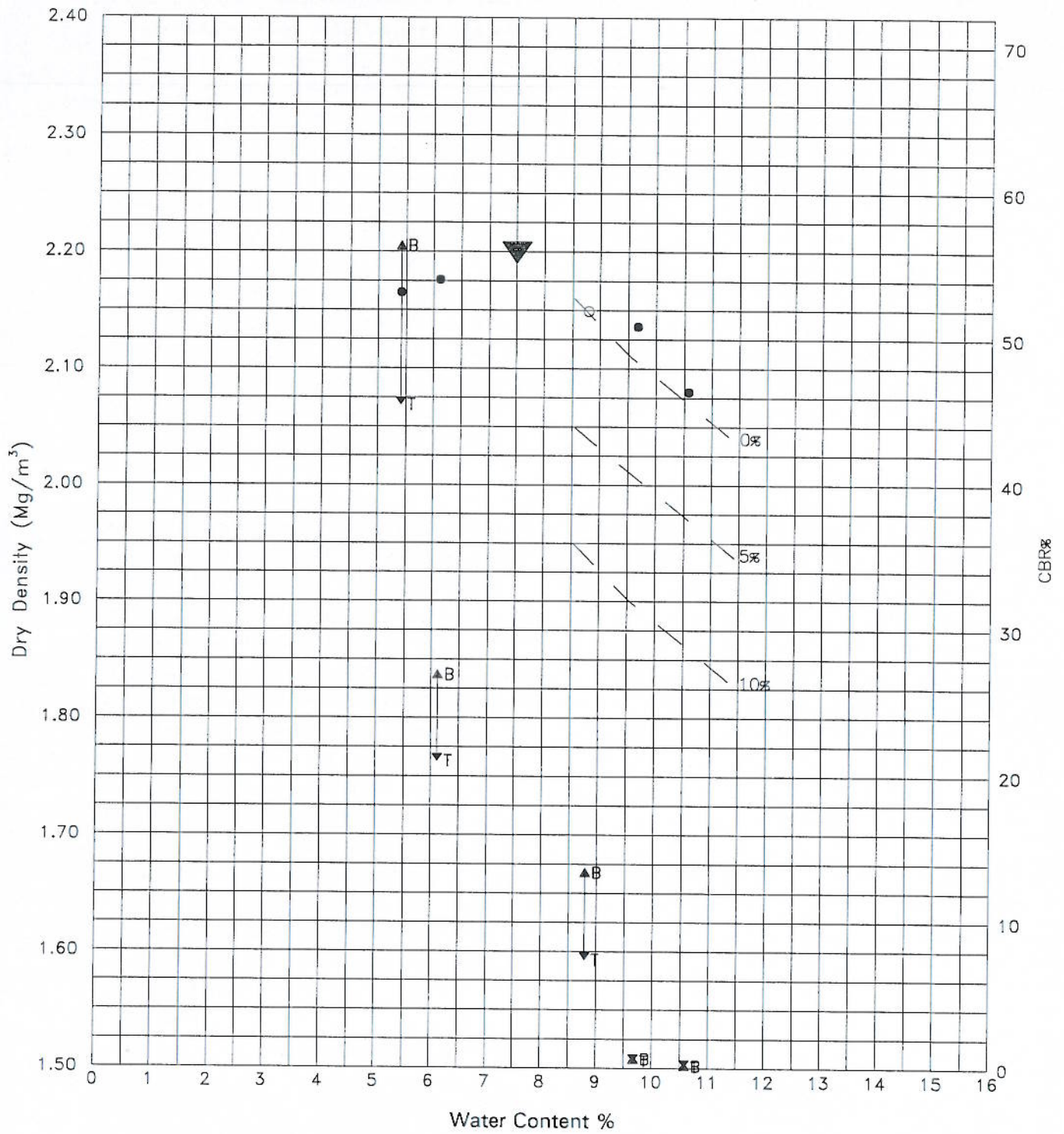
NP = No Penetration with hand vane

Hand Vanes In CBR Moulds

Project: N6 Galway City Outer Bypass
Contract 2 Ground Investigation
Gortaleva to Menalough

Contract 2
KC3210





- Moisture Content/Dry Density
- Compaction at Natural Water Content
- ▼ Maximum Dry Density/Optimum Water Content
- ▼ CBR% Top
- ▲ CBR% Bottom
- ▲ CBR% Average (if Top and Bottom are within 10%)

Type of Test/Mould	2.5Kg/ CBR	Description	Hole	TP125
Particle Density Assumed	2.65 Mg/m ³	Very clayey SAND and GRAVEL	Depth	1.50 -1.70
Maximum Dry Density	2.19 Mg/m ³		Type	B
Optimum Water Content	7.5 %			
% retained 37.5mm sieve	4			
% retained 20mm sieve	6			

Form 54/0

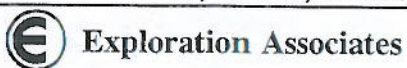
Remarks

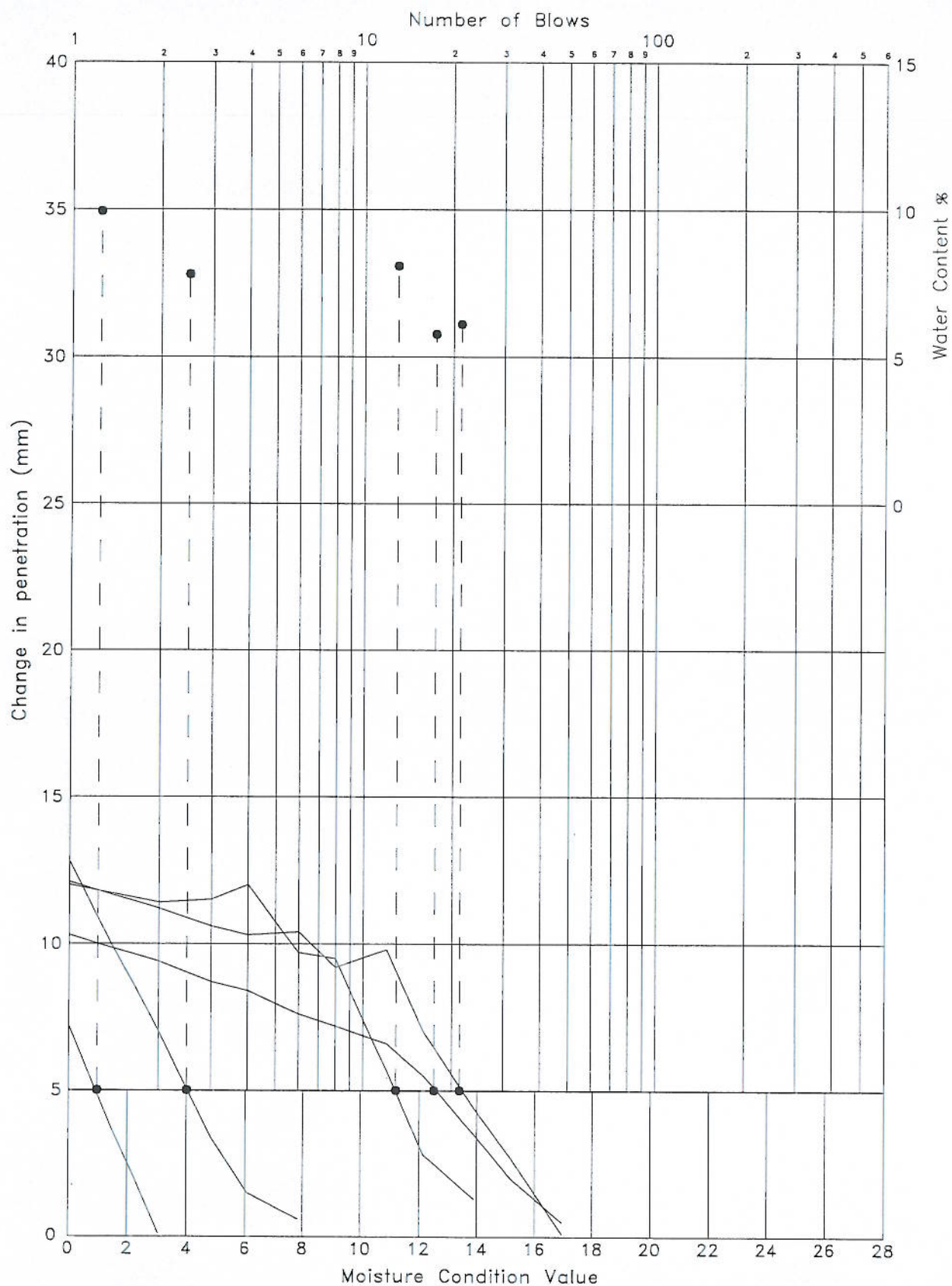
Laboratory - Moisture Content/
Dry Density Relationship


Project
N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

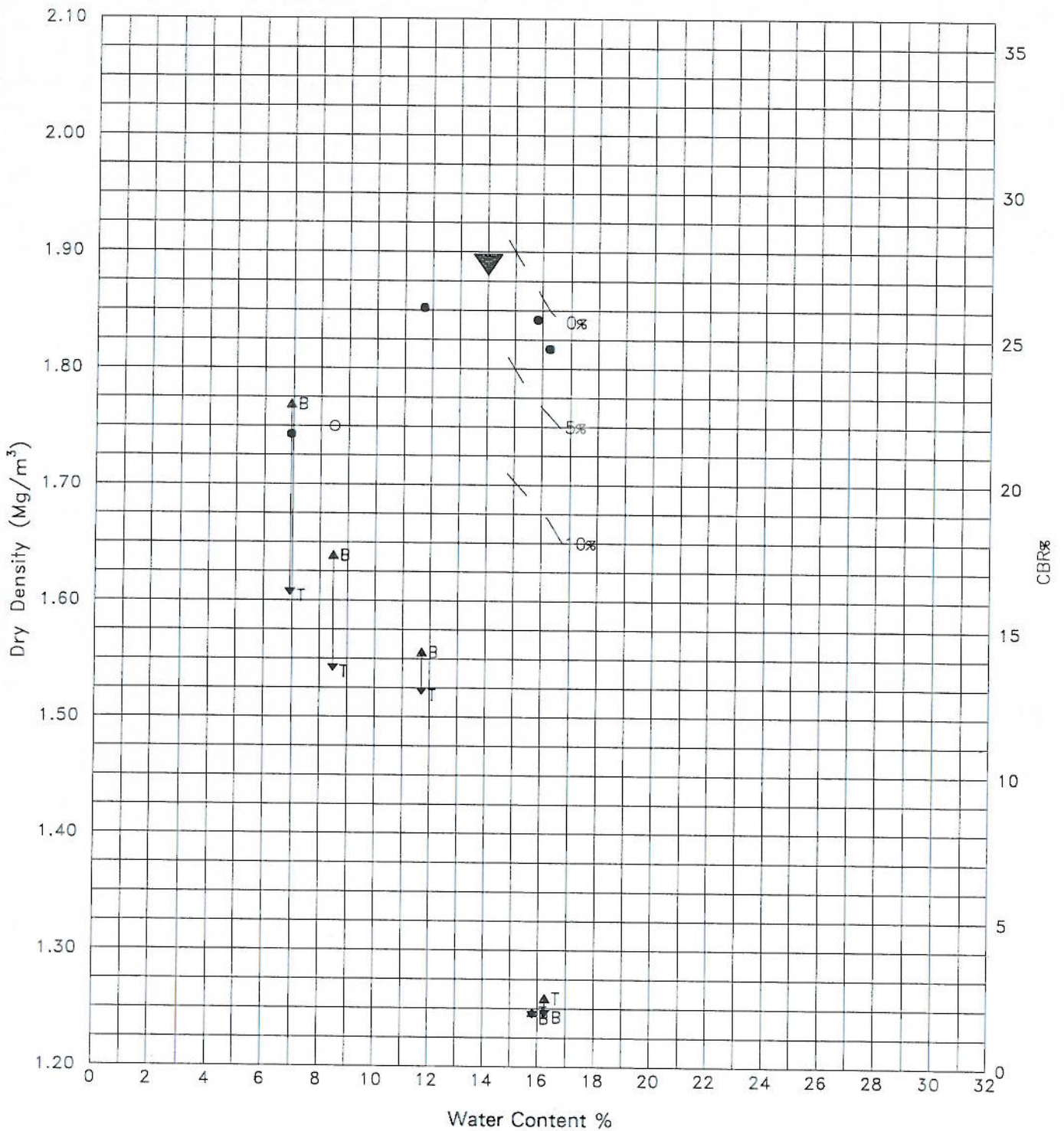
Contract

KC3210





% retained on 20mm sieve 10	Description Very clayey SAND and GRAVEL	Hole TP125 Depth 1.50 -1.70 Type B
Remarks		
Laboratory - MCV	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
 Exploration Associates	Form 52/1	



- Moisture Content/Dry Density
- Compaction at Natural Water Content
- ▼ Maximum Dry Density/Optimum Water Content
- ▼ CBR% Top
- ▲ CBR% Bottom
- ▲ CBR% Average (if Top and Bottom are within 10%)

Type of Test/Mould	2.5Kg/CBR	Description Slightly sandy gravelly CLAY	Hole	TP128
Particle Density Assumed	2.65 Mg/m ³		Depth	0.20 -0.30
Maximum Dry Density	1.88 Mg/m ³		Type	B
Optimum Water Content	14 %			
% retained 37.5mm sieve	8 %			
% retained 20mm sieve	10 %			

Form 54/O

Remarks

Laboratory - Moisture Content/
Dry Density Relationship

Project

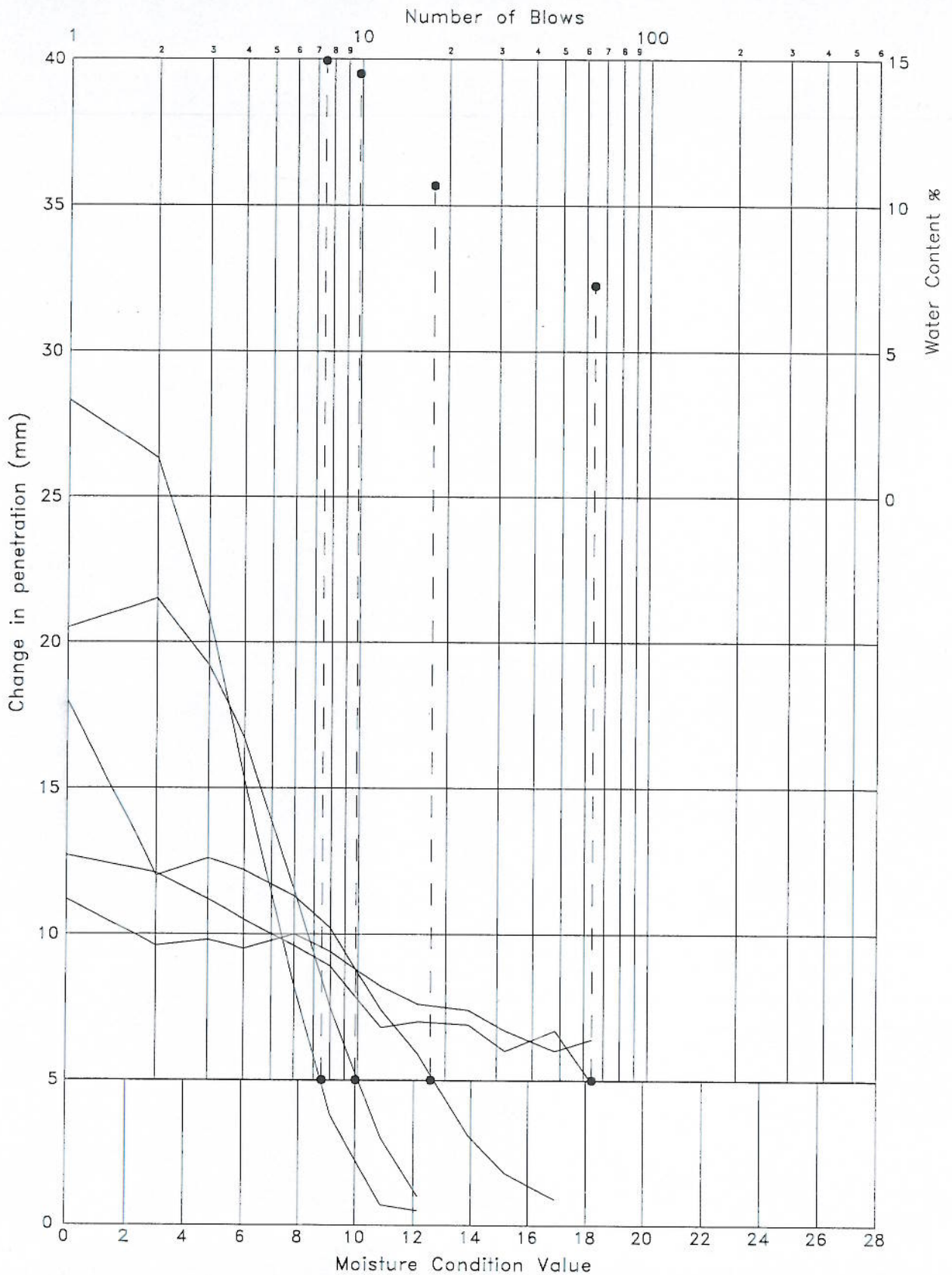
N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

Contract

KC3210



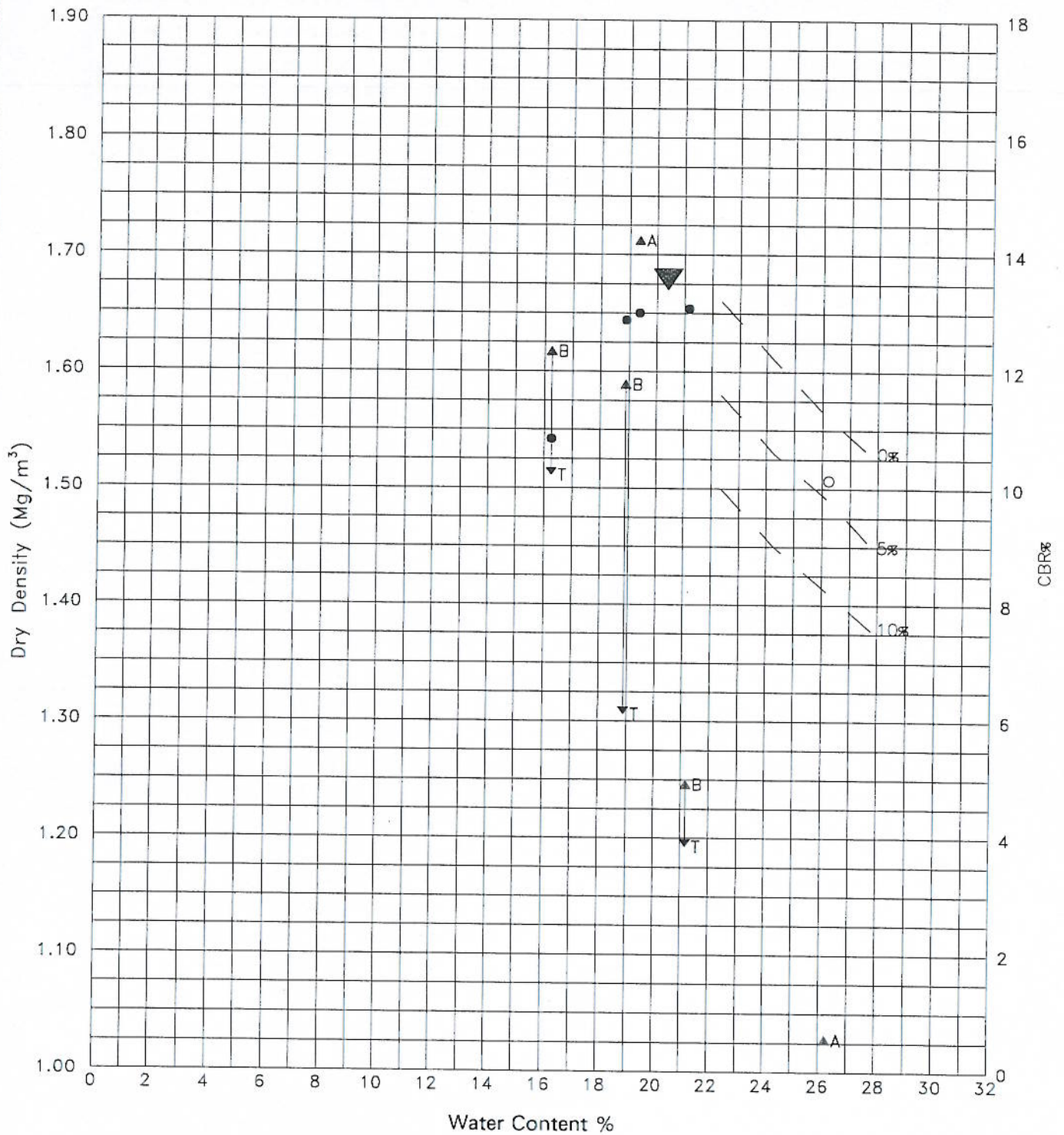
Exploration Associates



% retained on 20mm sieve 18	Description Slightly sandy gravelly CLAY	Hole TP128 Depth 0.20 -0.30 Type B
Remarks		
Laboratory - MCV	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
Form 52/1		



Exploration Associates

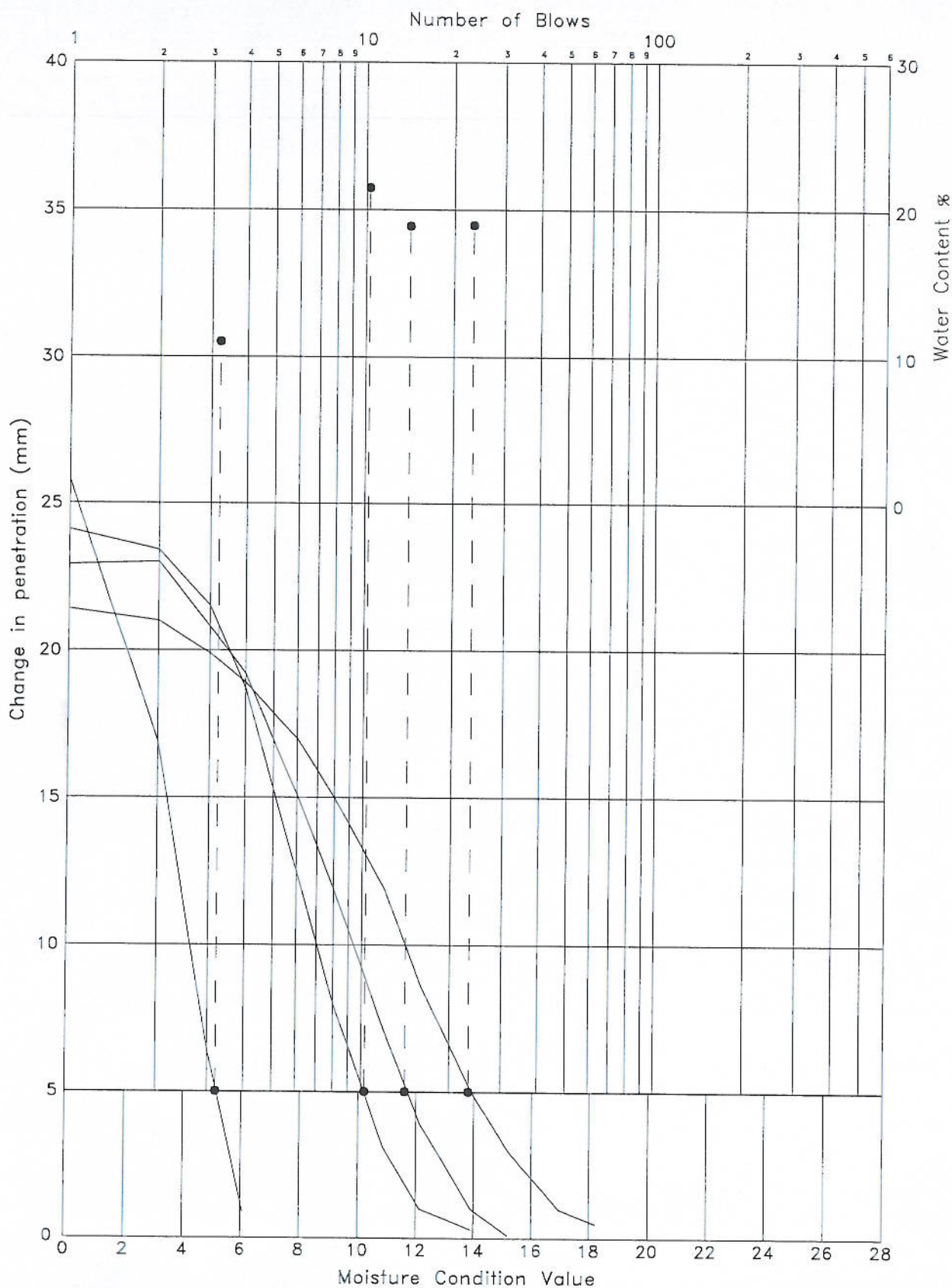


- Moisture Content/Dry Density
- Compaction at Natural Water Content
- ▽ Maximum Dry Density/Optimum Water Content
- ▽ CBR% Top
- ▲ CBR% Bottom
- ▲ CBR% Average (if Top and Bottom are within 10%)

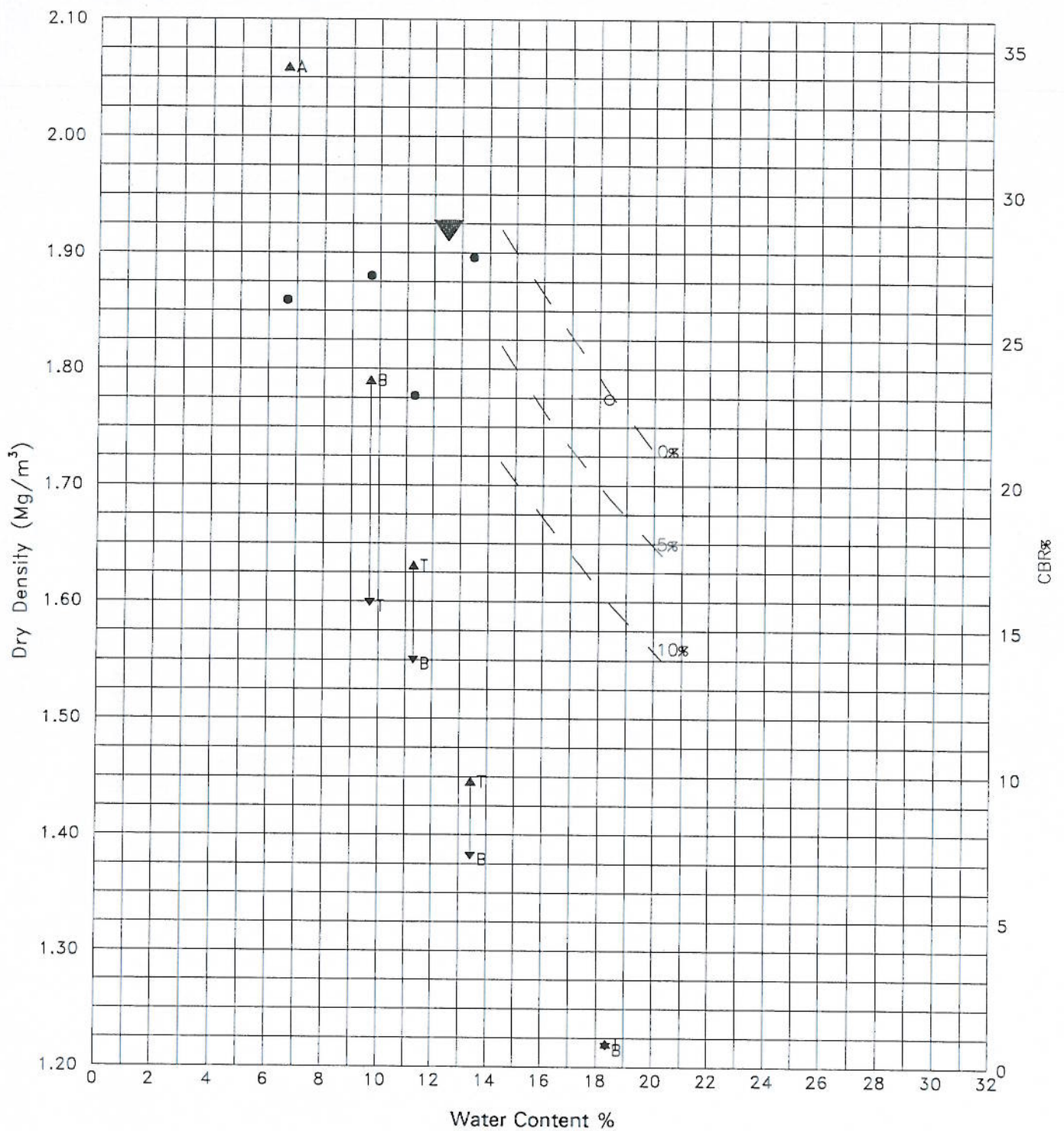
Type of Test/Mould	2.5Kg/CBR	Description	Hole	TP134
Particle Density Assumed	2.65 Mg/m ³	Clayey sandy GRAVEL	Depth	0.50 -0.80
Maximum Dry Density	1.67 Mg/m ³		Type	B
Optimum Water Content	20 %		Form 54/O	
% retained 37.5mm sieve	58			
% retained 20mm sieve	12			

Remarks

Laboratory - Moisture Content/ Dry Density Relationship Exploration Associates	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210



% retained on 20mm sieve 69	Description Clayey sandy GRAVEL	Hole TP134 Depth 0.50 -0.80 Type B
Remarks		
Form 52/1		
Laboratory - MCV	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
Exploration Associates		



- Moisture Content/Dry Density
- Compaction at Natural Water Content
- ▼ Maximum Dry Density/Optimum Water Content
- ▼ CBR% Top
- ▲ CBR% Bottom
- ▲ CBR% Average (if Top and Bottom are within 10%)

Type of Test/Mould	2.5Kg/CBR	Description	Hole	TP142
Particle Density Assumed	2.65 Mg/m ³	Slightly sandy very gravelly SILT	Depth	1.00 -1.40
Maximum Dry Density	1.91 Mg/m ³		Type	B
Optimum Water Content	13 %		Form 54/0	
% retained 37.5mm sieve	37			
% retained 20mm sieve	11			

Remarks

Laboratory - Moisture Content/
Dry Density Relationship

Project

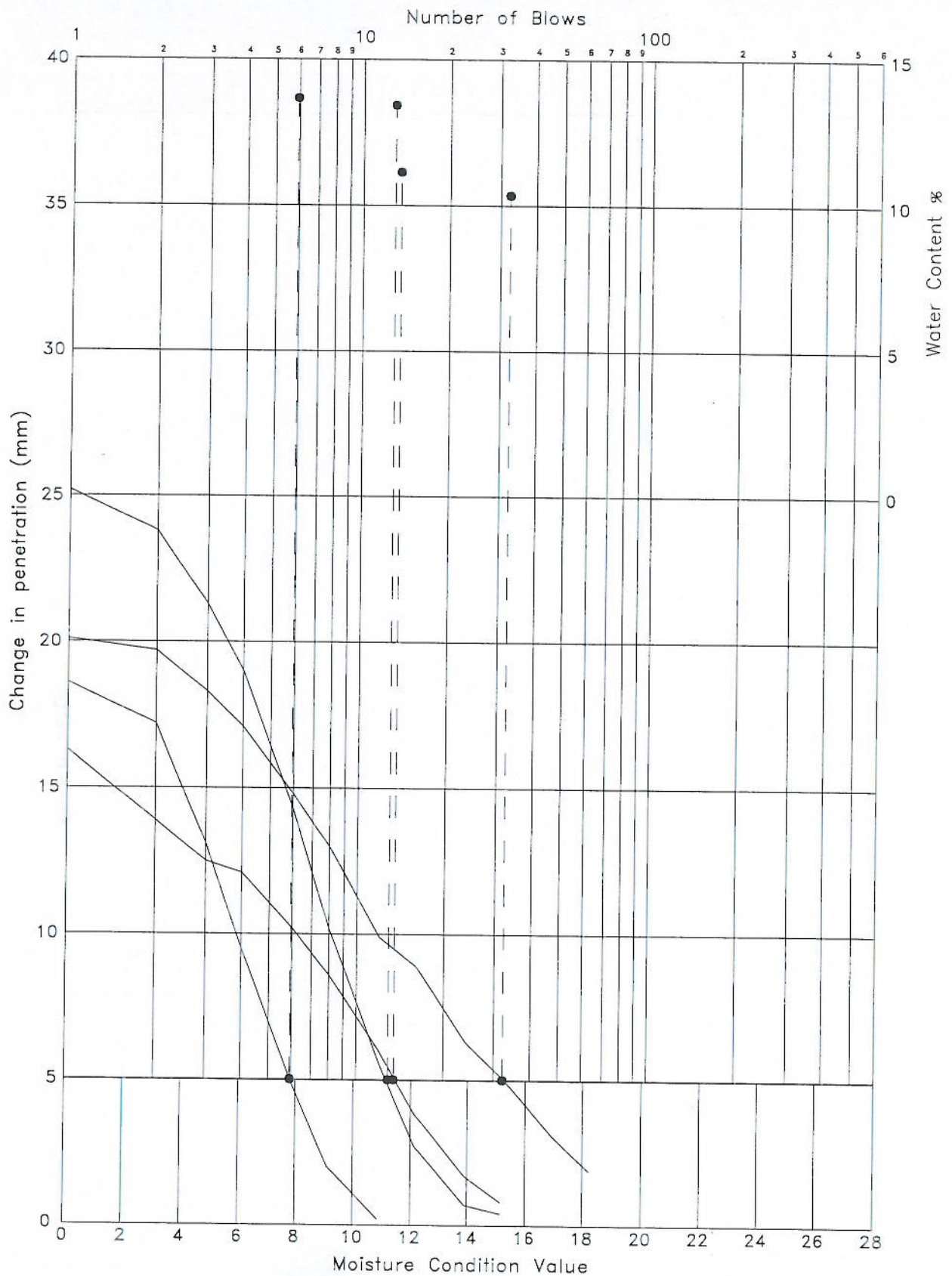
N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council


Contract

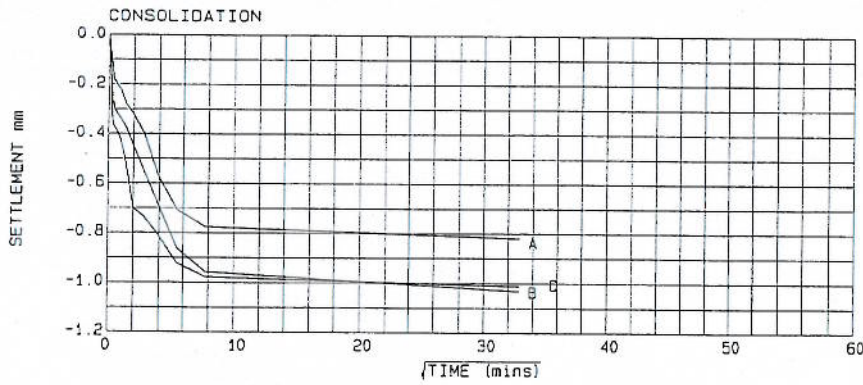
KC3210



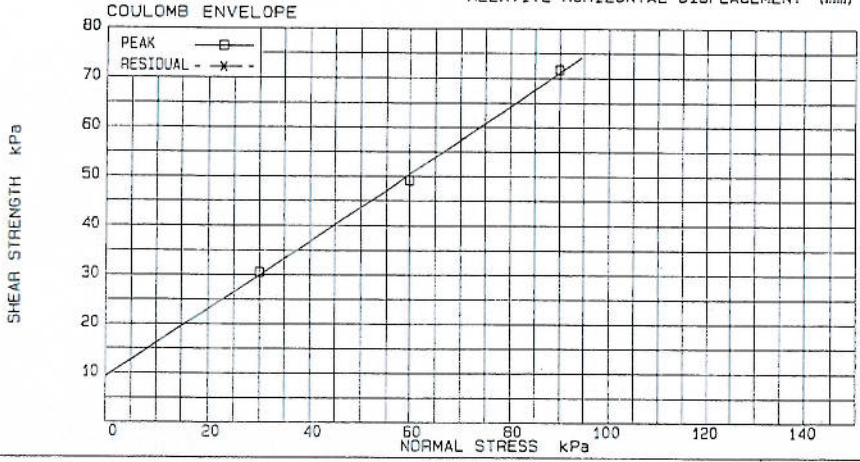
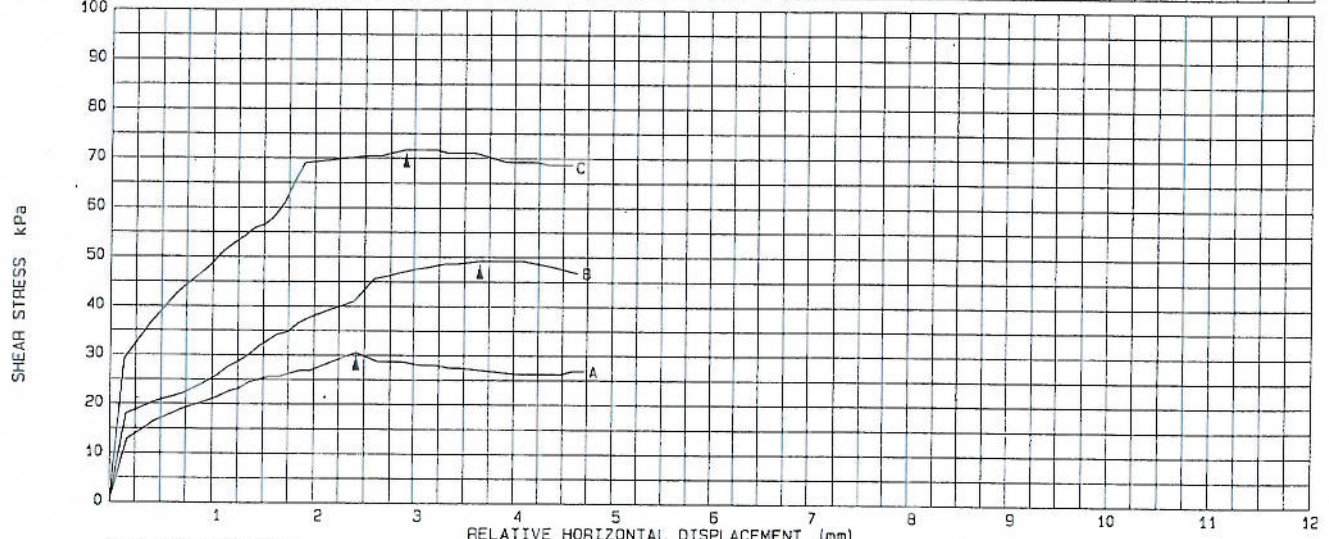
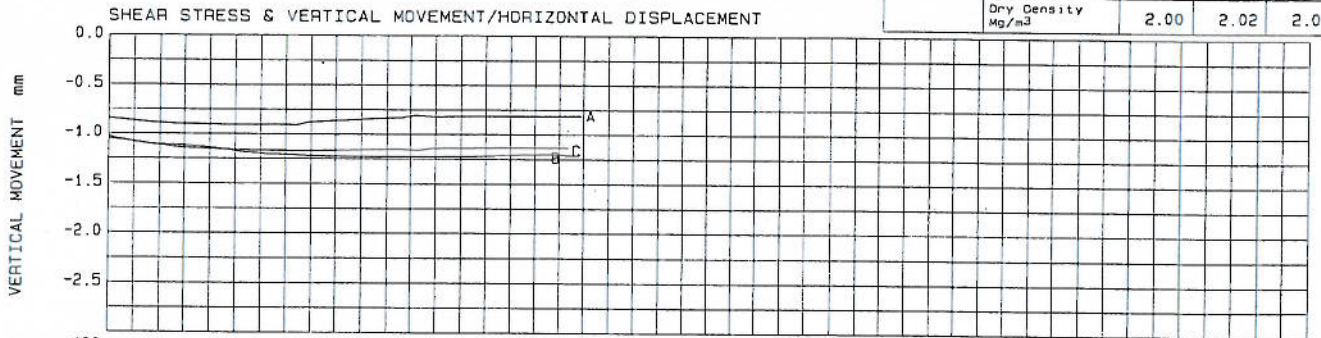
Exploration Associates



% retained on 20mm sieve 48	Description Slightly sandy very gravelly SILT	Hole TP142 Depth 1.00 -1.40 Type B
Remarks		
Laboratory - MCV  Exploration Associates	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210



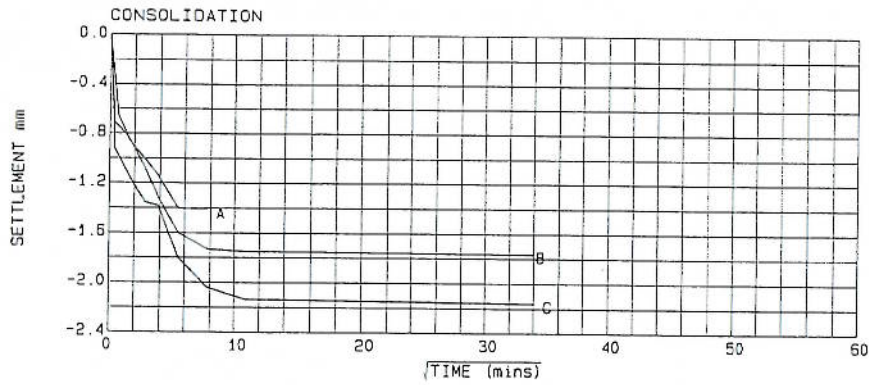
SOIL DESCRIPTION		Grey gravelly CLAY.		
PREPARATION		-2mm material. Recompact to equivalent of 2.5kg compactive effort at as received moisture content. Test carried out in submerged condition		
SPECIMEN		A	B	C
INITIAL	Bulk density Mg/m ³	2.15	2.14	2.13
	Moisture %	11	11	11
	Dry density Mg/m ³	1.93	1.92	1.91
Particle density 2.65 Mg/m ³ assumed	Void Ratio	0.374	0.382	0.385
	Saturation %	80	79	78
AFTER TEST	Bulk density Mg/m ³	2.00	2.02	2.01
	Moisture %	0.0	0.0	0.0
	Dry Density Mg/m ³	2.00	2.02	2.01



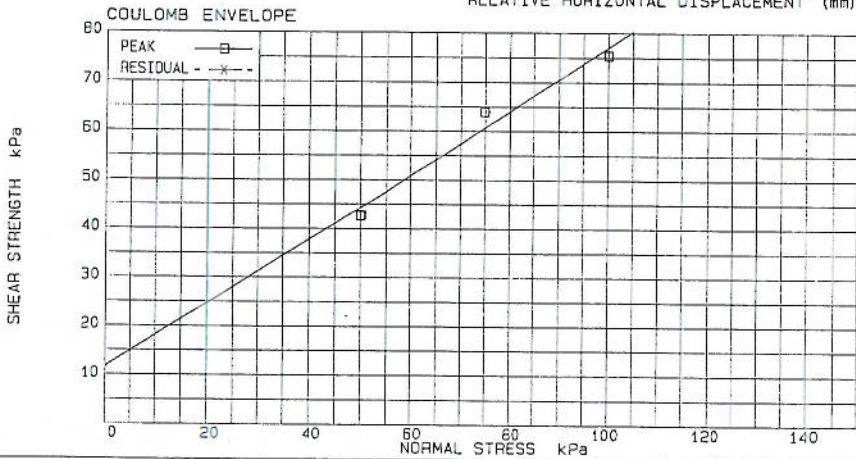
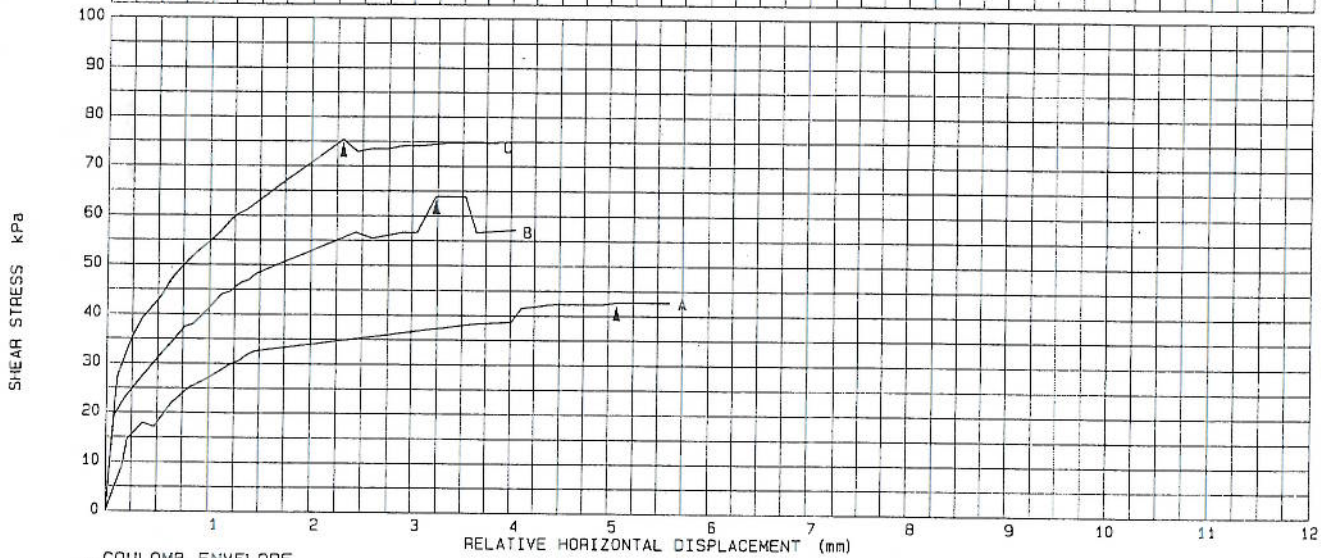
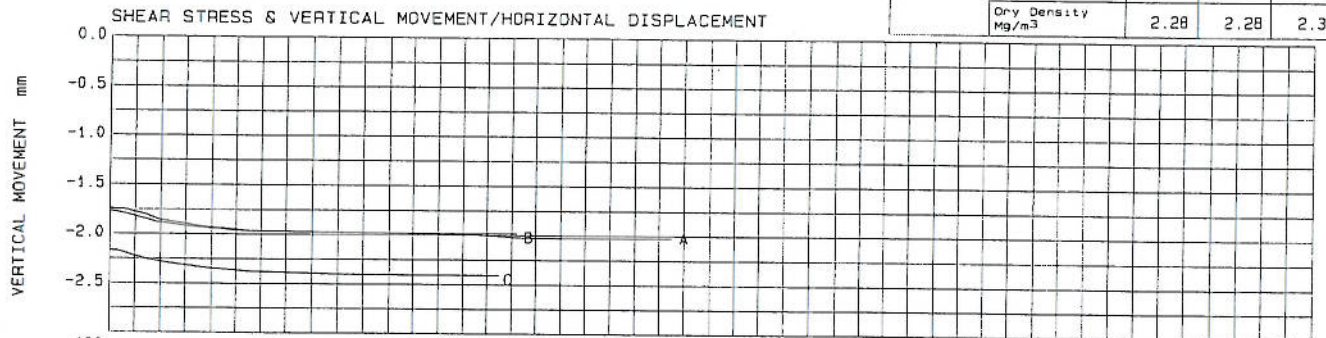
CONSOLIDATION PRESSURE / NORMAL STRESS		kPa	30	60	90
RATES OF DISPLACEMENT	Peak	mm/min	0.0047	0.0047	0.0047
	Post peak / Residual	mm/min	0.0047	0.0047	0.0047
PEAK VALUES	Relative Displacement	mm	2.41	3.64	2.90
	Shear Strength	kPa	30.5	49.2	71.7
RESIDUAL VALUES	Number of Reversals		/	/	/
	Relative Displacement	mm	/	/	/
	Shear Strength	kPa	/	/	/
SHEAR STRENGTH PARAMETERS	Linear regression		Re-assessed		
	PEAK	C'	9		kPa
		Ø'	34.5		Degrees
	RESIDUAL	C'R	/	/	kPa
		Ø'R	/	/	Degrees

CONSOLIDATED DRAINED DIRECT SHEAR TEST
 BS1377: Part 7: 1990, method 4 in 50mm square x 20mm deep box

Borehole No. BH55A Depth 2.00m
 Sample No.



SOIL DESCRIPTION		Grey gravelly slightly sandy CLAY.		
PREPARATION		-2mm material. Recomacted to a dense state at as received moisture content.		
Test carried out in submerged condition				
SPECIMEN		A	B	C
INITIAL	Bulk density Mg/m ³	2.31	2.32	2.33
	Moisture %	11	11	11
	Dry density Mg/m ³	2.08	2.09	2.09
Particle density 2.65 Mg/m ³ assumed	Void Ratio	0.273	0.269	0.267
	Saturation %	108	110	111
AFTER TEST	Bulk density Mg/m ³	2.50	2.50	2.56
	Moisture %	9.6	9.6	9.6
	Dry Density Mg/m ³	2.28	2.28	2.34



CONSOLIDATION PRESSURE / NORMAL STRESS kPa		50	75	100
RATES OF DISPLACEMENT	Peak mm/min	0.0043	0.0043	0.0043
	Post peak / Residual mm/min	0.0043	0.0043	0.0043
PEAK VALUES	Relative Displacement mm	5.06	3.22	2.30
	Shear Strength kPa	42.7	63.9	75.4
RESIDUAL VALUES	Number of Reversals			
	Relative Displacement mm			
	Shear Strength kPa			
SHEAR STRENGTH PARAMETERS	Linear regression		Re-assessed	
	PEAK	C'	12	kPa
		φ'	33	Degrees
	RESIDUAL	C' _r		kPa
	φ' _r		Degrees	

CONSOLIDATED DRAINED DIRECT SHEAR TEST
 BS1377: Part 7: 1990, method 4 in 60mm square x 20mm deep box

Trial Pit No. TP56 Depth 1.50m
 Sample No.

SLR 7.4	Soil Mechanics	Location GALWAY	Loc. No. KC3210	Fig.
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Borehole	Top Depth (mBGL)	Bottom Depth (mBGL)	Rock Description	Test Direction (PU/PD/R)	Core/Lump Diam/Width (mm)	Platen Separation D (initial) (mm)	Platen Separation D (failure) (mm)	Equip Diam (mm)	Failure Loa (kN)	Is P/De ² Mpa	Correction Factor (De/50) ^{0.45}	Is x F Mpa	Remarks
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Irregular Lump Tests

RC6A	8.4	-	Granite	R	75	56	45	65.5	37	8.6	1.1	9.1	good fracture
RC6A	9.45	-	Granite	R	75	47	42	63.3	4	1.0	1.0	1.0	good fracture
RC7	3.05	-	Granite	R	75	45	38	60.2	7	1.9	1.0	1.8	good fracture
RC10	2.92	-	Granite	R	67	56	49	64.6	16.0	3.8	1.1	4.0	good fracture
RC10	6.62	-	Granite	PL	67	51	41	59.1	36.0	10.3	1.0	10.4	good fracture
RC17	14.90	-	Grey Limestone	R	69	30	22	44.0	2.3	1.2	0.8	0.9	good fracture
RC28	7.20	-	Grey Limestone	R	65	54	44	60.3	23.0	6.3	1.0	6.5	good fracture
RC101	9.36	-	Grey Limestone	PL	72	56	35	56.6	20.0	6.2	1.1	6.6	good fracture
RC122	3.20	-	Grey Limestone	R	65	48	38	56.1	24.0	7.6	1.0	7.5	good fracture
RC126	4.70	-	Grey Limestone	R	68	40	32	52.6	16.0	5.8	0.9	5.2	good fracture
RC140	4.40	-	Grey Limestone	R	68	52	42	60.3	19.0	5.2	1.0	5.3	good fracture

Axial Tests

RC93	6.10	-	Grey Limestone	PD	63	95	84	82.1	22.0	3.3	1.3	4.4	good fracture
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Diametric Tests

RC5	2.33	-	Grey/pink Dolerite	R	75	75	58	74.4	12.0	2.2	1.2	2.6	shattered into several pieces
RC5	4.74	-	Pink Granite	PL	75	75	58	74.4	8.0	1.4	1.2	1.7	penetrative red stain on fracture
RC6A	3.80	-	Pink Granite	PL	75	68	59	75.1	25.0	4.4	1.1	5.1	good fracture
RC6A	9.43	-	Pink Granite	PD	75	75	70	81.8	1.0	0.1	1.2	0.2	along incipient fracture
RC10	4.90	-	Pink Granite	R	67	65	48	64.0	5.7	1.4	1.1	1.6	along incipient fracture
RC10	5.15	-	Pink Granite	R	67	67	61	72.1	10.0	1.9	1.1	2.2	good fracture
RC10	7.45	-	Pink Granite	R	67	66	53	67.2	6.0	1.3	1.1	1.5	good fracture
RC13	14.25	-	Grey Limestone	R	76	73	55	72.9	6.0	1.1	1.2	1.3	good fracture
RC13	16.68	-	Grey Limestone	R	76	76	54	72.3	18.0	3.4	1.2	4.2	good fracture
RC14A	10.60	-	Grey Limestone	R	76	76	62	77.5	2.9	0.5	1.2	0.6	follows calcite vein
RC14A	13.20	-	Grey Limestone	R	74	74	45	65.1	19.0	4.5	1.2	5.3	good fracture
RC16A	13.20	-	Grey Limestone	PL	74	74	55	72.0	9.0	1.7	1.2	2.1	good fracture
RC16A	17.03	-	Grey Limestone	R	75	75	58	74.4	8.0	1.4	1.2	1.7	along incipient fracture
RC17	8.95	-	Grey Limestone	R	69	69	45	62.9	23.0	5.8	1.2	6.7	chipped fracture
RC35	5.35	-	Grey Limestone	PL	75	74	61	76.3	26.0	4.5	1.2	5.3	good fracture
RC38	5.40	-	Grey Limestone	PL	75	74	63	77.6	29.0	4.8	1.2	5.8	good fracture
RC38	7.20	-	Grey Limestone	PL	75	74	57	73.8	32.0	5.9	1.2	7.0	good fracture

Borehole	Top Depth (mBGL)	Bottom Depth (mBGL)	Rock Description	Test Direction (PL/PD/R)	Core/Lump Diam/Width (mm)	Platen Separation D (initial) (mm)	Platen Separation D (failure) (mm)	Equiv Diam (mm)	Failure Loa (kN)	Is P/De ² Mpa	Correction Factor (De/50) ^{0.45}	Is x F Mpa	Remarks
RC42	3.60	-	Grey Limestone	PL	75	73	54	71.8	28.0	5.4	1.2	6.4	good fracture
RC42	7.95	-	Grey Limestone	PL	75	74	69	81.2	28.0	4.3	1.2	5.1	good fracture
RC45	2.75	-	Grey Limestone	PL	75	71	62	76.9	20.0	3.4	1.2	4.0	good fracture
RC45	3.80	-	Grey Limestone	PL	75	72	62	76.9	28.0	4.7	1.2	5.6	good fracture
RC49	2.62	-	Grey Limestone	PL	75	74	62	76.9	19.0	3.2	1.2	3.8	good fracture
RC49	5.30	-	Grey Limestone	PL	75	75	56	73.1	23.0	4.3	1.2	5.2	good fracture
RC52	2.80	-	Grey Limestone	PL	75	73	62	76.9	27.0	4.6	1.2	5.4	good fracture
RC52	3.55	-	Grey Limestone	PL	75	74	64	78.2	31.0	5.1	1.2	6.1	good fracture
RC57	3.55	-	Grey Limestone	PL	75	75	63	77.6	30.0	5.0	1.2	6.0	good fracture
RC57	6.92	-	Grey Limestone	PL	76	75	65	79.3	24.0	3.8	1.2	4.6	good fracture
RC60	7.65	-	Grey Limestone	PL	75	74	57	73.8	24.0	4.4	1.2	5.3	good fracture
RC63	5.45	-	Grey Limestone	PL	75	73	59	75.1	31.0	5.5	1.2	6.5	good fracture
RC63	7.05	-	Grey Limestone	PL	75	74	63	77.6	33.0	5.5	1.2	6.5	good fracture
RC67	11.20	-	Grey Limestone	PL	75	75	66	79.4	28.0	4.4	1.2	5.3	good fracture
RC67	13.25	-	Grey Limestone	PL	76	76	64	78.7	25.0	4.0	1.2	4.9	good fracture
RC70	12.85	-	Grey Limestone	PL	75	75	64	78.2	40.0	6.5	1.2	7.9	good fracture
RC70	15.75	-	Grey Limestone	PL	76	76	61	76.8	24.0	4.1	1.2	4.9	chipped fracture
RC72	15.20	-	Grey Limestone	PL	75	74	62	76.9	25.0	4.2	1.2	5.0	good fracture
RC72	16.35	-	Grey Limestone	PL	75	74	55	72.5	34.0	6.5	1.2	7.7	good fracture
RC82	15.85	-	Grey Limestone	PL	74	74	63	77.0	20.0	3.4	1.2	4.0	good fracture
RC82	20.64	-	Grey Limestone	PL	74	74	65	78.3	19.0	3.1	1.2	3.7	chipped fracture
RC84	19.35	-	Grey Limestone	PL	75	75	62	76.9	28.0	4.7	1.2	5.7	chipped fracture
RC84	23.22	-	Grey Limestone	PL	75	75	60	75.7	21.0	3.7	1.2	4.4	chipped fracture
RC84D	10.65	-	Grey Limestone	R	73	73	58	73.4	27.2	5.0	1.2	6.0	chipped fracture
RC84D	12.24	-	Grey Limestone	PL	75	75	72	82.9	17.3	2.5	1.2	3.0	good fracture
RC87	2.95	-	Grey limestone	R	75	75	64	78.2	26.0	4.3	1.2	5.1	chipped fracture
RC87	4.70	-	Grey limestone	R	75	75	69	81.2	23.0	3.5	1.2	4.2	chipped fracture
RC87A	8.25	-	Grey limestone	PL	80	80	72	85.6	35.0	4.8	1.2	5.9	chipped fracture
RC87A	11.05	-	Grey limestone	PL	75	75	67.5	80.3	30.0	4.7	1.2	5.6	chipped fracture
RC88	2.70	-	Grey Limestone	PL	75	75	53	71.1	29.0	5.7	1.2	6.9	chipped fracture
RC88	4.07	-	Grey Limestone	PL	75	75	62	76.9	25.0	4.2	1.2	5.1	chipped fracture
RC89	2.30	-	Grey Limestone	PL	67	63	52	66.6	24.0	5.4	1.1	6.0	good fracture
RC89	4.22	-	Grey Limestone	PL	67	63	54	67.9	18.0	3.9	1.1	4.3	good fracture
RC89	4.70	-	Grey Limestone	PL	61	61	40	55.7	21.0	6.8	1.1	7.4	chipped fracture
RC91	6.80	-	Grey Limestone	R	62	62	43	58.3	13.5	4.0	1.1	4.4	chipped fracture
RC91	8.90	-	Grey Limestone	PL	62	62	47	60.9	16.0	4.3	1.1	4.8	good fracture
RC91A	12.00	-	Grey Limestone	R	75	75	51	69.8	23.0	4.7	1.2	5.7	chipped fracture
RC93	3.90	-	Grey Limestone	R	63	63	45	60.1	26.0	7.2	1.1	8.0	chipped fracture

Diametric Tests

Borehole	Top Depth (mBGL)	Bottom Depth (mBGL)	Rock Description	Test Direction (PL/PD/R)	Core/Lump Diam/Width (mm)	Platen Separation D (initial) D (failure) (mm)	Equip Diam (mm)	Failure Loa (kN)	Is P/De ² Mpa	Correction Factor (De/50) ^{0.45}	Is50 Is x F Mpa	Remarks
RC97	3.70	-	Grey Limestone	PL	60	60	53.9	21.0	7.2	1.1	7.9	chipped fracture
RC97	9.40	-	Grey Limestone	PL	65	62	66.2	26.0	5.9	1.1	6.5	good fracture
RC99	2.43	-	Grey Limestone	PL	65	65	62.4	24.0	6.2	1.1	6.9	chipped fracture
RC99	3.34	-	Grey Limestone	PL	64	64	66.9	22.5	5.0	1.1	5.6	good fracture
RC99	6.20	-	Grey Limestone	PL	63	63	65.2	21.0	4.9	1.1	5.5	chipped fracture
RC101	8.15	-	Grey Limestone	R	72	72	62.0	28.0	7.3	1.2	8.6	chipped fracture
RC106	9.72	-	Grey Limestone	PL	65	64	66.8	18.0	4.0	1.1	4.5	good fracture
RC115	3.00	-	Grey Limestone	PL	65	64	66.8	27.0	6.0	1.1	6.8	good fracture
RC118	2.23	-	Grey Limestone	PL	64	64	65.1	29.0	6.8	1.1	7.6	good fracture
RC118	3.22	-	Grey Limestone	PL	64	64	63.8	27.0	6.6	1.1	7.4	chipped fracture
RC122	7.55	-	Grey Limestone	PL	65	64	68.1	23.0	5.0	1.1	5.5	good fracture
RC124	1.85	-	Grey Limestone	PL	66	66	61.5	24.0	6.3	1.1	7.2	chipped fracture
RC126	3.10	-	Grey Limestone	PL	68	68	70.9	17.0	3.4	1.1	3.9	good fracture
RC126	3.90	-	Grey Limestone	PL	68	68	69.6	18.0	3.7	1.1	4.3	good fracture
RC127	3.70	-	Grey Limestone	R	67	67	69.1	18.0	3.8	1.1	4.3	chipped fracture
RC135	2.35	-	Grey Limestone	PL	68	68	72.1	12.0	2.3	1.1	2.7	good fracture
RC135	6.50	-	Grey Limestone	PL	68	68	71.5	18.0	3.5	1.1	4.0	good fracture
RC135	6.72	-	Grey Limestone	PL	68	65	58.8	22.5	6.5	1.1	7.3	chipped fracture
RC138	2.50	-	Grey Limestone	PL	68	65	60.3	12.5	3.4	1.1	3.9	chipped fracture
RC138	3.00	-	Grey Limestone	PL	66	66	60.8	23.5	6.4	1.1	7.2	chipped fracture
RC140	3.60	-	Grey Limestone	PL	68	68	72.7	7.0	1.3	1.1	1.5	chipped fracture

Diametric Tests

Sample Details				Test Data								
Hole	Depth	Description	Length Dia. mm	Test Date	W %	γ_b Mg/m ³	Strain at Failure	Test Time secs	At 50% Stress		UCS Value MPa	NOTES (Failure Mode, Orientation etc.)
									Secant Mod. E MN/m ²	Poiss. Ratio		
RC6A	5.80-6.17		169.9 75.6	16/12/03	0.3 Nat	2.62		197			25.3	Axial Cleavage
RC10	7.75-8.65		121.5 67.4	09/02/04	0.5 Nat	2.64		294			49.4	Axial Cleavage
RC14A	11.7-12.04		159.0 75.5	30/01/04	0.3 Nat	2.70		393			46.3	Axial Cleavage
RC17	9.33-9.62		153.0 67.3	02/02/04	0.2 Nat	2.92		638			90.1	Axial cleavage
RC28	10.3-10.60		174.5 63.3	13/12/03	0.3 Nat	2.70		602			93.1	Axial Cleavage
RC35	5.88-6.15		150.7 75.1	05/02/04	0.2 Nat	2.70		777			81.6	Axial Cleavage
RC42	5.28-5.55		144.1 75.3	06/02/03	0.1 Nat	2.71		921			97.2	Axial Cleavage
RC45	4.00-4.50		154.7 74.3	05/02/04	0.2 Nat	2.72		959			96.1	Axial Cleavage
RC49	4.05-4.37		172.7 75.5	05/02/04	0.1 Nat	2.69		755			88.5	Axial Cleavage
RC52	3.75-4.15		150.1 75.5	06/02/04	0.1 Nat	2.70		818			91.9	Axial Cleavage
RC57	4.25-4.60		171.2 75.3	05/02/04	0.2 Nat	2.70		931			94.0	Axial Cleavage
RC60	6.25-6.70		181.1 74.8	05/02/04	0.1 Nat	2.71		568			62.7	Axial Cleavage
RC63	8.35-8.75		157.0 75.2	05/02/04	0.1 Nat	2.70		739			75.7	Axial Cleavage
RC67	13.8-14.10		169.3 75.4	05/02/04	0.2 Nat	2.70		584			61.1	Axial Cleavage

Remarks Tests performed and reported in accordance with ISRM (1981). Applied stress Rate 0.5 to 1 MPa/sec.
All testing performed along core axis unless otherwise stated in the notes.
Moisture condition (w%) - A-air dry, S-saturated, N-natural moisture content

Form 44/2

Laboratory - Uniaxial Compression Test Summary

Project N6 Galway City Outer By-Pass Contract 2

Contract KC3210

Sheet



Sample Details				Test Data								
Hole	Depth	Description	Length Dia. mm	Test Date	W %	γ_b Mg/m ³	Strain at Failure	Test Time secs	At 50% Stress		UCS Value MPa	NOTES (Failure Mode, Orientation etc.)
									Secant Mod. E MN/m ²	Poiss. Ratio		
RC70	11.0-11.31		170.9 74.9	05/02/04	0.1 Nat	2.71		1040			102.3	Axial Cleavage
RC72	15.8-16.25		173.1 74.7	05/02/04	0.1 Nat	2.74		874			86.4	Axial Cleavage
RC87	4.89-5.09		176.1 75.4	24/12/03	0.3 Nat	2.70		619			92.0	Axial Cleavage
RC87A	7.82-8.14		171.1 75.5	24/12/03	0.2 Nat	2.72		608			89.6	Axial Cleavage
RC88	2.77-3.02		170.3 75.4	24/12/03	0.2 Nat	2.71		682			100.9	Axial Cleavage
RC89	3.48-3.70		132.9 63.0	06/02/04	0.1 Nat	2.70		611			91.9	Axial Cleavage
RC89	3.71-4.00		155.0 63.0	06/02/04	0.1 Nat	2.70		679			93.8	Axial Cleavage
RC91	3.23-3.46		146.0 63.0	06/02/04	0.1 Nat	2.69		177			85.5	Axial Cleavage
RC93	2.50-2.75		139.0 62.8	02/02/04	0.1 Nat	2.73		270			37.7	Axial cleavage
RC106	13.0-13.63		164.3 63.2	16/12/03	0.3 Nat	2.71		302			67.1	Axial Cleavage
RC115	2.50-2.88		115.0 63.2	16/12/03	0.2 Nat	2.73		607			95.2	Axial Cleavage
RC118	1.15-1.34		139.7 63.1	02/02/04	0.1 Nat	2.73		287			49.3	Axial cleavage
RC122	3.85-4.30		182.2 67.4	13/12/03	0.2 Nat	2.72		529			99.9	Axial Cleavage
RC124	6.70-7.09		169.3 67.2	16/12/03	0.1 Nat	2.70		480			90.1	Axial Cleavage

Remarks Tests performed and reported in accordance with ISRM (1981). Applied stress Rate 0.5 to 1 MPa/sec.
All testing performed along core axis unless otherwise stated in the notes.
Moisture condition (w%) - A-air dry, S-saturated, N-natural moisture content

Form 44/2

Laboratory - Uniaxial Compression Test Summary

Project
N6 Galway City Outer By-Pass Contract 2

Contract
KC3210

Sheet



Sample Details				Test Data								
Hole	Depth	Description	Length Dia. mm	Test Date	W %	γ_b Mg/m ³	Strain at Failure	Test Time secs	At 50% Stress		UCS Value MPa	NOTES (Failure Mode, Orientation etc.)
									Secant Mod. E MN/m ²	Poiss. Ratio		
RC126	3.40-3.84		181.1 67.2	13/12/03	0.4 Nat	2.62		207			41.2	Axial Cleavage
RC135	4.15-4.65		180.0 67.1	13/12/03	0.6 Nat	2.69		566			78.9	Axial Cleavage
RC138	3.70-3.92		176.5 67.3	13/12/03	0.1 Nat	2.69		525			77.7	Axial Cleavage
RC140	2.15-2.35		106.1 67.4	13/12/03	0.1 Nat	2.70		608			70.9	Axial Cleavage

Remarks Tests performed and reported in accordance with ISRM (1981). Applied stress Rate 0.5 to 1 MPa/sec.
All testing performed along core axis unless otherwise stated in the notes.
Moisture condition (w%) - A-air dry, S-saturated, N-natural moisture content

Form 44/2

Laboratory - Uniaxial Compression Test Summary

Project N6 Galway City Outer By-Pass Contract 2

Contract KC3210



Sheet

Samples				Classification					Strength			Other Tests
Hole	Depth	Type	Description	<425 I _p	Prep w _L	w _p	Water %	γ _b Mg/m ³	Test	σ ₃ kPa	C kPa	
RC6A	5.80 - 6.17	CS										Porosity: 1.40% Dry Density: 2.62kg/m ³
RC6A/7	0.00	COMB										Water Sol. Chl = <0.01% SO ₃ (2:1) = 0.04g/l Passing 2mm = 100%
RC124	6.70 - 7.09	CS										Porosity: 0.49% Dry Density: 2.71kg/m ³
RC 122/124	0.00	COMB										Water Sol. Chl = <0.01% SO ₃ (2:1) = 0.01g/l Passing 2mm = 100%

Remarks

Form 10/2

Laboratory - Results Summary

Project

N6 Galway City Outer By-Pass Contract 2

Contract

KC3210



Sheet

Determination of Aggregate Properties



Hole Number	Sulphate Content g/l	Chloride Content %	Soundness	10% Fines kN	Water Absorption %	Slake Durability	PSV	AAV
RC6A and RC7	0.04	0.00	98	180	1.0	99.6	53	2.6
RC122 and 124	0.01	0.00	100	170	0.3	99.4	38	15
RC10 7.75 - 8.65	0.09	0.00	-	240	-	98.8	52	-

Notes: 14 -10mm size used for soundness and 10% fines.

Slake durability except RC10, PSV and AAV tested by Celtest Ltd, Bangor, Gwynedd, LL57 4DA. U.K.

Notes:

Project N6 Galway City Outer Bypass, Contract 2
Project No. KC3210
Carried out for

Table

Results of ICP Analysis



Hole Number & Depth	SiO ₂ mg/kg	Al ₂ O ₃ mg/kg	CaO mg/kg	MgO mg/kg	Na ₂ O mg/kg	MnO mg/kg	Fe ₂ O ₃ mg/kg
RC006A 5.80 - 6.17	789	7140	24343	398	419	310	16299
RC124 6.7-7.09	445	263	628151	4957	191	43	289

Oxide quantities proportioned from elemental quantities appended.

Notes:

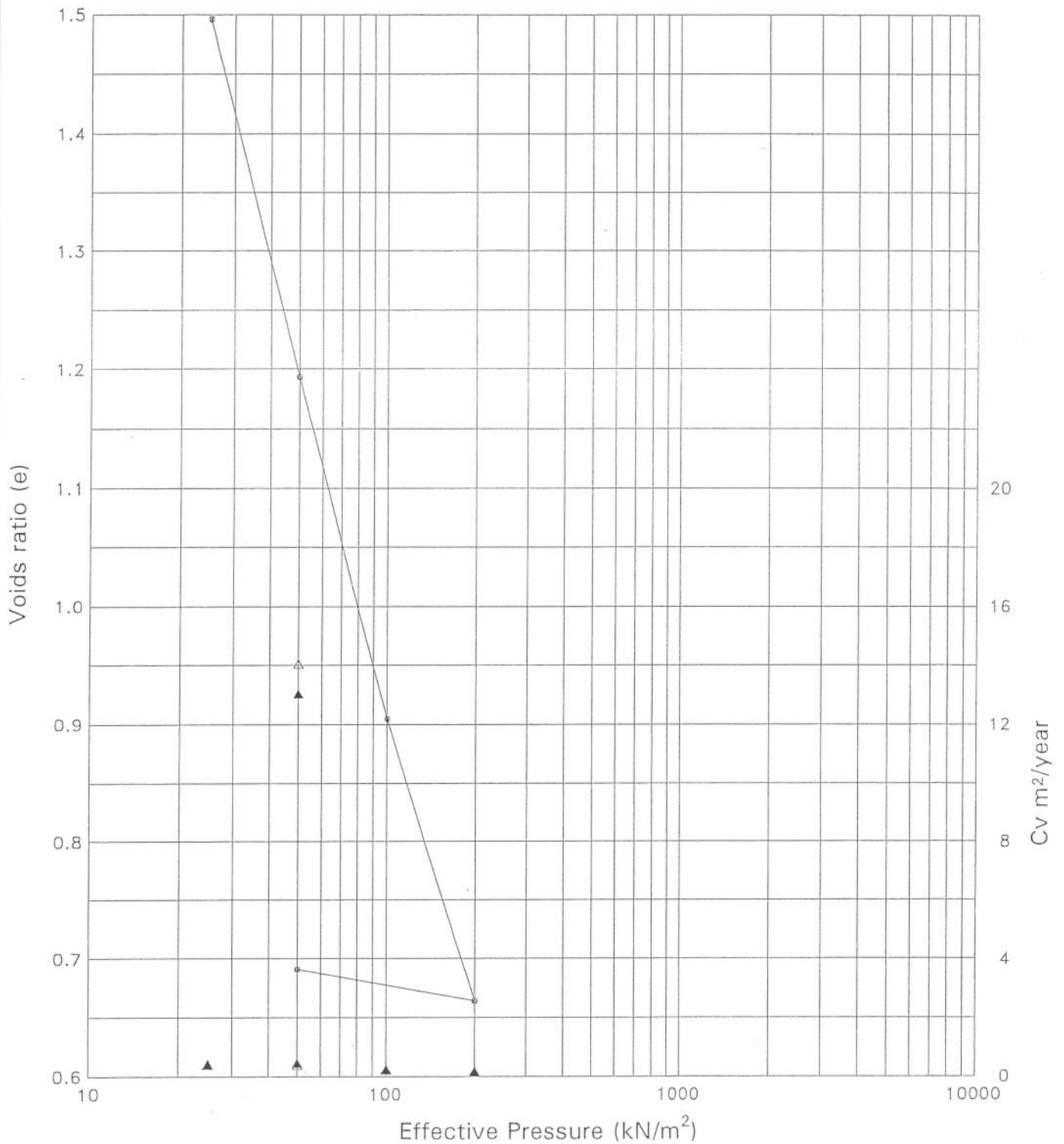
Project N6 Galway City Outer Bypass, Contract 2
Project No. KC3210
Carried out for

Table

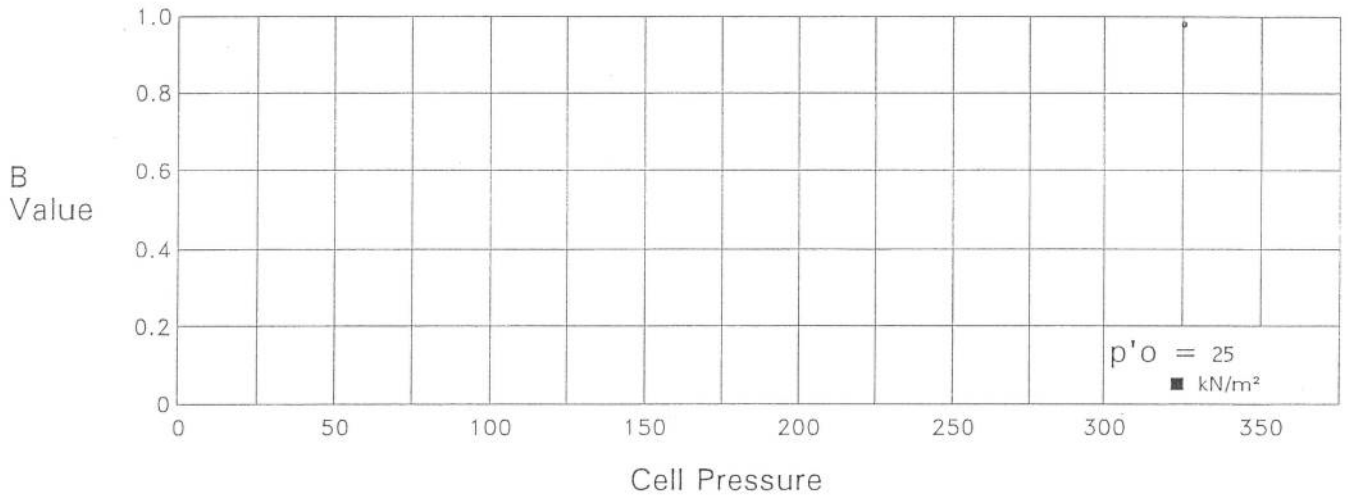
Samples				Water Content		Density			Consolidation					
Hole	Depth	Type	Description	Initial %	Final %	Initial Mg/m ³	Final Mg/m ³	Dry Mg/m ³	Prep.	Test Drainage	P'o kN/m ²	Cv m ² /year		
												t ₅₀	t ₉₀	
100A	3.70 - 4.70	P	Very soft grey very silty CLAY	102	55	1.91	2.17	.95	NAT	One Way Vertical	25	3.10	2.72	
												50	1.31	1.18
												100	.77	.86
												200	.65	.69
												50	3.77	4.00
110	3.50 - 4.50	P	Soft grey brown CLAY with occasional rootlets	200	122	1.20	1.26	.40	NAT	Two Way Vertical	25	2.00	1.91	
												50	1.10	1.16
												100	1.52	1.48
												50	.26	.31
110	6.50 - 7.50	P	Very soft grey very silty CLAY	109	55	1.95	2.50	.93	NAT	Two Way Vertical	25	.39	.42	
												50	.45	.38
												100	.23	.24
												200	.15	.18
												50	13.05	14.05

Remarks Volume Change used to calculate Cv and Mv values Form 18/2

Laboratory - Hydraulic Cell Consolidation Test	Project N6 Galway	Contract KC3210
		 Exploration Associates



Sample Dimensions	97.13 mm dia. 49.45 mm high	Pressure	kN/m ²	0	25	50	100	200					
Initial Voids Ratio	1.834	mv	m ² /MN	4.770	4.853	2.631	1.264	.107					
Final Voids Ratio	.691	Cv Log t ₅₀	▲ m ² /yr	.39	.45	.23	.15	13.05					
Initial Water Content	108.83 %	Cv Root t ₉₀	△ m ² /yr	.42	.38	.24	.18	14.05					
Final Water Content	55.06 %	Final Voids Ratio		1.496	1.193	.905	.664	.691					
Initial Saturation	157.24 %	Description	Very soft grey very silty CLAY										
Initial Bulk Density	1.952 Mg/m ³	Hole	110										
Initial Dry Density	.935 Mg/m ³	Depth	6.50 - 7.50										
Particle Density	2.65 ASSUMED	Sample Type	P										
Sample Type	UNDISTURBED	Contract	KC3210										
Drainage Condition	Two Way Vertical	Project	N6 Galway										
Strain Condition	FREE	Figure											
Mv & (e) calculated using	Vol. Change Data												
Cvs calculated using	Vol. Change Data												
Laboratory - Hydraulic Cell Consolidation Test													
Exploration Associates													



Sample Information

Diameter :	97.13 mm	Specific Gravity :	2.65 ASSUMED
Length :	49.45 mm	Initial Voids Ratio :	1.834
Area :	7409.632 mm ²	Initial B Value :	.98
Volume :	366.406 cm ³	Final B Value :	.98

Saturation B Value/Cell Pressure

Borehole 110
Depth 6.50 - 7.50 m

Remarks

Laboratory - Hydraulic Cell Consolidation Test

Project
N6 Galway

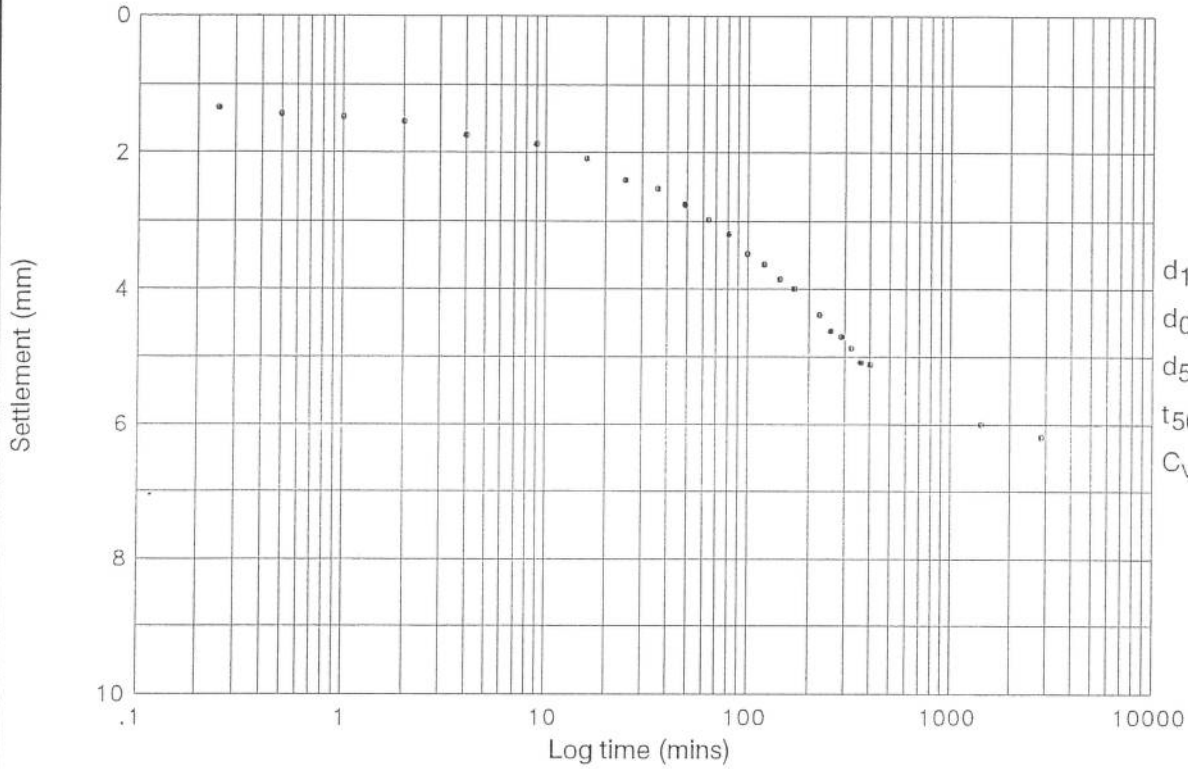
Contract KC3210

 Exploration Associates

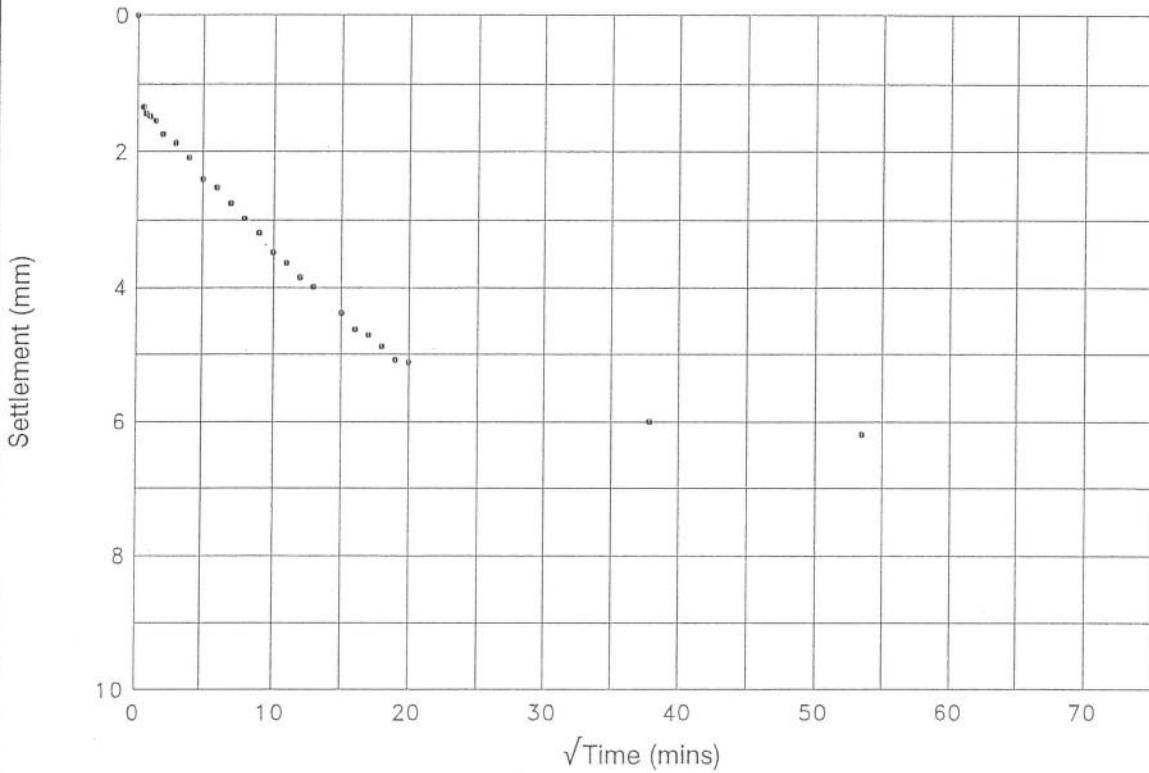
Figure

Stage = 1

Applied Load = 0 - 25 kN/m²



$d_{100} = 4.788 \text{ mm}$
 $d_0 = 1.204 \text{ mm}$
 $d_{50} = 2.996 \text{ mm}$
 $t_{50} = 65.00 \text{ mins}$
 $C_v = .78 \text{ m}^2/\text{year}$



$t_{g0} = 459.80 \text{ mins}$
 $C_v = .47 \text{ m}^2/\text{year}$

Initial Height = 47.310 mm
 Height Change = 6.188 mm
 Final Height = 41.122 mm


Remarks

Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

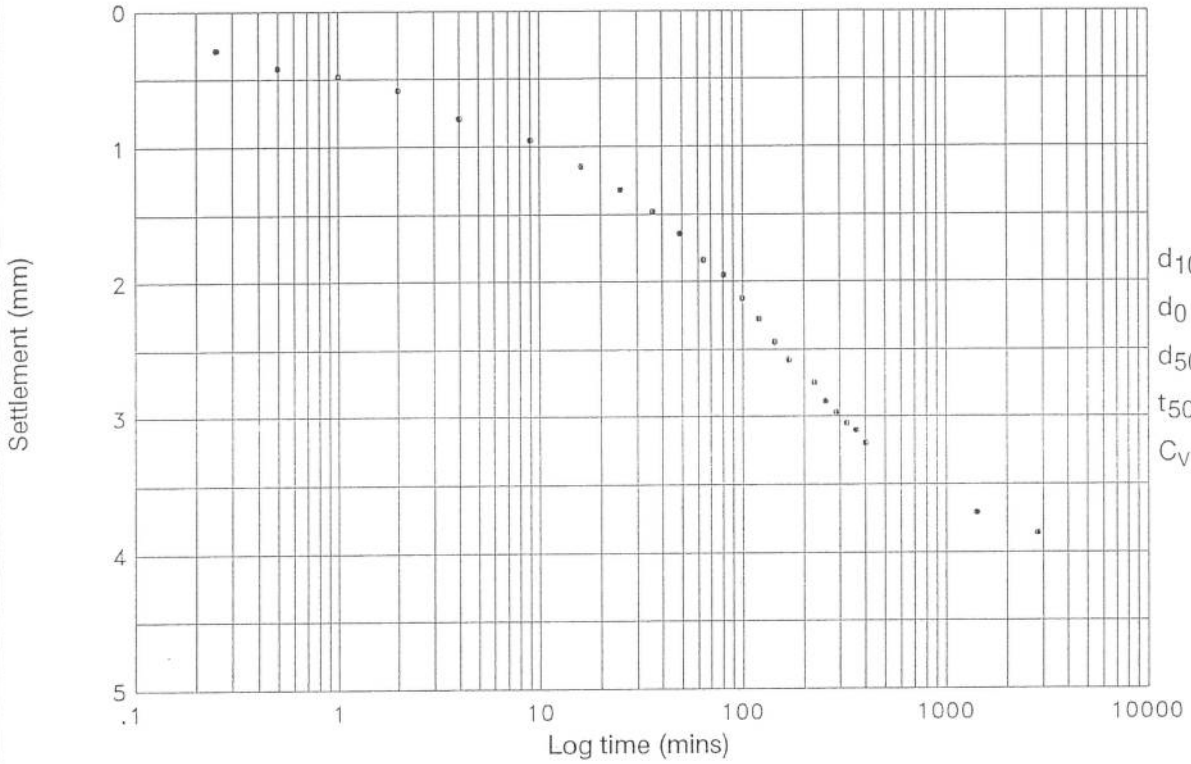
Project
 N6 Galway

Contract KC3210

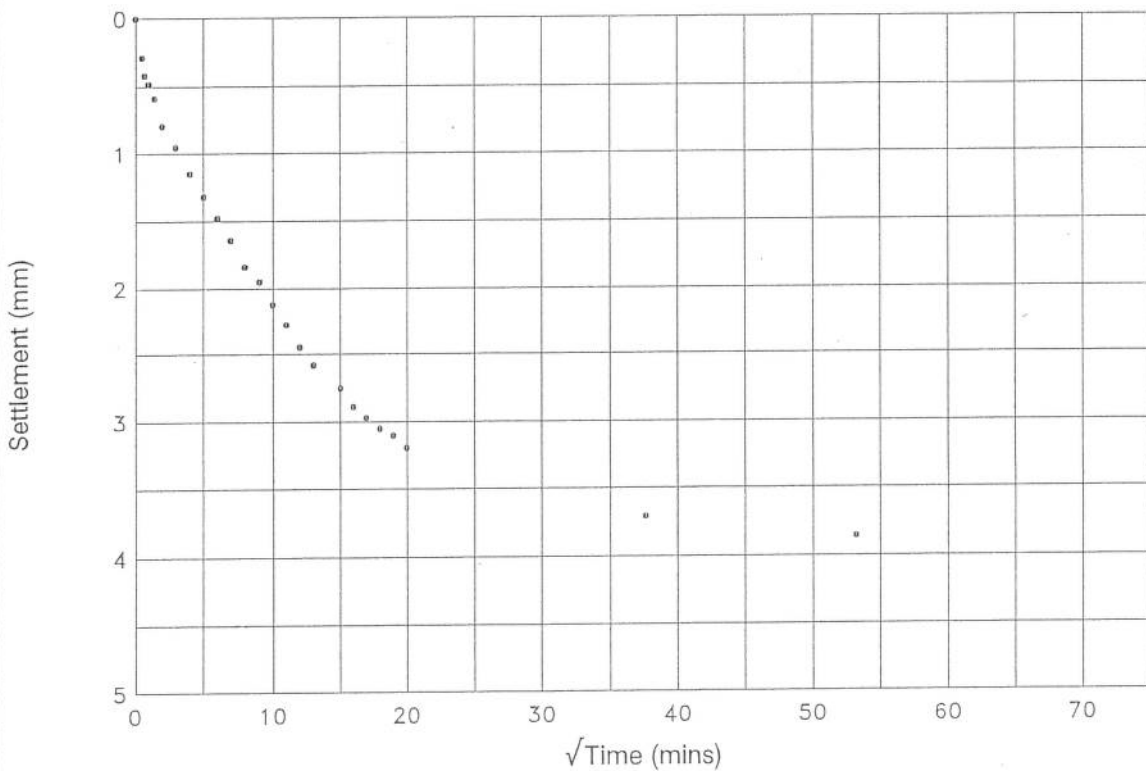
 Exploration Associates

Stage = 2

Applied Load = 25 - 50 kN/m²



$d_{100} = 3.858$ mm
 $d_0 = .096$ mm
 $d_{50} = 1.977$ mm
 $t_{50} = 83.69$ mins
 $C_v = .48$ m²/year



$t_{90} = 329.66$ mins
 $C_v = .52$ m²/year

Initial Height = 41.074 mm
 Height Change = 3.858 mm
 Final Height = 37.216 mm

Remarks

Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

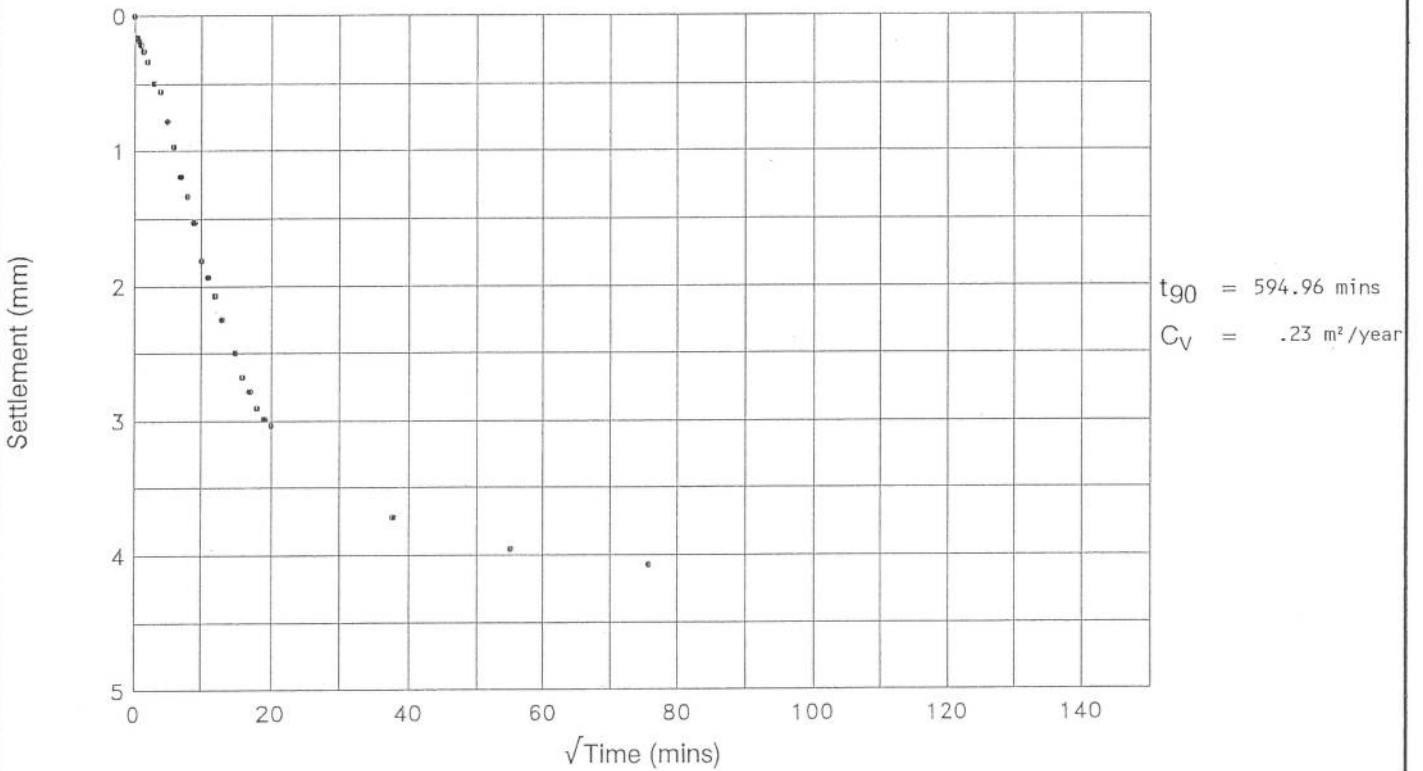
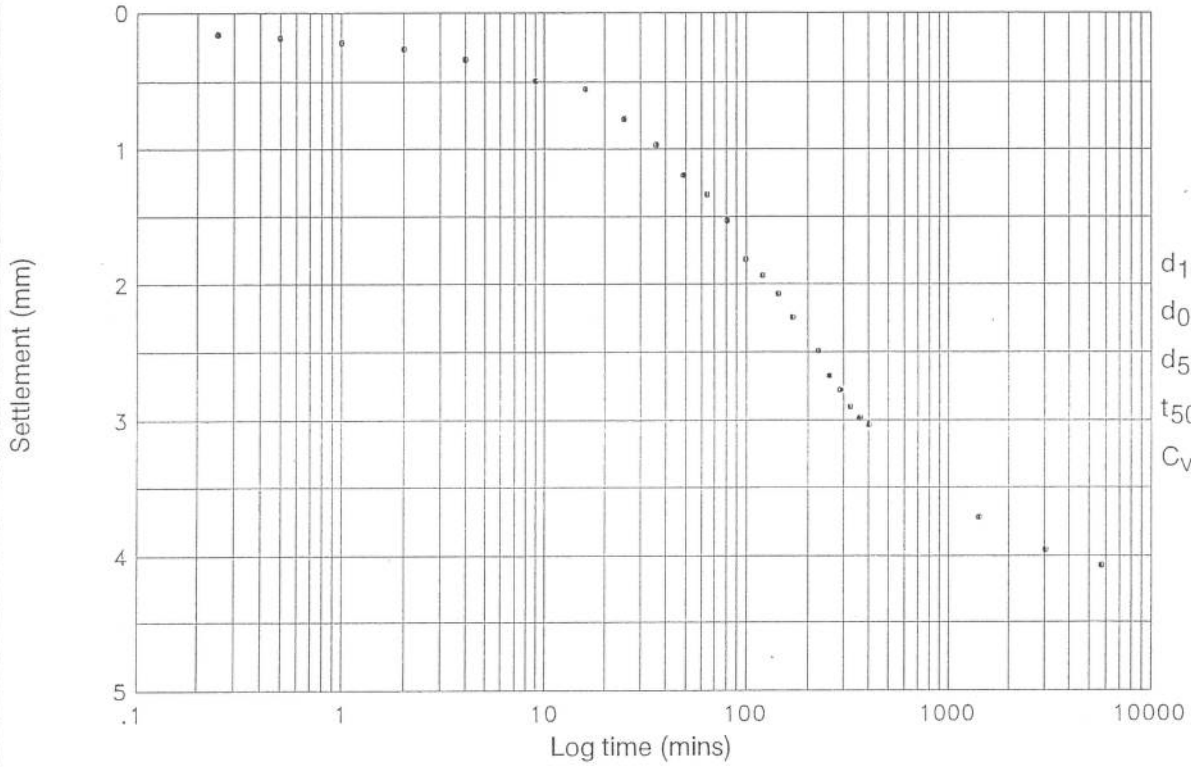
Project N6 Galway

Contract KC3210

 Exploration Associates

Stage = 3

Applied Load = 50 - 100 kN/m²



Initial Height = 37.056 mm


Height Change = 4.074 mm

Final Height = 32.982 mm

Remarks

Laboratory - Hydraulic Cell Consolidation Test

Project
N6 Galway

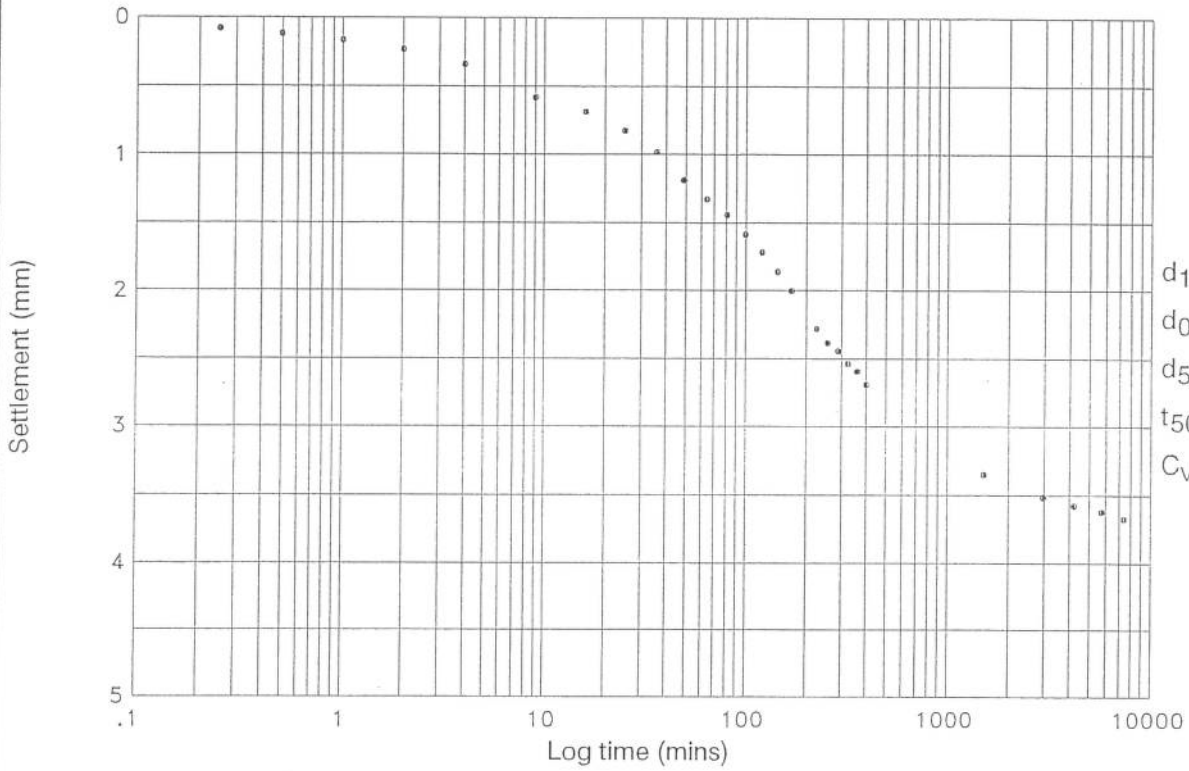
 Exploration Associates

Depth 6.50 - 7.50 m
Borehole 110

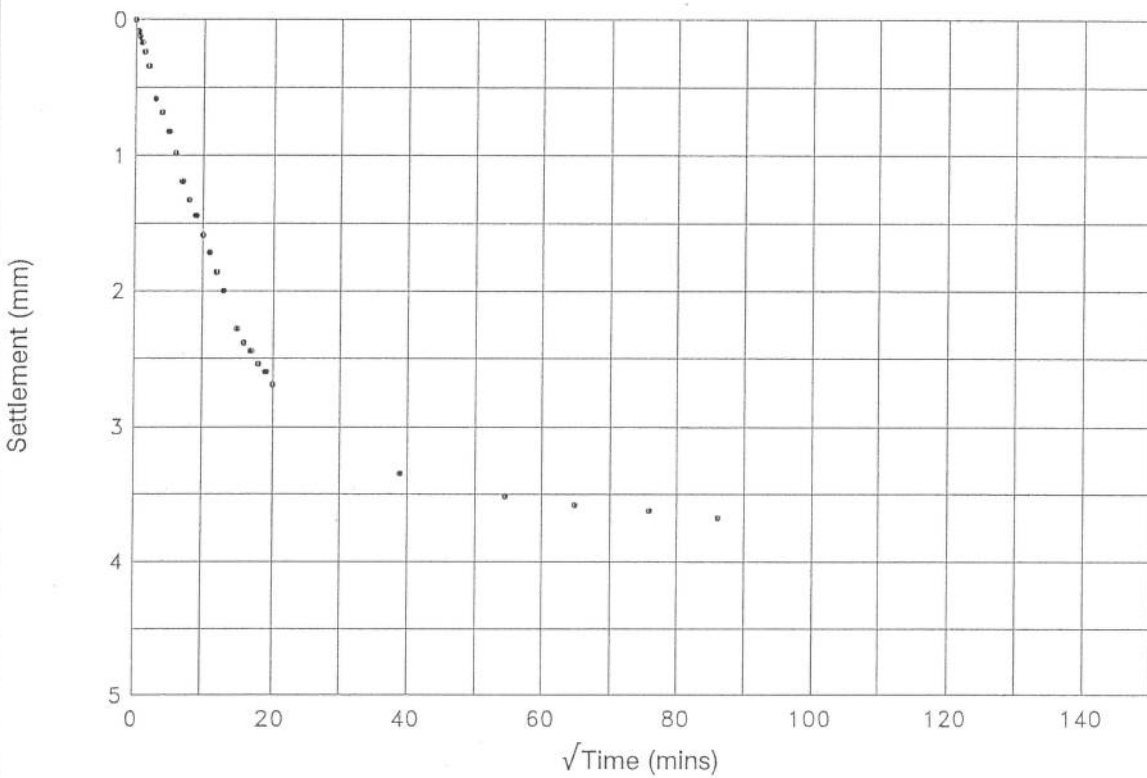
Contract KC3210

Stage = 4

Applied Load = 100 - 200 kN/m²



$d_{100} = 3.753$ mm
 $d_0 = .002$ mm
 $d_{50} = 1.878$ mm
 $t_{50} = 146.94$ mins
 $C_v = .17$ m²/year



$t_{90} = 548.77$ mins
 $C_v = .19$ m²/year

Initial Height = 32.634 mm
 Height Change = 3.670 mm
 Final Height = 28.964 mm

Remarks

Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

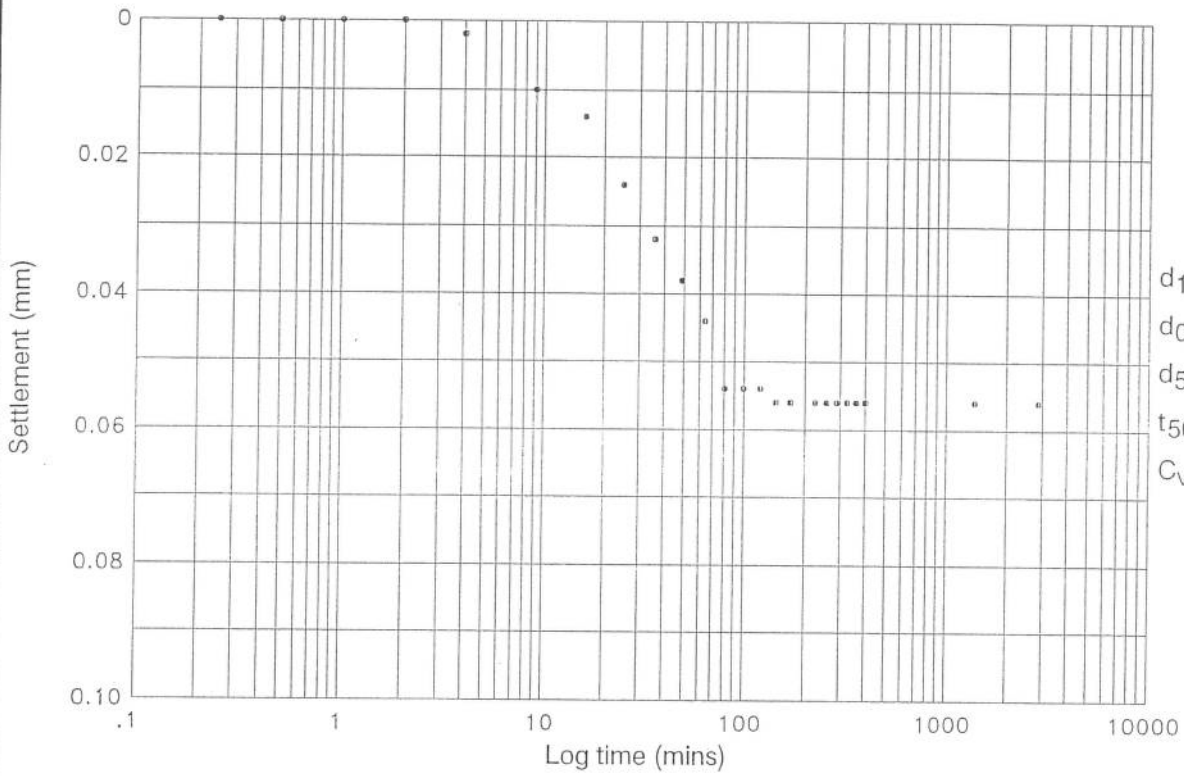
Project N6 Galway

Contract KC3210

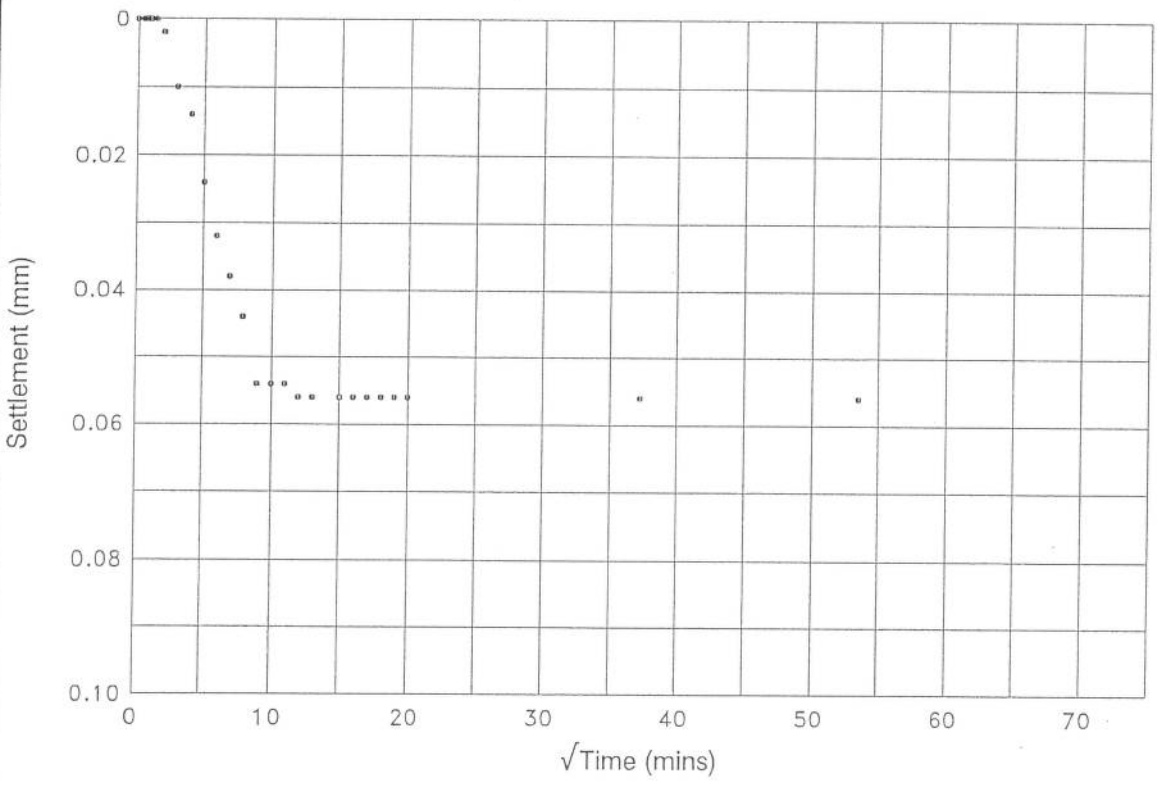
 Exploration Associates

Stage = 5

Applied Load = 200 - 50 kN/m²




$d_{100} = .058 \text{ mm}$
 $d_0 = .000 \text{ mm}$
 $d_{50} = .029 \text{ mm}$
 $t_{50} = 31.64 \text{ mins}$
 $C_v = .69 \text{ m}^2/\text{year}$



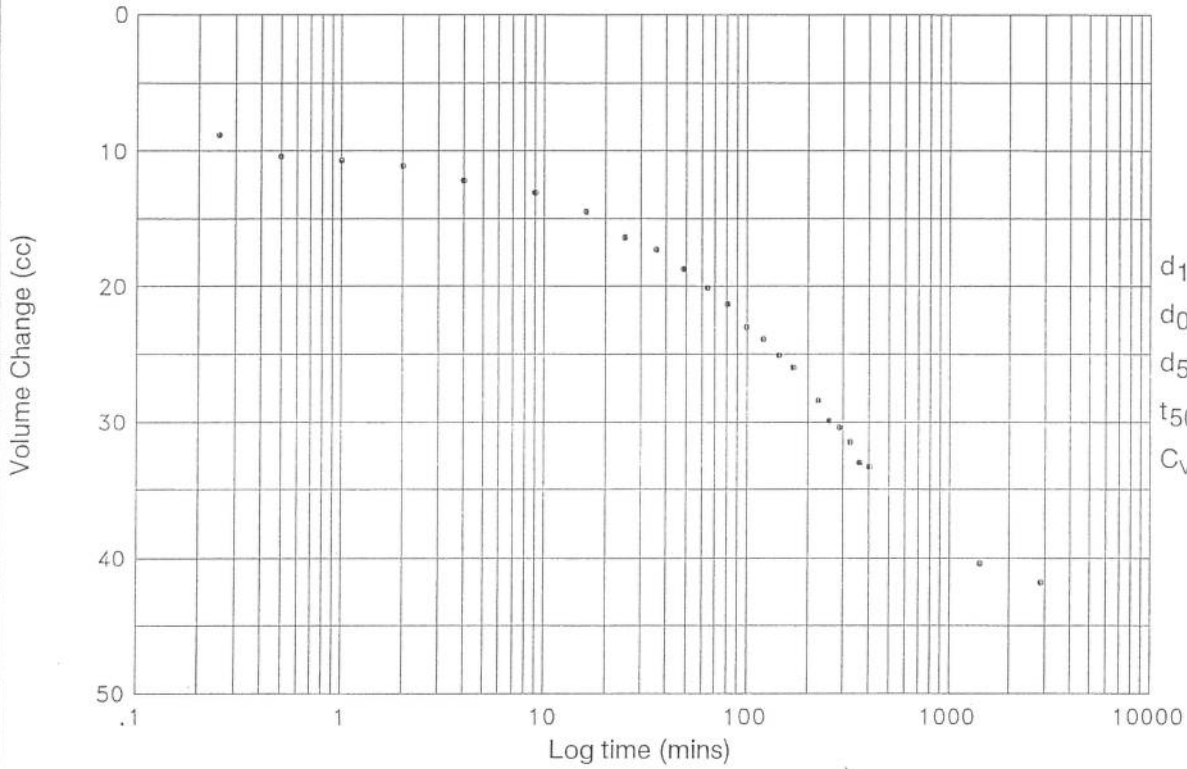
$t_{90} = 124.45 \text{ mins}$
 $C_v = .75 \text{ m}^2/\text{year}$

Initial Height = 29.164 mm
 Height Change = -.056 mm
 Final Height = 29.220 mm

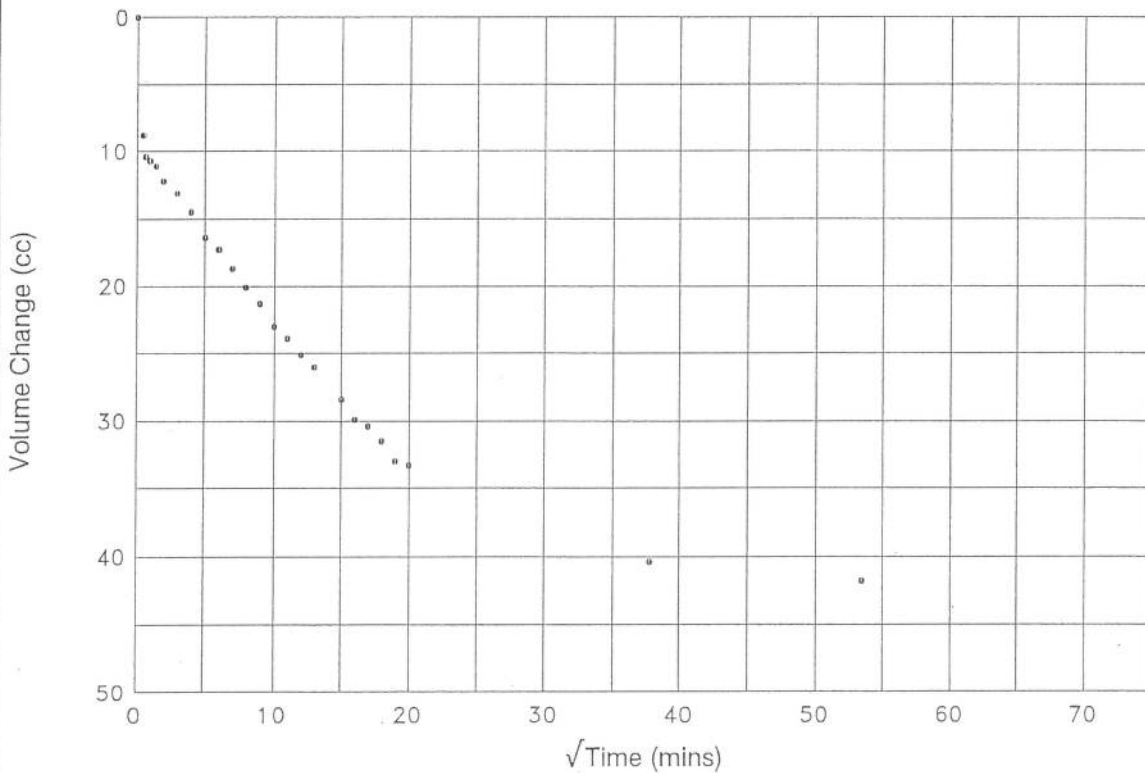
Remarks		Depth	6.50 - 7.50 m
		Borehole	110
Laboratory - Hydraulic Cell Consolidation Test	Project N6 Galway	Contract	KC3210
 Exploration Associates			

Stage = 1

Applied Load = 0 - 25 kN/m²



$d_{100} = 41.800 \text{ cc}$
 $d_0 = 6.900 \text{ cc}$
 $d_{50} = 24.350 \text{ cc}$
 $t_{50} = 129.16 \text{ mins}$
 $C_V = .39 \text{ m}^2/\text{year}$



$t_{90} = 518.26 \text{ mins}$
 $C_V = .42 \text{ m}^2/\text{year}$

Initial Volume = 350.550 cc
 Volume Change = 41.800 cc
 Final Volume = 308.750 cc

Remarks

Depth 6.50 - 7.50 m
Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

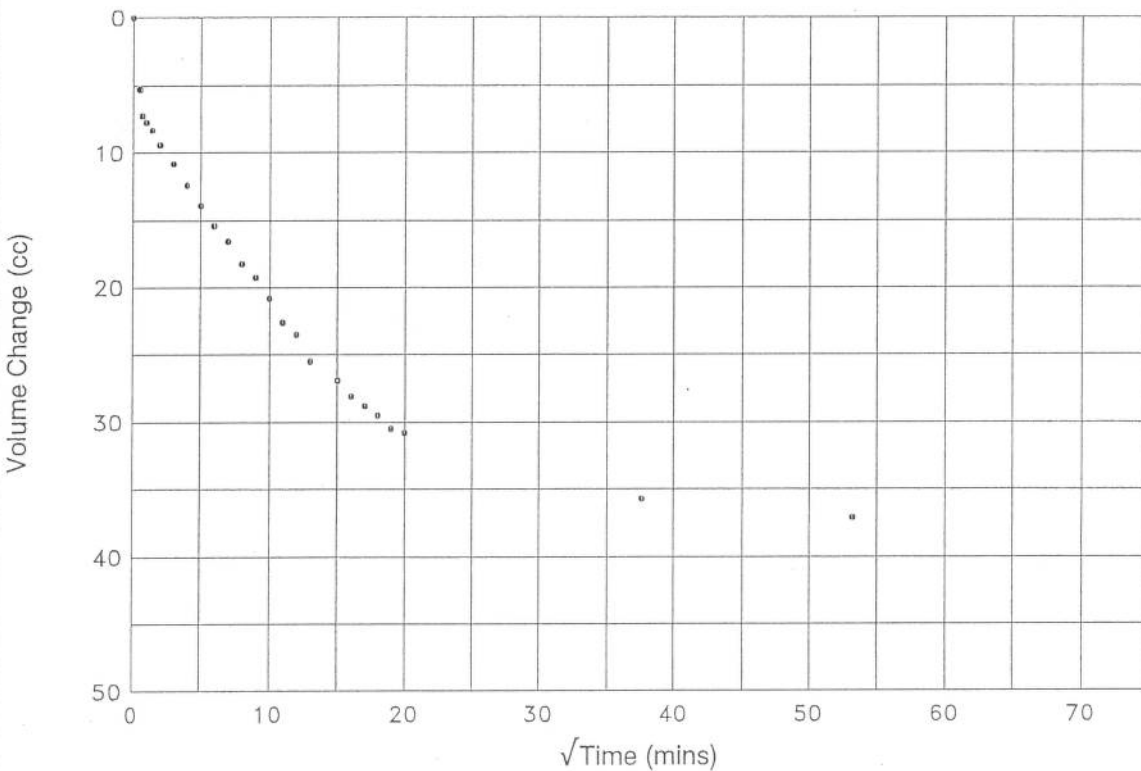
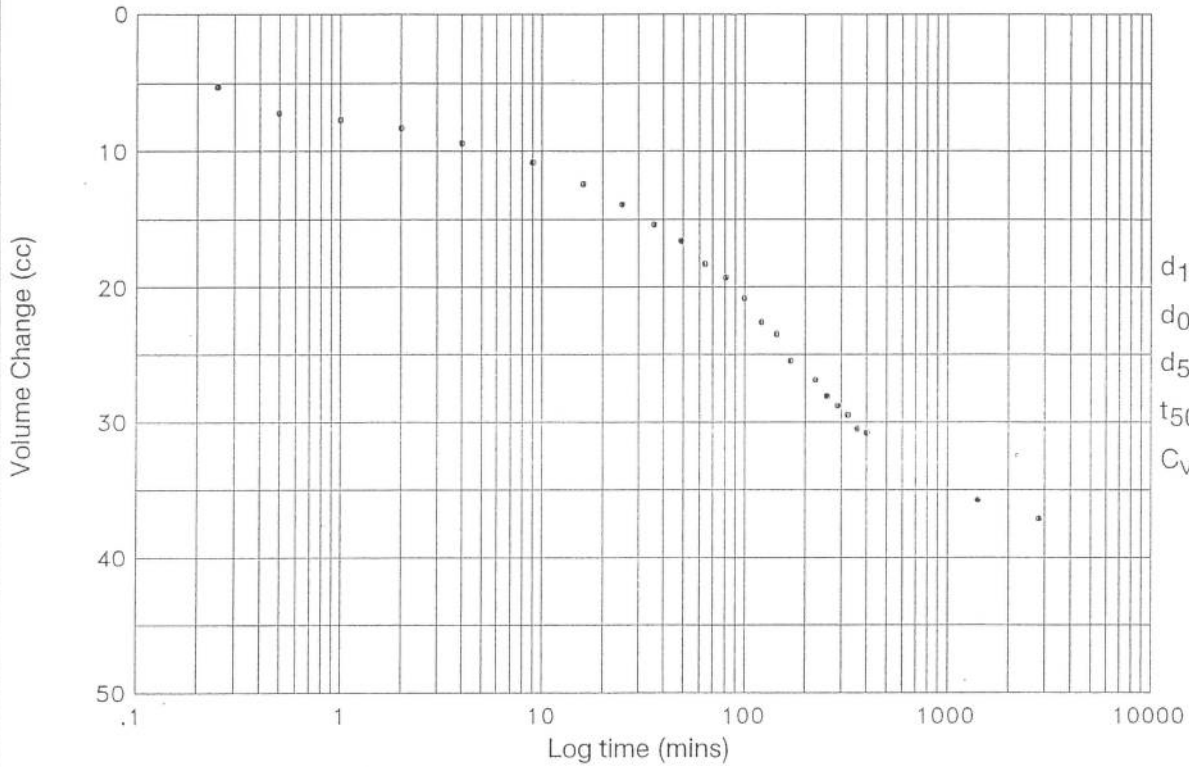
Project N6 Galway

Contract KC3210

 Exploration Associates

Stage = 2

Applied Load = 25 - 50 kN/m²



Initial Volume = 308.394 cc
 Volume Change = 37.100 cc
 Final Volume = 271.294 cc

Remarks

Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

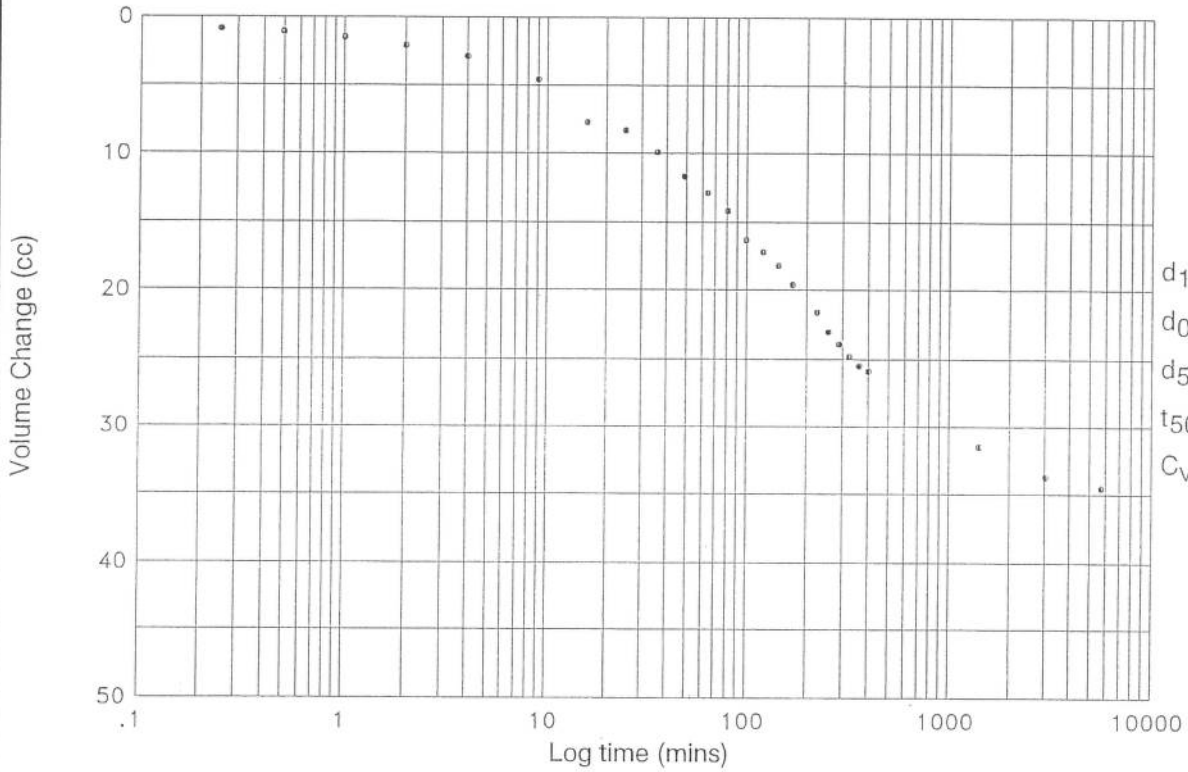
Project N6 Galway

Contract KC3210

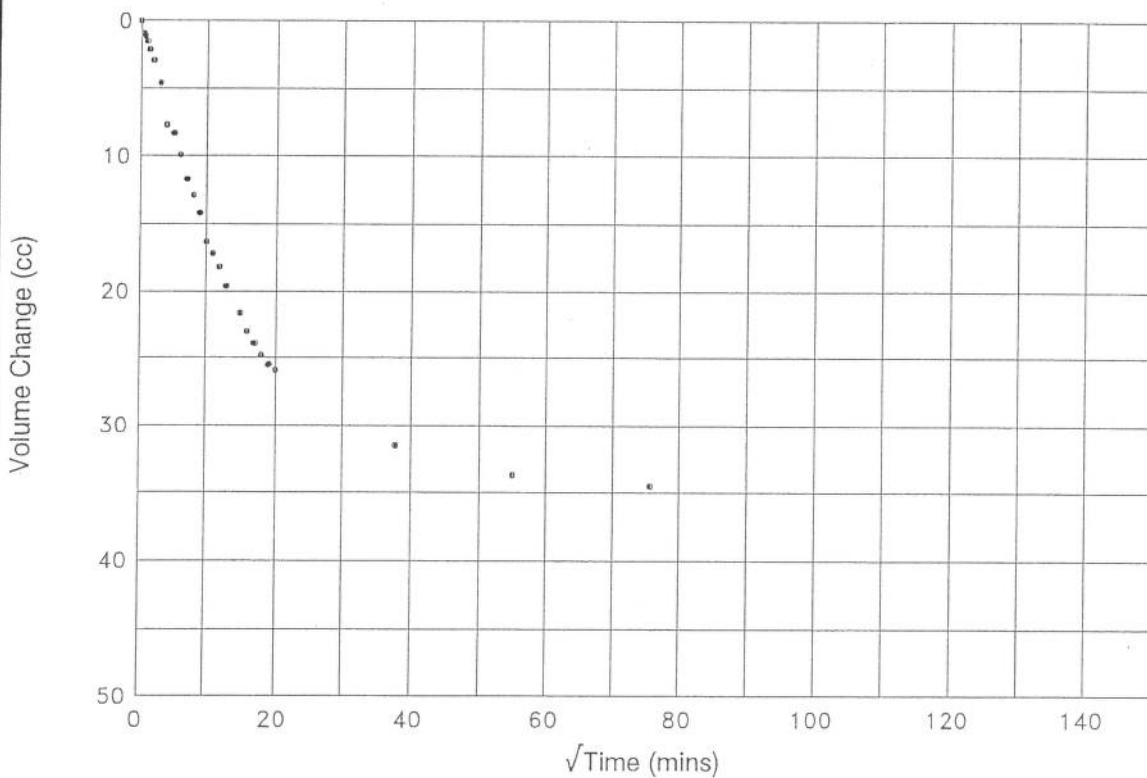
 Exploration Associates

Stage = 3

Applied Load = 50 - 100 kN/m²



$d_{100} = 35.833$ cc
 $d_0 = .300$ cc
 $d_{50} = 18.067$ cc
 $t_{50} = 140.70$ mins
 $C_v = .23$ m²/year



$t_{90} = 565.81$ mins
 $C_v = .24$ m²/year

Initial Volume = 270.109 cc
 Volume Change = 34.500 cc
 Final Volume = 235.609 cc


Remarks

Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

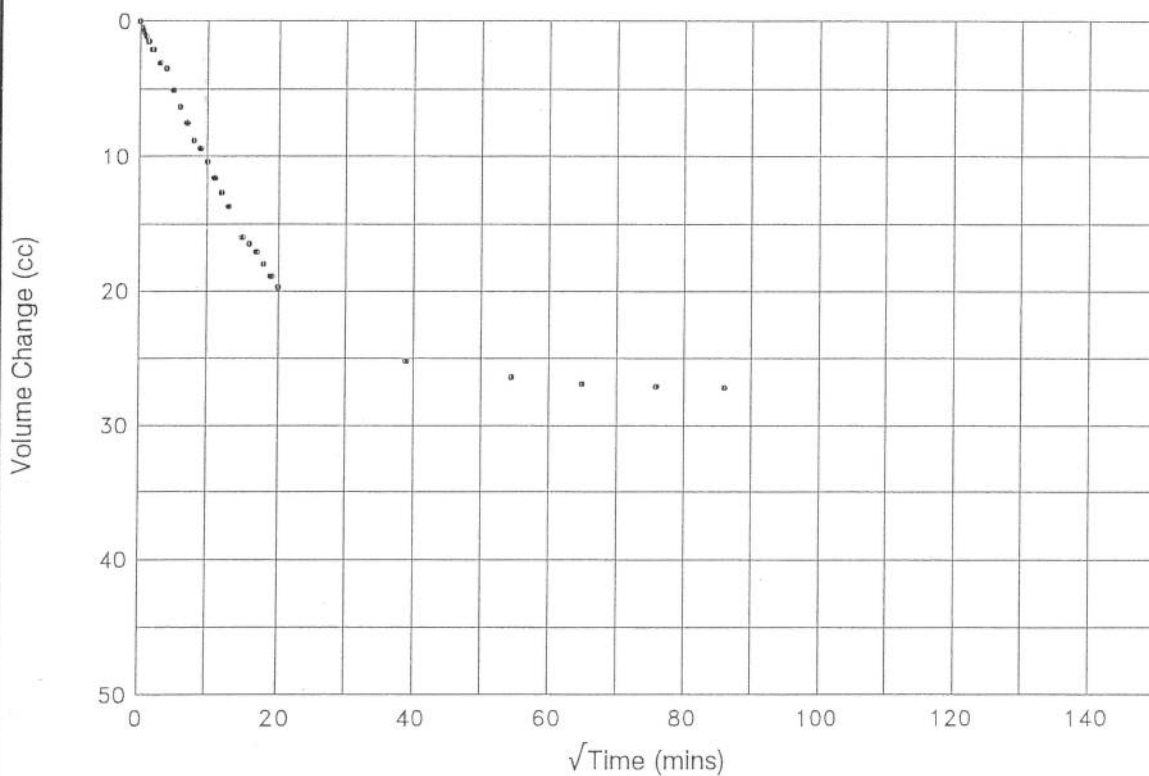
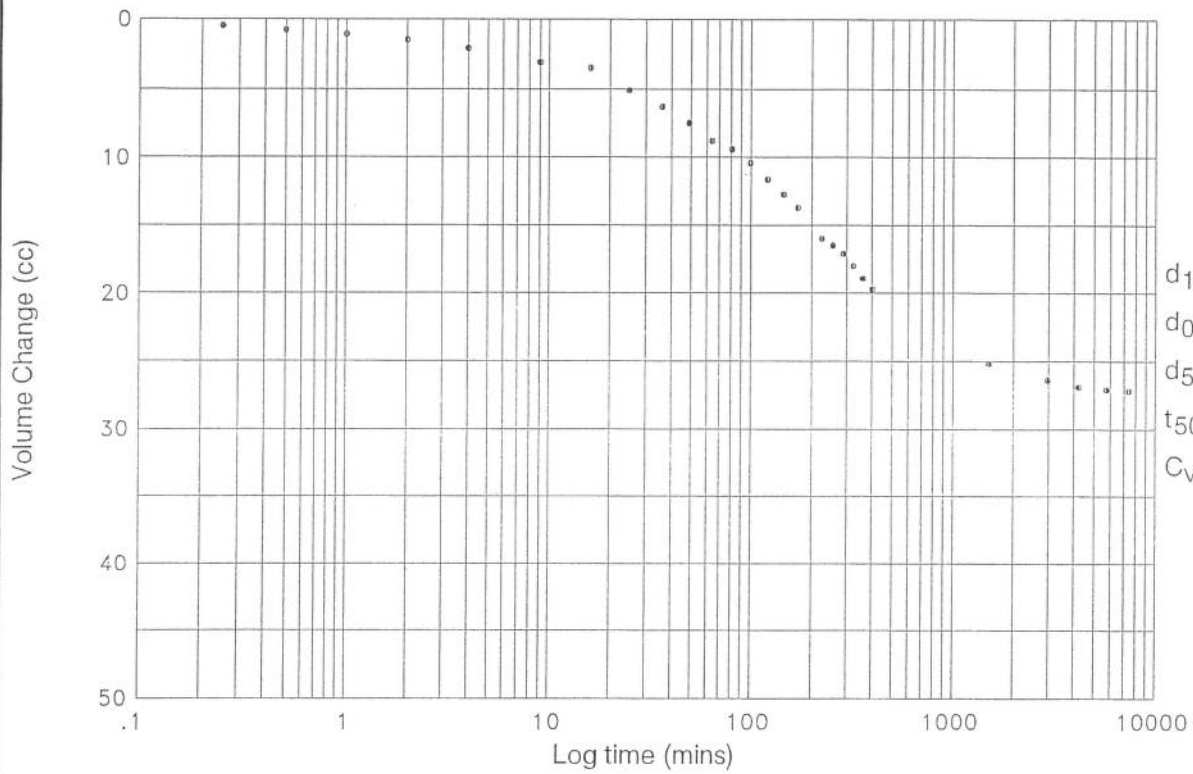
Project
 N6 Galway

Contract KC3210

 Exploration Associates

Stage = 4

Applied Load = 100 - 200 kN/m²



Initial Volume = 233.030 cc
 Volume Change = 27.200 cc
 Final Volume = 205.830 cc


Remarks

Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell Consolidation Test

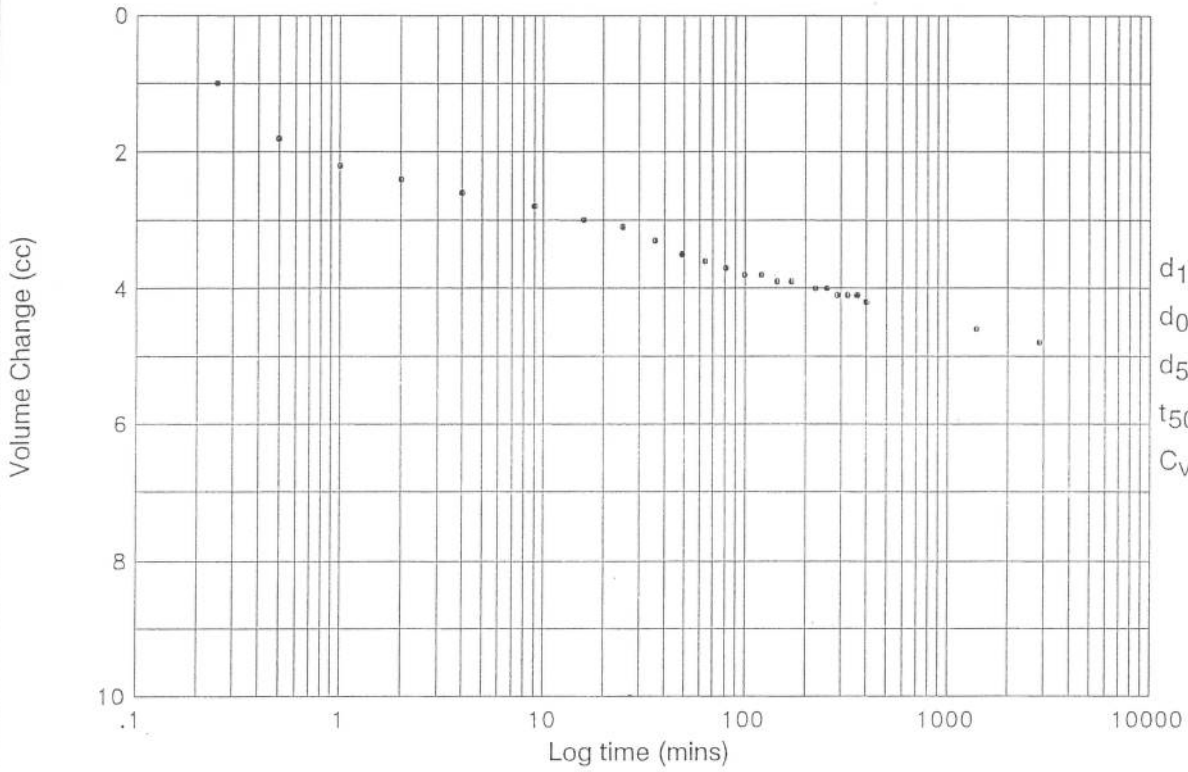
Project N6 Galway

Contract KC3210

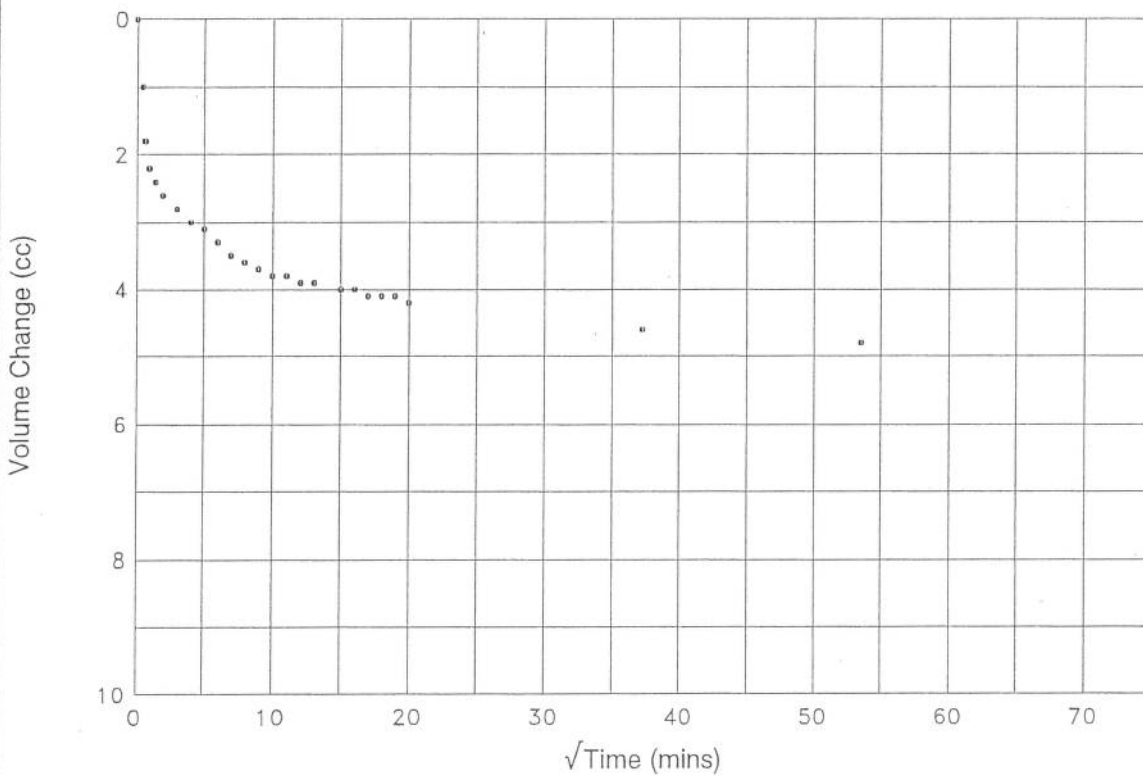
 Exploration Associates

Stage = 5

Applied Load = 200 - 50 kN/m²



$d_{100} = 4.700$ cc
 $d_0 = .000$ cc
 $d_{50} = 2.350$ cc
 $t_{50} = 1.68$ mins
 $C_v = 13.05$ m²/year



$t_{90} = 6.66$ mins
 $C_v = 14.05$ m²/year

Initial Volume = 207.312 cc
 Volume Change = -4.8 cc
 Final Volume = 212.112 cc

Remarks

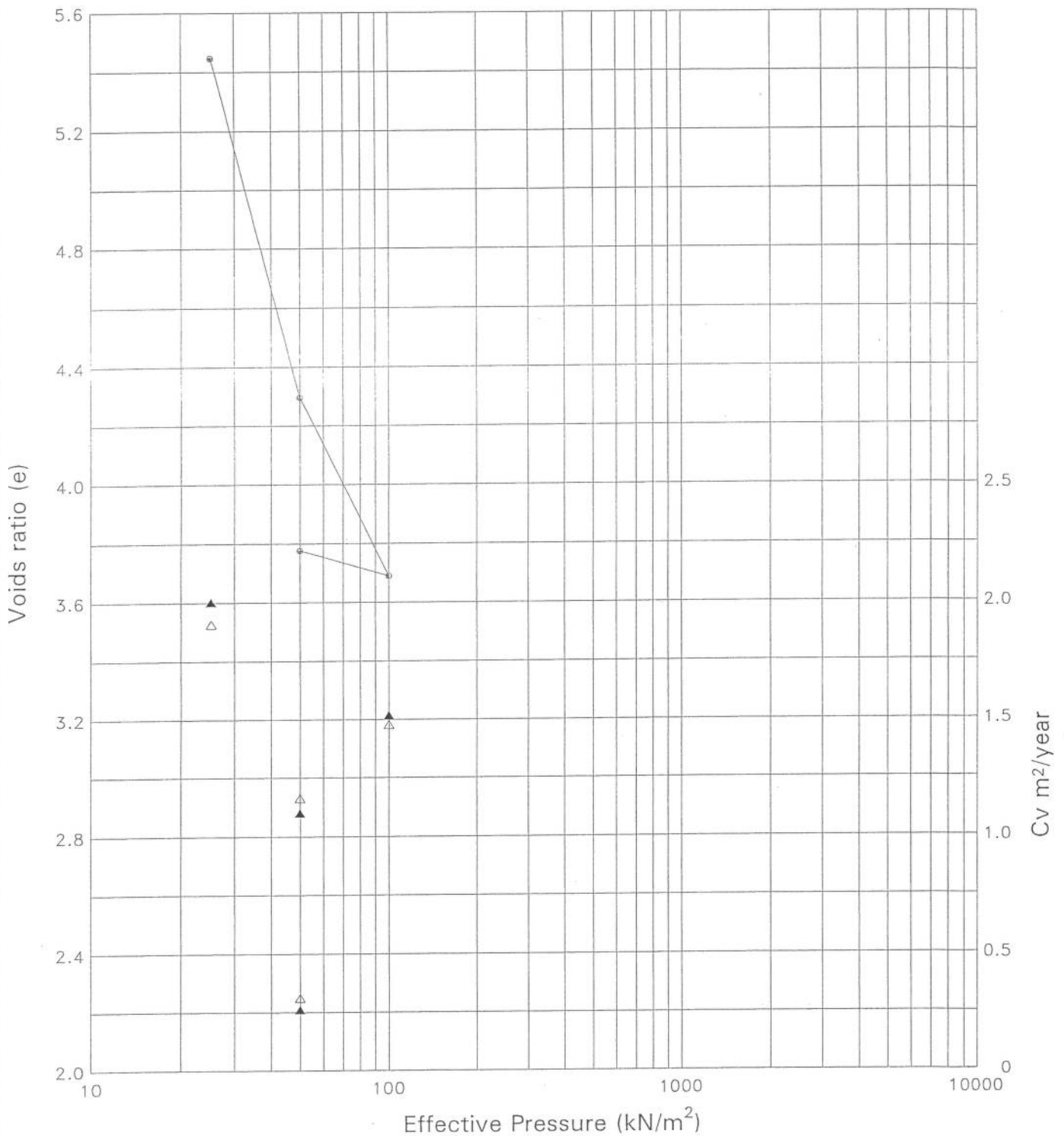
Depth 6.50 - 7.50 m
 Borehole 110

Laboratory - Hydraulic Cell
 Consolidation Test

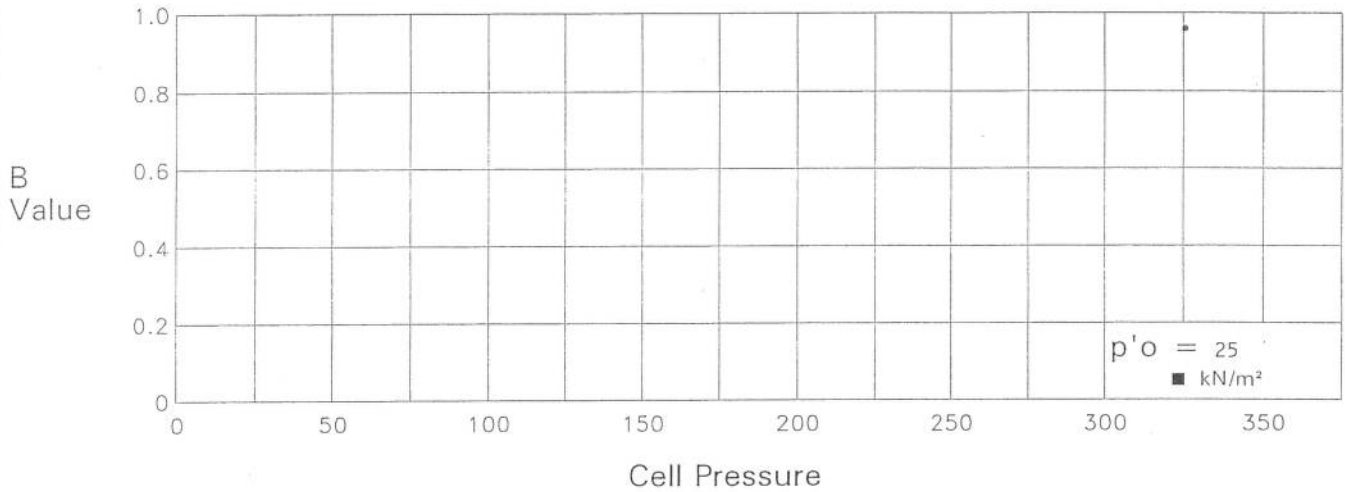
Project
 N6 Galway

Contract KC3210

 Exploration Associates



Sample Dimensions	102.76 mm dia. 53.24 mm high	Pressure	kN/m ²	0	25	50	100				
Initial Voids Ratio	5.625	m _v	m ² /MN	1.077	7.142	2.290	.372				
Final Voids Ratio	3.776	C _v Log t ₅₀	▲ m ² /yr	2.00	1.10	1.52	.26				
Initial Water Content	200.06 %	C _v Root t ₉₀	△ m ² /yr	1.91	1.16	1.48	.31				
Final Water Content	122.12 %	Final Voids Ratio		5.447	4.296	3.689	3.776				
Initial Saturation	94.25 %	Description	Soft grey brown CLAY with occasional rootlets								
Initial Bulk Density	1.201 Mg/m ³	Hole	110								
Initial Dry Density	.400 Mg/m ³	Depth	3.50 - 4.50								
Particle Density	2.65 ASSUMED	Sample Type	P								
Sample Type	UNDISTURBED	Contract	KC3210								
Drainage Condition	Two Way Vertical	Project	N6 Galway								
Strain Condition	FREE	Figure									
Mv & (e) calculated using	Vol. Change Data										
Cvs calculated using	Vol. Change Data										
Laboratory - Hydraulic Cell Consolidation Test		Exploration Associates									
		Form 34/0									



Sample Information

Diameter	:	102.76 mm	Specific Gravity	:	2.65 ASSUMED
Length	:	53.24 mm	Initial Voids Ratio	:	5.625
Area	:	8293.504 mm ²	Initial B Value	:	.96
Volume	:	441.546 cm ³	Final B Value	:	.96

Saturation B Value/Cell Pressure

Borehole 110
Depth 3.50 - 4.50 m

Remarks

Laboratory - Hydraulic Cell Consolidation Test

Project
N6 Galway

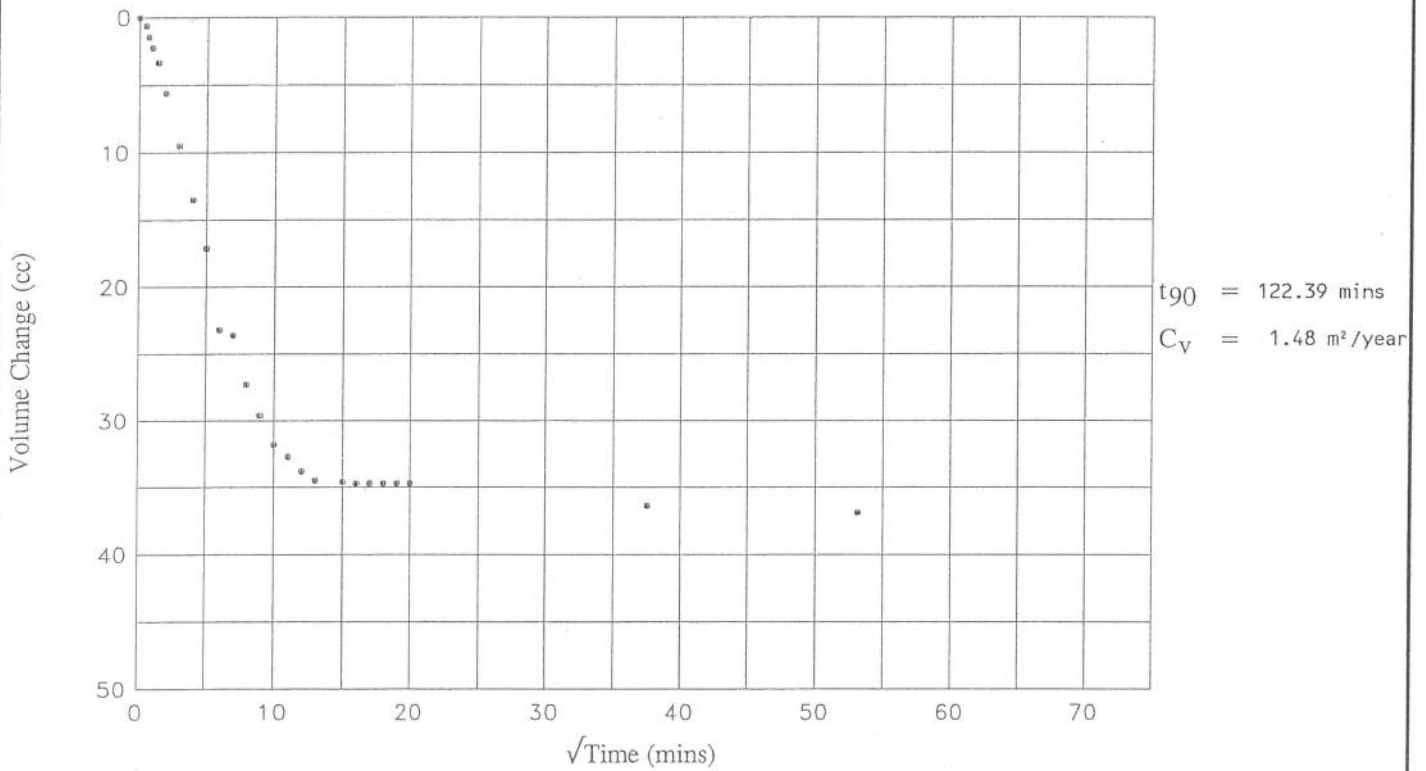
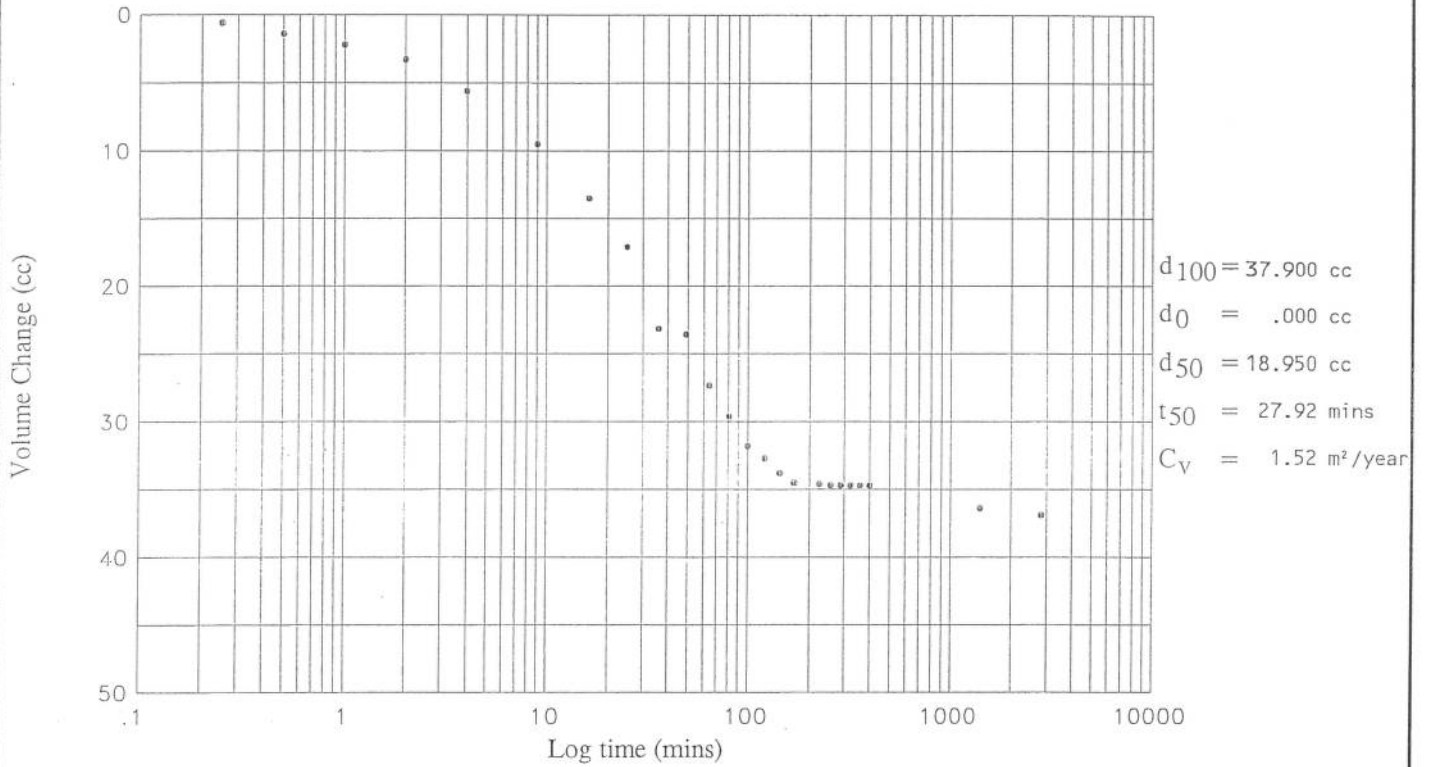
Contract KC3210

 Exploration Associates

Figure

Stage = 3

Applied Load = 50 - 100 kN/m²



Initial Volume = 341.894 cc
 Volume Change = 36.900 cc
 Final Volume = 304.994 cc


Remarks

Depth 3.50 - 4.50 m
 Borehole 110

Laboratory - Hydraulic Cell
 Consolidation Test

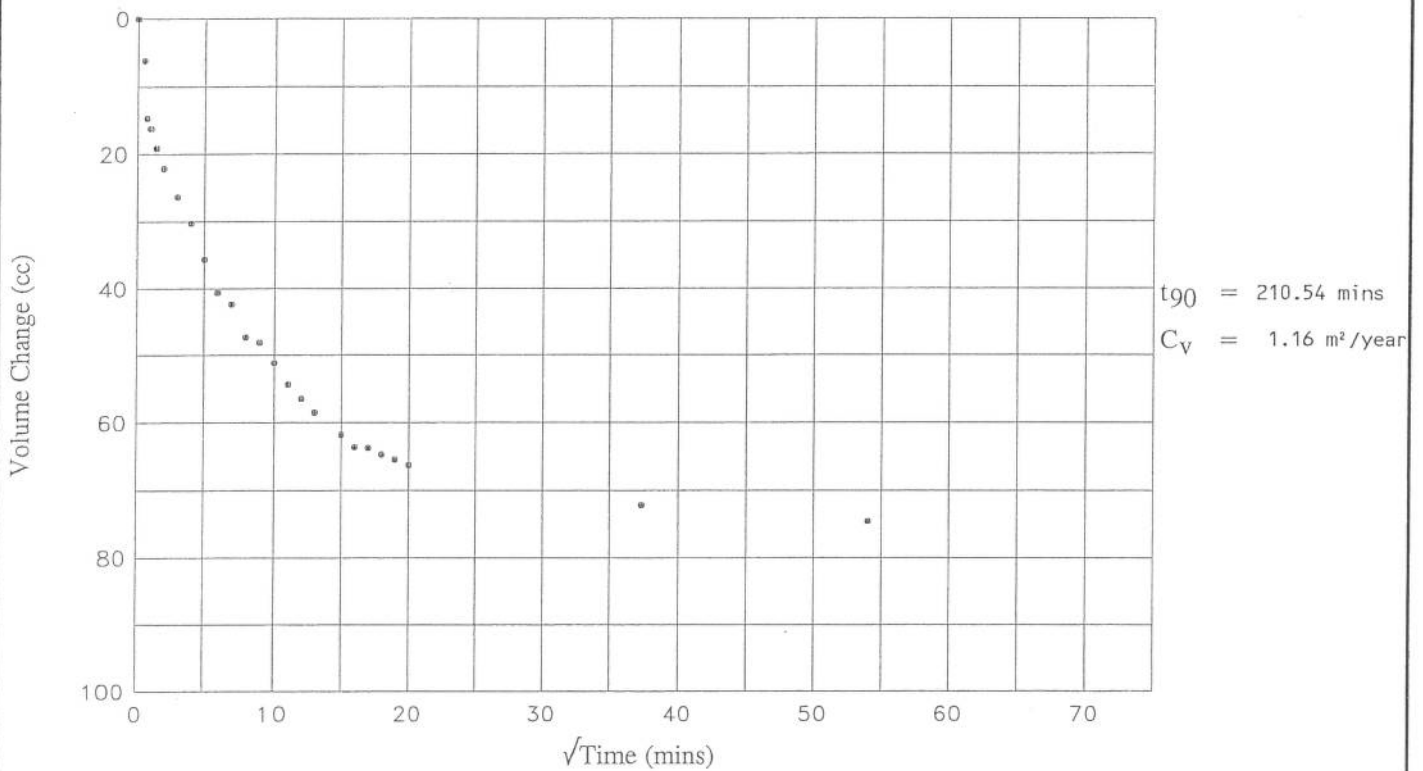
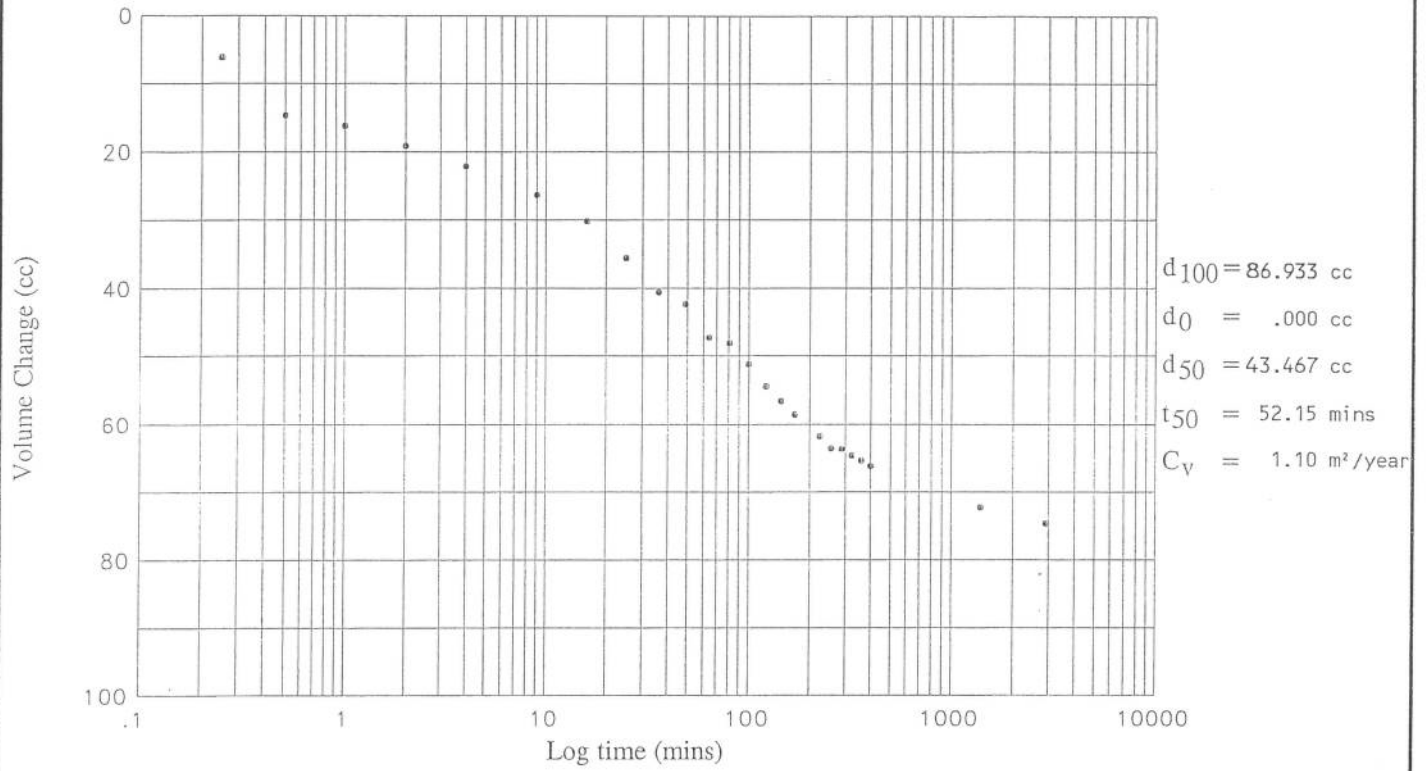
Project
 N6 Galway

Contract KC3210

 Exploration Associates

Stage = 2

Applied Load = 25 - 50 kN/m²



Initial Volume = 419.032 cc

Volume Change = 74.600 cc

Final Volume = 344.432 cc

Remarks

Depth 3.50 - 4.50 m
 Borehole 110

Laboratory - Hydraulic Cell
 Consolidation Test

Project
 N6 Galway

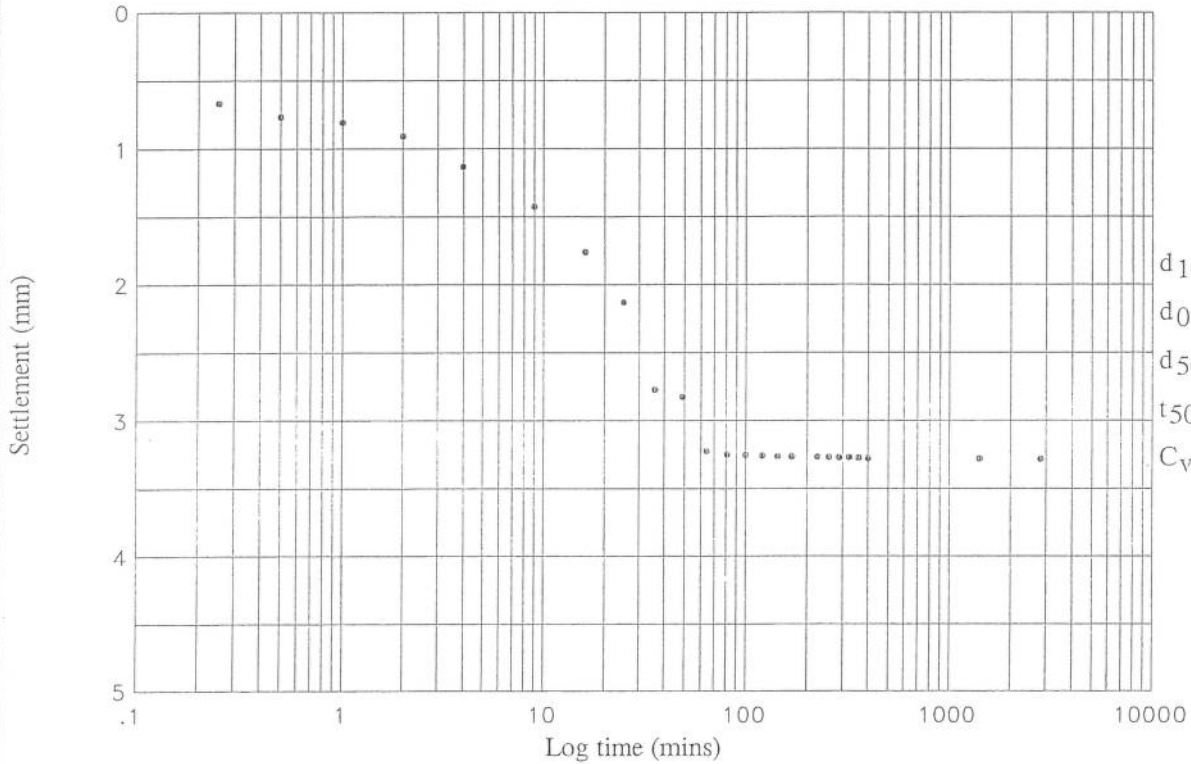
Contract KC3210



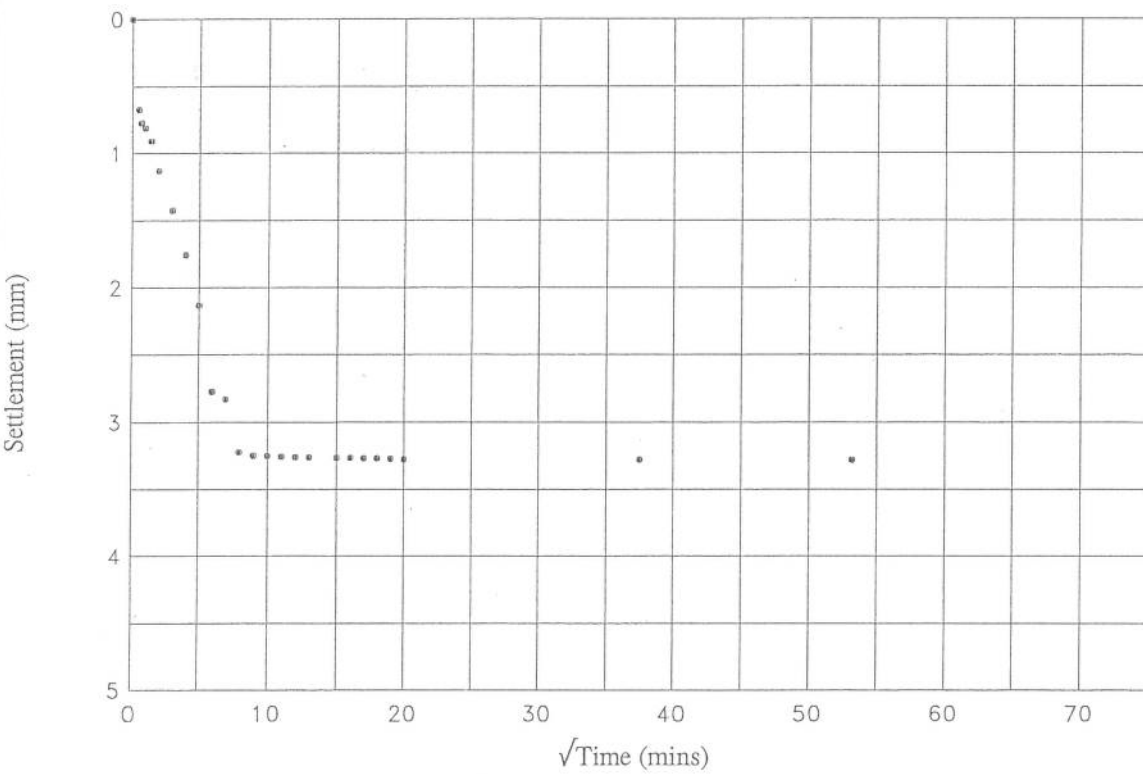
Exploration Associates

Stage = 3

Applied Load = 50 - 100 kN/m²




$d_{100} = 2.951 \text{ mm}$
 $d_0 = .528 \text{ mm}$
 $d_{50} = 1.739 \text{ mm}$
 $t_{50} = 15.49 \text{ mins}$
 $C_v = 2.74 \text{ m}^2/\text{year}$



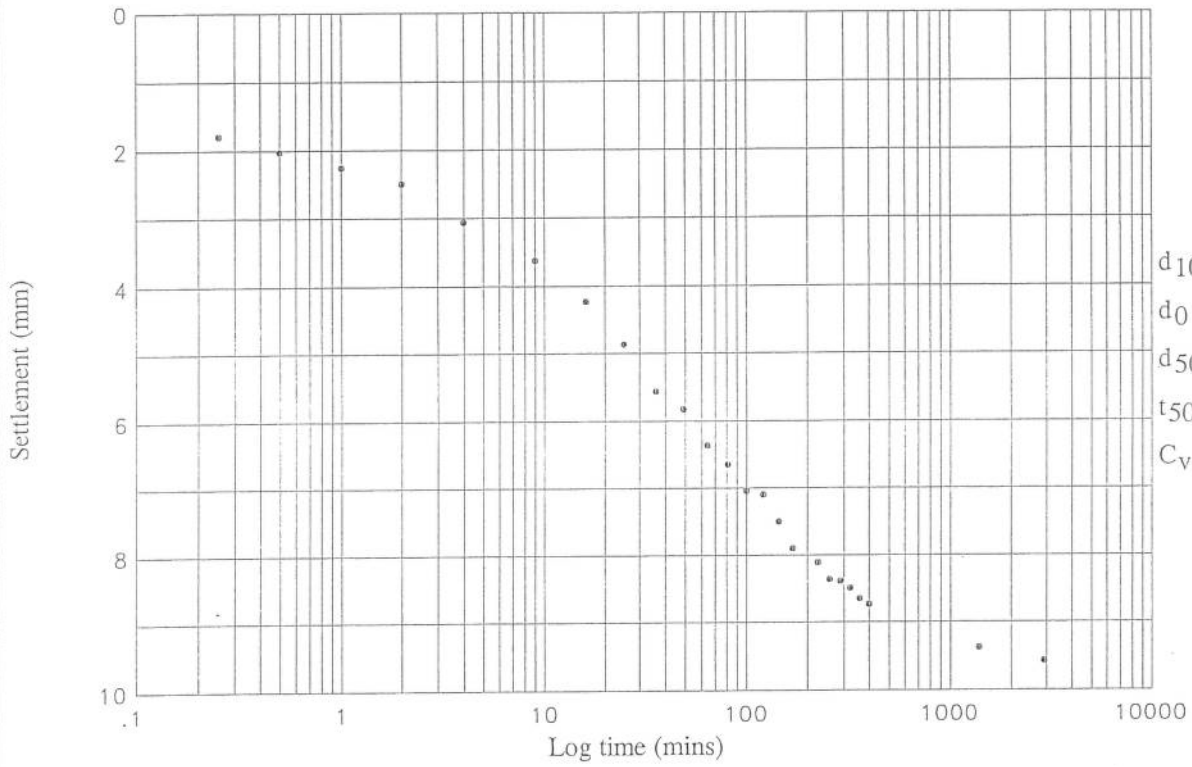
$t_{90} = 72.07 \text{ mins}$
 $C_v = 2.51 \text{ m}^2/\text{year}$

Initial Height = 41.860 mm
 Height Change = 3.284 mm
 Final Height = 38.576 mm

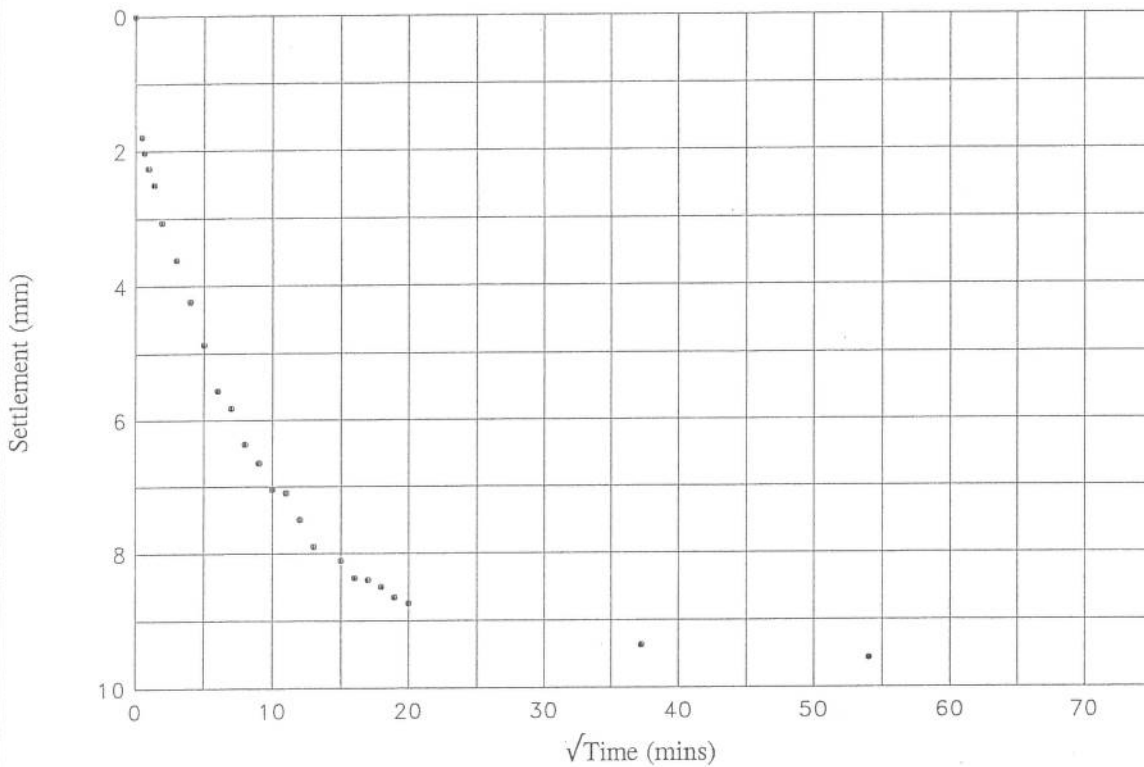
Remarks		Depth 3.50 - 4.50 m
		Borehole 110
Laboratory - Hydraulic Cell Consolidation Test	Project N6 Galway	Contract KC3210
 Exploration Associates		

Stage = 2

Applied Load = 25 - 50 kN/m²




$d_{100} = 9.133$ mm
 $d_0 = 1.332$ mm
 $d_{50} = 5.232$ mm
 $t_{50} = 30.32$ mins
 $C_v = 1.89$ m²/year



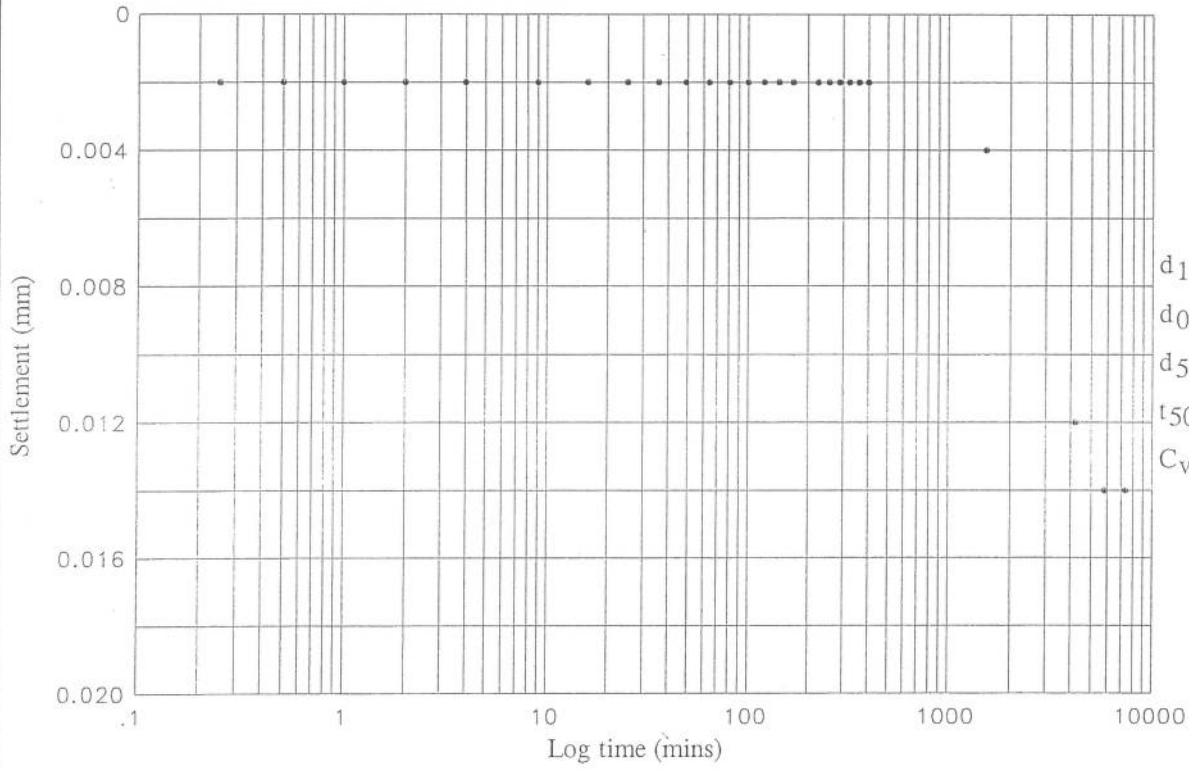
$t_{90} = 135.46$ mins
 $C_v = 1.81$ m²/year

Initial Height = 51.732 mm
 Height Change = 9.566 mm
 Final Height = 42.166 mm

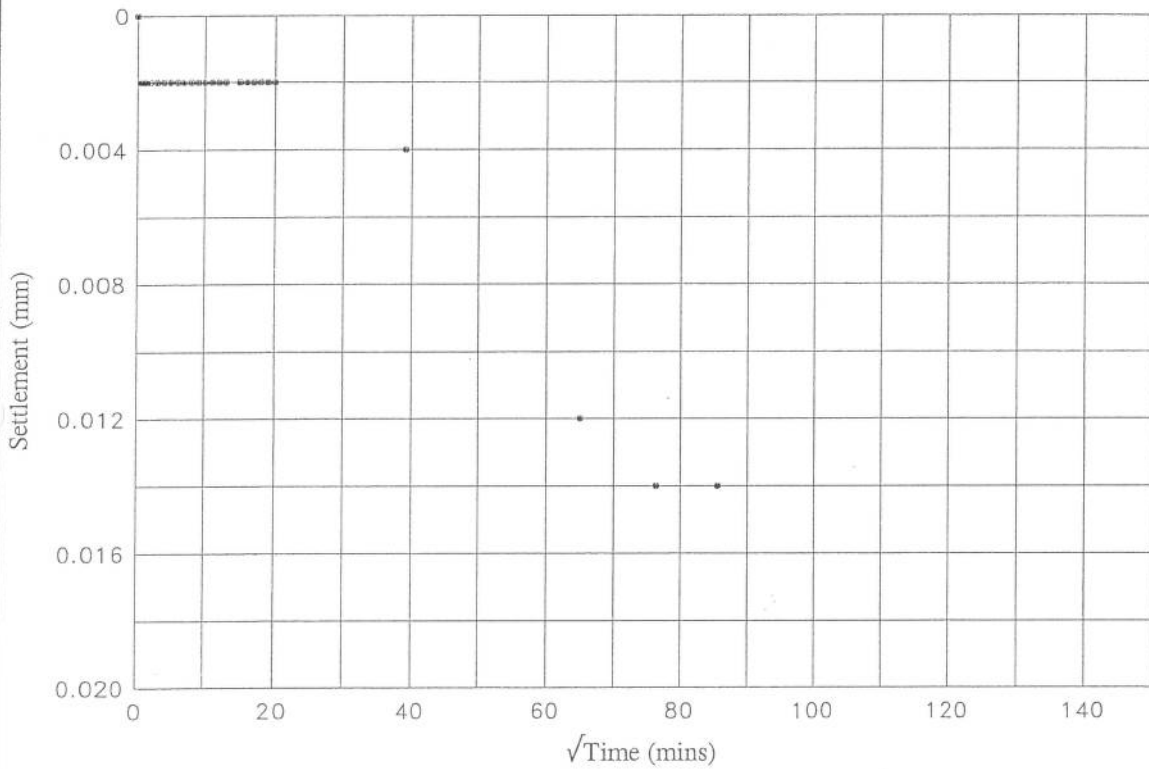
Remarks		Depth Borehole	3.50 - 4.50 m 110
Laboratory - Hydraulic Cell Consolidation Test	Project	Contract	KC3210
N6 Galway			
 Exploration Associates			

Stage = 4

Applied Load = 100 - 50 kN/m²



d₁₀₀ = .000 mm
 d₀ = .000 mm
 d₅₀ = .000 mm
 t₅₀ = .00 mins
 C_v = .00 m²/year



t₉₀ = .00 mins
 C_v = .00 m²/year

Initial Height = 38.580 mm
 Height Change = -.014 mm
 Final Height = 38.594 mm


Remarks

Depth 3.50 - 4.50 m
 Borehole 110

Laboratory - Hydraulic Cell
 Consolidation Test

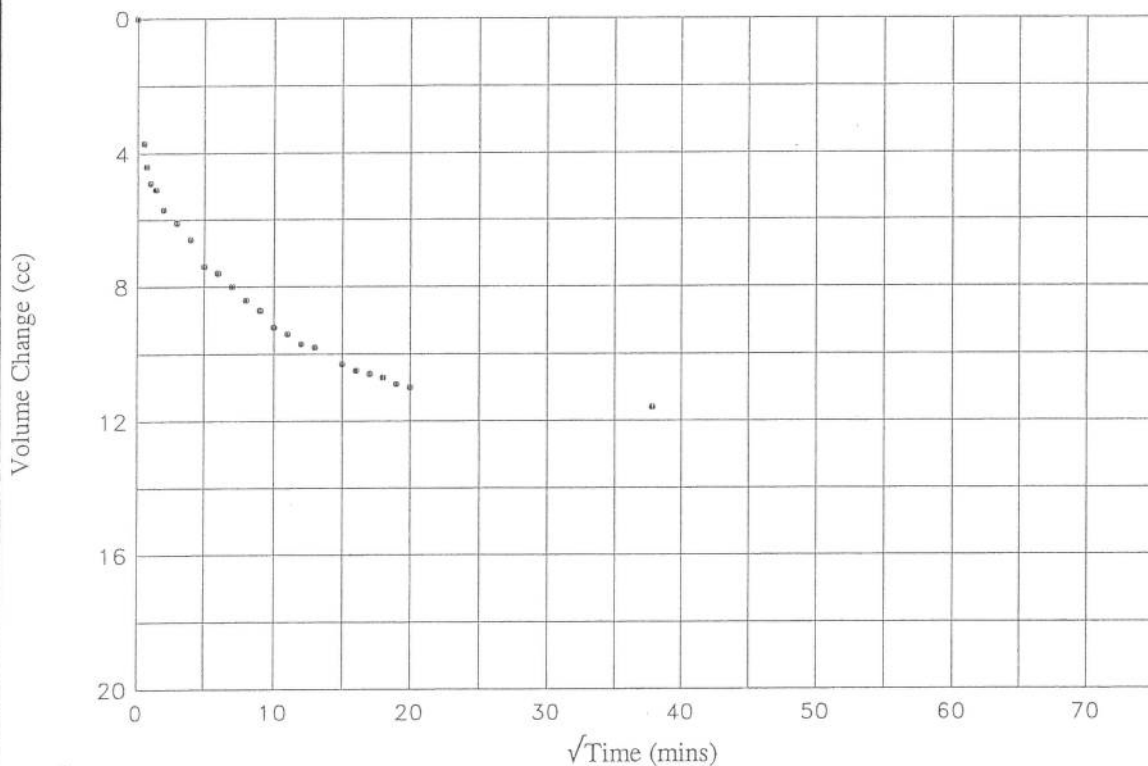
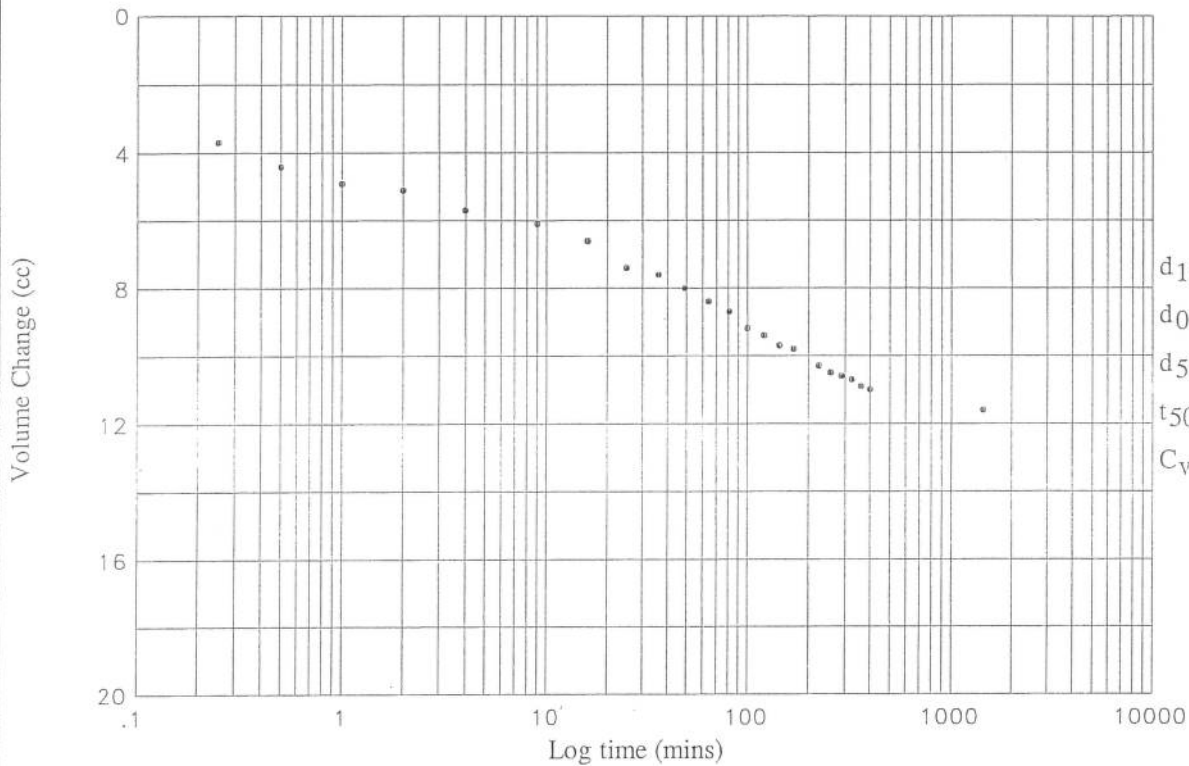
Project
 N6 Galway

Contract KC3210


 Exploration Associates

Stage = 1

Applied Load = 0 - 25 kN/m²

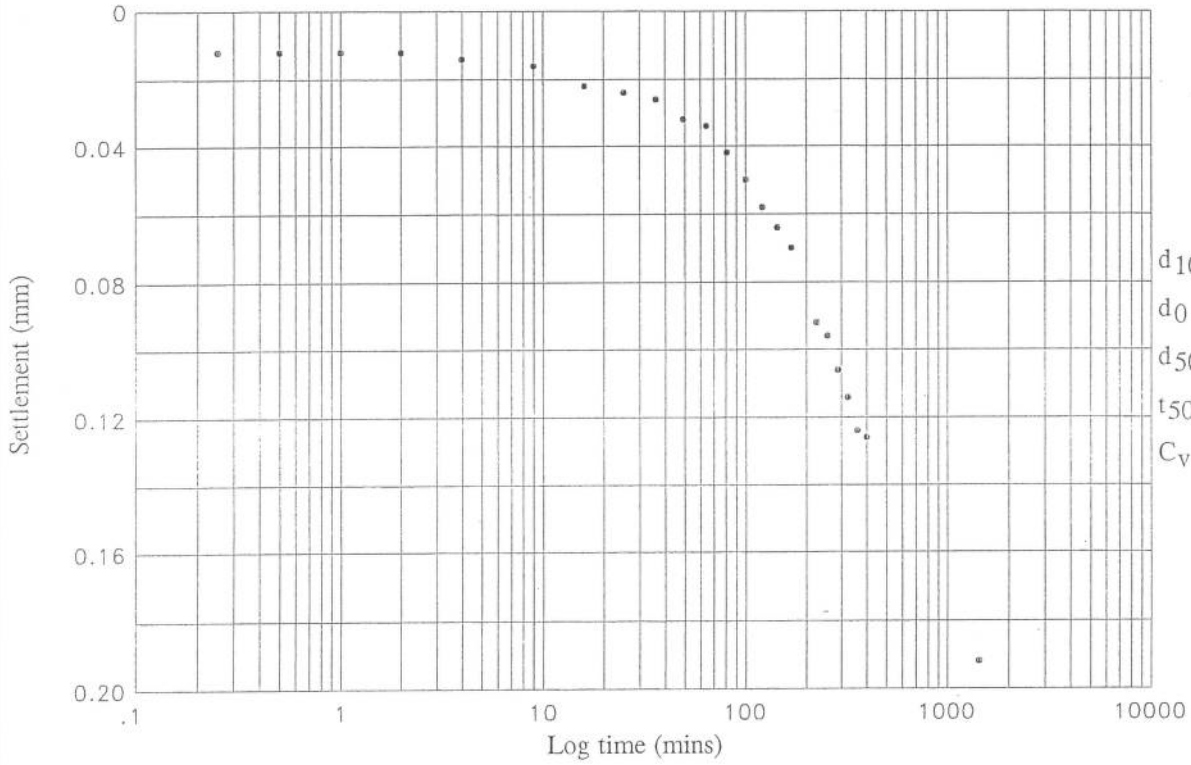


Initial Volume = 430.897 cc
 Volume Change = 11.600 cc
 Final Volume = 419.297 cc

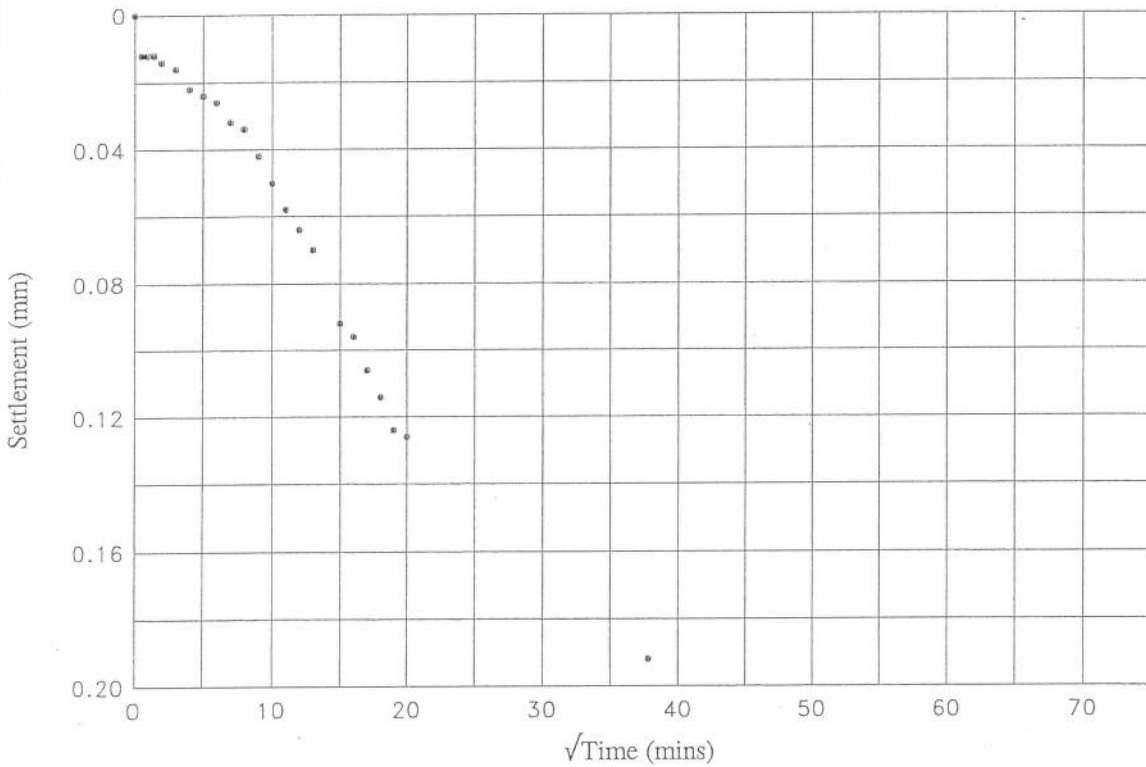
Remarks		Depth	3.50 - 4.50 m
		Borehole	110
Laboratory - Hydraulic Cell Consolidation Test	Project	Contract	KC3210
N6 Galway			
 Exploration Associates			

Stage = 1

Applied Load = 0 - 25 kN/m²



$d_{100} = .127$ mm
 $d_0 = .012$ mm
 $d_{50} = .070$ mm
 $t_{50} = 167.50$ mins
 $C_v = .42$ m²/year



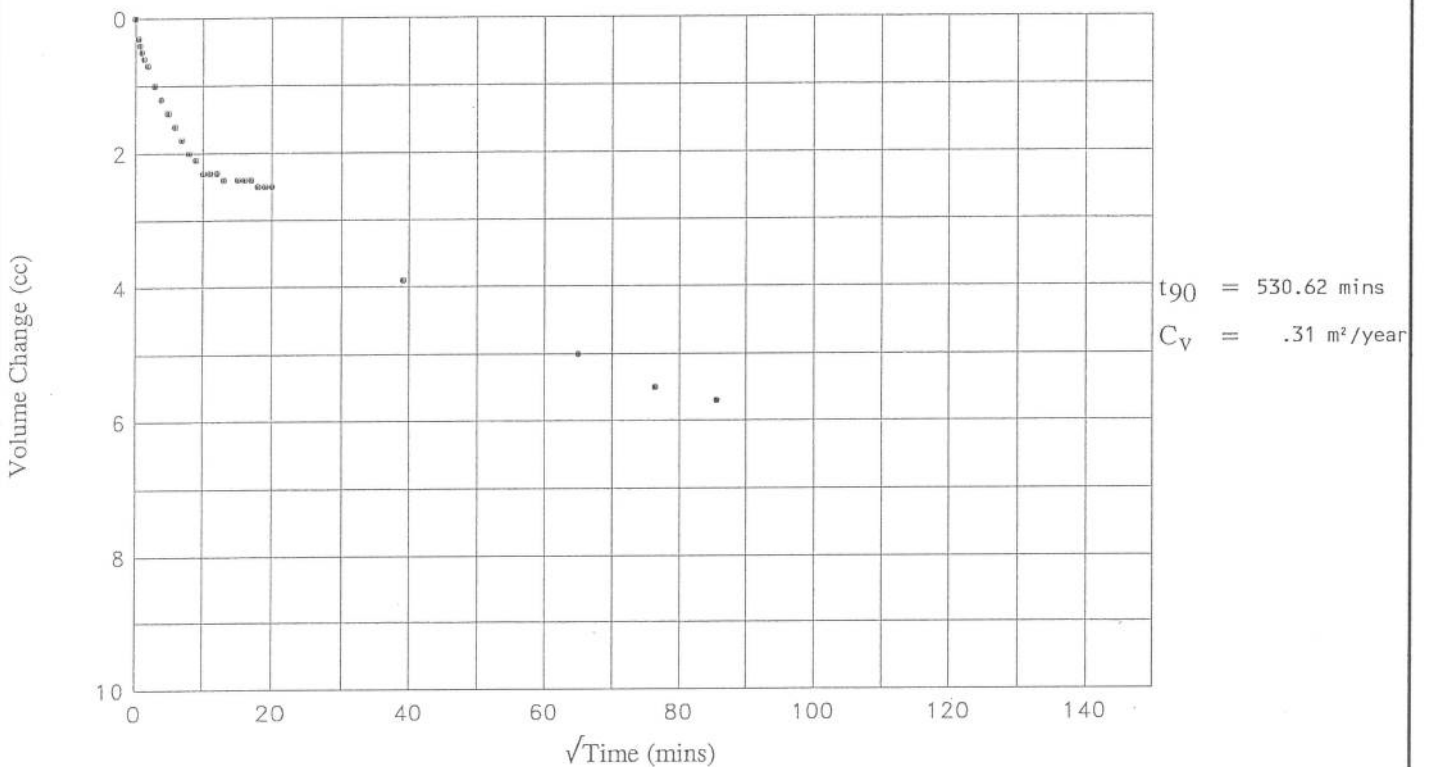
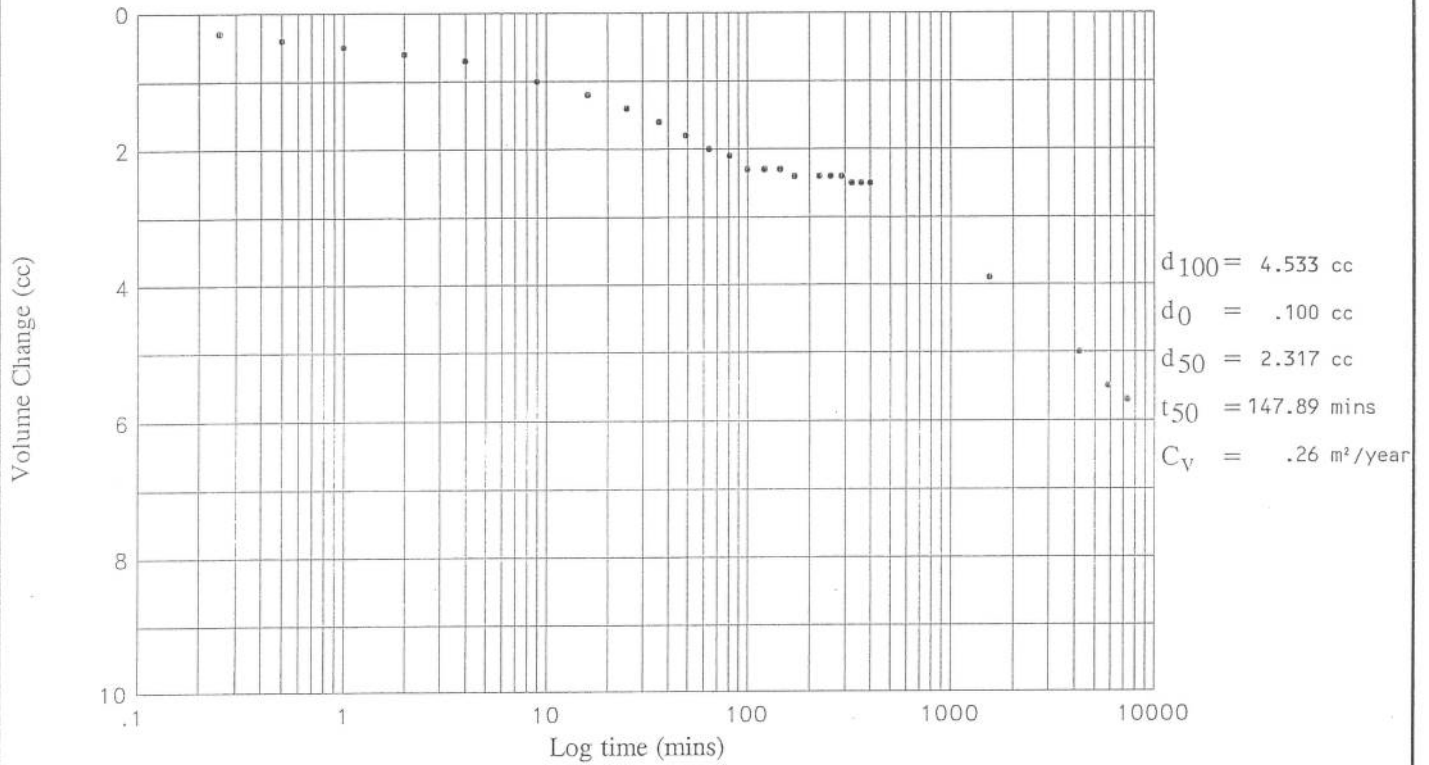
$t_{90} = 708.67$ mins
 $C_v = .42$ m²/year

Initial Height = 51.956 mm
 Height Change = .192 mm
 Final Height = 51.764 mm


Remarks		Depth Borehole	3.50 - 4.50 m 110
Laboratory - Hydraulic Cell Consolidation Test	Project	Contract	KC3210
Exploration Associates		N6 Galway	

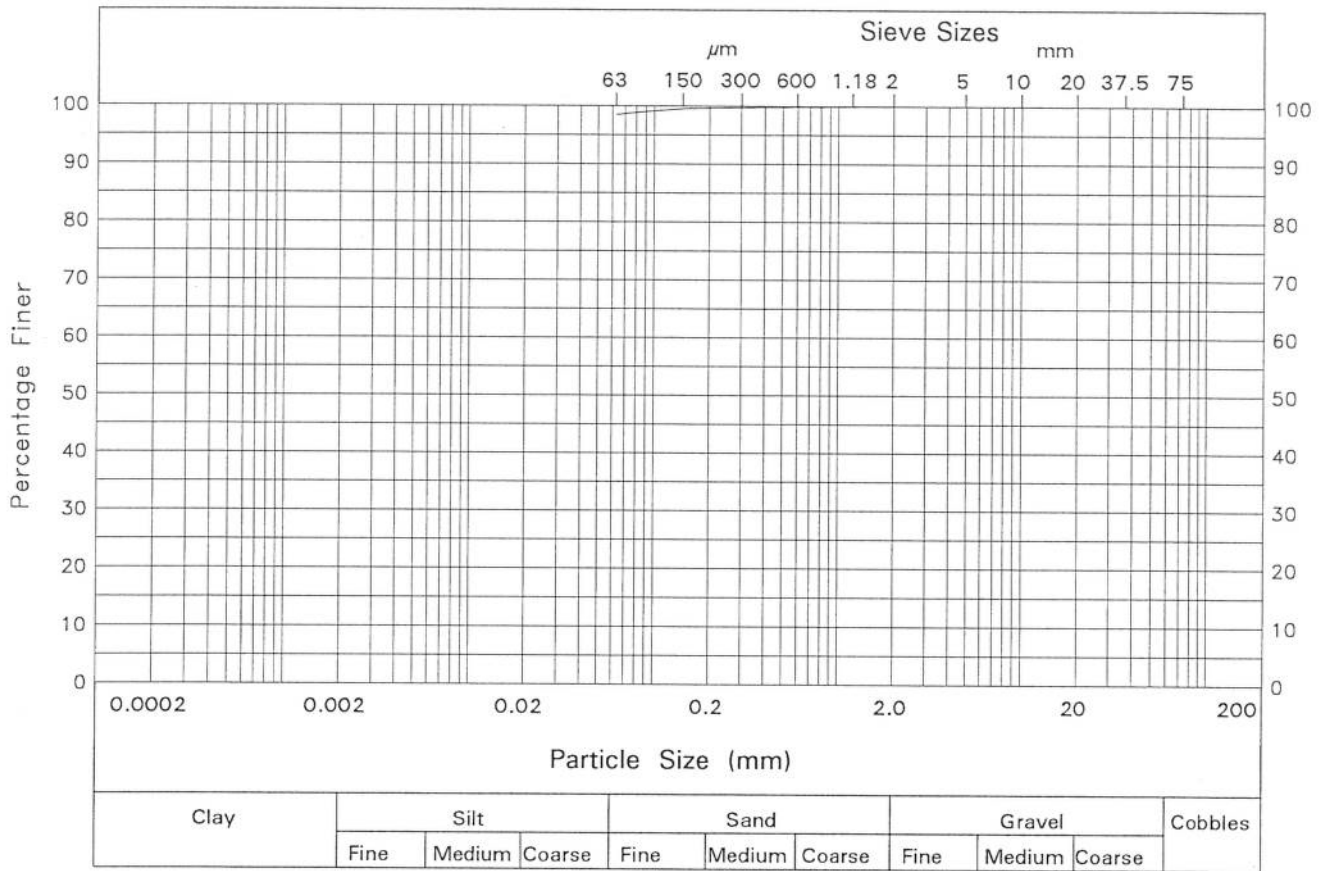
Stage = 4

Applied Load = 100 - 50 kN/m²



Initial Volume = 305.027 cc
 Volume Change = -5.7 cc
 Final Volume = 310.727 cc

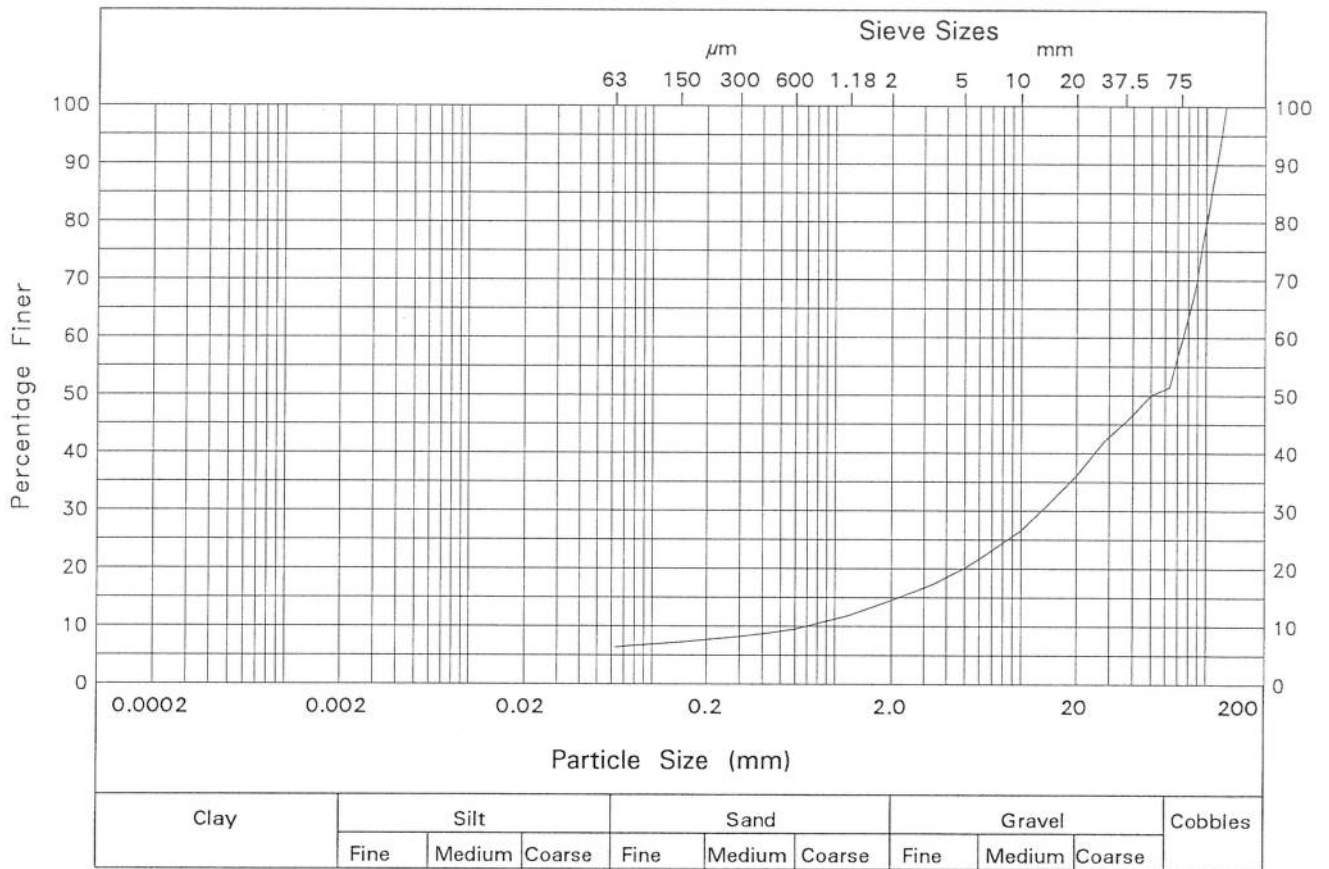
Remarks		Depth	3.50 - 4.50 m
		Borehole	110
Laboratory - Hydraulic Cell Consolidation Test	Project	Contract	KC3210
N6 Galway			
 Exploration Associates			



Particle Size	% Passing	Particle Size	% Passing
2 mm	100		
1.18 mm	100		
600 μm	100		
425 μm	100		
300 μm	100		
212 μm	100		
150 μm	100		
75 μm	99		
63 μm	98		
Hole BH39	Description SILT with rare sand		
Depth 3.50 -4.00			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot 	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
	Sheet	



Particle Size	% Passing	Particle Size	% Passing
90 mm	70	2 mm	15
75 mm	60	1.18 mm	12
63 mm	51	600 μm	10
50 mm	50	425 μm	9
37.5 mm	46	300 μm	8
28 mm	42	212 μm	8
20 mm	36	150 μm	7
14 mm	31	75 μm	7
10 mm	27	63 μm	6
6.3 mm	22		
5 mm	20		
3.35 mm	17		
Hole BH41	Description Clayey sandy GRAVEL		
Depth 2.50 -3.00			
Type B			
Test Performed Wet	Uniformity Coefficient = 125		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

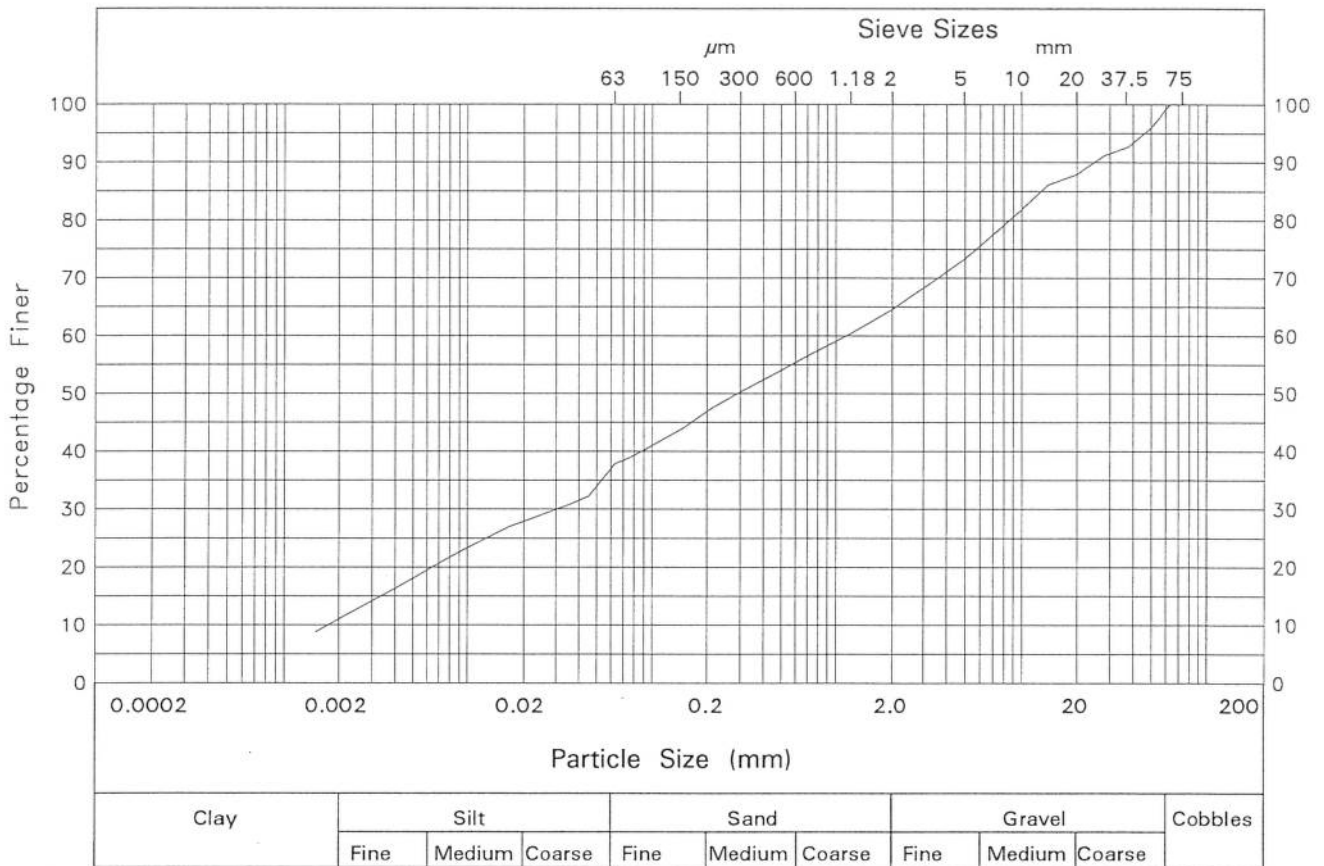
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
63 mm	100	600 μm	55
50 mm	96	425 μm	53
37.5 mm	93	300 μm	50
28 mm	91	212 μm	47
20 mm	88	150 μm	44
14 mm	86	75 μm	39
10 mm	82	63 μm	38
6.3 mm	76	45 μm	32
5 mm	73	35 μm	31
3.35 mm	69	17 μm	27
2 mm	65		
1.18 mm	60		
Hole BH44	Description Slightly sandy slightly gravelly to gravelly CLAY		
Depth 0.50 -1.00			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleva to Menlough
Galway County Council

Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
75 mm	100	1.18 mm	55
63 mm	97	600 µm	51
50 mm	95	425 µm	49
37.5 mm	93	300 µm	46
28 mm	86	212 µm	44
20 mm	83	150 µm	42
14 mm	78	75 µm	37
10 mm	74	63 µm	36
6.3 mm	69	46 µm	29
5 mm	66	24 µm	26
3.35 mm	63	13 µm	23
2 mm	59		
Hole BH50	Description Slightly sandy gravelly CLAY		
Depth 1.50 -2.00			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

Contract

KC3210

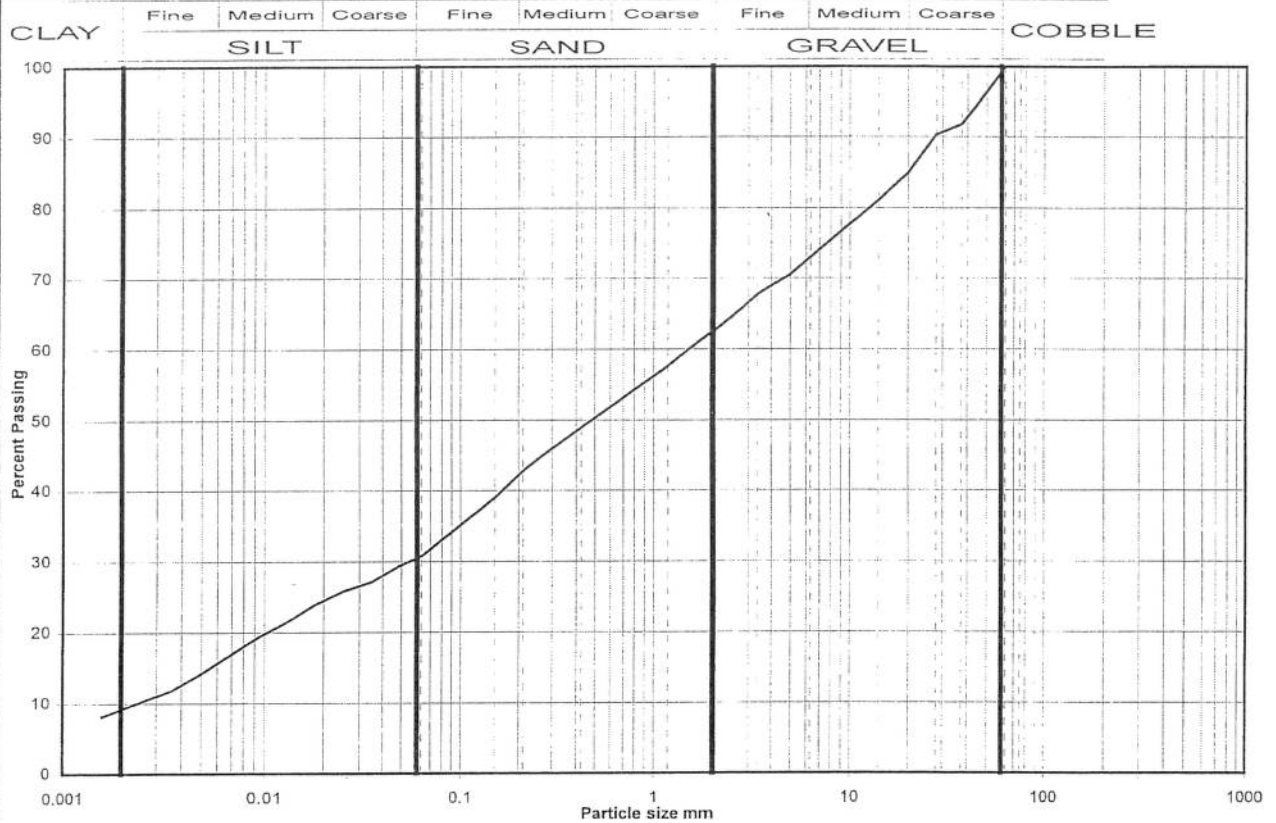


Exploration Associates

Sheet

Particle Size Distribution Analysis

Project No	KC3210	Sample Details:	Hole No	BH55A
Project Name	N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough		Depth (m BGL)	2.00
			No	
			Type	B
			ID	ESGN500077642

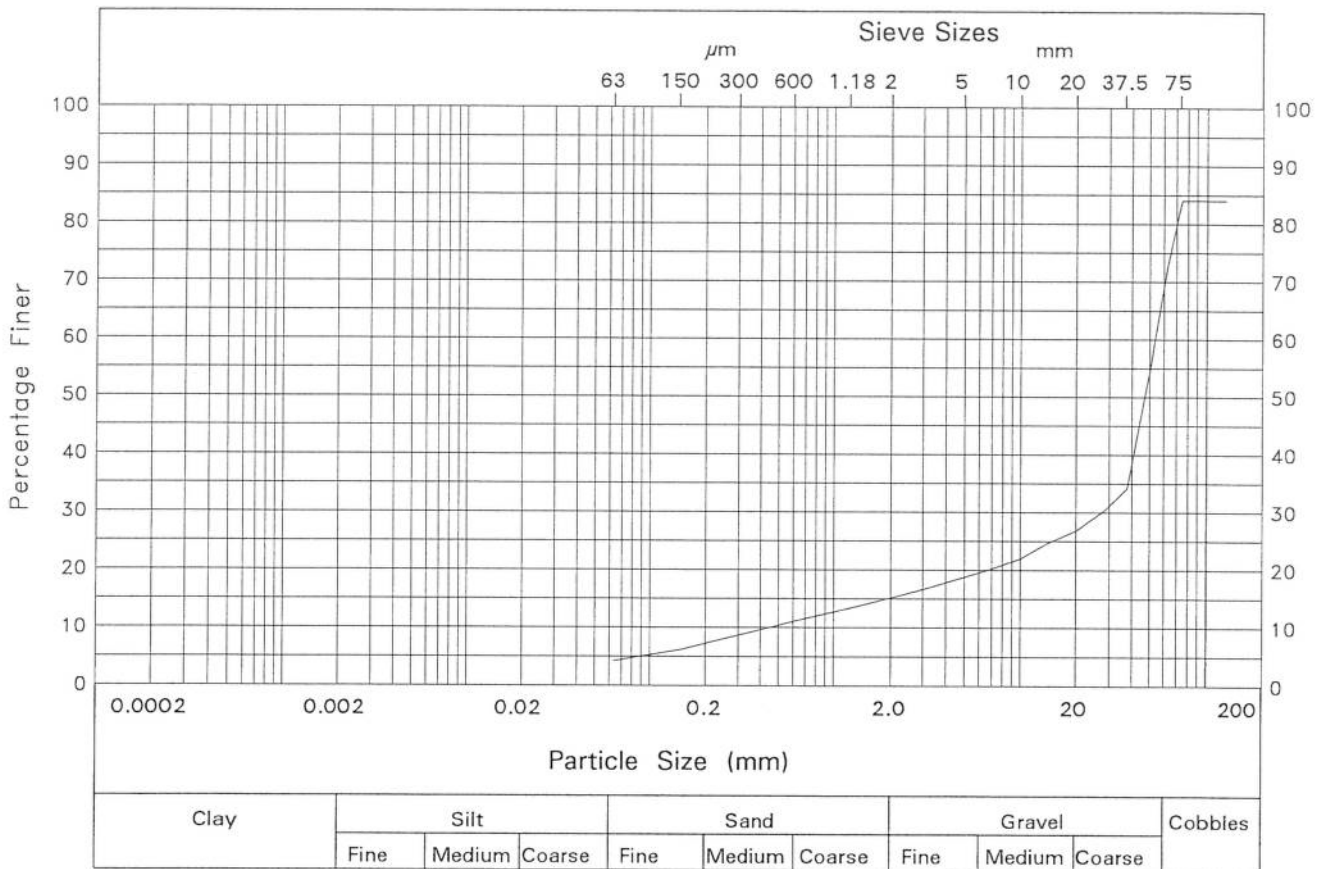


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0630	31
63	100	0.0488	29
50	96	0.0351	27
37.5	92	0.0251	26
28	90	0.0180	24
20	85	0.0096	20
14	81	0.0050	14
10	78	0.0036	12
6.3	73	0.0016	8
5.0	71		
3.35	68		
2.00	63		
1.18	58		
0.600	52		
0.425	49	Particle density, Mg/m ³	
0.300	46	2.65 assumed	
0.212	43	Dry mass of sample, kg	
0.150	39	9.4	
0.063	31		

Soil description	Grey sandy gravelly CLAY. Gravel is fine to coarse. Sand is fine to medium.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions	Cobbles / boulders		1
	Gravel		36
	Sand		32
	Silt		22
	Clay		9

Uniformity Coefficient	D ₆₀ / D ₁₀	638
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Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer



Particle Size	% Passing	Particle Size	% Passing
90 mm	84	2 mm	15
75 mm	84	1.18 mm	13
63 mm	73	600 μm	11
50 mm	54	425 μm	10
37.5 mm	34	300 μm	9
28 mm	30	212 μm	7
20 mm	27	150 μm	6
14 mm	25	75 μm	5
10 mm	22	63 μm	4
6.3 mm	20		
5 mm	19		
3.35 mm	17		
Hole BH64	Description Slightly silty sandy GRAVEL		
Depth 1.50 -2.00			
Type B			
Test Performed Wet	Uniformity Coefficient = 127		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleva to Menlough
Galway County Council

Contract

KC3210



Exploration Associates

Sheet

Particle Size Distribution Analysis

Project No	KC3210	Sample Details:	Hole No	BH110
Project Name	N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough		Depth (m BGL)	3.50 - 4.50
			No	11
			Type	P
			ID	ESGN500077149



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0630	58
63	100	0.0528	57
50	100	0.0375	56
37.5	100	0.0267	53
28	100	0.0191	48
20	100	0.0102	35
14	100	0.0053	15
10	100	0.0038	12
6.3	100	0.0017	9
5.0	100		
3.35	99		
2.00	93		
1.18	84		
0.600	75		
0.425	72	Particle density, Mg/m3	
0.300	69	2.65 assumed	
0.212	67	Dry mass of sample, kg	
0.150	64	0.7	
0.063	58		

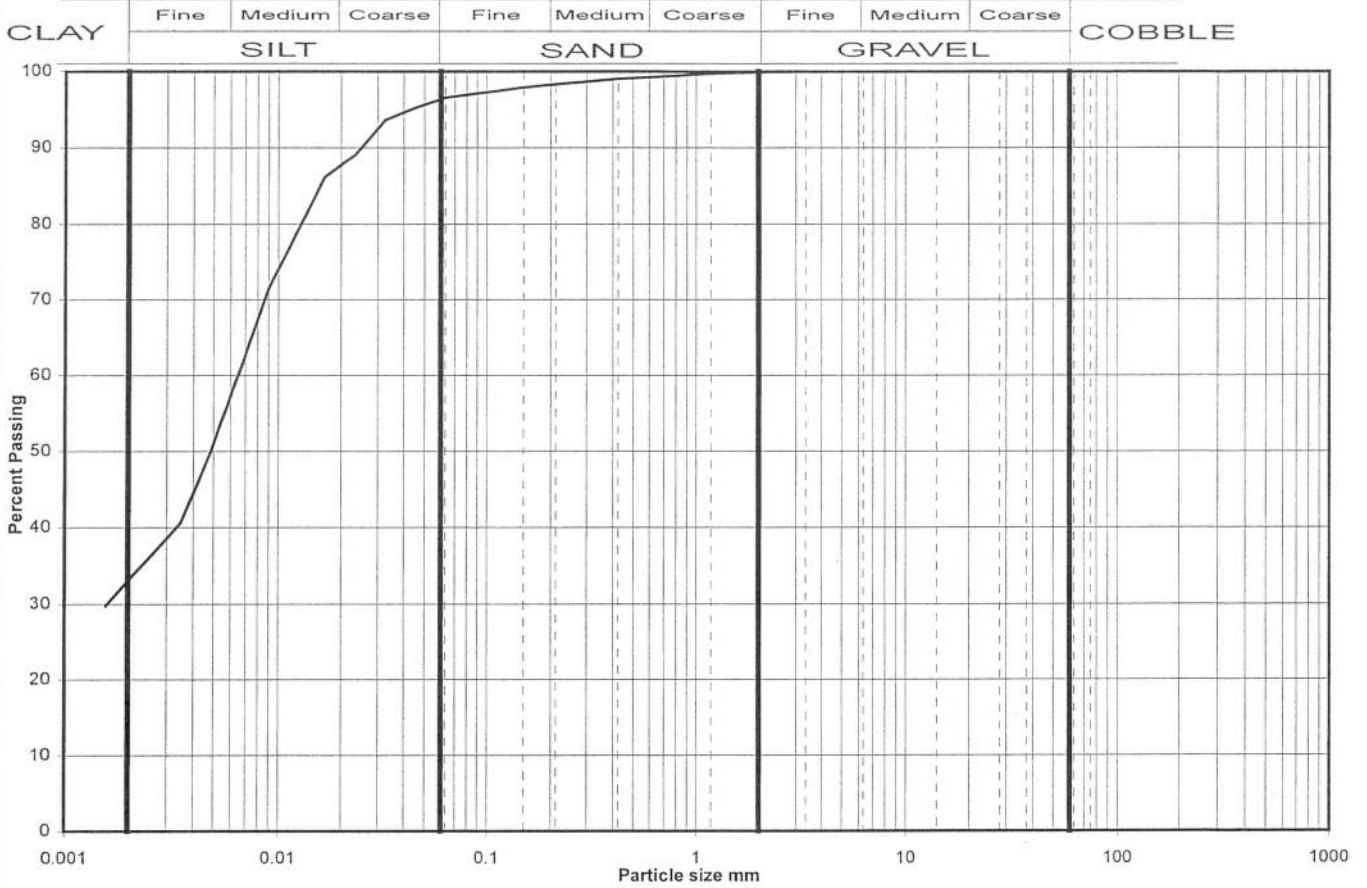
Soil description	Soft brownish grey organic CLAY with fine rootlets and plant remains.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions	Cobbles / boulders		0
	Gravel		7
	Sand		35
	Silt		48
	Clay		10

Uniformity Coefficient	D_{60} / D_{10}	39
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Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

Particle Size Distribution Analysis

Project No	KC3210	Sample Details:	Hole No	BH110
Project Name	N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough		Depth (m BGL)	6.50 - 7.50
			No	16
			Type	P
			ID	ESGN500077151

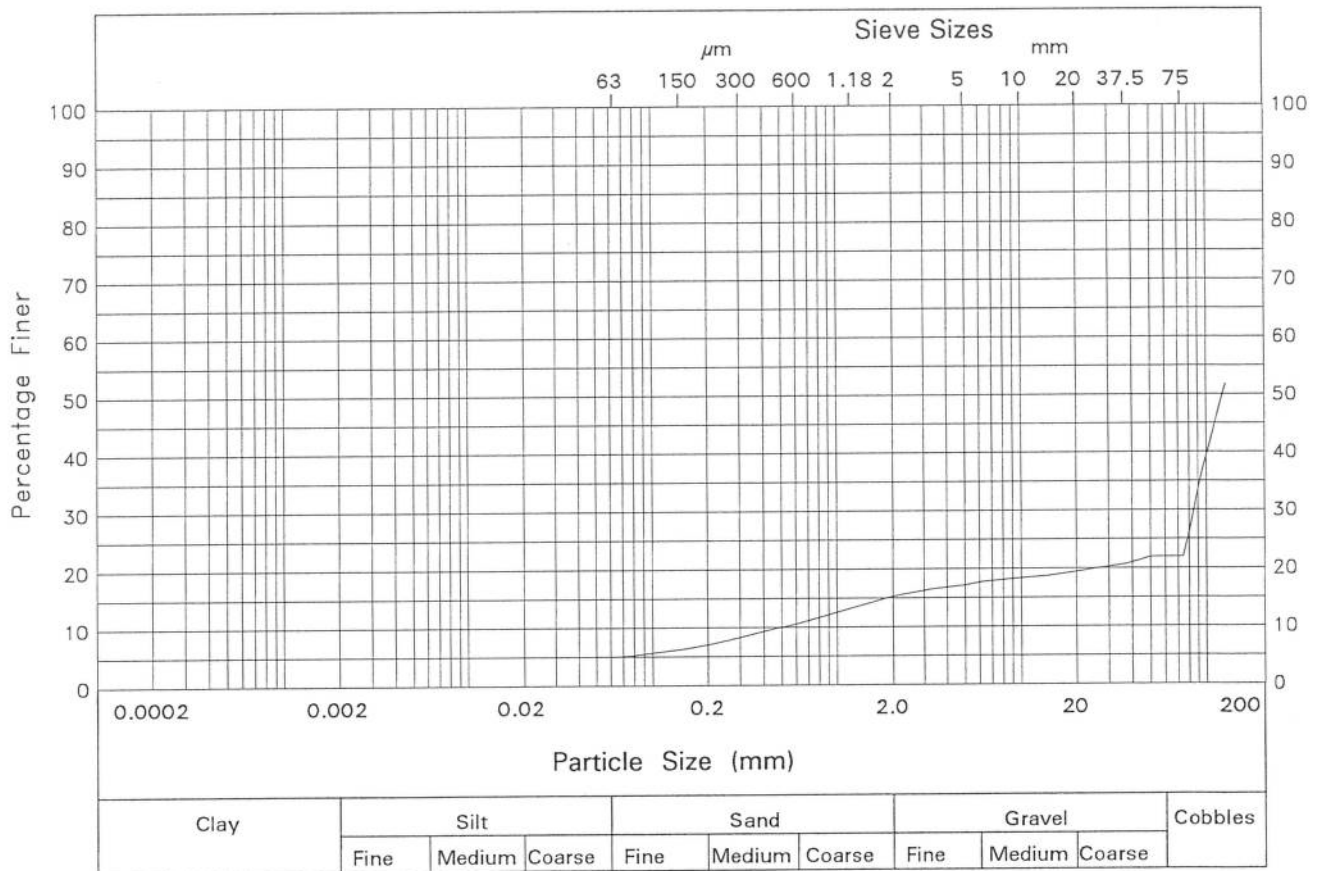


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0630	97
63	100	0.0458	95
50	100	0.0326	94
37.5	100	0.0234	89
28	100	0.0167	86
20	100	0.0091	72
14	100	0.0048	50
10	100	0.0035	41
6.3	100	0.0016	30
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	99		
0.425	99	Particle density, Mg/m ³ 2.65 assumed	
0.300	99		
0.212	98	Dry mass of sample, kg 1.6	
0.150	98		
0.063	97		

Soil description	Soft uncompact light grey slightly clayey SILT.	
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377	
Remarks		
Sample Proportions	Cobbles / boulders	0
	Gravel	0
	Sand	4
	Silt	63
	Clay	33


Uniformity Coefficient	D_{60} / D_{10}	#N/A
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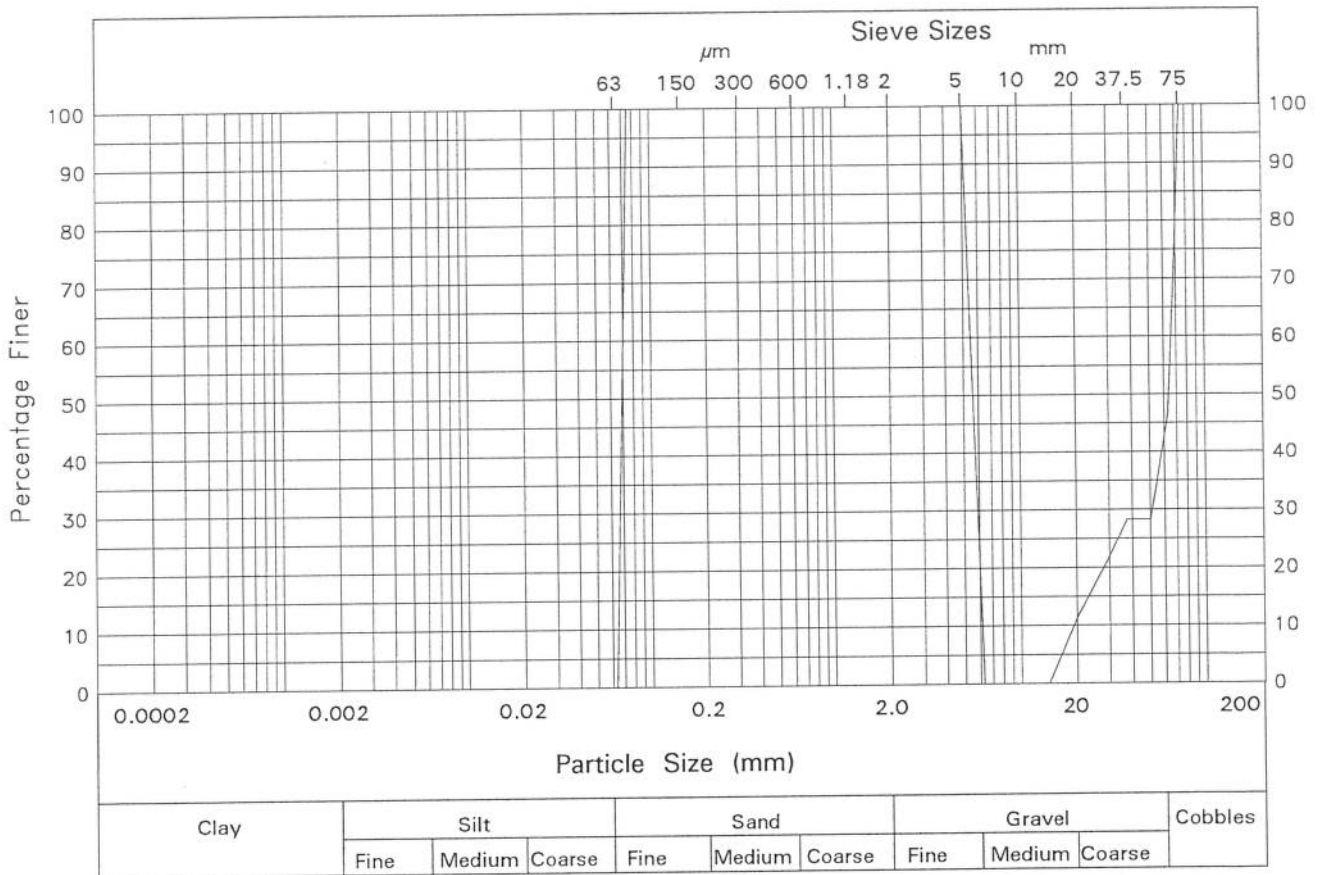
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer



Particle Size	% Passing	Particle Size	% Passing
90 mm	34	2 mm	15
75 mm	22	1.18 mm	13
63 mm	22	600 μm	11
50 mm	22	425 μm	10
37.5 mm	21	300 μm	8
28 mm	20	212 μm	7
20 mm	19	150 μm	6
14 mm	19	75 μm	5
10 mm	18	63 μm	5
6.3 mm	18		
5 mm	17		
3.35 mm	17		
Hole BH114	Description Silty sandy GRAVEL		
Depth 0.20 -0.60			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

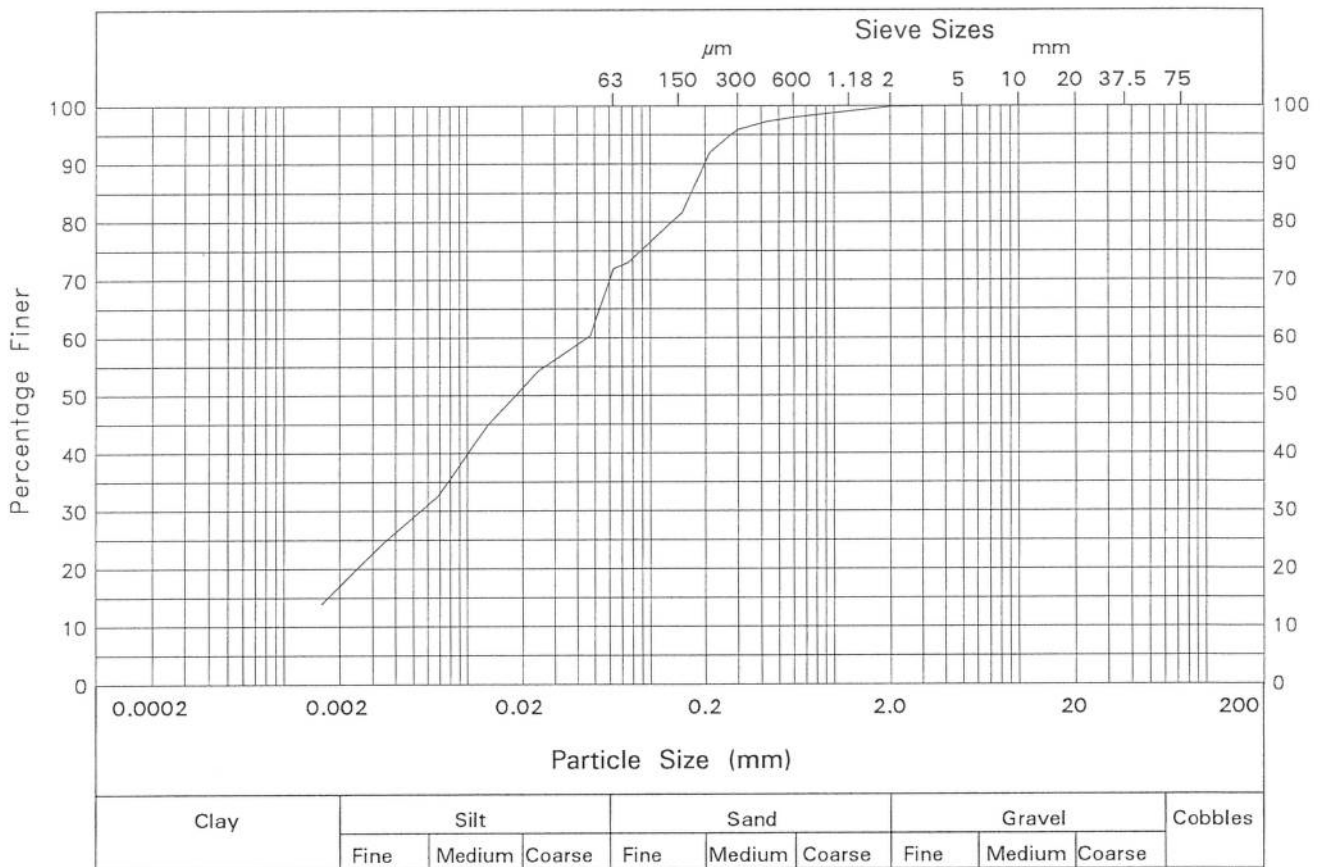
Laboratory - Particle Size Plot  Exploration Associates	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
	Sheet	



Particle Size	% Passing	Particle Size	% Passing
75 mm	100	1.18 mm	0
63 mm	47	600 μm	0
50 mm	28	425 μm	0
37.5 mm	28	300 μm	0
28 mm	20	212 μm	0
20 mm	11	150 μm	0
14 mm	0	75 μm	0
10 mm	0	63 μm	0
6.3 mm	0		
5 mm	0		
3.35 mm	0		
2 mm	0		
Hole BH145A	Description GRAVEL		
Depth 0.50 -1.00			
Type B			
Test Performed Dry	Uniformity Coefficient = 3.4		

Form 25/4

Laboratory - Particle Size Plot 	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Galway County Council	Contract KC3210
	Sheet	



Particle Size	% Passing	Particle Size	% Passing
6.3 mm	100	47 μ m	60
5 mm	100	24 μ m	54
3.35 mm	100	13 μ m	45
2 mm	100		
1.18 mm	99		
600 μ m	98		
425 μ m	97		
300 μ m	96		
212 μ m	92		
150 μ m	82		
75 μ m	73		
63 μ m	72		
Hole BH145A	Description Slightly sandy SILT		
Depth 5.50 -5.95			
Type D			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleva to Menlough
Galway County Council

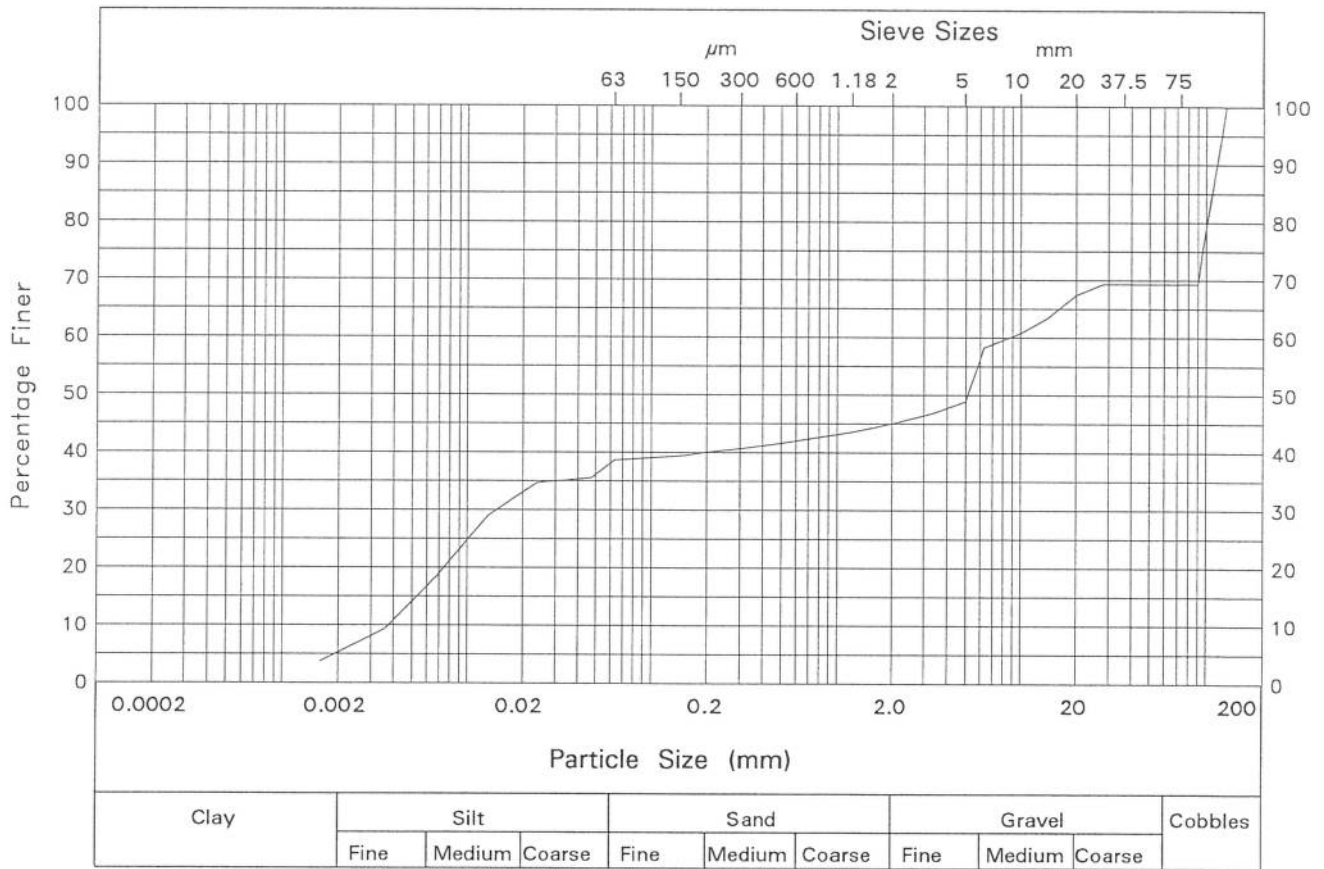
Contract

KC3210



Exploration Associates

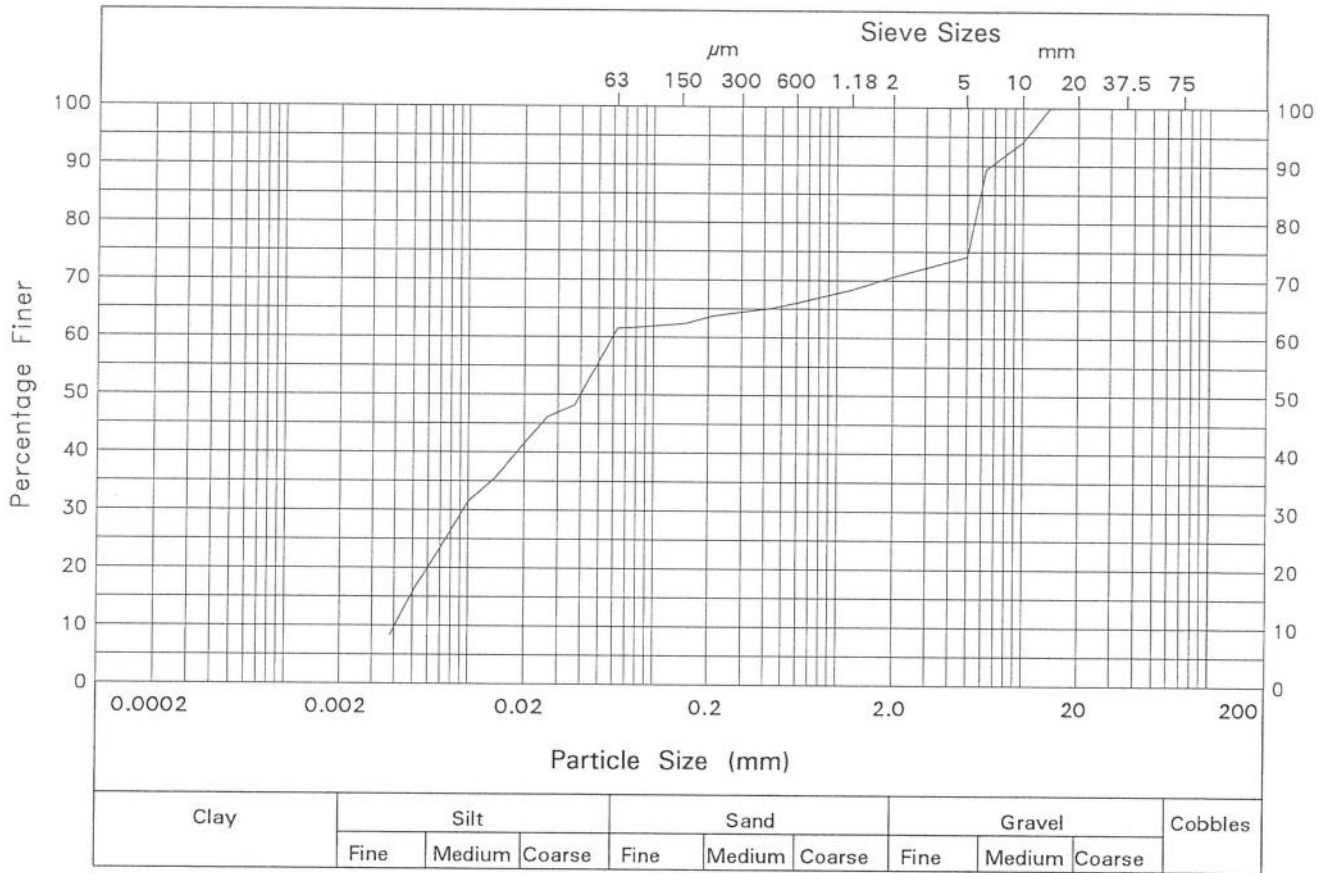
Sheet



Particle Size	% Passing	Particle Size	% Passing
90 mm	69	2 mm	45
75 mm	69	1.18 mm	44
63 mm	69	600 μm	42
50 mm	69	425 μm	41
37.5 mm	69	300 μm	41
28 mm	69	212 μm	40
20 mm	67	150 μm	39
14 mm	63	75 μm	39
10 mm	61	63 μm	39
6.3 mm	58	47 μm	36
5 mm	49	24 μm	35
3.35 mm	47	13 μm	29
Hole TP34	Description Slightly sandy gravelly CLAY		
Depth 1.40 -1.60			
Type B			
Test Performed Dry	Uniformity Coefficient not applicable.		


Form 25/4

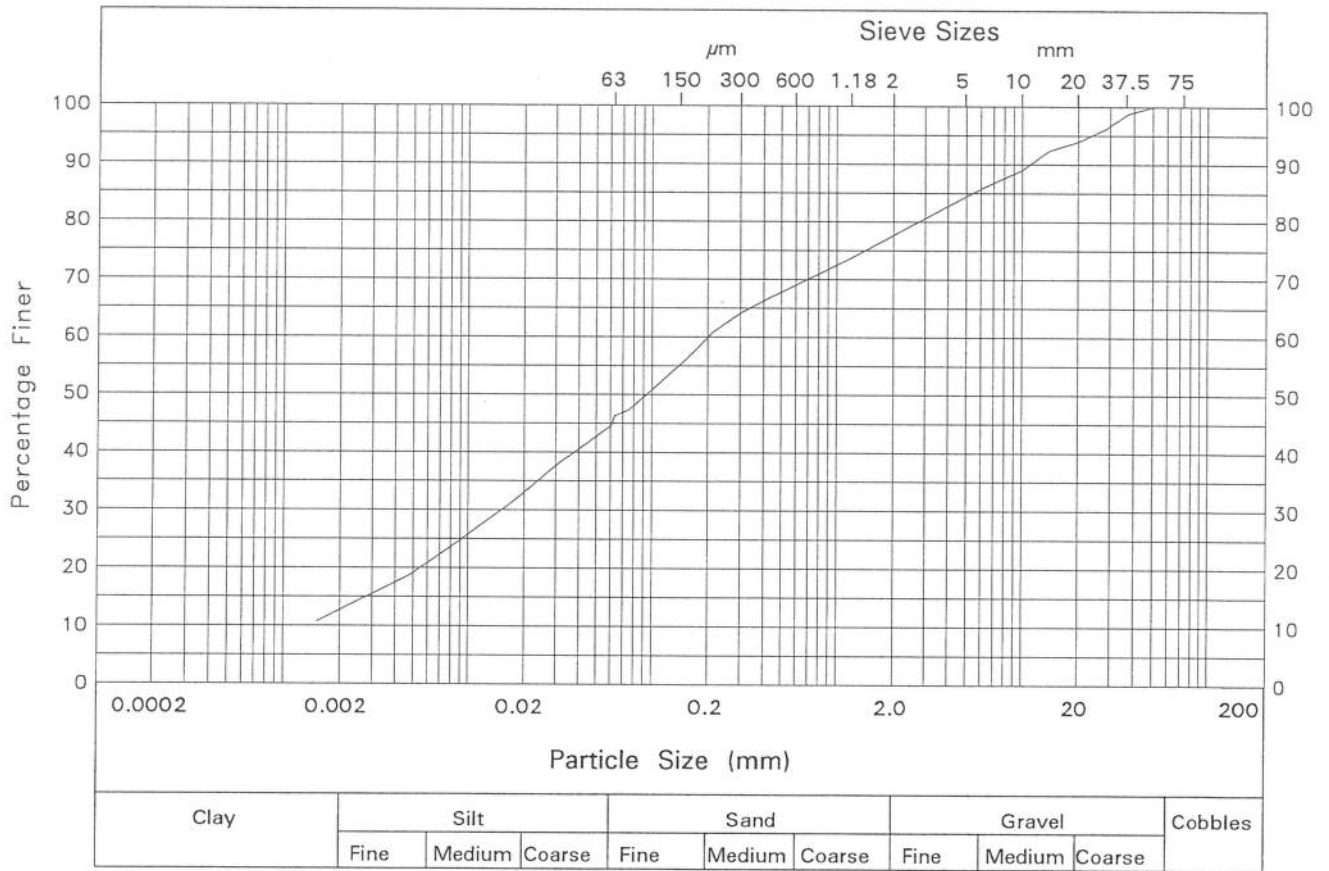
Laboratory - Particle Size Plot 	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
	Sheet	



Particle Size	% Passing	Particle Size	% Passing
14 mm	100	75 μm	62
10 mm	94	63 μm	61
6.3 mm	89	37 μm	48
5 mm	74	26 μm	46
3.35 mm	73	14 μm	36
2 mm	71		
1.18 mm	68		
600 μm	66		
425 μm	65		
300 μm	64		
212 μm	64		
150 μm	62		
Hole TP40	Description Slightly sandy slightly gravelly organic SILT		
Depth 2.80			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot  Exploration Associates	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
	Sheet	



Particle Size	% Passing	Particle Size	% Passing
50 mm	100	425 µm	67
37.5 mm	99	300 µm	64
28 mm	96	212 µm	61
20 mm	94	150 µm	56
14 mm	92	75 µm	47
10 mm	89	63 µm	46
6.3 mm	86	61 µm	45
5 mm	84	32 µm	38
3.35 mm	81	17 µm	31
2 mm	78		
1.18 mm	74		
600 µm	69		
Hole TP56	Description Slightly sandy slightly gravelly CLAY		
Depth 1.50 -2.00			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleava to Menlough
Galway County Council

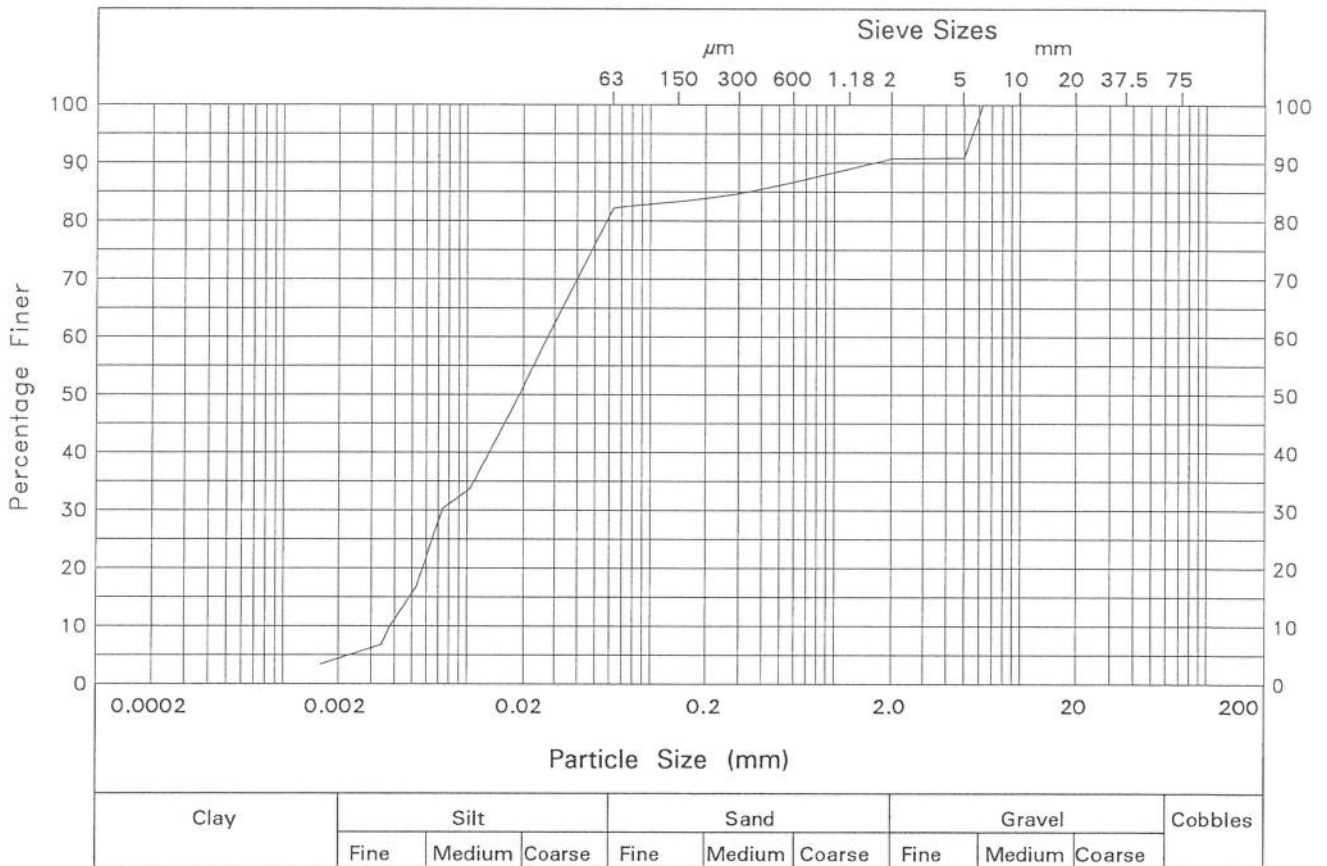
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
6.3 mm	100	10 µm	34
5 mm	91	7 µm	30
3.35 mm	91	5 µm	17
2 mm	91		
1.18 mm	89		
600 µm	87		
425 µm	86		
300 µm	85		
212 µm	84		
150 µm	83		
75 µm	83		
63 µm	82		
Hole TP104	Description Slightly sandy slightly gravelly organic SILT		
Depth 3.40			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

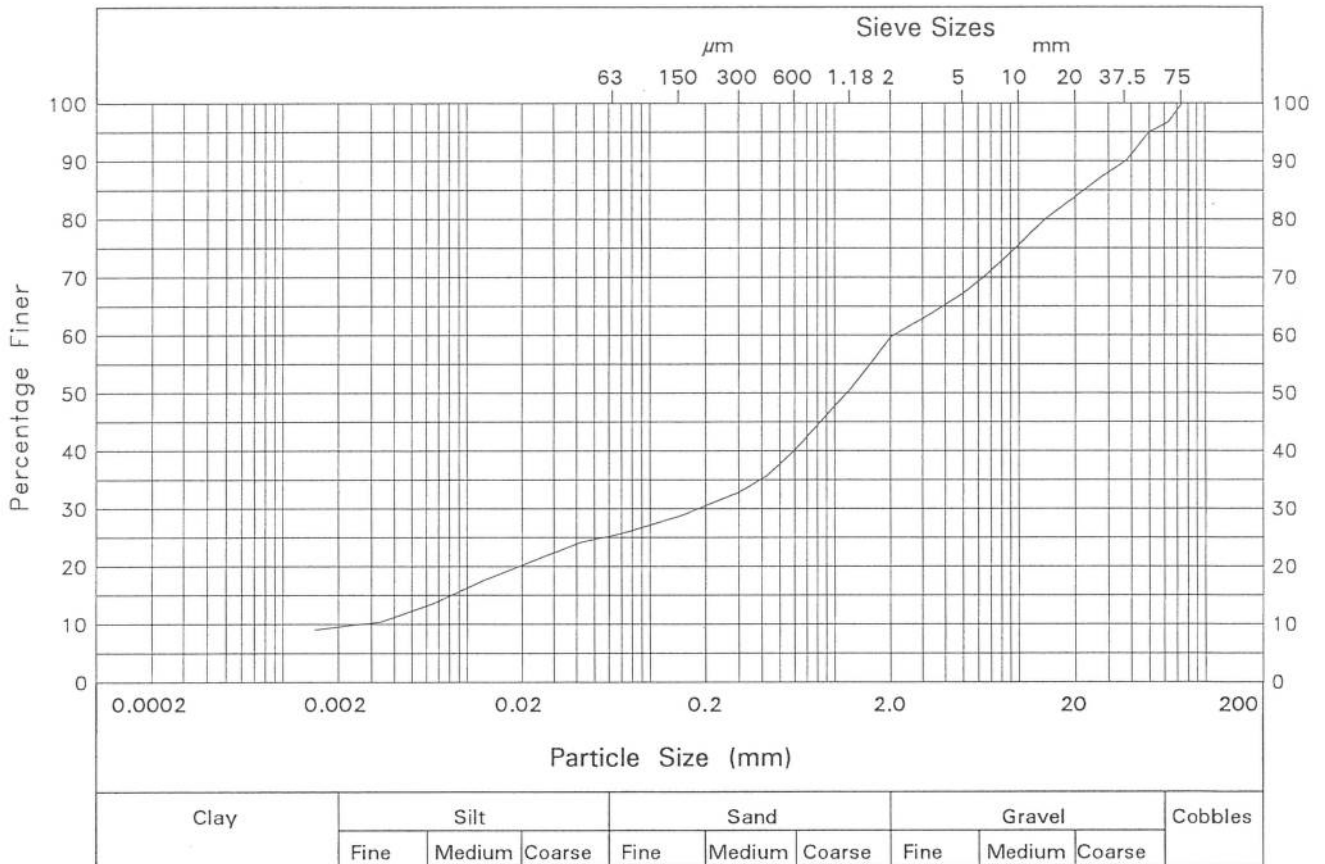
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
75 mm	100	1.18 mm	50
63 mm	97	600 μm	40
50 mm	95	425 μm	36
37.5 mm	90	300 μm	33
28 mm	87	212 μm	31
20 mm	84	150 μm	29
14 mm	80	75 μm	26
10 mm	75	63 μm	25
6.3 mm	70	43 μm	24
5 mm	67	23 μm	21
3.35 mm	64	12 μm	18
2 mm	60		
Hole TP113	Description Slightly sandy gravelly CLAY		
Depth 1.40			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleva to Menlough
Galway County Council

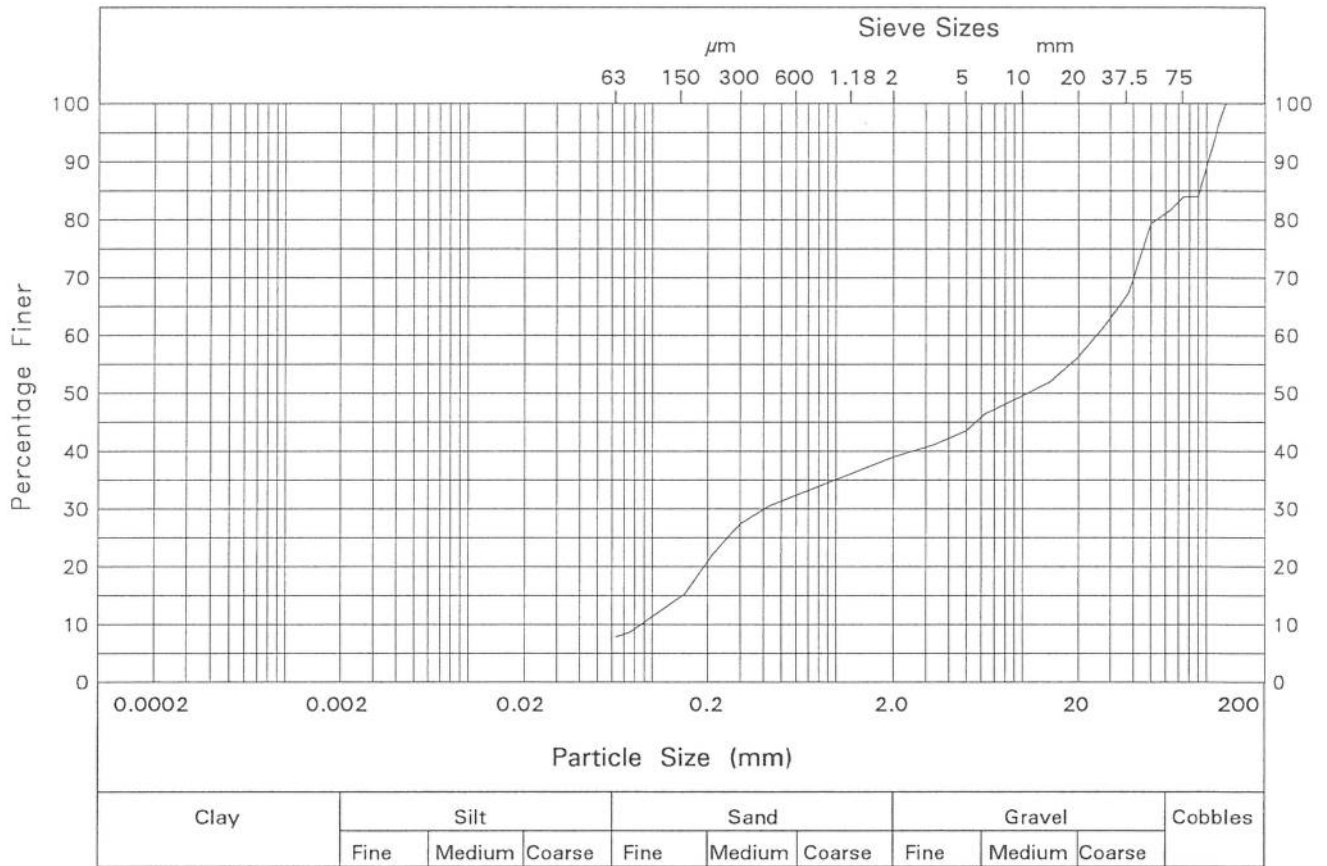
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
90 mm	84	2 mm	39
75 mm	84	1.18 mm	36
63 mm	82	600 µm	32
50 mm	79	425 µm	30
37.5 mm	67	300 µm	27
28 mm	62	212 µm	22
20 mm	56	150 µm	15
14 mm	52	75 µm	9
10 mm	50	63 µm	8
6.3 mm	46		
5 mm	44		
3.35 mm	41		
Hole TP121	Description Clayey very sandy GRAVEL		
Depth 1.00 - 1.30			
Type B			
Test Performed Dry	Uniformity Coefficient = 302		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

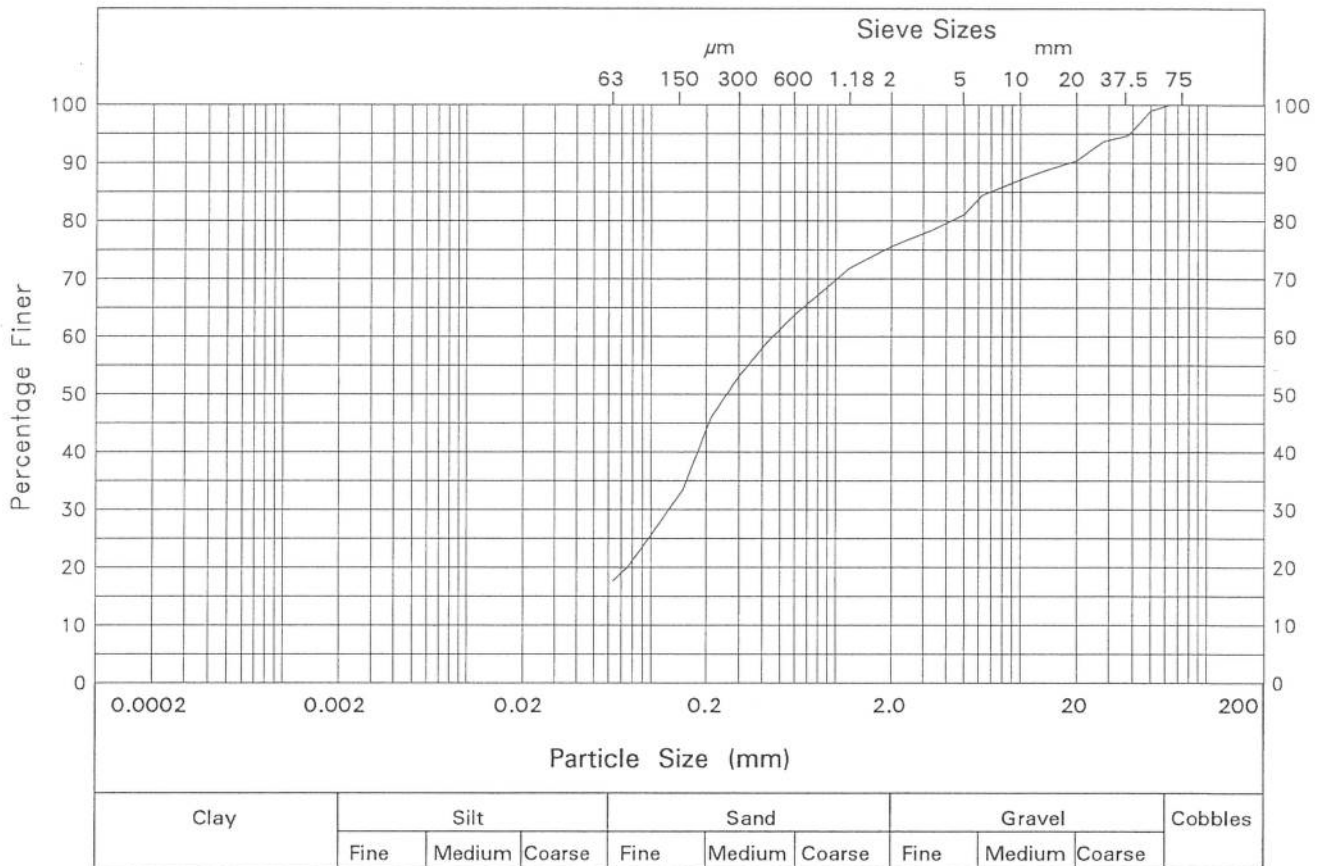
Contract

KC3210

Sheet




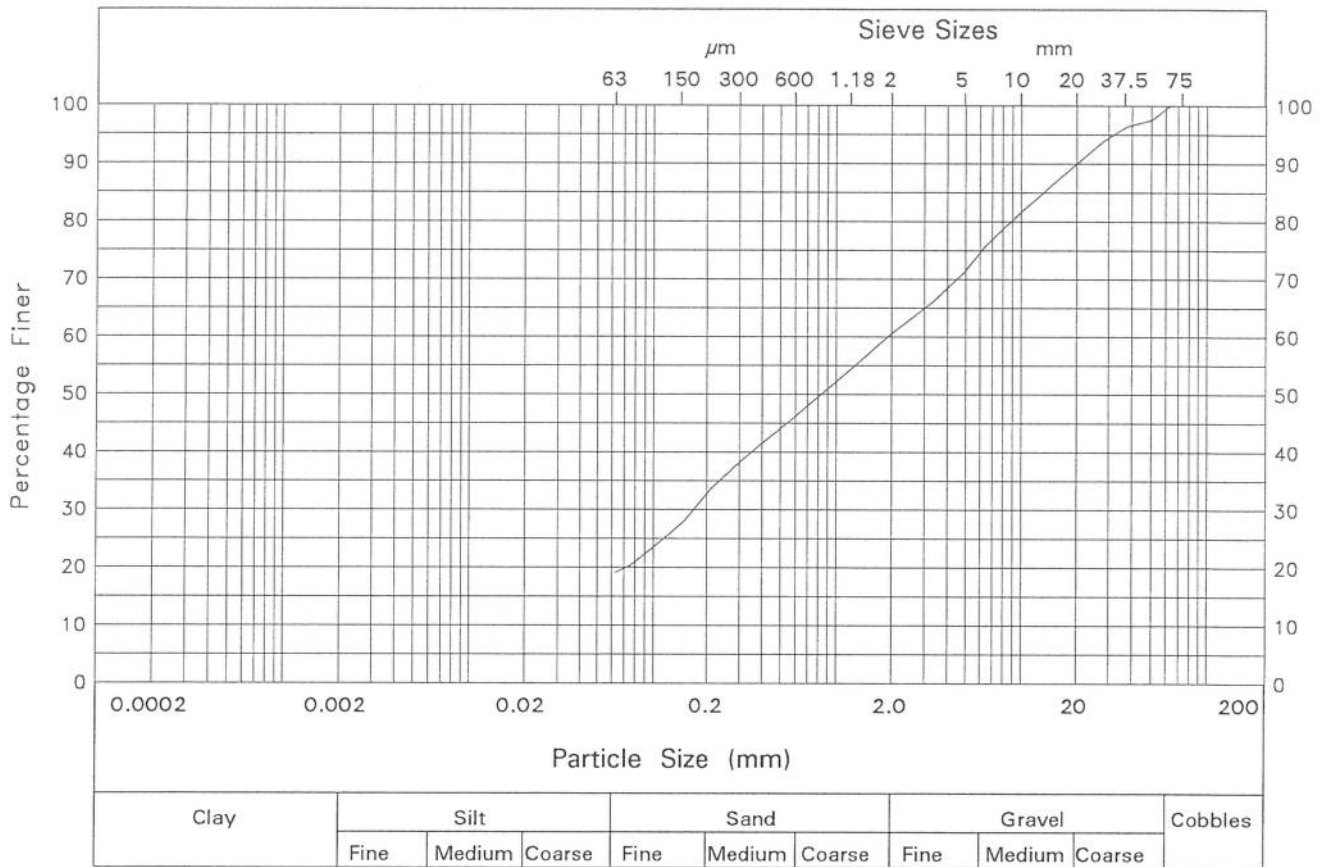
Exploration Associates



Particle Size	% Passing	Particle Size	% Passing
63 mm	100	600 μm	64
50 mm	99	425 μm	59
37.5 mm	95	300 μm	53
28 mm	94	212 μm	46
20 mm	90	150 μm	33
14 mm	89	75 μm	20
10 mm	87	63 μm	18
6.3 mm	84		
5 mm	81		
3.35 mm	78		
2 mm	76		
1.18 mm	72		
Hole TP123	Description Clayey very gravelly SAND		
Depth 1.50 -1.80			
Type B			
Test Performed Dry	Uniformity Coefficient not applicable.		

Form 25/4

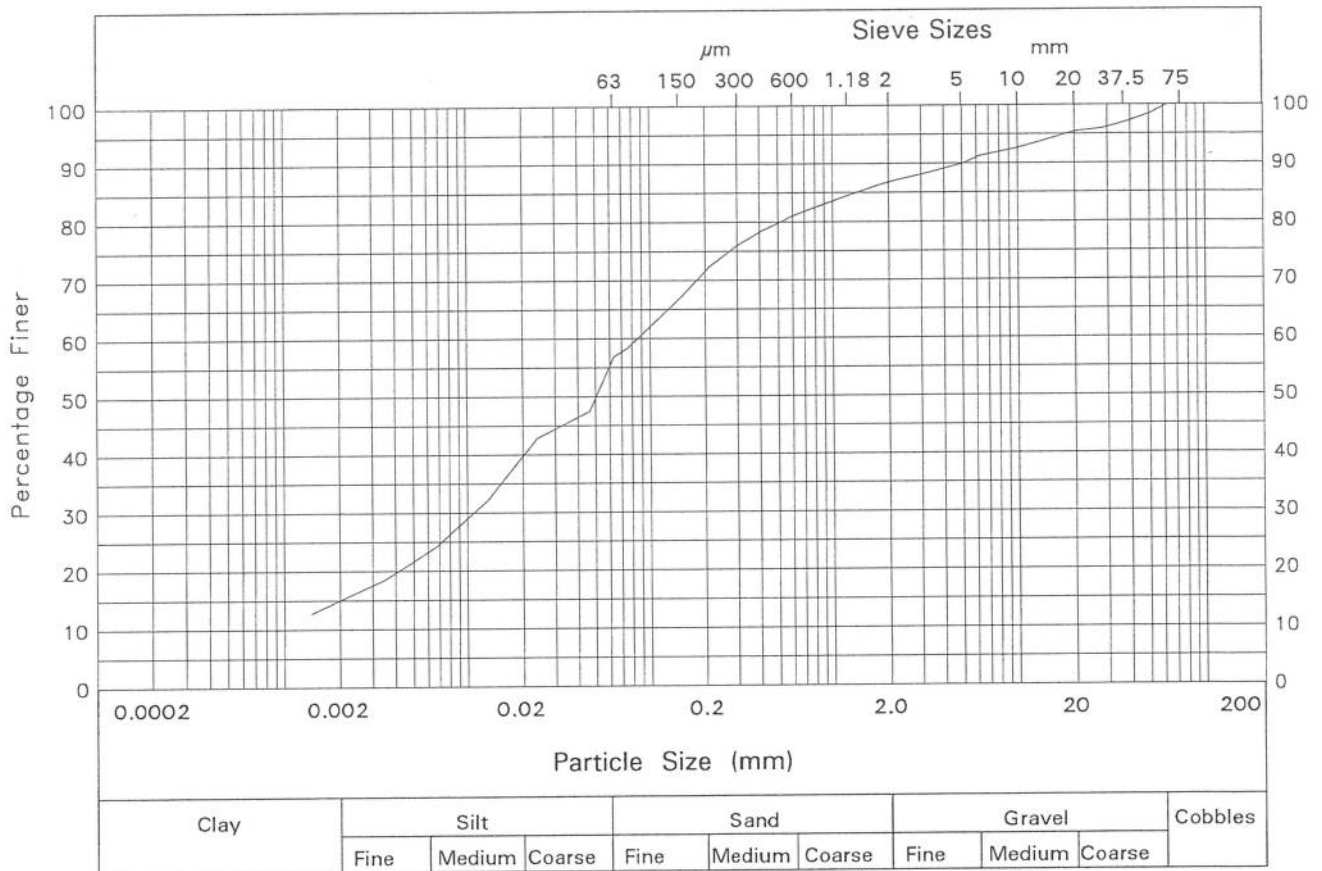
Laboratory - Particle Size Plot  Exploration Associates	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
	Sheet	



Particle Size	% Passing	Particle Size	% Passing
63 mm	100	600 μm	46
50 mm	98	425 μm	42
37.5 mm	96	300 μm	38
28 mm	94	212 μm	34
20 mm	90	150 μm	28
14 mm	86	75 μm	20
10 mm	82	63 μm	19
6.3 mm	75		
5 mm	71		
3.35 mm	66		
2 mm	61		
1.18 mm	54		
Hole TP125	Description Very clayey SAND and GRAVEL		
Depth 1.50 -1.70			
Type B			
Test Performed Dry	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot 	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleava to Menlough Galway County Council	Contract KC3210
	Sheet	

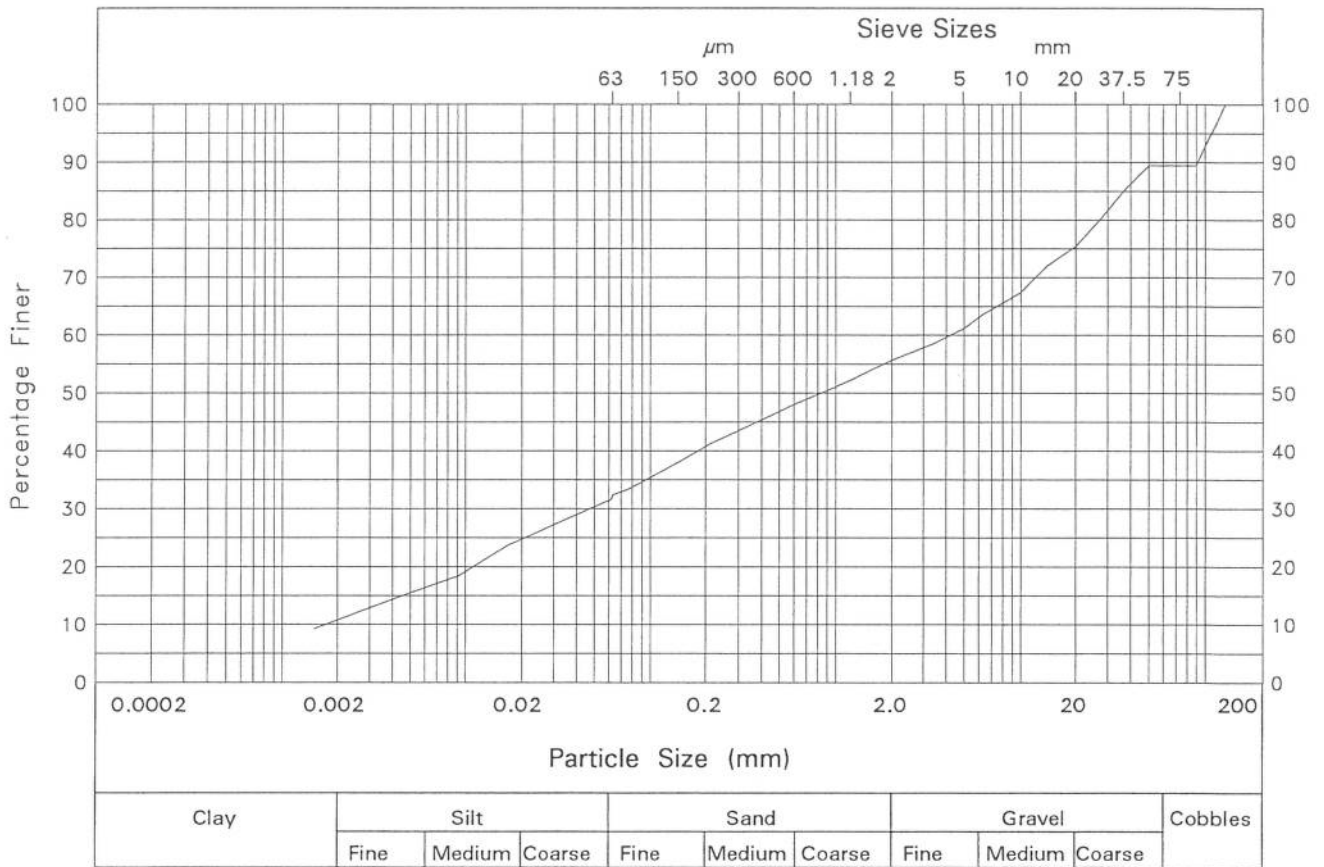


Particle Size	% Passing	Particle Size	% Passing
63 mm	100	600 μm	81
50 mm	98	425 μm	79
37.5 mm	97	300 μm	76
28 mm	96	212 μm	72
20 mm	95	150 μm	67
14 mm	94	75 μm	58
10 mm	93	63 μm	57
6.3 mm	91	46 μm	47
5 mm	90	24 μm	43
3.35 mm	88	13 μm	32
2 mm	87		
1.18 mm	84		

Hole TP127A	Description slightly sandy slightly gravelly CLAY
Depth 0.50 -0.80	
Type B	
Test Performed Wet	Uniformity Coefficient not applicable.

Form 25/4

Laboratory - Particle Size Plot 	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Galway County Council	Contract KC3210
		Sheet



Particle Size	% Passing	Particle Size	% Passing
90 mm	89	2 mm	56
75 mm	89	1.18 mm	52
63 mm	89	600 μm	48
50 mm	89	425 μm	46
37.5 mm	85	300 μm	44
28 mm	81	212 μm	41
20 mm	75	150 μm	38
14 mm	72	75 μm	33
10 mm	67	63 μm	32
6.3 mm	64	62 μm	32
5 mm	61	33 μm	28
3.35 mm	58	17 μm	24

Hole TP127B	Description Slightly sandy gravelly CLAY
Depth 0.50 -1.00	
Type B	
Test Performed Wet	Uniformity Coefficient not applicable.

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

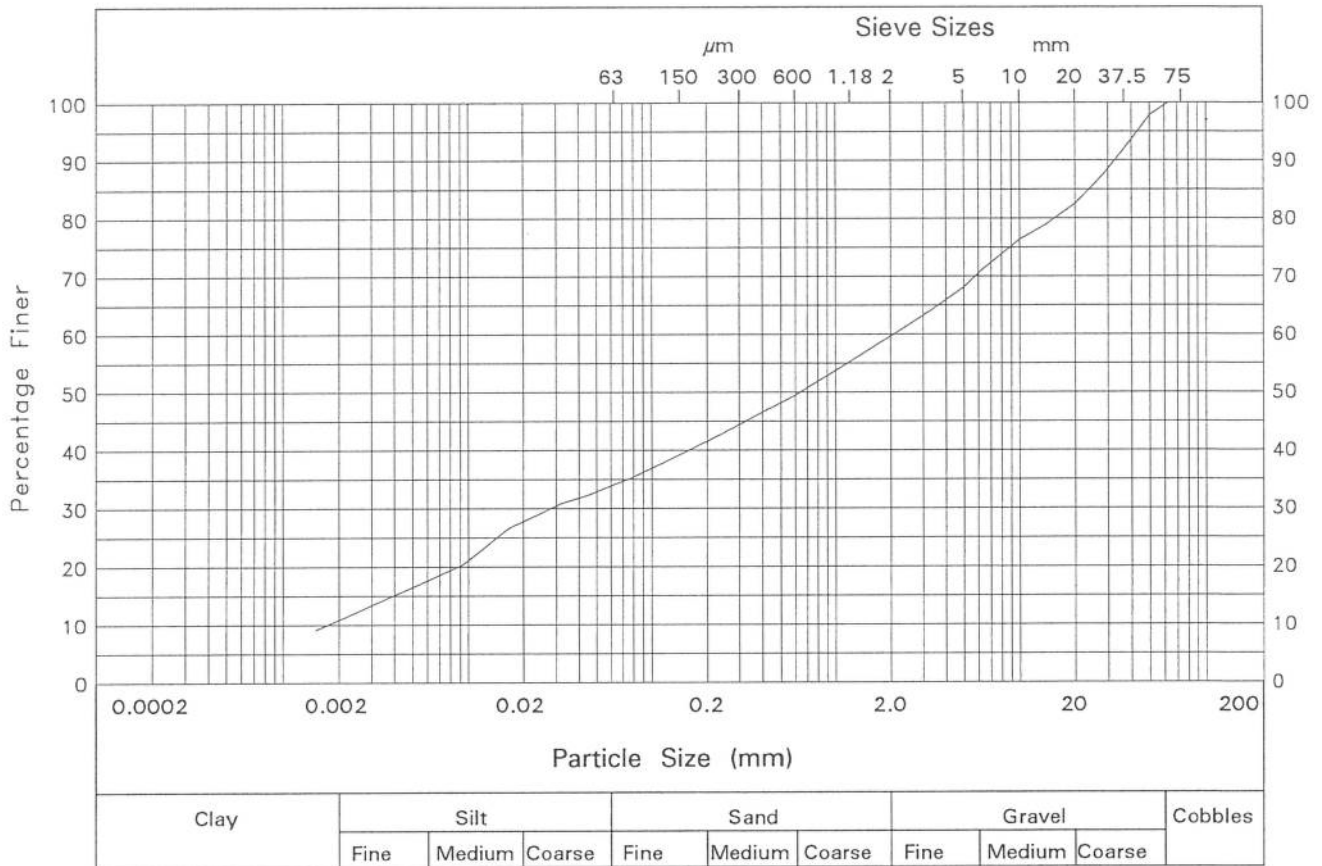
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
63 mm	100	600 µm	49
50 mm	98	425 µm	47
37.5 mm	92	300 µm	44
28 mm	87	212 µm	42
20 mm	83	150 µm	40
14 mm	79	75 µm	35
10 mm	76	63 µm	34
6.3 mm	71	45 µm	32
5 mm	68	32 µm	31
3.35 mm	64	17 µm	27
2 mm	60		
1.18 mm	55		

Hole TP128	Description Slightly sandy gravelly CLAY
Depth 0.20 -0.30	
Type B	
Test Performed Wet	Uniformity Coefficient not applicable.

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleva to Menlough
Galway County Council

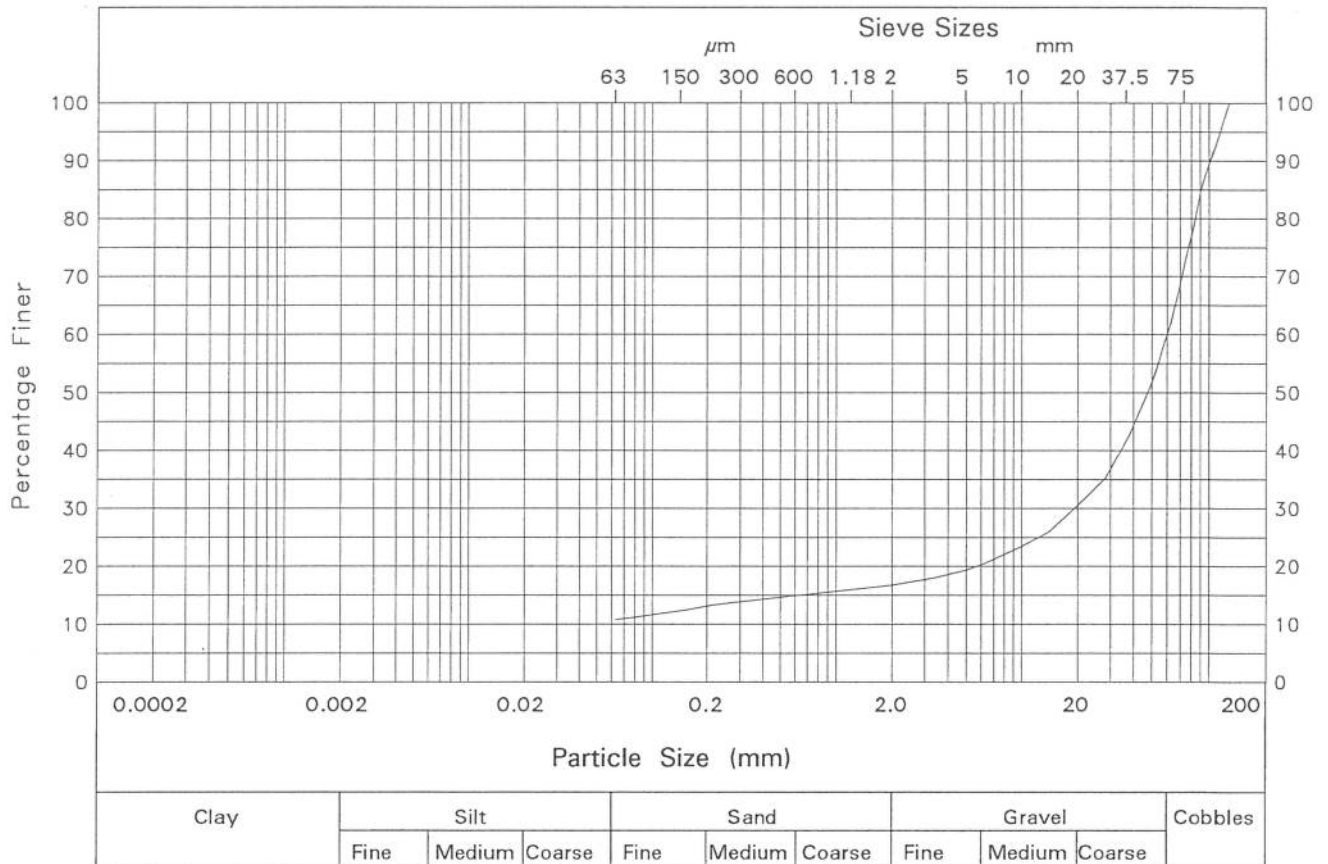
Contract

KC3210



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Sheet



Particle Size	% Passing	Particle Size	% Passing
90 mm	85	2 mm	17
75 mm	73	1.18 mm	16
63 mm	62	600 μm	15
50 mm	52	425 μm	14
37.5 mm	42	300 μm	14
28 mm	35	212 μm	13
20 mm	31	150 μm	12
14 mm	26	75 μm	11
10 mm	23	63 μm	11
6.3 mm	21		
5 mm	19		
3.35 mm	18		
Hole TP134	Description Clayey sandy GRAVEL		
Depth 0.50 -0.80			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

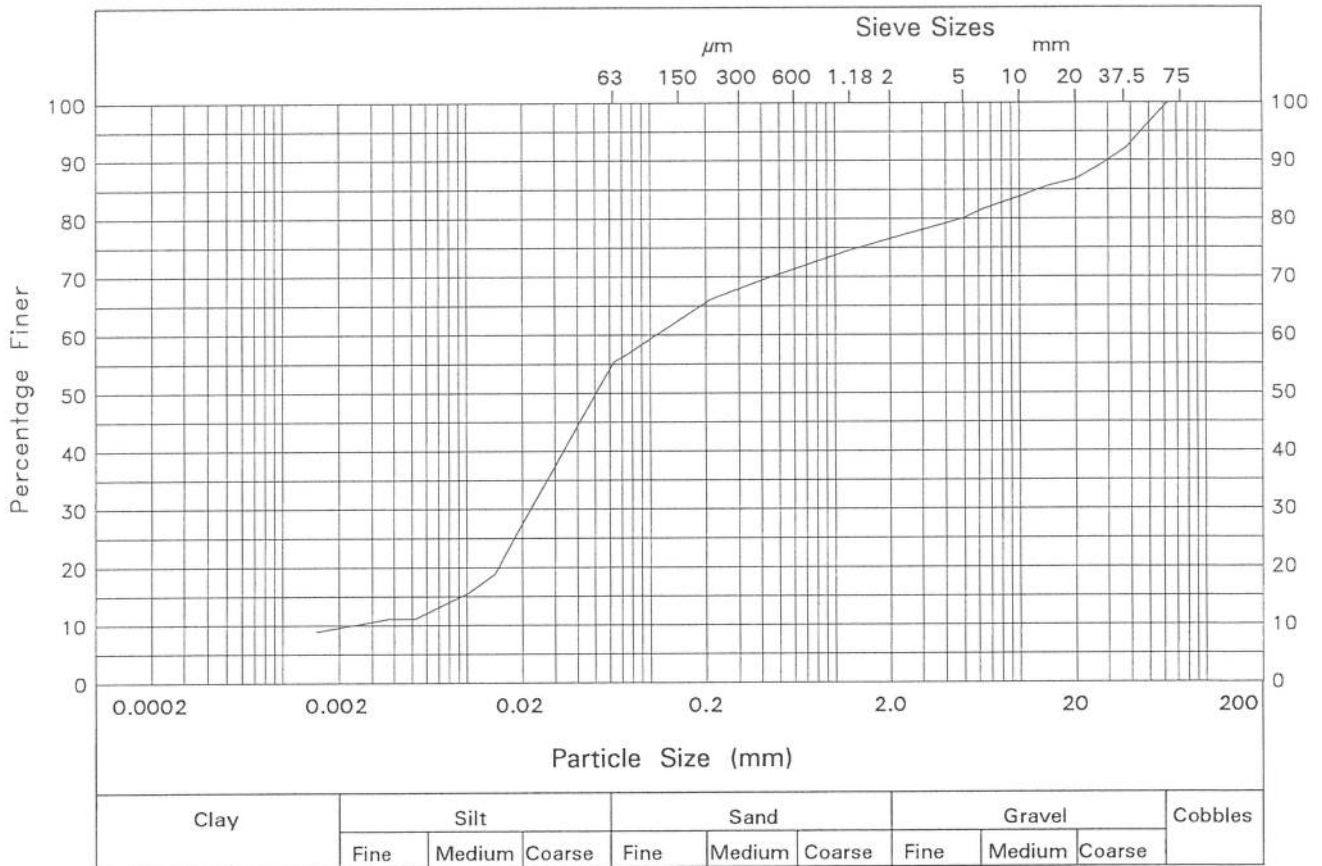
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
63 mm	100	600 μm	71
50 mm	97	425 μm	70
37.5 mm	92	300 μm	68
28 mm	89	212 μm	66
20 mm	87	150 μm	63
14 mm	86	75 μm	57
10 mm	84	63 μm	55
6.3 mm	82	14 μm	19
5 mm	80	10 μm	16
3.35 mm	78	7 μm	13
2 mm	77		
1.18 mm	75		

Hole TP134A	Description Slightly sandy slightly gravelly CLAY
Depth 0.50 -1.00	
Type B	
Test Performed Wet	Uniformity Coefficient not applicable.

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

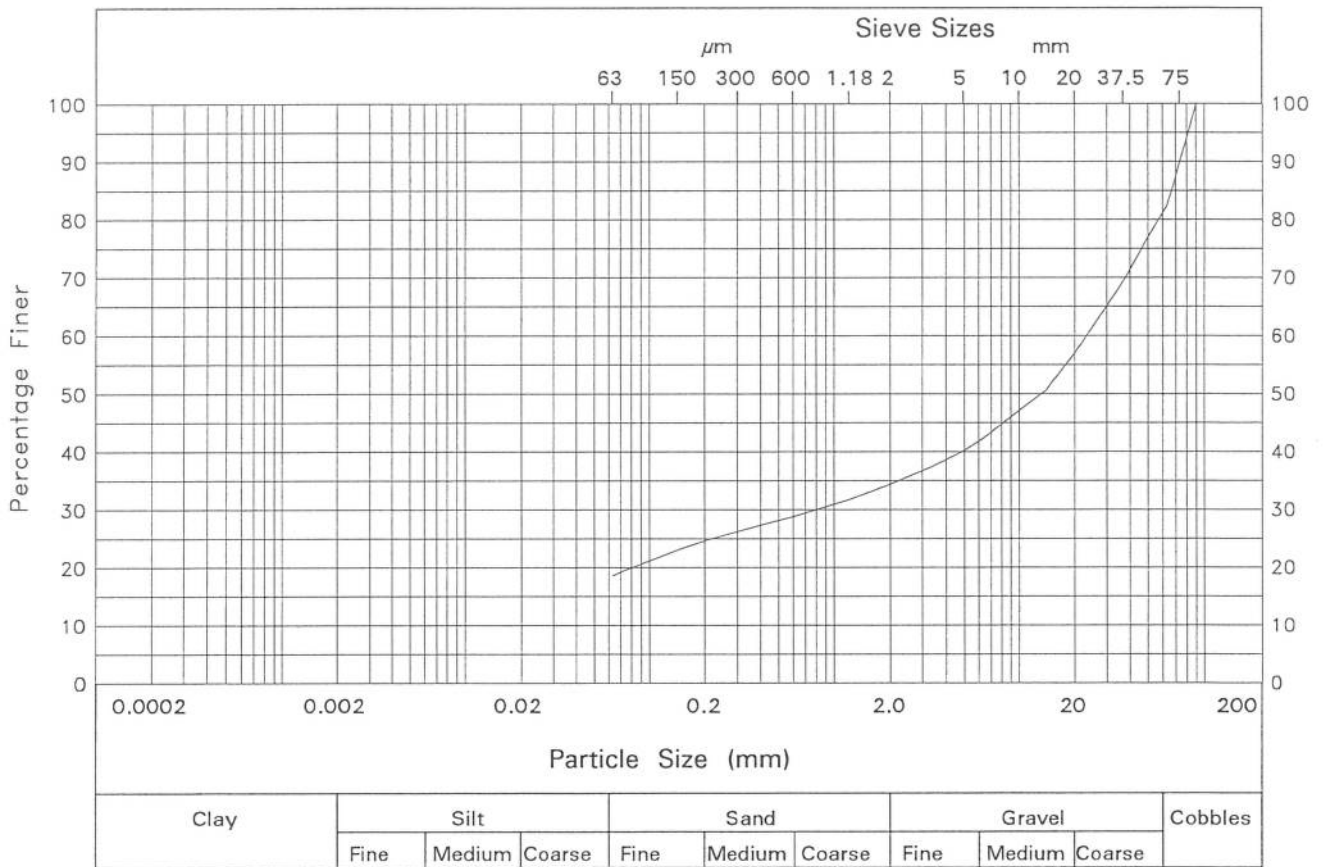
Contract

KC3210

Sheet



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Particle Size	% Passing	Particle Size	% Passing
90 mm	100	2 mm	34
75 mm	91	1.18 mm	32
63 mm	82	600 μm	29
50 mm	77	425 μm	28
37.5 mm	70	300 μm	26
28 mm	64	212 μm	25
20 mm	57	150 μm	23
14 mm	51	75 μm	20
10 mm	47	63 μm	19
6.3 mm	42		
5 mm	40		
3.35 mm	37		
Hole TP136	Description MADE GROUND: Slightly sandy very gravelly CLAY		
Depth 0.50 -0.90			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleava to Menlough
Galway County Council

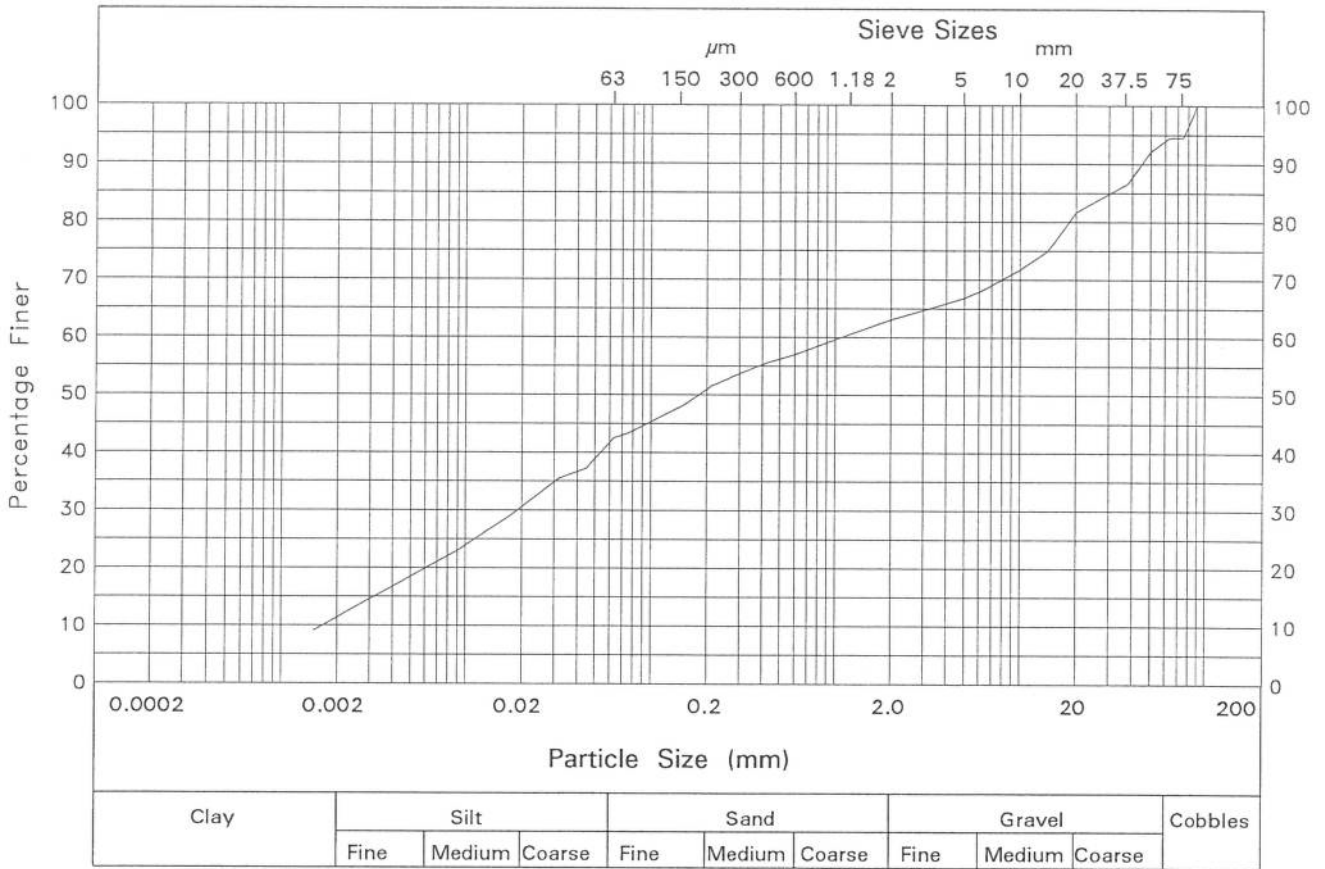
Contract

KC3210

Sheet



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Particle Size	% Passing	Particle Size	% Passing
90 mm	100	2 mm	63
75 mm	94	1.18 mm	60
63 mm	94	600 µm	57
50 mm	92	425 µm	56
37.5 mm	87	300 µm	54
28 mm	84	212 µm	52
20 mm	82	150 µm	48
14 mm	75	75 µm	43
10 mm	72	63 µm	42
6.3 mm	68	45 µm	37
5 mm	67	32 µm	36
3.35 mm	65	17 µm	29
Hole TP139	Description Slightly sandy gravelly SILT		
Depth 0.20 -0.50			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

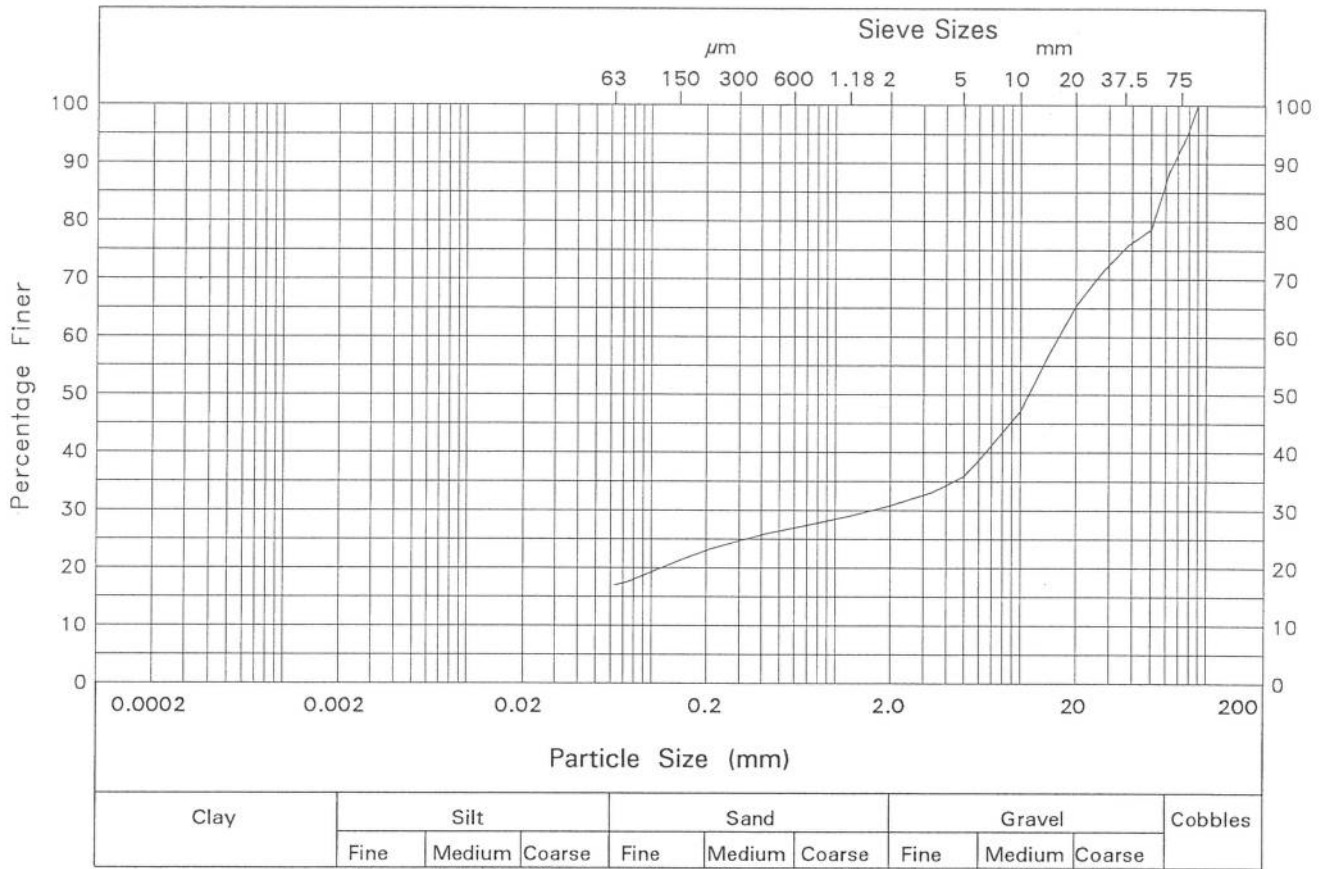
Contract

KC3210

Sheet



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Particle Size	% Passing	Particle Size	% Passing
90 mm	100	2 mm	31
75 mm	93	1.18 mm	29
63 mm	89	600 μm	27
50 mm	79	425 μm	26
37.5 mm	76	300 μm	25
28 mm	71	212 μm	23
20 mm	65	150 μm	22
14 mm	57	75 μm	18
10 mm	47	63 μm	17
6.3 mm	39		
5 mm	36		
3.35 mm	33		
Hole TP146	Description Slightly sandy very gravelly SILT		
Depth 1.00 -1.50			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatleava to Menlough
Galway County Council

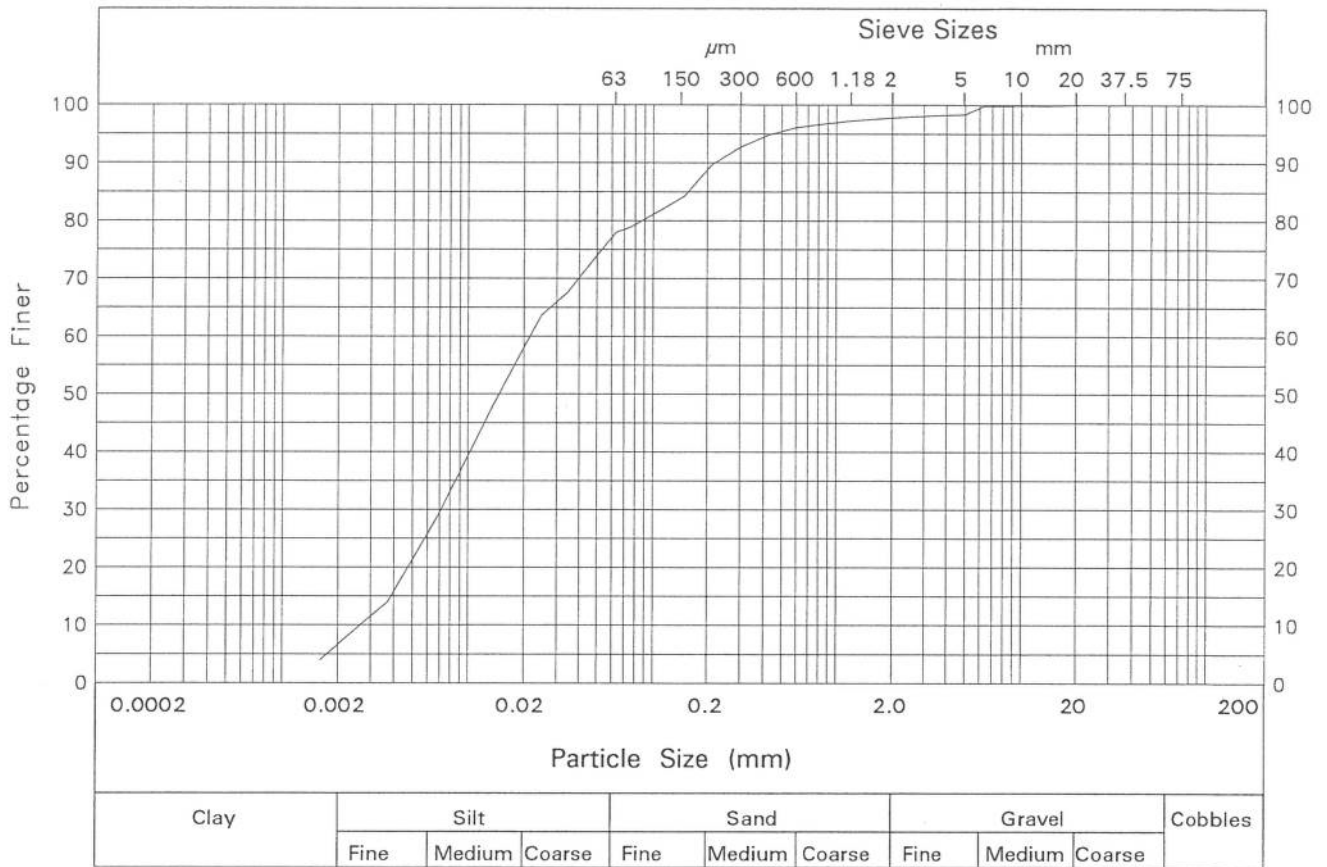
Contract

KC3210



Exploration Associates

Sheet



Particle Size	% Passing	Particle Size	% Passing
20 mm	100	150 μm	84
14 mm	100	75 μm	79
10 mm	100	63 μm	78
6.3 mm	100	35 μm	68
5 mm	98	25 μm	64
3.35 mm	98	14 μm	48
2 mm	98		
1.18 mm	97		
600 μm	96		
425 μm	95		
300 μm	93		
212 μm	90		
Hole TP148	Description Organic slightly sandy CLAY with rare gravel		
Depth 2.50 -2.70			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

Form 25/4

Laboratory - Particle Size Plot

Project

N6 Galway City Outer Bypass Contract 2
Ground Investigation Gortatlewa to Menlough
Galway County Council

Contract

KC3210



Exploration Associates

Sheet

Borehole Log

Drilled by GC Logged by JL Checked by ROR		Start 03/10/2003 End 03/10/2003		Equipment, Methods and Remarks Dando 175 Cable Percussion 200 diameter from 0.0m to 2.40m.		Depth from 0.00m to 2.40m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+6.33 mOD E 127495.60 N 228378.30							
Samples and Tests						Strata											
Depth		Type & No		Records		Date Casing Time Water		Description		Depth, Level (Thickness)		Legend		Backfill/ Instruments			
0.50-0.95 0.50-0.90		SPT S B 1		N=1 (-,1/,-,1,-)		03/10/2003 0800		Peat with roots** Plastic to spongy dark brown to black amorphous Peat with frequent decaying rootlets and occasional grass. 0.20-1.50 m Driller noted pieces of timber		0.20 +6.13 (1.30)		1		1			
1.60-2.05 1.60-2.00		SPT S B 2		N=1 (-,1/,-,1,-)		03/10/2003 1800		Plastic to spongy dark brown to black amorphous Peat with frequent decaying rootlets/grass, occasional pockets of uncompact cream silt with shells and occasional cobbles sized pockets of spongy brown clayey fibrous peat.		1.50 +4.83 (0.55)		1		1			
2.20-2.30		B 3						Cream SILT with shells** Grey angular GRAVEL** Recovered as gravelly COBBLES. Gravel is subangular coarse. Cobbles are subangular of limestone. EXPLORATORY HOLE ENDS AT 2.40 m		2.05 +4.28 2.10 +4.23 (0.30) 2.40 +3.93		1		SP			
Depth		Type & No		Records		Date Casing Time Water		Description		Depth, Level (Thickness)		Legend		Backfill/ Instruments			
Groundwater Entries		No. Struck		Post strike behaviour		Depth sealed (m)		Depth Related Remarks		Chiselling Depths (m)		Time		Tools used			
1		2.10		Rose to 0.80 m after 20 minutes.		-		2.40 Encountered obstruction, borehole terminated.		2.30-2.40		60 mins					
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council						Borehole BH36 Sheet 1 of 1					
Scale 1:50						(c) MESG HBIII (28), 11/02/2004 15:30:38						AGS					

Borehole Log

Drilled by MC Logged by CH Checked by ROR	Start 10/12/2003 End 10/12/2003	Equipment, Methods and Remarks Dando Cable Percussion 200mm diameter 0.00m to 6.00m.	Depth from 0.00m to 6.00m Diameter 200mm Casing Depth	Ground Level Coordinates National Grid +6.40 mOD E 127534.20 N 228344.70
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Samples and Tests					Strata			
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50-0.95	U 1	225 mm rec	10/12/2003	0800	Dark brown non-fibrous plastic PEAT	(2.20)		
1.00	D 2							
1.50-2.00	B 3							
2.00	D 4							
2.50-3.50	P 5	500 mm rec			Uncompact creamy brown SILT with abundant shells and rare sand.	2.20 +4.20		
3.50	D 6							
3.50-4.00	B 7							
4.50	D 8				4.50 m Becoming grey mottled black SILT	(3.50)		
5.00-5.70	P 9	140 mm rec						
6.00-6.04	SPT C	75 (25 for 20mm/75 for 20mm)	10/12/2003	1800	BOULDERS or ROCK** Recovered as subangular to subrounded fine to medium GRAVEL.	5.70 +0.70		
6.00	D 10				EXPLORATORY HOLE ENDS AT 6.00 m	6.00 +0.40		

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m) 3.50 6.00 In-situ vane Peak 23kPa, Residual 13kPa Encountered obstruction, borehole terminated.	Chiselling Depths (m) Time Tools used 5.70-6.00 90 mins
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough Project No. KC3210 Carried out for Galway County Council	Borehole BH39 Sheet 1 of 1
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Borehole Log

Drilled by MC Logged by CH Checked by ROR		Start 08/12/2003 End 08/12/2003		Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 4.00m.		Depth from 0.00m to 2.00m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+6.36 mOD E 127591.06 N 228328.15	
Samples and Tests					Strata						
Depth	Type & No	Records	Date Casing	Time Water	Description		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments		
0.50-0.95	U 1	3 blows	08/12/2003	0800	Dark brown pseudo-fibrous plastic PEAT						
1.00	D 2						(2.00)				
1.50-2.00	B 3										
2.00-2.20	P 4	No recovery	08/12/2003	1800			2.00	+4.36			
2.20	D 5		09/12/2003	0800	Grey SILT**		2.20	+4.16			
2.50-2.95	SPT C	N=73 (11,17/14,18,18,23)	09/12/2003	1.70	Grey clayey sandy GRAVEL		(0.80)				
2.50-3.00	B 6										
3.00	D 7				ROCK or BOULDERS**		3.00	+3.36			
							(1.00)				
			09/12/2003	1800	EXPLORATORY HOLE ENDS AT 4.00 m		4.00	+2.36			
Groundwater Entries		No. Struck (m)		Post strike behaviour		Depth sealed (m)		Depth Related Remarks		Chiselling Depths (m)	
		1 0.50		Rose to 0.30 m after 20 minutes.		-		4.00 No advance on chiselling, borehole terminated.		3.50-3.70 60 mins	
		2 3.00		Rose to 0.40 m after 20 minutes.		-				4.00-4.00 30 mins	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough			Project No. KC3210			Borehole BH41		
Scale 1:50			Carried out for Galway County Council						Sheet 1 of 1		

Borehole Log

Drilled by MC Logged by CH Checked by ROR	Start 08/12/2003 End 08/12/2003	Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 1.0m.	Depth from 0.00m to 1.00m Diameter 200mm Casing Depth	Ground Level Coordinates National Grid +6.73 mOD E 127638.20 N 228329.35
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.50-0.95 0.50-1.00	SPT C B 1	N=72 (3,4,7,17,18,30)	08/12/2003	0800	TOPSOIL** Dark grey slightly sandy slightly gravelly to gravelly CLAY	0.20-1.00 m Driller noted with cobble	0.20 +6.53 (0.80)		
1.00	D 2		08/12/2003	1800	EXPLORATORY HOLE ENDS AT 1.00 m	1.00 m ROCK or BOULDERS	1.00 +5.73		

Groundwater Entries No. Struck Post strike behaviour (m)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m)	Time	Tools used
None observed (see Key Sheet)		1.00 - No advance on chiselling, borehole terminated.	1.00 - 1.00	60 mins	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) MESH HBRII (298), 13/02/2004 17:57:56

Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough

Project No. KC3210

Carried out for Galway County Council

Borehole
BH44
Sheet 1 of 1







Borehole Log

Drilled by MC Logged by CH Checked by ROR		Start 05/12/2003 End 05/12/2003		Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 2.20m.		Depth from 0.00m to 2.20m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+6.92 mOD E 127695.00 N 228272.39	
Samples and Tests						Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description		Depth, Level (Thickness)	Legend	Backfill/ Instruments		
0.50-0.95	U 1	4 blows	05/12/2003	0800	TOPSOIL**		(0.30)				
					PEAT**		0.30 +6.62				
1.00	D 2				Soft becoming very stiff grey slightly sandy gravelly CLAY		(0.60)				
1.50-1.95 1.50-2.00	SPT C B 3	N=33 (1,2/5,8,8,14)			0.90-2.20 m Driller noted with cobbles		0.90 +6.02				
2.00	D 4		05/12/2003	1800			(1.30)				
2.20-2.31 2.20	SPT C D 5	75 (25/75 for 30mm)		1.90	EXPLORATORY HOLE ENDS AT 2.20 m		2.20 +4.72	2.20 m ROCK or BOULDERS			
Depth	Type & No	Records	Date Casing	Time Water							
Groundwater Entries			Depth sealed (m)		Depth Related Remarks			Chiselling			
No.	Struck (m)	Post strike behaviour			From	to (m)	Depths (m)	Time	Tools used		
1	2.20	Rose to 1.90 m after 20 minutes.			2.20		2.20-2.20	60 mins			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project		N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough			Borehole			
Scale 1:50			Project No.		KC3210			BH50			
(c) MESG HBIII (298), 11/02/2004 15:32:02			Carried out for		Galway County Council			Sheet 1 of 1			

Borehole Log

Drilled by MC Logged by CH Checked by ROR		Start 17/11/2003 End 17/11/2003		Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 2.5m.		Depth from 0.00m to 2.50m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+7.39 mOD E 127771.49 N 228260.51	
Samples and Tests						Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments			
0.50-0.95	U 1	41 blows	17/11/2003	0800	TOPSOIL** Soft becoming stiff grey brown slightly sandy slightly gravelly CLAY with some cobbles. Gravel is subangular to subrounded, fine to coarse. Cobbles are subangular to subrounded of limestone.	0.25	+7.14				
1.00	D 2					(2.25)					
1.50-1.95 1.50-2.00	SPT C B 3	N=27 (1,1/2,3,7,15)				1.50 m Stiff					
2.00	D 4										
2.50-2.55 2.50	SPT C D 5	75 (25 for 20mm/75 for 30mm)	17/11/2003	1800	EXPLORATORY HOLE ENDS AT 2.50 m	2.50	+4.89		2.50 m Rock or boulder		
Depth	Type & No	Records	Date Casing	Time Water							
Groundwater Entries				Depth Related Remarks		Chiselling					
No.	Struck (m)	Post strike behaviour	Depth sealed (m)	From	to (m)	Depths (m)	Time	Tools used			
1	2.50	Rose to 1.20 m after 20 minutes.	-	2.50		2.50-2.50	60 mins				
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council		Borehole BH53 Sheet 1 of 1					
Scale 1:50 (c) MESH HBIII (298), 11/02/2004 15:32:30				AGS							

Borehole Log

Drilled by MC Logged by CH Checked by ROR		Start 18/11/2003 End 18/11/2003		Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 1.50m. Borehole terminated due to boulders, moved and redrilled as BH55A.		Depth from 0.00m to 1.50m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+6.74 mOD E 127819.02 N 228260.97	
Samples and Tests						Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments			
0.50-0.90	U 1		18/11/2003	0800	PEAT**	(0.35)					
1.00	D 2				Firm grey slightly sandy slightly gravelly CLAY with cobbles. Gravel is subangular to subrounded, fine to coarse. Cobbles are of limestone.	0.35 +6.39					
			18/11/2003	1800		(1.15)					
					EXPLORATORY HOLE ENDS AT 1.50 m	1.50 +5.24					
Depth	Type & No	Records	Date Casing	Time Water							
Groundwater Entries					Depth Related Remarks			Chiselling			
No. Struck		Post strike behaviour		Depth sealed (m)	From	to (m)	From	Time	Tools used		
None observed (see Key Sheet)					1.50		1.50 -1.50	60 mins			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project			Borehole			
Scale 1:50					Project			BH55			
(c) MESG HBIII (298), 11/02/2004 15:32:58					Project No.			Sheet 1 of 1			
AGS					Carried out for			Galway County Council			

Borehole Log

Drilled by MC Logged by CH Checked by ROR	Start 18/11/2003 End 18/11/2003	Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 2.80m.	Depth from 0.00m to 2.80m	Diameter 200mm	Casing Depth	Ground Level Coordinates National Grid	+6.70 mOD E 127822.65 N 228260.42
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Samples and Tests				Strata				
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
			18/11/2003	0800	PEAT**	(0.35)		
					Firm grey slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of limestone.	0.35 +6.35		
						(1.65)		
2.00-2.45 2.00-2.50	SPT C B 1	N=24 (1,2/5,6,6,7)				2.00 +4.70		
2.50	D 2				Stiff grey slightly sandy gravelly CLAY with some subangular cobbles of limestone.	(0.80)		
2.80-2.91 2.80	SPT C D 3	75 (25/25 for 20mm)	18/11/2003	1800		2.80 +3.90		
					EXPLORATORY HOLE ENDS AT 2.80 m			
					2.80 m Rock or Boulders			

Groundwater Entries			Depth sealed (m)		Depth Related Remarks		Chiselling		
No.	Struck (m)	Post strike behaviour			From	to (m)	Depths (m)	Time	Tools used
1	2.80	Rose to 1.30 m after 20 minutes.		-	0.00	2.00	2.80-2.80	60 mins	
					2.80				Descriptions taken from BH55 samples. No advance on chiselling, borehole terminated.

Borehole Log

Drilled by MC Logged by CH Checked by ROR	Start 19/11/2003 End 19/11/2003	Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 2.0m.	Depth from 0.00m to 2.00m Diameter 200mm Casing Depth	Ground Level Coordinates National Grid +6.56 mOD E 127867.70 N 228233.63
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Samples and Tests				Strata		Depth, Level (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.50-0.95	U 1	3 blows	19/11/2003	0800	Plastic dark brown to black pseudo fibrous PEAT	(1.40)		
1.00	D 2							
1.50-1.95	SPT C	N=61 (1,5/7,6,14,34)	19/11/2003	1800	BOULDERS**	1.40 +5.16 (0.60)		
EXPLORATORY HOLE ENDS AT 2.00 m						2.00 +4.56		

Groundwater Entries No. Struck Post strike behaviour 1 1.50 Rose to 1.15 m after 20 minutes.	Depth sealed (m) -	Depth Related Remarks From to (m) 2.00 Encountered obstruction, borehole terminated.	Chiselling Depths (m) Time Tools used 1.50 -2.00 60 mins
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Borehole Log

Drilled by MC Logged by CH Checked by ROR	Start 19/11/2003 End 19/11/2003	Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 3.50m.	Depth from 0.00m to 3.50m Diameter 200mm Casing Depth	Ground Level Coordinates National Grid +6.45 mOD E 127908.67 N 228208.24
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Samples and Tests					Strata		Depth, Level (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.80-1.25	U 1	4 blows	19/11/2003	0800	Dark brown plastic non fibrous PEAT with some rootlets.	(1.30)			
1.30	D 2					1.30			
1.50-1.95 1.50-2.00	SPT C B 3	N=32 (2,7,6,6,9,11)			Grey slightly silty sandy GRAVEL of limestone with some cobbles. Gravel is subangular coarse. Cobbles are subangular of limestone.	+5.15			
2.00	D 4				2.00 m PEAT	(2.20)			
2.50-2.95 2.50-3.00	SPT C B 5	N=36 (1,5,9,6,7,14)							
3.00	D 6								
3.50-3.55 3.50	SPT C D 7	75 (25 for 20mm/75 for 25mm)	19/11/2003	1800	EXPLORATORY HOLE ENDS AT 3.50 m	3.50			
					3.50 m Rock or Boulder	+2.95			

Groundwater Entries	Depth Related Remarks	Chiselling
No. Struck (m) Post strike behaviour	From to (m)	Depths (m) Time Tools used
1 3.50 Rose to 1.20 m after 20 minutes.	3.50 No advance on chiselling, borehole terminated.	3.50-3.50 60 mins

Borehole Log

Drilled by JC Logged by JL Checked by ROR		Start 02/10/2003 End 02/10/2003		Equipment, Methods and Remarks Dando 3000 Cable Percussion 200mm diameter 0.00m to 5.23m.		Depth from 0.00m to 5.23m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+6.43 mOD E 128308.42 N 228096.68	
Samples and Tests					Strata						
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments			
0.50-1.00	B 1				TOPSOIL** Plastic dark brown to black amorphous PEAT with occasional rootlets and decaying grass.	(0.30) 0.30 +6.13					
1.00-1.45	SPT S D 2	N=0 (-, -, -, -, -) SW=450									
1.50-2.00	B 3										
2.00-2.45	SPT S D 4	N=0 (-, -, -, -, -) SW=450	1.45	dry							
2.50-3.00	B 5					(4.50)					
3.00-3.45	SPT S D 6	N=0 (-, -, -, -, -) SW=450	3.00	dry							
3.50-4.00	B 7										
4.00-4.45	SPT S D 8	N=0 (-, -, -, -, -) SW=450	4.00	dry							
4.80-5.20	B 9					4.80 +1.63					
5.00-5.26	SPT C	50 (1, 1/25, 25 for 30mm)	5.00	dry	Plastic dark brown to grey clayey amorphous PEAT.	(0.43) 5.23 +1.20					
			5.20		EXPLORATORY HOLE ENDS AT 5.23 m			SP			
Groundwater Entries		Depth sealed		Depth Related Remarks		Chiselling		Time Tools used			
No.	Struck (m)	Post strike behaviour	(m)	From	to (m)	Depths (m)					
1	5.20	Rose to 2.60 m after 20 minutes.	-	5.23		5.20 -5.23	60 mins	Encountered obstruction, borehole terminated.			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleava to Menlough Project No. KC3210 Carried out for Galway County Council			Borehole BH107 Sheet 1 of 1					

Borehole Log

Drilled by BJ Logged by JL Checked by ROR		Start 04/10/2003 End 05/10/2003		Equipment, Methods and Remarks Dando 175 Cable Percussion 200mm diameter 0.00m to 9.30m.		Depth from 0.00m to 9.30m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+6.28 mOD E 128354.70 N 228101.70	
Samples and Tests					Strata						
Depth	Type & No	Records	Date Casing	Time Water	Description			Depth, Level / (Thickness)	Legend	Backfill / Instruments	
0.00-0.50	B 1		04/10/2003	0800	TOPSOIL**			0.10 +6.18			
0.50-0.95	SPT S B 3	N=1 (1,-,-,1,-)			Plastic dark brown to black amorphous PEAT.			(0.40)			
0.50-1.00					Spongy to plastic dark brown pseudofibrous PEAT with abundant rootlets and frequent grasses.			0.50 +5.78			
1.50-1.95	U 4	4 blows	1.50	dry				(1.50)			
2.00-2.45	U 6 D 5	3 blows	2.00	dry	Spongy dark brown pseudofibrous PEAT with abundant fibres / rootlets			2.00 +4.28			
2.55	D 7							(1.00)			
3.00-3.45	SPT S B 10	N=1 (1,-,-,1,-)	3.00	dry	Plastic dark brown to black amorphous PEAT with occasional rootlets / fibres.			3.00 +3.28			
3.00-3.50								(0.50)			
3.50-4.50	P 11				Uncompact grey slightly sandy to sandy slightly gravelly organic CLAY. Sand is fine to medium.			3.50 +2.78			
4.50-4.95	U 12	15 blows	4.50	0.00				(1.50)			
5.05	D 13				Uncompact grey organic SILT rare sand.			5.00 +1.28			
5.50-5.95	SPT S B 15	N=0 (1,1,-,-,-)	5.50	0.20							
5.50-6.00											
6.50-7.50	P 16 B 17		6.00	0.30				(4.00)			
6.50-7.00											
			04/10/2003	1800							
			7.50	0.10							
			05/10/2003	0800							
			7.50	0.40							
8.50-8.95	SPT S B 19	N=1 (1,-,-,1,-)	8.00	0.10							
8.50-9.00											
9.10-9.23	SPT C	50 (25 for 30mm/50)	9.10	0.90	GRAVEL**			9.00 -2.72			
9.10-9.23			05/10/2003	1800				9.10 -2.82			
9.30-9.34	SPT C	50 (25 for 10mm/50 for 30mm)	9.30	1.30	LIMESTONE**			9.30 -3.02			
					EXPLORATORY HOLE ENDS AT 9.30 m						
Depth	Type & No	Records	Date Casing	Time Water							
Groundwater Entries					Depth Related Remarks			Chiselling			
No.	Struck	Post strike behaviour	Depth sealed (m)		From	to (m)	In-situ vane Peak 33kPa		Depths (m)	Time	Tools used
None observed (see Key Sheet)					2.55	7.50	Borehole kept full of water		9.10-9.30	60 mins	
					3.00		In-situ vane Peak 25kPa				
					5.05		In-situ vane Peak 28kPa				
					8.00		Encountered obstruction, borehole terminated.				
					9.30						
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough KC3210			Borehole BH110			
Scale 1:50					Carried out for Galway County Council			Sheet 1 of 1			

Borehole Log

Drilled by JC Logged by JL Checked by ROR		Start 02/10/0030 End 02/10/2003		Equipment, Methods and Remarks Dando 3000 Cable Percussion 200mm diameter 0.00m to 0.65m.		Depth from 0.00m to 0.65m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid		+7.37 mOD E 128406.23 N 228094.97	
Samples and Tests						Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments			
0.20-0.60	B 1		02/10/2003	0800	TOPSOIL**	0.20 +7.17					
0.60-0.75	SPT C	50 (25/50)	02/10/2003	1800	Silty sandy GRAVEL with some cobbles. Cobbles are subangular to subrounded of limestone.	(0.45) 0.65 +6.72					
						EXPLORATORY HOLE ENDS AT 0.65 m					
Depth	Type & No	Records	Date Casing	Time Water							
Groundwater Entries No. Struck Post strike behaviour (m)			Depth sealed (m)		Depth Related Remarks From to (m)			Chiselling Depths (m) Time Tools used			
None observed (see Key Sheet)					0.65 Encountered obstruction, borehole terminated.			0.60 -0.65 60 mins			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough					Borehole BH114	
Scale 1:50 (c) MESH HBIII (288), 11/02/2004 15:40:11					Project No. KC3210					Sheet 1 of 1	
AGS					Carried out for Galway County Council						

Borehole Log

Drilled by BJ Logged by JL Checked by ROR		Start 07/10/2003 End 07/10/2003		Equipment, Methods and Remarks Dando 175 Cable Percussion 200mm diameter 0.30m to 9.20m.		Depth from 0.00m to 9.20m Diameter 200mm Casing Depth		Ground Level Coordinates National Grid +6.24 mOD E 129602.15 N 228148.16	
Samples and Tests					Strata				
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
0.00-0.50	B 1		07/10/2003	0800	TOPSOIL**	(0.40)			
0.50-0.76 0.50-1.00	SPT C B 3	64 (4,7/14,50 for 30mm)			GRAVEL with some cobbles. Gravel is subangular to rounded medium to coarse. Cobbles are subangular to subrounded of granite and limestone.	0.40 +5.84			
1.50-1.95 1.50-2.00	SPT C B 5	N=32 (6,8/9,7,9,7)	1.50	dry		(2.00)			
2.50-2.95	U 6	10 blows	2.50	dry	Plastic dark brown and black amorphous PEAT.	2.40 +3.84			
3.05	D 7								
3.50-4.50 3.50-4.50	P 8 B 9	No recovery	3.50	dry		(2.10)			
5.50-5.95 5.50-5.95 5.50-6.00	SPT S D 10 B 11	N=1 (1,-,-,1,-,-)	5.50	dry	Uncompact grey and brown slightly sandy SILT with occasional plant remains and frequent shells.	4.50 +1.74			
7.50-8.50 7.50-8.50	P 12 B 13	No recovery	7.50	3.60	Spongy grey brown organic SILT with frequent plant remains.	7.50 -1.27			
9.00-9.10	SPT C	50 (25 for 40mm/50 for 60mm)	9.00	4.90	GRAVEL**	8.80 -2.57			
9.20-9.25	SPT C	50 (25 for 10mm/50 for 40mm)	9.10	5.30	LIMESTONE**	9.00 -2.77			
EXPLORATORY HOLE ENDS AT 9.25 m						9.25 -3.02			
Depth	Type & No	Records	Date Casing	Time Water					
Groundwater Entries					Depth Related Remarks				
No.	Struck (m)	Post strike behaviour	Depth sealed (m)	From to (m)		Chiselling Depths (m)	Time	Tools used	
1	7.50	Rose to 3.60 m after 20 minutes.	-	4.50	6.50	0.60-0.75	30 mins		
				6.50	9.25	8.80-9.00	45 mins		
						9.10-9.20	60 mins		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleava to Menlough KC3210				
Scale 1:50					Carried out for Galway County Council				
					Borehole BH145A Sheet 1 of 1				

ENCLOSURE B
INSTRUMENTATION MONITORING & PERMEABILITY TESTS

Groundwater Monitoring
Permeability Tests

Groundwater Monitoring



Hole No.	Instrument Type	Tip Depth (mBGL)	Reading				Comments
			Date	Time (hhmmss)	Water Level (mBGL)	Head (m above Tip)	
BH68	SPIE	9.00	02 Dec 2003		0.25	8.75	
BH68	SPIE	9.00	06 Dec 2003		0.16	8.84	
BH68	SPIE	9.00	11 Dec 2003		0.20	8.80	
BH68	SPIE	9.00	11 Feb 2004		0.20	8.80	
BH68	SPIE	9.00	14 Apr 2004		0.20	8.80	
BH107	SP	5.20	04 Nov 2003		0.38	4.82	
BH107	SP	5.20	06 Dec 2003		0.10	5.10	
BH107	SP	5.20	11 Feb 2004		0.15	5.05	
BH145A	SP	7.00	04 Nov 2003		0.45	6.55	
BH145A	SP	7.00	06 Dec 2003		0.20	6.80	
BH145A	SP	7.00	11 Feb 2004		0.00	7.00	
RC6A	SPIE	11.30	11 Feb 2004		2.01	9.29	
RC13	SP	15.00	04 Nov 2003		10.82	4.18	
RC13	SP	15.00	06 Dec 2003		11.83	3.17	
RC13	SP	15.00	11 Feb 2004		11.91	3.09	
RC13	SP	15.00	14 Apr 2004		11.60	3.40	
RC17	SP	10.00	11 Dec 2003		8.72	1.28	
RC17	SP	10.00	11 Feb 2004		7.70	2.30	
RC17	SP	10.00	14 Apr 2004		7.50	2.50	
RC28	SP	4.00	04 Nov 2003		1.70	2.30	
RC28	SP	4.00	06 Dec 2003		0.80	3.20	
RC28	SP	4.00	11 Feb 2004		0.80	3.20	
RC28	SP	4.00	14 Apr 2004		0.85	3.15	
RC49	SP	3.70	11 Dec 2003		0.50	3.20	
RC49	SP	3.70	11 Feb 2004		0.45	3.25	
RC49	SP	3.70	14 Apr 2004		0.40	3.30	
RC72	SP	14.00	17 Dec 2003		0.10	13.90	
RC72	SP	14.00	11 Feb 2004		0.00	14.00	
RC72	SP	14.00	14 Apr 2004		0.20	13.80	
RC97	SPIE	9.50	14 Apr 2004		2.35	7.15	
RC118	SPIE	11.00	04 Nov 2003		4.02	6.98	
RC118	SPIE	11.00	06 Dec 2003		3.87	7.13	
RC118	SPIE	11.00	11 Feb 2004		3.52	7.48	
RC118	SPIE	11.00	14 Apr 2004		3.45	7.55	
RC127	SP	3.00	06 Dec 2003		3.95	-0.95	Pipe damaged
RC127	SP	3.00	11 Feb 2004		3.32	-0.32	Pipe damaged, wl approx. 2m
RC129	SP	14.00	17 Dec 2003		6.80	7.20	
RC129	SP	14.00	11 Feb 2004		5.90	8.10	
RC133	SP	10.40	04 Nov 2003		4.22	6.18	
RC133	SP	10.40	06 Dec 2003		3.50	6.90	
RC133	SP	10.40	11 Feb 2004		4.19	6.21	
RC133	SP	10.40	14 Apr 2004		4.00	6.40	
RC138	SPIE	10.00	04 Nov 2003		5.60	4.40	
RC138	SPIE	10.00	06 Dec 2003		4.95	5.05	
RC138	SPIE	10.00	11 Feb 2004		5.52	4.48	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleiva to Menlough
 Project No. KC3210
 Carried out for Galway County Council

Sheet

Sheet 1 of 1

Groundwater Monitoring

Hole No.	Instrument Type	Tip Depth (mBGL)	Reading				Comments
			Date	Time (hhmmss)	Water Level (mBGL)	Head (m above Tip)	
BH68	SPIE	9.00	02 Dec 2003		0.25	8.75	
BH68	SPIE	9.00	06 Dec 2003		0.16	8.84	
BH68	SPIE	9.00	11 Dec 2003		0.20	8.80	
BH68	SPIE	9.00	11 Feb 2004		0.20	8.80	
BH107	SP	5.20	04 Nov 2003		0.38	4.82	
BH107	SP	5.20	06 Dec 2003		0.10	5.10	
BH107	SP	5.20	11 Feb 2004		0.15	5.05	
BH145A	SP	7.00	04 Nov 2003		0.45	6.55	
BH145A	SP	7.00	06 Dec 2003		0.20	6.80	
BH145A	SP	7.00	11 Feb 2004		0.00	7.00	
RC6A	SPIE	11.30	11 Feb 2004		2.01	9.29	
RC13	SP	15.00	04 Nov 2003		10.82	4.18	
RC13	SP	15.00	06 Dec 2003		11.83	3.17	
RC13	SP	15.00	11 Feb 2004		11.91	3.09	
RC17	SP	10.00	11 Dec 2003		8.72	1.28	
RC17	SP	10.00	11 Feb 2004		7.70	2.30	
RC28	SP	4.00	04 Nov 2003		1.70	2.30	
RC28	SP	4.00	06 Dec 2003		0.80	3.20	
RC28	SP	4.00	11 Feb 2004		0.80	3.20	
RC49	SP	3.70	11 Dec 2003		0.50	3.20	
RC49	SP	3.70	11 Feb 2004		0.45	3.25	
RC72	SP	14.00	17 Dec 2003		0.10	13.90	
RC72	SP	14.00	11 Feb 2004		0.00	14.00	
RC118	SPIE	11.00	04 Nov 2003		4.02	6.98	
RC118	SPIE	11.00	06 Dec 2003		3.87	7.13	
RC118	SPIE	11.00	11 Feb 2004		3.52	7.48	
RC127	SP	3.00	06 Dec 2003		3.95	-0.95	pipe damaged
RC127	SP	3.00	11 Feb 2004		3.32	-0.32	pipe damaged, wl approx 2.0m
RC129	SP	14.00	17 Dec 2003		6.80	7.20	
RC129	SP	14.00	11 Feb 2004		5.90	8.10	
RC133	SP	10.40	04 Nov 2003		4.22	6.18	
RC133	SP	10.40	06 Dec 2003		3.50	6.90	
RC133	SP	10.40	11 Feb 2004		4.19	6.21	
RC138	SPIE	10.00	04 Nov 2003		5.60	4.40	
RC138	SPIE	10.00	06 Dec 2003		4.95	5.05	
RC138	SPIE	10.00	11 Feb 2004		5.52	4.48	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Project N6 Galway City Outer Bypass Contract 2 Ground Investigation
 Gortatleva to Menlough
 Project No. KC3210
 Carried out for Galway County Council

Sheet
 Sheet 1 of 1

Borehole Log

Drilled by MN Logged by CH Checked by ROR		Start 11/12/2003 End 12/12/2003		Equipment, Methods and Remarks C6 Rotary Open Hole 131mm diameter 0.00m to 4.10m. Rotary Core 75mm diameter 4.10m to 10.30m. Borehole examined by televiewer.		Depth from 0.00m to 4.10m		Diameter 131mm 75mm		Casing Depth		Ground Level Coordinates National Grid		+6.31 mOD E 127502.50 N 228390.10							
Samples and Tests						Strata						Depth, Level/ (Thickness)		Legend		Backfill/ Instruments					
Depth		Type & No		Records		Date Casing		Time Water		Description											
0.00-4.10		Rotary Open Hole Drilling				11/12/2003 0800				PEAT**						(1.70)					
0.00-4.10		Rotary Open Hole Drilling				11/12/2003 1800 4.10 0.00				Light grey SILT/CLAY**						1.70 +4.61					
0.00-4.10		Rotary Open Hole Drilling				12/12/2003 0800				CLAY**						2.70 +3.61					
4.10-5.60		89 89 82				11/12/2003 1800 4.10 0.00				LIMESTONE** Strong light grey fine grained crystalline LIMESTONE. WEATHERING: Slight with some minor discolouration and dissolution features on fracture surfaces. DISCONTINUITIES: Subhorizontal to subvertical closely to widely spaced planar to undulating smooth fractures						3.90 +2.41 4.10 +2.21					
5.35				CS 1		11/12/2003 1800 4.10 0.00				4.38 m Driller induced fracture											
5.60-6.15 5.88-6.15		100 100 80		CS 2		12/12/2003 0800				5.00-5.20 m Assessed zone of core loss											
6.15-7.65		100 100 97		5 350 920						5.55 m Horizontal planar rough fracture 5.80 m 65° rough fracture 5.95-6.00 m Non-intact 6.39 m Rough undulating fracture 6.85 m 65° rough undulating fracture						(6.20)					
7.65-9.15		100 93 93								7.65-7.75 m Non-intact											
9.15-10.30		100 100 96								8.50 m Subvertical to 65° smooth fracture 9.40 m Subvertical to 65° smooth fracture 9.48 m Drilling induced fracture at 9.48m and											
Depth		TCR SCR RSD		If		Records/Samples		Date Casing		Time Water		Stratum continued next sheet									
Groundwater Entries No. Struck Post strike behaviour (m)				Depth sealed (m)				Depth Related Remarks From to (m)				Chiselling Depths (m) Time Tools used									
None observed (see Key Sheet)																					
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council						Borehole RC35 Sheet 1 of 2									
Scale 1:50 (c) MESH HBIII (298), 11/02/2004 11:07:47						AGS															

Borehole Log

Drilled by MN Logged by CH Checked by ROR		Start 10/12/2003 End 11/12/2003		Equipment, Methods and Remarks C6 Rotary Open Hole 131mm diameter 0.00m to 4.00m. Rotary Core 75mm diameter 4.00m to 10.10m.		Depth from 0.00m to 4.00m Diameter 131mm Casing Depth		Ground Level Coordinates National Grid +6.26 mOD E 127540.40 N 228357.10		
Samples and Tests					Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level / (Thickness)	Legend	Backfill / Instruments		
0.00-4.00	Rotary Open Hole Drilling		10/12/2003	0800	PEAT**	(2.40)				
					Light grey CLAY**	2.40 +3.86				
					Limestone GRAVEL with boulders**	2.60 +3.66				
						(1.40)				
4.00-4.50	100 80 60				Strong dark grey fine grained massive LIMESTONE.	4.00 +2.26				
					WEATHERING: Slight with no obvious loss of mass / wall strength observed.					
4.50-5.00	100 100 100	NI 120 350	10/12/2003	1800	DISCONTINUITIES: Closely to widely spaced planar smooth to rough fractures.					
			4.00	1.00		4.50 m Non-intact				
5.00-5.60	50 33		11/12/2003	0800						
	17	CS 1	4.00	0.00		5.00 m 45° rough fracture				
						5.30-5.40 m Non-intact				
5.60-7.10	100 100 100									
						6.40 m 35° rough fracture				
						6.50 m Smooth undulating fracture				
7.20		CS 2				7.00 m 45° smooth undulating fracture	(6.10)			
7.10-8.60	100 100 100	200 600 1000								
						8.60-10.10 m Solid stick of core				
8.60-10.10	100 100 100									
						9.50 m Drilling induced fracture				
			11/12/2003	1800	Stratum continued next sheet					
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water					
Groundwater Entries					Depth Related Remarks		Chiselling			
No.	Struck (m)	Post strike behaviour		Depth sealed (m)	From	to (m)	Depths (m)	Time	Tools used	
1	1.20	-		-						
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough KC3210			Borehole RC38 Sheet 1 of 2		
Scale 1:50 (c) MESH HBIII (298), 11/02/2004 11:08:48					Project No. Carried out for Galway County Council			AGS		

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 10/12/2003 End 11/12/2003	Equipment, Methods and Remarks	Depth from 0.00m	to 4.00m	Diameter 131mm	Casing Depth	Ground Level Coordinates National Grid	+6.26 mOD E 127540.40 N 228357.10
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Samples and Tests				Strata				Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Description				
						Strong dark grey fine grained massive LIMESTONE. WEATHERING: Slight with no obvious loss of mass / wall strength observed. DISCONTINUITIES: Closely to widely spaced planar smooth to rough fractures. EXPLORATORY HOLE ENDS AT 10.10 m	10.10 -3.84			

Groundwater Entries No. Struck Post strike behaviour (m)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths.(m) Time Tools used
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Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 09/12/2003 End 10/12/2003	Equipment, Methods and Remarks C6 Rotary Open Hole 131mm diameter 0.00m to 2.85m. Rotary Core 75mm diameter 2.85m to 11.05m.	Depth from 0.00m to 2.85m to 2.85m to 11.05m Diameter 131mm Casing Depth 75mm	Ground Level Coordinates National Grid +6.27 mOD E 127579.50 N 228321.70
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
Depth	Type & No	Records	Date Casing	Time Water	Description					
			09/12/2003	0800	PEAT**		(1.10)			
0.00-2.85	Rotary Open Hole Drilling				Grey CLAY / GRAVEL**		1.10 +5.17 (0.40)			
					Limestone GRAVEL with boulders**		1.50 +4.77 (1.35)			
2.85-3.52	100 100 100				Strong to very strong light grey fine grained massive fossiliferous LIMESTONE. WEATHERING: Fresh, no evidence of weathering observed. DISCONTINUITIES: Subhorizontal ranging from closely to widely spaced, predominantly medium spaced planar smooth to rough fractures. Many are drilling induced.		2.85 +3.42			
3.60		CS 1								
3.52-4.81	100 100 100		09/12/2003	1800						
			2.85	1.00			4.24 m Drilling induced fracture			
			10/12/2003	0800			4.71 m Subhorizontal drilling induced fracture			
5.28-5.55		CS 2								
4.81-6.31	100 100 100									
6.31-7.81	100 100 100 190 350 1000					6.35 m 45° planar smooth fracture, clean 6.40 m <1mm calcite vein	(8.20)			
7.95		CS 3								
7.81-8.45	100 100 100									
8.45-9.64	100 100 100									
Stratum continued next sheet										

Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Depth Related Remarks From to (m)	Chiselling Depths (m)	Time	Tools used
Groundwater Entries									
No. Struck (m)									
1 1.10 -									

Borehole Log

Drilled by MN Logged by CH Checked by ROR		Start 09/12/2003 End 10/12/2003		Equipment, Methods and Remarks			Depth from 0.00m to 2.85m Diameter 131mm Casing Depth 75mm		Ground Level +6.27 mOD Coordinates E 127579.50 National Grid N 228321.70	
Samples and Tests					Strata					
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
9.64-11.05	100 100 84			10/12/2003	1800	Strong to very strong light grey fine grained massive fossiliferous LIMESTONE. WEATHERING: Fresh, no evidence of weathering observed. DISCONTINUITIES: Subhorizontal ranging from closely to widely spaced, predominantly medium spaced planar smooth to rough fractures. Many are drilling induced. EXPLORATORY HOLE ENDS AT 11.05 m	11.05 -4.79			
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water					
Groundwater Entries No. Struck Post strike behaviour (m)				Depth sealed (m)		Depth Related Remarks From to (m)		Chiselling Depths (m) Time Tools used		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council		Borehole RC42 Sheet 2 of 2				
Scale 1:50				(c) MESH HBRII (298), 13/02/2004 10:15:23						

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 03/12/2003 End 09/12/2003	Equipment, Methods and Remarks C6 Rotary Open Hole 131mm diameter 0.00m to 2.50m. Rotary Core 75mm diameter 2.50m to 10.40m.	Depth from 0.00m to 2.50m to 2.50m to 10.40m Diameter 131mm Casing Depth 75mm	Ground Level +6.48 mOD Coordinates E 127633.93 National Grid N 228317.04
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-2.50	Rotary Open Hole Drilling		03/12/2003	0800	Boulder CLAY / GRAVEL**		(2.50)		
2.75		CS 1			Strong dark grey fine grained crystalline LIMESTONE.	2.70 m 15° rough fracture	2.50	+3.98	
2.50-3.50	60 53 53 NI 130 190		03/12/2003	1800	WEATHERING: Fresh to very slight weathering with some iron staining from 2.50m to 2.90m with no loss of mass strength.	3.10 m 60° smooth fracture			
3.50-3.70		TCR 100, SCR 100, RQD 75	09/12/2003	0800	DISCONTINUITIES: Subhorizontal closely to widely spaced planar smooth to rough fractures.	3.70-3.80 m 2 no. 15° planar rough fractures			
3.80		CS 2							
4.00-4.50	100 100 95								
3.70-4.54		CS 3							
4.54-6.12	100 100 100					5.00 m Drilling induced fracture			
6.12-7.62	100 100 97 80 1000 1000					7.12 m 35° planar rough fracture	(7.90)		
7.62-9.12	100 100 100								
9.12-10.40	100 100 94					9.40 m 45° planar smooth fracture			
					Stratum continued next sheet				

Groundwater Entries	No.	Struck (m)	Post strike behaviour	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m)	Time	Tools used
	1	1.80	-	-				

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 03/12/2003 End 03/12/2003	Equipment, Methods and Remarks C6 Rotary Open Hole 131mm diameter 0.00m to 2.50m. Rotary Core 75mm diameter 2.50m to 10.50m.	Depth from 0.00m to 2.50m	to 2.50m 10.50m	Diameter 131mm Casing Depth 75mm	Ground Level Coordinates National Grid	+7.11 mOD E 127702.90 N 228283.96
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-2.50	Rotary Open Hole Drilling		03/12/2003	0800	Boulder CLAY GRAVEL**		(2.50)		
2.62					Strong dark grey fine grained crystalline LIMESTONE.		2.50	+4.61	
2.50-3.17	100 100 90	CS 1			WEATHERING: Fresh to slight with no apparent loss of mass or wall strength, some minor dissolution features on some fracture surfaces.	3.15-3.20 m Non-intact			
3.17-4.53	97 97 97				DISCONTINUITIES: Subhorizontal to subvertical closely to widely spaced fractures, locally some clay infilling.	3.47 m 45° smooth fracture			
4.05-4.37		CS 2				4.10 m 40° smooth fracture			SP
4.53-5.10	100 100 88					4.70 m 75° smooth fracture			
5.30									
5.10-5.68	100 86 69	CS 3				5.50-5.60 m Non-intact, clay infilled fracture			
5.68-6.00	100 84 84					5.90-6.00 m Non-intact 6.00-6.50 m Vertical rough fracture			
6.00-7.50	100 100 87					7.00 m Drilling induced fracture	(8.00)		
						7.50-9.50 m Solid core, no fractures			
7.50-9.00	100 100 100					8.50 m Drilling induced fracture			
	270 1000 1900					9.00 m Drilling induced fracture			
9.00-10.50	100 100 100					9.50 m 45° fracture			
Stratum continued next sheet									

Depth	TSR SCR ROD	If	Records/Samples	Date Casing	Time Water	Depth Related Remarks From to (m)	Chiselling Depths (m)	Time	Tools used
Groundwater Entries									
No. Struck (m)									
1 1.00 -									

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleiva to Menlough KC3210	Borehole RC49 Sheet 1 of 2
Scale 1:50 (c) MESH HBIII (298), 11/02/2004 11:11:53	Project No. Carried out for Galway County Council	

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 03/12/2003 End 03/12/2003	Equipment, Methods and Remarks	Depth from 0.00m 2.50m	to 2.50m 10.50m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+7.11 mOD E 127702.90 N 228283.96
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Samples and Tests						Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Description					
				03/12/2003 2.50	1800 1.00	<p>Strong dark grey fine grained crystalline LIMESTONE.</p> <p>WEATHERING: Fresh to slight with no apparent loss of mass or wall strength, some minor dissolution features on some fracture surfaces.</p> <p>DISCONTINUITIES: Subhorizontal to subvertical closely to widely spaced fractures, locally some clay infilling.</p> <p>EXPLORATORY HOLE ENDS AT 10.50 m</p>			10.50	-3.39	
						10.50 m 45° clay infilled fracture, with some dissolution features on fracture walls					

Groundwater Entries				Depth Related Remarks		Chiselling		
No.	Struck	Post strike behaviour	Depth sealed (m)	From	to (m)	Depths (m)	Time	Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough KC3210	Borehole RC49 Sheet 2 of 2
Scale 1:50 (c) MESH HBIII (2005), 11/02/2004 11:12:17	Project Project No. Carried out for Galway County Council	

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 01/12/2003 End 02/12/2003	Equipment, Methods and Remarks CB Rotary Open Hole 131mm diameter 0.00m to 2.70m. Rotary Core 75mm diameter 2.70m to 10.25m. Borehole examined using televiever.	Depth from 0.00m to 2.70m	to 2.70m 10.25m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+7.38 mOD E 127773.30 N 228273.80
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Samples and Tests				Strata			Depth, Level (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-2.70	Rotary Open Hole Drilling		01/12/2003	0800	Boulder CLAY GRAVEL**		(2.70)		
2.80									
2.70-3.28	100 100 100	CS 1			Strong dark grey fine grained laminated fossiliferous LIMESTONE. WEATHERING: Fresh		2.70 +4.68		
3.55									
3.28-4.15	100 98 79	CS 2			DISCONTINUITIES: Subhorizontal (0° - 30°) medium spaced planar rough fractures, clean.	3.28-3.38 m 2 no, closely spaced fractures, possibly drilling induced			
3.75-4.15		CS 3	01/12/2003	1800					
			2.70	1.00					
4.15-4.50	100 100 100		02/12/2003	0800					
			2.70	0.50					
4.50-5.70	100 100 93					4.45 m Subhorizontal drilling induced fracture 4.90 m Subhorizontal fracture with some slight clay smearing			
5.70-7.00	98 98 98	80 450 600					(7.55)		
7.00-8.02	100 100 100					6.90 m Subhorizontal drilling induced fracture 7.30 m 35° planar rough fracture			
8.02-9.00	100 100 88					8.00 m 60° rough fracture, clean 8.65 m 10° rough fracture			
9.00-10.25	100 100 100					9.00-9.05 m Drilling induced conjugate fractures 9.70 m 70° rough fracture, clay smeared			
Stratum continued next sheet									

Groundwater Entries			Depth Related Remarks		Chiselling		
No.	Struck (m)	Post strike behaviour	Depth sealed (m)	From to (m)	Depths (m)	Time	Tools used
1	2.00	-	-				

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 01/12/2003 End 02/12/2003	Equipment, Methods and Remarks	Depth from 0.00m to 2.70m	to 2.70m 10.25m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+7.38 mOD E 127773.30 N 228273.80
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Samples and Tests				Strata					
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments

				02/12/2003	1800	Strong dark grey fine grained laminated fossiliferous LIMESTONE. WEATHERING: Fresh DISCONTINUITIES: Subhorizontal (0° - 30°) medium spaced planar rough fractures, clean. EXPLORATORY HOLE ENDS AT 10.25 m	10.25 -2.87		
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Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water				
Groundwater Entries No. Struck Post strike behaviour (m)				Depth sealed (m)		Depth Related Remarks From to (m)		Chiselling Depths (m) Time Tools used	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(4) ME90 HBIII (288), 11/02/2004 11:13:21



Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough
Project No. KC3210
Carried out for Galway County Council

Borehole

RC52
Sheet 2 of 2

Borehole Log

Drilled by MC Logged by CH Checked by ROR	Start 19/11/2003 End 19/11/2003	Equipment, Methods and Remarks Cable Percussion 200mm diameter from 0.0m to 2.0m.	Depth from 0.00m to 2.00m Diameter 200mm Casing Depth	Ground Level Coordinates National Grid +6.56 mOD E 127867.70 N 228233.63
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.50-0.95	U 1	3 blows	19/11/2003	0800	Plastic dark brown to black pseudo fibrous PEAT	(1.40)		
1.00	D 2							
1.50-1.95	SPT C	N=61 (1,5/7,6,14,34)	19/11/2003	1800	BOULDERS**	1.40 +5.16 (0.60)		
EXPLORATORY HOLE ENDS AT 2.00 m						2.00 +4.56		

Groundwater Entries No. Struck Post strike behaviour 1 1.50 Rose to 1.15 m after 20 minutes.	Depth sealed (m) -	Depth Related Remarks From to (m) 2.00 Encountered obstruction, borehole terminated.	Chiselling Depths (m) Time Tools used 1.50 -2.00 60 mins
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Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 12/12/2003 End 13/12/2003	Equipment, Methods and Remarks C6 Rotary Open Hole 131mm diameter 0.00m to 5.60m. Rotary Core 75mm diameter 5.60m to 12.00m. Borehole examined by televiewer.	Depth from 0.00m to 5.60m to 5.60m to 12.00m Diameter 131mm Casing Depth 75mm	Ground Level Coordinates National Grid +6.61 mOD E 127864.60 N 228222.50
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments		
Depth	Type & No	Records	Date Casing	Time Water	Description					
0.00-5.60	Rotary Open Hole Drilling		12/12/2000	0800	PEAT**	(1.70)				
					CLAY GRAVEL**	1.70 +4.91 (0.40)				
					Stiff grey CLAY GRAVEL**	2.10 +4.51				
6.25-6.70			12/12/2003	1800	Strong fine grained light grey crystalline LIMESTONE WEATHERING: Slight with no obvious alteration or loss of wall strength. DISCONTINUITIES: Horizontal or subvertical medium becoming widely spaced planar smooth to rough fractures, clean. 6.30-6.90 m 80° smooth fracture 7.50 m Drilling induced fracture 7.80-8.40 m Many random undulating rough fractures producing non-intact core	5.60 +1.01				
5.60-7.50	95 74 56	CS 1	13/12/2003	0800						
7.65		CS 2								
7.50-9.00	100 100 47							(6.40)		
9.00-10.50	100 100 100				Stratum continued next sheet					

Groundwater Entries			Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m)	Time	Tools used
No.	Struck (m)	Post strike behaviour					
1	1.60	-					

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 12/12/2003 End 13/12/2003	Equipment, Methods and Remarks	Depth from 0.00m 5.60m	to 5.60m 12.00m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+6.61 mOD E 127864.60 N 228222.50
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Samples and Tests				Strata				Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	Description				
10.50-12.00	100 100 100	460 700 955		13/12/2003	1800	Strong fine grained light grey crystalline LIMESTONE WEATHERING: Slight with no obvious alteration or loss of wall strength. DISCONTINUITIES: Horizontal or subvertical medium becoming widely spaced planar smooth to rough fractures, clean.				
						EXPLORATORY HOLE ENDS AT 12.00 m	12.00	-5.39		

Groundwater Entries No. Struck Post strike behaviour (m)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 17/12/2003 End 17/12/2003	Equipment, Methods and Remarks C8 Rotary Open Hole 131mm diameter 0.00m to 5.00m. Rotary Core 75mm diameter 5.00m to 11.70m.	Depth from 0.00m to 5.00m	to 5.00m 11.70m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+6.54 mOD E 127915.02 N 228222.50
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-5.00	Rotary Open Hole Drilling		17/12/2003	0800	PEAT**	(2.60)		
					GRAVEL CLAY**	2.60 +3.94 (2.40)		
5.45 5.00-6.00	100 100 90	CS 1			Strong light grey fine grained crystalline LIMESTONE WEATHERING: Slight with no obvious dissolution or loss of strength. DISCONTINUITIES: Subhorizontal to subvertical closely to medium spaced planar rough to smooth fractures.	5.00 +1.54		
6.00-7.25	100 100 100				6.00 m Clay infilled fracture 6.25 m 25° rough fracture			
7.05		CS 2			7.18 m 25° rough fracture			
7.25-8.75	100 100 80				7.80 m 45° smooth fracture			
8.35-8.75	70 450 600	CS 3			8.10 m 25° clay infilled fracture	(6.70)		
8.75-10.25	100 100 100				8.65 m Drilling induced fracture			
					9.75 m 70° clay smeared fracture			
Stratum continued next sheet								

Groundwater Entries			Depth Related Remarks		Chiselling		
No.	Struck (m)	Post strike behaviour	Depth sealed (m)	From to (m)	Depths (m)	Time	Tools used
1	1.80	-	-				

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough KC3210
Project No.
Carried out for Galway County Council

Scale 1:50

(c) MESA HRIF (298), 11/02/2004 11:21:35



Borehole
RC63
Sheet 1 of 2

Borehole Log

Drilled by MN Logged by CH Checked by ROR	Start 17/12/2003 End 17/12/2003	Equipment, Methods and Remarks	Depth from 0.00m to 5.00m Diameter 131mm Casing Depth 75mm	Ground Level Coordinates National Grid +6.54 mOD E 127915.02 N 228222.50
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Samples and Tests				Strata				Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description				
10.25-11.70	100 100 100			17/12/2003 5.00	1800 0.50	Strong light grey fine grained crystalline LIMESTONE WEATHERING: Slight with no obvious dissolution or loss of strength. DISCONTINUITIES: Subhorizontal to subvertical closely to medium spaced planar rough to smooth fractures. 10.25 m 70" incipient fracture EXPLORATORY HOLE ENDS AT 11.70 m	11.70	-5.16		
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water					

Groundwater Entries No. Struck Post strike behaviour (m)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council	Borehole RC63 Sheet 2 of 2
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Borehole Log

Drilled by AC Logged by JL Checked by ROR	Start 08/10/2003 End 08/10/2003	Equipment, Methods and Remarks Hiltwister Rotary Core 65mm diameter 0.00m to 16.0m	Depth from 0.00m to 16.00m Diameter 65mm Casing Depth	Ground Level +6.57 mOD Coordinates E 128307.00 National Grid N 228114.60
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Samples and Tests					Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Description				
0.00-1.00	0 N/A N/A		No Recovery	08/10/2003	0800	PEAT**				
1.00-2.50	0 N/A N/A		No Recovery					(5.20)		
2.50-4.00	0 N/A N/A		No Recovery							
4.00-5.50	0 N/A N/A		No Recovery							
5.50-7.00	0 N/A N/A		No Recovery			Soft grey silty CLAY**		5.20 +1.37		
7.00-8.50	0 N/A N/A		No Recovery					(4.00)		
8.50-10.00	53 N/A N/A					Limestone BOULDERS.		9.20 -2.63		
9.72			CS 1			Stratum continued next sheet		(0.80)		

Groundwater Entries No. Struck (m) Post strike behaviour None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by AC Logged by JL Checked by ROR		Start 08/10/2003 End 08/10/2003		Equipment, Methods and Remarks		Depth from 0.00m to 16.00m Diameter 65mm Casing Depth		Ground Level +6.57 mOD Coordinates E 128307.00 National Grid N 228114.60	
Samples and Tests						Strata			
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
10.00-11.50	20 N/A N/A					Possible BOULDERS** Recovered as medium to coarse subangular to subrounded GRAVEL of limestone. Poor recovery.	10.00 -3.43 (2.55)		
11.50-13.00	37 30 30								
13.00-13.63			CS 2			Strong grey fine grained slightly fossiliferous LIMESTONE with occasional calcite veins.	12.55 -5.98		
13.00-14.50	65 65 65	NI 260 400				WEATHERING: Slight solution features on exposed surfaces. DISCONTINUITIES: 0° -10° closely to medium spaced rough to smooth fractures	(1.95)		
14.50-16.00	0 N/A N/A		No Recovery	08/10/2003	1800	CAVITY infilled with very soft SILT**	14.50 -7.93 (1.50)		
						EXPLORATORY HOLE ENDS AT 16.00 m	16.00 -9.43		
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water				
Groundwater Entries				Depth sealed (m)		Depth Related Remarks		Chiselling	
No. Struck Post strike behaviour						From to (m)		Depths (m) Time Tools used	
None observed (see Key Sheet)									
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough		Borehole	
Scale 1:50						Project No. KC3210		RC106	
(c) MESSG HBIII (298), 16/02/2004 09:59:06						Carried out for Galway County Council		Sheet 2 of 2	

Borehole Log

Drilled by MN Logged by Checked by ROR		Start 07/11/2003 End 07/11/2003		Equipment, Methods and Remarks Open Hole Drilling 131mm diameter from 0.0m to 27.0m.			Depth from 0.00m to 27.00m Diameter 131mm Casing Depth		Ground Level Coordinates National Grid +6.57 mOD E 128307.45 N 228115.98	
Samples and Tests					Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments		
			07/11/2003	0800	PEAT**	(8.00)				
					Grey CLAY with gravel**	8.00 -1.43				
						(1.70)				
					Stratum continued next sheet	9.70 -3.13				
Depth	Type & No	Records	Date Casing	Time Water	Depth Related Remarks	Chiselling Depths (m)	Time	Tools used		
Groundwater Entries No. Struck Post strike behaviour 1 2.00 -					Depth sealed (m) -	From to (m)				
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council	Borehole RC106A Sheet 1 of 3				
Scale 1:50 <small>(c) MESH HBIII (298), 28/01/2004 14:17:46</small>										

Borehole Log

Drilled by MN Logged by Checked by ROR		Start 07/11/2003 End 07/11/2003		Equipment, Methods and Remarks		Depth from 0.00m to 27.00m Diameter 131mm Casing Depth		Ground Level Coordinates National Grid +6.57 mOD E 128307.45 N 228115.98		
Samples and Tests					Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments		
0.00-27.00	Rotary Open Hole Drilling				Grey boulder CLAY**	(0.70)				
					Loose BOULDERS**	10.40 -3.83 (1.20)				
					Boulder CLAY**	11.60 -5.03 (1.60)				
					Black CLAY**	13.20 -6.63 (1.50)				
14.70-15.08	SPT S	50 (2,9/18,30,2)	14.70	2.00	White SAND**	14.70 -8.13 (2.30)				
16.20-16.65	SPT S	N=50 (5,7/8,9,18,15)	16.20	2.00	Brown SAND**	17.00 -10.43 (2.20)				
19.20-19.53	SPT S	50 (12,12/17,18,15 for 25mm)	19.20	2.00	Coarse white SAND**	19.20 -12.63				
					Stratum continued next sheet					
Depth	Type & No	Records	Date Casing	Time Water	Groundwater Entries		Depth Related Remarks			
No. Struck (m)			Post strike behaviour		Depth sealed (m)		From to (m)			
							Chiselling Depths (m) Time Tools used			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough			Borehole RC106A		
Scale 1:50					Project No. KC3210			Sheet 2 of 3		
(c) MESG HBIII (288), 28/01/2004 14:17:49					Carried out for Galway County Council			AGS		

Borehole Log

Drilled by MN Logged by Checked by ROR		Start 07/11/2003 End 07/11/2003		Equipment, Methods and Remarks		Depth from 0.00m to 27.00m Diameter 131mm Casing Depth		Ground Level Coordinates National Grid		+6.57 mOD E 128307.45 N 228115.98		
Samples and Tests					Strata							
Depth	Type & No	Records	Date Casing	Time Water	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments		
					Coarse white SAND**			(1.60)				
					Brown CLAY**			20.80 -14.23				
								(2.90)				
					Brown SAND**			23.70 -17.13				
								(3.30)				
			07/11/2003	1800 0.50	EXPLORATORY HOLE ENDS AT 27.00 m			27.00 -20.43				
Depth	Type & No	Records	Date Casing	Time Water	Depth Related Remarks			Chiselling				
Groundwater Entries			Depth sealed (m)		From to (m)			Depths (m)		Time Tools used		
No.	Struck (m)	Post strike behaviour										
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council			Borehole RC106A Sheet 3 of 3				
Scale 1:50					(c) MESH HBIII (298), 28/01/2004 14:17:52							

Borehole Log

Drilled by TB Logged by Checked by ROR	Start 22/10/2003 End 22/10/2003	Equipment, Methods and Remarks Open Hole 131mm diameter from 0.0m to 20.0m.	Depth from 0.00m to 20.00m Diameter 131mm Casing Depth	Ground Level Coordinates National Grid +6.33 mOD E 128349.60 N 228088.20
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Samples and Tests					Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description					
			22/10/2003	0800	Hard stiff brown CLAY**					
					Stratum continued next sheet			(15.00)		

Groundwater Entries No. Struck Post strike behaviour 1 8.00 -	Depth sealed (m) -	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by TB Logged by Checked by ROR		Start 22/10/2003 End 22/10/2003		Equipment, Methods and Remarks		Depth from 0.00m to 20.00m Diameter 131mm Casing Depth		Ground Level Coordinates National Grid +6.33 mOD E 128349.60 N 228088.20	
Samples and Tests				Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments	
0.00-20.00	Rotary Open Hole Drilling				Hard stiff brown CLAY**				
					White SAND**	15.00 -8.67 (4.00)			
					Hard brown CLAY**	19.00 -12.67 (1.00)			
			22/10/2003	1800					
					EXPLORATORY HOLE ENDS AT 20.00 m				
Groundwater Entries		Depth sealed (m)		Depth Related Remarks		Chiselling Depths (m) Time Tools used			
No. Struck (m)	Post strike behaviour			From	to (m)				
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.		Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough		Project No. KC3210		Borehole RC111 Sheet 2 of 2			
Scale 1:50		(c) MESH HBIII (298), 28/01/2004 14:18:05		Carried out for Galway County Council		AGS			

Borehole Log

Drilled by AC Logged by JL Checked by ROR		Start 09/10/2003 End 09/10/2003		Equipment, Methods and Remarks Hiltwister Rotary Core 65mm diameter 0.00m to 14.50m.		Depth from 0.00m to 14.50m Diameter 65mm Casing Depth		Ground Level Coordinates National Grid +7.21 mOD E 128401.80 N 228088.20			
Samples and Tests						Strata					
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
0.00-1.00	0 0 0		No recovery	09/10/2003	0800	PEAT** Grey brown sandy gravelly CLAY with boulders**		(0.30) 0.30 +6.91			
1.00-2.50	66 13 13					1.00-1.63 m Recovered as subrounded coarse GRAVEL of limestone 1.63-2.30 m Recovered as limestone COBBLES.		(2.00)			
2.50-2.88			CS 1			Strong grey fine grained slightly fossiliferous LIMESTONE with occasional clay bands between 5.50m and 10.00m.		2.30 +4.91			
3.00			CS 2			WEATHERING: Occasional dissolution features on fracture surfaces, penetrating up to 40mm, resulting in small voids and localised brown discolouration. No loss in strength.					
2.50-4.00	95 93 93					DISCONTINUITIES: 20 - 45° closely to medium spaced smooth planar fractures, often with calcite on fracture surfaces and 0° - 10° subhorizontal closely spaced smooth planar and undulating fractures.					
4.00-5.50	100 100 80					3.49-3.68 m 70° smooth undulating fracture with calcite on surface 3.69-3.80 m Non-intact, recovered as angular coarse gravel, assessed zone of core loss 4.54-4.61 m 60° smooth planar fracture with calcite on surface					
5.50-7.00	94 74 61					5.56-5.68 m Orange to light brown slightly sandy CLAY (up to 150mm) 5.68-5.91 m Non-intact, Assessed zone of core loss					
7.00-8.50	61 61 61					7.46-7.65 m Assessed zone of core loss 8.10-8.50 m Assessed zone of core loss		(12.20)			
8.50-10.00	51 41 31	NI 360 670				8.73-9.47 m Assessed zone of core loss 9.31-9.46 m Orange to light brown slightly sandy CLAY (up to 150mm)					
						Stratum continued next sheet					
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Groundwater Entries		Depth Related Remarks		Chiselling	
				Depth sealed (m)		From to (m)		Depths (m)		Time Tools used	
None observed (see Key Sheet)											
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project		N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough		Borehole			
Scale 1:50				Project No.		KC3210		RC115			
(c) MESH HBH (288), 16/02/2004 09:58:25				Carried out for		Galway County Council		Sheet 1 of 2			

Borehole Log

Drilled by AC Logged by JL Checked by ROR		Start 09/10/2003 End 09/10/2003		Equipment, Methods and Remarks			Depth from 0.00m to 14.50m Diameter 65mm Casing Depth		Ground Level Coordinates National Grid +7.21 mOD E 128401.80 N 228088.20	
Samples and Tests						Strata				
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
10.00-11.50	100 97 97					Strong grey fine grained slightly fossiliferous LIMESTONE with occasional clay bands between 5.50m and 10.00m. WEATHERING: Occasional dissolution features on fracture surfaces, penetrating up to 40mm, resulting in small voids and localised brown discolouration. No loss in strength. DISCONTINUITIES: 20 - 45° closely to medium spaced smooth planar fractures, often with calcite on fracture surfaces and 0° - 10° subhorizontal closely spaced smooth planar and undulating fractures.				
11.50-13.00	100 100 96									
13.00-14.50	100 100 100			09/10/2003	1800					
						EXPLORATORY HOLE ENDS AT 14.50 m	14.50	-7.29		
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Groundwater Entries		Chiselling		
No. Struck Post strike behaviour (m)				Depth sealed (m)		Depth Related Remarks From to (m)		Depths (m) Time Tools used		
None observed (see Key Sheet)						14.50 Unable to backreaming rods, cut off rods at ground level.				
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council		Borehole RC115 Sheet 2 of 2		
Scale 1:50 (c) MESH HBIII (298), 16/02/2004 09:59:30										

Borehole Log

Drilled by Hillards Logged by SL Checked by ROR		Start 20/10/2003 End 21/10/2003		Equipment, Methods and Remarks Rotary Cored 65mm diameter from 0.0m to 14.50m.		Depth from 0.00m to 14.50m Diameter 65mm Casing Depth		Ground Level Coordinates National Grid +10.12 mOD E 128452.80 N 228086.90		
Samples and Tests						Strata				
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Description		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.00-1.00	50 0 0			20/10/2003	0800	SILT and BOULDERS** Recovered as coarse angular to subrounded limestone gravel, assessed zone of core loss		(0.80)		
1.15-1.34			CS 1			Moderate strong to strong grey crystalline fine grained fossiliferous LIMESTONE with occasional stylolites.		0.80 +9.32		
1.00-2.50	60 37 29					WEATHERING: Fresh to slight brown discolouration on fracture surfaces.				
2.23			CS 2			DISCONTINUITIES Subhorizontal to 10° very closely to widely predominately medium spaced planar smooth to rough fractures.				
3.22	91 86 82		CS 3			1.04 m 45-55° planar smooth fracture with light brown clay smear 1.08 m 45-55° planar smooth fracture with light brown clay smear 2.00 m 45-55° possibly producing some non intact, assessed zone of core loss 2.33-2.40 m Subvertical planar stepped fracture				
4.00-5.50	95 79 79					3.80 m 45-55° planar smooth fracture with light brown clay smear 4.60 m 55-60° planar smooth fracture				
				20/10/2003	1800	5.15-5.37 m 55-60° planar smooth fracture				
				21/10/2003	0800					
5.50-7.00	99 89 86									
		NI 250 870				7.10 m Incipient 45-55° fracture				
7.00-8.50	99 99 99					7.53 m 45-55° planar smooth fracture		(13.70)		
						8.57 m 45-55° planar smooth fracture				
8.50-10.00	96 85 55					9.40 m 60° planar smooth fracture with light brown clay smear on surface				
						Stratum continued next sheet				
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water					
Groundwater Entries No. Struck Post strike behaviour (m)				Depth sealed (m)		Depth Related Remarks From to (m)		Chiselling Depths (m) Time Tools used		
None observed (see Key Sheet)										
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough KC3210		Borehole RC118 Sheet 1 of 2				
Scale 1:50 (c) MESG HBIII (298), 05/02/2004 13:24:17				Project No. Carried out for Galway County Council		AGS				

Borehole Log

Drilled by Hillard Logged by SL Checked by ROR		Start 20/10/2003 End 21/10/2003		Equipment, Methods and Remarks		Depth from 0.00m to 14.50m Diameter 65mm Casing Depth		Ground Level +10.12 mOD Coordinates E 128452.80 National Grid N 228086.90		
Samples and Tests					Strata					
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
10.00-13.00	50 40 40					Moderate strong to strong grey crystalline fine grained fossiliferous LIMESTONE with occasional stylolites. WEATHERING: Fresh to slight brown discolouration on fracture surfaces. DISCONTINUITIES Subhorizontal to 10° very closely to widely predominately medium spaced planar smooth to rough fractures.	10.30 m 45-55° planar smooth fracture 10.60-10.90 m Subvertical planar stepped smooth fracture possibly produced some non intact, assessed zone of core loss. 11.65-12.00 m Non Intact: Recovered as coarse angular limestone gravel			
13.00-14.50	100 97 97			21/10/2003	1800					
						EXPLORATORY HOLE ENDS AT 14.50 m	14.20-14.27 m 55-60° planar smooth fracture with brown discolouration on surface	14.50	-4.39	
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)		Depth Related Remarks From to (m)		Chiselling Depths (m) Time Tools used
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council		Borehole RC118 Sheet 2 of 2		

Borehole Log

Drilled by TB Logged by JL Checked by ROR	Start 07/10/2003 End 08/10/2003	Equipment, Methods and Remarks Soil Mech Rotary Open Hole 100mm diameter 0.00m to 1.05m. Rotary Core 65mm diameter 1.05m to 12.30m. Borehole examined using televiewer.	Depth from 0.00m to 1.05m to 1.05m to 12.30m Diameter 100mm Casing Depth 65mm	Ground Level +16.44 mOD Coordinates E 128583.50 National Grid N 228031.20
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-1.05	Rotary Open Hole Drilling		07/10/2003	0800	Boulder CLAY**	(0.80)		
					LIMESTONE**	0.80 +15.64		
1.05-1.70	100 71 29				Strong grey fine grained LIMESTONE	1.05 +15.39		
					WEATHERING: Slight solution features on occasional fracture surfaces.			
					DISCONTINUITIES: 1.05m - 3.60m: 0 - 20° very closely to medium spaced predominantly closely spaced smooth undulating smooth fractures. 3.60m - 12.30m: 0 -20° very closely to widely spaced, predominantly medium spaced smooth undulating fractures.			
1.70-2.75	97 86 74	NI 110 260			1.09-1.19 m 50° smooth undulating fracture			
2.75-3.60	98 91 87				1.28-1.37 m Non-intact			
		CS 1			2.70-2.75 m 45° smooth undulating fracture			
3.85-4.30					2.75-2.78 m Non-intact			
3.60-5.10	98 98 98				3.03-3.44 m 80° smooth planar fracture with abundant calcite on fracture surface			
		CS 2			4.82-4.87 m 40° smooth undulating fracture			
5.10-6.60	87 87 87				5.17-5.24 m 50° smooth planar fracture			
					5.43-5.60 m 3 No 45° fractures all displaying slight calcite mineralisation on fracture surfaces			
6.60-8.10	100 96 77				6.56-6.60 m 40° smooth planar fracture	(11.25)		
		CS 3			7.88-7.90 m Non-intact			
8.10-9.15	97 97 95	Slipped Core						
9.15-10.10	100 100 67	Slipped Core						
					Stratum continued next sheet			
						9.84-9.90 m 45° smooth planar		

Groundwater Entries No. Struck (m) Post strike behaviour None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council	Borehole RC122 Sheet 1 of 2
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Borehole Log

Drilled by TB Logged by JL Checked by ROR		Start 07/10/2003 End 08/10/2003		Equipment, Methods and Remarks				Depth from 0.00m to 1.05m to 1.05m 12.30m Diameter 100mm Casing Depth 65mm		Ground Level Coordinates National Grid		+16.44 mOD E 128583.50 N 228031.20			
Samples and Tests						Strata									
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Description				Depth,Level/ (Thickness)	Legend	Backfill/ Instruments			
10.10-11.60	100 99 75			07/10/2003 1.05	1800 dry	Strong grey fine grained LIMESTONE fracture with calcite on surface 10.06-10.10 m 35° smooth undulating fracture with calcite on fracture surface 10.46-10.50 m Non-intact.									
				08/10/2003 1.05	0800	WEATHERING: Slight solution features on occasional fracture surfaces. DISCONTINUITIES: 1.05m - 3.60m: 0 - 20° very closely to medium spaced predominantly closely spaced smooth undulating smooth fractures. 3.60m - 12.30m: 0 -20° very closely to widely spaced, predominantly medium spaced smooth undulating fractures.									
11.60-12.30	100 100 100			08/10/2003 1.05	1800 dry	EXPLORARY HOLE ENDS AT 12.30 m				12.30	+4.14				
Depth	TCR SCR RGD	If	Records/Samples	Date Casing	Time Water	Groundwater Entries				Depth Related Remarks		Chiselling			
No. Struck Post strike behaviour (m) None observed (see Key Sheet)						Depth sealed (m)		From to (m)				Depths (m)		Time	Tools used
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough KC3210		Borehole RC122 Sheet 2 of 2				Scale 1:50 (c) MES/G HBIII (298), 11/02/2004 11:32:29 AGS Carried out for Galway County Council					

Borehole Log

Drilled by TB Logged by JL Checked by ROR	Start 09/10/2003 End 09/10/2003	Equipment, Methods and Remarks Soil Mech Rotary Open Hole 131 diameter 0.00m to 0.90m. Rotary Core 66mm diameter 0.90m to 10.70m. Borehole examined using televiewer.	Depth from 0.00m to 0.90m	to 0.90m 10.70m	Diameter 131mm 66mm	Casing Depth	Ground Level Coordinates National Grid	+16.03 mOD E 128748.72 N 228019.54
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Samples and Tests				Strata				
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.00-0.90	Rotary Open Hole Drilling		09/10/2003	0800	Clay bound LIMESTONE**	(0.90)		
0.90-1.70	84 60 34 NI 60 160				Strong grey fine grained fossiliferous LIMESTONE with occasional calcite veins. WEATHERING: Possible solution features on fracture surfaces. DISCONTINUITIES: 0° - 20° very closely to medium spaced, predominantly closely spaced to 1.70m, then predominantly medium spaced smooth planar to undulating fractures.	0.90 - 1.22 m 90° rough planar fracture producing partially non-intact core 1.22-1.64 m Non-intact, recovered as coarse gravel. Assessed zone of core loss 1.64-1.70 m 40° smooth undulating fracture	0.90 +15.13	
1.85		CS 1				2.83-2.85 m 30° smooth undulating to stepped fracture		
1.70-3.00	100 100 91					3.61-3.72 m 70° smooth undulating fracture 3.78-4.63 m 80° smooth planar fracture with occasional calcite on fracture surfaces.		
3.00-4.50	100 100 96					5.69-5.73 m Non-intact	(9.80)	
4.50-6.10	93 93 79 NI 400 590							
6.70-7.09 6.10-7.60	100 100 100	CS 2						
7.60-9.10	91 84 84					8.55-8.62 m 55° -80° smooth planar fracture 8.68-8.80 m Partially non-intact core 9.15-9.21 m Non-intact		
9.10-10.70	100 98 95				Stratum continued next sheet			

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by TB Logged by JL Checked by ROR	Start 08/10/2003 End 08/10/2003	Equipment, Methods and Remarks Soil Mech Rotary Open Hole 131 diameter 0.00m to 1.00m. Rotary Core 68mm diameter 1.00m to 6.20m.	Depth from 0.00m 1.00m	to 1.00m 6.20m	Diameter 131mm 68mm	Casing Depth	Ground Level Coordinates National Grid	+9.89 mOD E 128883.40 N 227998.86
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-1.00	Rotary Open Hole Drilling		08/10/2003	0800	Weathered clay bound LIMESTONE**		(1.00)		
1.00-1.40	40 0 0				Strong grey fine grained LIMESTONE WEATHERING: Occasional slight solution features on fracture surfaces.	1.00-1.40 m Non-intact. Recovered as angular coarse gravel	1.00 +8.89		
1.40-2.60	85 52 36				DISCONTINUITIES: 30° and 60° very closely to medium spaced predominantly closely to medium spaced smooth undulating fractures with frequent brown clay smearing on fracture surfaces.	1.52-1.83 m Non-intact, assumed zone of core loss 1.83-1.90 m Subvertical to 85 degree smooth planar fracture 1.90-2.20 m Non-intact			
2.60-3.00	90 73 38					2.66-2.72 m Non-intact. Assessed zone of core loss			
3.00-3.40	100 85 75	CS 1				2.90-3.00 m 75° smooth planar fracture			
3.40-3.84		CS 2				3.17-3.19 m Non-intact			
3.40-4.00	100 73 58					3.30-3.33 m Non-intact	(5.20)		
3.90		CS 3				3.63-3.83 m 80° smooth planar fracture with calcite on fracture surface			
4.00-4.80	75 55 44					4.03-4.30 m Subvertical smooth planar fracture with calcite on surface			
4.70		CS 4				4.30-4.64 m Non-intact, assessed zone of core loss			
4.80-5.55	81 71 37					4.64-5.38 m Subvertical to 80° smooth planar fracture with slight calcite mineralisation on surface			
5.55-6.20	92 92 92		08/10/2003	1800		6.00-6.20 m 65° smooth planar fracture with calcite on surface	6.20 +3.69		
					EXPLORATORY HOLE ENDS AT 6.20 m				

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by TB Logged by SL Checked by ROR	Start 21/10/2003 End --- 21/10/2003	Equipment, Methods and Remarks Open hole 131mm diameter from 0.0m to 2.50m. Rotary Cored 75mm diameter from 2.50m to 6.0m.	Depth from 0.00m to 2.50m to 2.50m to 6.00m Diameter 131mm Casing Depth 75mm	Ground Level +6.66 mOD Coordinates E 129014.93 National Grid N 228032.34
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Samples and Tests				Strata			Ground Level Coordinates		
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments	
0.00-2.50	Rotary Open Hole Drilling	if //	21/10/2003	0800	Boulder CLAY**	(2.50)			
2.50-4.00	30 0 0				Broken LIMESTONE or BOULDERS** Recovered as angular GRAVEL of limestone with light brown smears less than 2mm on surfaces.	2.50 +4.16		1	
3.70		CS 1						2	
4.00-4.50	60 0 0					(3.50)			
4.50-6.00	30 0 0				4.25-4.48 m Possible BOULDER of limestone				
			21/10/2003	1800	EXPLORATORY HOLE ENDS AT 6.00 m	6.00 +0.66			

Groundwater Entries No. Struck Post strike behaviour 1 2.50 - 2 3.20 -	Depth sealed (m) - -	Depth Related Remarks From to (m) 3.00 6.00 Borehole caved in.	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) MESH HBIII (298), 18/02/2004 10:00:43



Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough
 Project No. KC3210
 Carried out for Galway County Council

Borehole
RC127
 Sheet 1 of 1

Borehole Log

Drilled by TB Logged by SL Checked by ROR	Start 18/10/2003 End 21/10/2003	Equipment, Methods and Remarks Open Hole 131mm diameter from 0.00m to 1.00m. Rotary Cored 75mm diameter from 1.0m to 14.50m.	Depth from 0.00m to 1.00m	to 1.00m 14.50m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+18.61 mOD E 129164.75 N 228076.23
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Samples and Tests				Strata				
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.00-1.00	Rotary Open Hole Drilling		18/10/2003	0800	OVERBURDEN**	(0.70)		
1.00-2.00	80 N/A N/A				Broken LIMESTONE** Non Intact: Recovered as coarse angular limestone GRAVEL with occasional slight brown clay smears less than 1mm thick on surfaces.	0.70 +17.91		
2.00-3.50	87 47 9	NI 50 170			Strong grey fine grained LIMESTONE. WEATHERING: Slight light brown discolouration on fracture surfaces with occasional light brown clay smear less than 1mm thick. DISCONTINUITIES: 1.00-3.50m: Subhorizontal to 10° very closely to closely predominately very closely spaced planar to undulating smooth to rough fractures. 3.50-10.80m: Subhorizontal to 10° very closely to medium predominately closely spaced planar to undulating smooth to rough fractures.	2.00 +16.61		
3.50-4.80	92 85 46				2.25-2.45 m Subvertical planar smooth fracture with light brown clay smear less than 1mm on surfaces. 2.75-2.83 m 80-70° planar to slightly undulating smooth fracture			
4.80-6.30	100 75 39				3.95 m Subhorizontal to 25° undulating smooth fracture			
6.30-7.90	38 37 34	5 150 340			4.65 m 45-50° planar smooth fracture with less than 1mm light brown clay smear on fracture surfaces			
7.90-8.30	100 83 0		18/10/2003	1800	6.00-6.20 m 45-50° planar smooth fracture producing some non intact core	(12.50)		
8.30-9.90	94 78 56		19/10/2003	1800	8.60 m 55-60° planar smooth fracture 8.80-8.93 m Subvertical to 70° planar rough fracture 9.20-10.80 m LIMESTONE becomes dark grey.			
			20/10/2003	0800	Stratum continued next sheet			

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by TB Logged by SL Checked by ROR	Start 18/10/2003 End 21/10/2003	Equipment, Methods and Remarks	Depth from 0.00m to 1.00m to 1.00m to 14.50m Diameter 131mm Casing Depth 75mm	Ground Level +18.61 mOD Coordinates E 129164.75 National Grid N 228076.23
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Samples and Tests						Strata			
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
9.90-10.80	98 88 88					Strong grey fine grained LIMESTONE. WEATHERING: Slight light brown discolouration on fracture surfaces with occasional light brown clay smear less than 1mm thick. DISCONTINUITIES: 1.00-3.50m: Subhorizontal to 10° very closely to closely predominately very closely spaced planar to undulating smooth to rough fractures. 3.50-10.80m: Subhorizontal to 10° very closely to medium predominately closely spaced planar to undulating smooth to rough fractures.			
10.80-11.30	0 0 0			20/10/2003	1800				
11.30-12.10	0 0 0			21/10/2003	0800				
				21/10/2003	1800				SP
						EXPLORATORY HOLE ENDS AT 14.50 m	14.50	+4.11	

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) MESH HBIII (286), 11/02/2004 11:17:48



Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleava to Menlough
 Project No. KC3210
 Carried out for Galway County Council

Borehole
RC129
 Sheet 2 of 2

Borehole Log

Drilled by TB Logged by SL Checked by ROR	Start 17/10/2004 End 17/10/2004	Equipment, Methods and Remarks Open hole 131mm diameter from 0.0m to 1.0m. Rotary Cored 75mm diameter from 1.0m to 5.25m.	Depth from 0.00m to 1.00m	to 1.00m to 5.25m	Diameter 131mm to 75mm	Casing Depth	Ground Level Coordinates National Grid	+10.86 mOD E 129384.30 N 228142.61
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-1.00	Rotary Open Hole Drilling		17/10/2003	0800	OVERBURDEN**		(0.60)		
1.00-1.50	30 0 0				Strong grey fine grained fossiliferous LIMESTONE.		0.60 +10.26		
1.50-2.15	77 31 0	15 80 160			WEATHERING: Slight light brown discolouration on fracture surface.	1.00-1.40 m Assessed zone of core loss			
2.15-2.65	88 46 0				DISCONTINUITIES: 1.00m to 3.80m: Subhorizontal to 10° very closely to closely predominately closely spaced planar smooth fracture. 3.80-5.25m: Subhorizontal very closely to medium predominately closely spaced planar smooth fracture.	1.40-1.50 m Undulating rough fracture with brown discolouration on surface 1.52 m 45-55° undulating rough fracture 2.15 m 55 to 65° undulating rough fracture			
2.65-3.60	68 48 34					3.20-3.28 m 60 to 70° planar smooth fracture	(4.65)		
3.60-5.25	83 56 36	9 150 450	17/10/2003 1.00	1800	EXPLORATORY HOLE ENDS AT 5.25 m		5.25 +5.61		

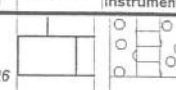
Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by TB Logged by SL Checked by ROR		Start 14/10/2003 End 17/10/2003		Equipment, Methods and Remarks Open hole 131mm diameter from 0.0m to 1.00m. Rotary Cored 75mm diameter from 1.00m to 10.40m.		Depth from 0.00m to 1.00m to 1.00m to 10.40m		Diameter 131mm Casing Depth 75mm		Ground Level Coordinates National Grid		+11.66 mOD E 129358.85 N 228156.25	
Samples and Tests						Strata							
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments					
0.00-1.00	Rotary Open Hole Drilling		14/10/2003	0800	Boulders possible weathered LIMESTONE**	(1.00)							
1.00-1.70	21 0 0				BOULDER / weathered LIMESTONE** Non Intact: Recovered as coarse subrounded to angular limestone GRAVEL. Assessed zone of core loss.	1.00 +10.66							
1.70-2.70	138 18 0		14/10/2003	1800		(1.70)							
2.70-3.60	61 47 28		16/10/2003	0800	Strong to moderate strong grey finegrained LIMESTONE. WEATHERING: Fresh to slight light brown discolouration on fracture surfaces. DISCONTINUITIES: 0.0m to 6.80m: Subhorizontal very closely to closely predominately closely spaced planar smooth fractures. 6.80m to 10.40m: Subhorizontal very closely to medium spaced predominately medium spaced planar smooth fractures.	2.70 +8.96							
3.60-4.45	66 29 0	NI 110 200											
4.45-4.60		TCR 100, SCR 0, RQD 0											
4.60-6.10	29 0 0												
6.10-6.80	93 0 0					(7.70)							
6.80-8.00	82 0 0		16/10/2003	1800									
8.00-9.10	98 86 0	30 260 520	17/10/2003	0800									
9.10-9.55	87 0 0												
9.55-10.40	79 29 13												
Depth	If	Records/Samples	Date Casing	Time Water	Stratum continued next sheet								
Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)					Depth Related Remarks From to (m)					Chiselling Depths (m) Time Tools used			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.					Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough KC3210 Carried out for Galway County Council					Borehole RC133 Sheet 1 of 2			
Scale 1:50 (c) MESH HBIII (298), 28/01/2004 14:18:54					AGS								

Borehole Log

Drilled by TB Logged by SL Checked by ROR	Start 14/10/2003 End 17/10/2003	Equipment, Methods and Remarks	Depth from 0.00m to 1.00m 1.00m	to 1.00m 10.40m	Diameter 131mm 75mm	Casing Depth	Ground Level Coordinates National Grid	+11.66 mOD E 129358.85 N 228156.25
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Samples and Tests				Strata				Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water	Description				
				17/10/2004	1800	Strong to moderate strong grey finegrained LIMESTONE. WEATHERING: Fresh to slight light brown discolouration on fracture surfaces. DISCONTINUITIES: 0.0m to 6.80m: Subhorizontal very closely to closely predominately closely spaced planar smooth fractures. 6.80m to 10.40m: Subhorizontal very closely to medium spaced predominately medium spaced planar smooth fractures. EXPLORATORY HOLE ENDS AT 10.40 m		10.40	+1.26	 SP
Depth	TCR SCR ROD	If	Records/Samples	Date Casing	Time Water					

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Borehole Log

Drilled by TB Logged by JL Checked by ROR	Start 10/10/2003 End 11/10/2003	Equipment, Methods and Remarks Soil Mech Rotary Open Hole 131mm diameter 0.00m to 1.00m. Rotary Core 68mm diameter 1.00m to 10.00m.	Depth from 0.00m to 1.00m	Diameter 131mm Casing Depth 10.00m	Ground Level Coordinates National Grid +13.10 mOD E 129503.30 N 228274.50
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-1.00	Rotary Open Hole Drilling		10/10/2003	0800	OVERBURDEN**	(0.50)		
					Weathered LIMESTONE**	0.50 +12.60		
1.00-1.70	100 54 23				Strong light grey fine grained to crystalline LIMESTONE with occasional becoming frequent crenulated stylolites.	1.00 +12.10		
1.70-2.70	52 28 28				WEATHERING: Dissolution features are common with fracture surfaces displaying chalky residue and occasional brown clay smearing			
2.50		CS 1			DISCONTINUITIES: 1.0m -6.0m: 0° -10° very closely to medium spaced, predominantly closely spaced smooth undulating fractures. 6.0m - 10.0m: 0° -10° medium to widely spaced predominantly medium spaced smooth undulating fractures.			
3.00		CS 2						
2.70-4.20	100 100 84							
3.70-3.92		CS 3						
4.20-4.50		TCR 63, SCR 0, RQD 0						
4.50-6.00	100 73 64					(9.00)		
6.00-6.40	95 95 70							
6.40-7.40	80 80 80							
7.40-8.40	100 100 100		10/10/2003	1800				
			1.00	dry				
			11/10/2003	0800				
			1.00					
8.40-10.00	100 100 100		11/10/2003	1800				
			1.00					
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	EXPLORATORY HOLE ENDS AT 10.00 m		

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) MEG HBIII (298), 05/02/2004 13:15:46



Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough

Project No. KC3210

Carried out for Galway County Council

Borehole
RC138
 Sheet 1 of 1

Borehole Log

Drilled by TB Logged by JL Checked by ROR	Start 12/10/2003 End 14/10/2003	Equipment, Methods and Remarks Soil Mech Rotary Open Hole 131mm diameter 0.00m to 0.70m. Rotary Core 68mm diameter 0.20m - 10.00m. Borehole collapsed - not examined using televiewer.	Depth from 0.00m to 0.70m to 0.70m to 10.00m Diameter 131mm Casing Depth 68mm	Ground Level Coordinates National Grid	+11.58 mOD E 129502.60 N 228240.80
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








Samples and Tests				Strata		Depth, Level (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-0.70	Rotary Open Hole Drilling		12/10/2003	0800	OVERBURDEN** LIMESTONE**	0.20 +11.38 (0.50)		
0.70-1.90	73 53 22				Strong light grey brown fine grained to crystalline LIMESTONE. WEATHERING: Dissolution features are common, with fracture surfaces displaying chalky residue, often accompanied by yellow brown discolouration.	0.70 +10.88		
2.15-2.35 1.90-2.60	90 67 59	CS 1			DISCONTINUITIES: 0 - 10 degree closely to medium spaced, predominantly closely spaced smooth planar to undulating fractures. Between 0.70m - 5.50m: 60 - 75 degree medium spaced smooth planar to undulating fractures, often with yellow brown staining on surface.			
2.60-3.20	103 83 83	NI 110 210						
3.20-3.90 3.60	89 71 71	CS 2						
3.90-4.45 4.40	100 75 56	CS 3	12/10/2003	1800				
4.45-4.75		TCR 87, SCR 13, RQD 73	13/10/2003	0800				
4.75-5.00		TCR 100, SCR 88, RQD 68	13/10/2003	0800				
5.00-6.50	100 100 85		13/10/2003	1800		(9.30)		
6.50-8.10	100 100 100	60 260 880	14/10/2003	0800				
8.10-9.70	94 94 89		14/10/2003	1800				
			14/10/2003	1800				
Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water	EXPLORATORY HOLE ENDS AT 10.00 m		

Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks From to (m)	Chiselling Depths (m) Time Tools used
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

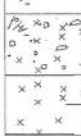

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council	Borehole RC140 Sheet 1 of 1
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Trial Pit Log

Logged by DJB Checked by ROR		Start End	Equipment, Methods and Remarks Excavated using a track machine.	Dimensions and Orientation Width 2.00 m Length 2.50 m  75 (Deg)	Ground Level Coordinates National Grid	+6.27 mOD E 127503.10 N 228405.00	
Samples and Tests			Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
Depth	Type & No.	Date Records	Description				
			1 TOPSOIL		0.10 +6.17		
			2 Plastic dark brown clayey pseudo fibrous PEAT.				
0.40-0.60 0.40-0.60 0.50	B 2 B 3 D 1				(1.35)		
1.00 1.00 1.00-1.30	D 4 B 5 B 6						
1.40-1.60 1.40-1.60 1.50	B 8 B 9 D 7						
			3 Soft light grey slightly sandy gravelly CLAY with abundant shell fragments, mainly laminated with soft grey silt.		1.45 +4.82		
			4 Soft grey gravelly CLAY . Gravel is subangular to subrounded, fine to coarse of limestone.		1.65 +4.62 1.70 +4.57		
			EXPLORATORY HOLE ENDS AT 1.70 m				
Depth	Type & No.	Records Date					
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 1.45 Slight inflow.			Depth Related Remarks From to (m) 1.70 Trial pit terminated due to obstruction - boulders or rock.		Stability Moderate Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP34 Sheet 1 of 1		
Scale 1:25 (e) MESH HBIII (298), 27/01/2004 09:45:57 							

Trial Pit Log

Logged by CH Checked by ROR		Start 20/11/2003 End 20/11/2003	Equipment, Methods and Remarks Excavated using track machine	Dimensions and Orientation Width 1.00 m Length 3.50 m  160 (Deg)	Ground Level Coordinates National Grid	+6.39 mOD E 127577.99 N 228331.56	
Samples and Tests			Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
Depth	Type & No.	Date Records	Description				
1.00 1.00	B 1 D 2		1 Dark brown to black pseudo fibrous plastic PEAT with abundant wood fragments (80mm x 100mm x 200mm) and some reed debris.		(2.40)		
2.60 2.60 2.60 2.80 2.80	HV HV D 3 D 4 B 5	p 35 kPa, r 12 kPa p 6 kPa, r 2 kPa	2 Uncompact soft creamy dark brown organic slightly sandy slightly gravelly SILT with abundant shells and reed debris.		2.40 +3.99		
			3 Very soft creamy brown slightly organic SILT/CLAY with abundant shells		2.60 +3.79		
			EXPLORATORY HOLE ENDS AT 2.80 m		2.80 +3.59		
Depth	Type & No.	Records Date	Depth Related Remarks		Stability	Shoring	Weather
			From to (m) 2.80 Trial pit terminated due to walls collapsing.		Very poor	None	
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 1.10 Inflow from side A 1 2.30 Strong Inflow			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatieva to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP40 Sheet 1 of 1		

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25


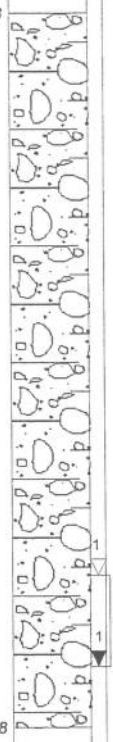
(c) MESH HBIII (298), 26/01/2004 17:55:24



Trial Pit Log

Logged by CH Checked by ROR		Start 20/11/2003 End 20/11/2003	Equipment, Methods and Remarks Excavated using a track machine.	Dimensions and Orientation Width 1.00 m Length 3.00 m	Ground Level Coordinates National Grid	+7.11 mOD E 127704.33 N 228287.76		
Samples and Tests			Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instrument	
Depth	Type & No.	Date Records	Description					
0.10	D 1		1 TOPSOIL		0.10	+7.01		
0.40	D 2		2 Grey slightly clayey sandy GRAVEL with some cobbles. Cobbles are subangular of limestone		(0.45)			
0.40	B 3		0.50 m Boulders of limestone 200 x 300 x 300mm		0.55	+6.56		
0.80	D 4		3 Firm yellow/brown very sandy slightly gravelly CLAY with occasional cobbles. Cobbles are subangular to subrounded of limestone.		(0.70)			
0.80	B 5		1.00 m Boulders of limestone 900mm x 1000mm x 1200mm		1.25	+5.86		
1.00	HV	p 42 kPa	EXPLORATORY HOLE ENDS AT 1.25 m					
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 1.00 Slight inflow into base			Depth Related Remarks From to (m) 1.25 Trial pit terminated on obstruction - presumed bedrock.		Stability Good Shoring None Weather			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP47 Sheet 1 of 1			

Trial Pit Log

Logged by DB Checked by ROR		Start 07/11/2003 End 07/11/2003	Equipment, Methods and Remarks Excavated using a track machine	Dimensions and Orientation Width 0.85 m Length 4.00 m  132 (Deg)	Ground Level Coordinates National Grid	+6.98 mOD E 127805.85 N 228242.44		
Samples and Tests			Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instrument	
Depth	Type & No.	Date Records	Description					
0.10	D 1		1 TOPSOIL: Firm brown slightly sandy slightly gravelly CLAY with many roots. Gravel is subangular to rounded.		0.15	+6.83		
0.50-1.00 0.50-1.00	B 2 B 3		2 Stiff grey slightly sandy slightly gravelly CLAY with many cobbles and boulders. Gravel is subrounded fine to coarse. Cobbles and boulders are subrounded of limestone. Boulders are up to 400mm.			(2.35)		
1.50 1.50-2.00 1.50-2.00	D 4 B 5 B 7							
			EXPLORATORY HOLE ENDS AT 2.50 m		2.50	+4.48		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 2.30 Rose to 2.00 m after 20 minutes.			Depth Related Remarks From to (m) 2.50 Trial pit terminated due to obstruction - presumed bedrock.		Stability Poor below 0.70m. Shoring None Weather			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleava to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP56 Sheet 1 of 1			



Trial Pit Log

Logged by CH Checked by ROR		Start 20/11/2003 End 20/11/2003	Equipment, Methods and Remarks Excavated using a track machine	Dimensions and Orientation Width 1.00 m Length 3.00 m	Ground Level Coordinates National Grid	+6.52 mOD E 127909.92 N 228224.87	
Samples and Tests			Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
Depth	Type & No.	Date Records	Description				
0.80	W3		1 Dark brown to black fibrous non plastic locally plastic PEAT with some wood and plant debris. Locally slightly sandy organic clay.				
1.00	D 1						
1.00	B 2				(2.20)		
			1.00 m Slightly sandy organic CLAY. Strong sulphate odour				
			1.20 m Boulders of granite				
			2.00 m Boulders of limestone				
			2 Light grey silty sandy GRAVEL with cobbles of limestone.		2.20 +4.32		
			EXPLORATORY HOLE ENDS AT 2.30 m		2.30 +4.22		
Depth	Type & No.	Records Date					
Groundwater Entries No. Struck Post Strike Behaviour (m)			Depth Related Remarks From to (m)		Stability Poor		
1 1.40 Rose to 1.30 m after 10 minutes.			2.30 Trial pit terminated due to flooding. Water rose to 0.80m in an hour.		Shoring None		
2 2.00 Rose to 1.70 m after 5 minutes.					Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatieva to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP62 Sheet 1 of 1		
Scale 1:25							

Trial Pit Log


Logged by DMF Checked by ROR		Start 07/10/2003 End 07/10/2003	Equipment, Methods and Remarks Excavated using a track machine	Dimensions and Orientation Width 2.20 m Length 3.50 m	Ground Level Coordinates National Grid	+6.50 mOD E 128296.70 N 228116.60
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.10	D 1		1 Spongy dark brown black fibrous PEAT with abundant decaying organic matter.			
0.50	D 2			0.50 m Becoming orange brown		
0.50	B 3					
0.50	B 4					
1.50	D 5			1.50 m Becoming dark brown, organics moderately to partially decomposed	(3.10)	
1.50	B 6					
1.50	B 7					
2.50	B 10			2.30 m Organics less decomposed from 2.30m		
2.50	D 8					
2.50	B 9			2.60 m Becoming mottled yellow		
3.40	D 11		2 Uncompact grey highly organic fibrous slightly sandy slightly gravelly SILT with abundant shells and shell fragments.	3.10 +3.40		
3.40	B 12			(0.40)		
3.40	B 13					
3.40	W 14		EXPLORATORY HOLE ENDS AT 3.50 m	3.50 +3.00		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 0.80 Slight seepage 2 1.90 Slight seepage 3 2.60 Slight seepage 4 3.50 Rose to 2.75 m after 60 minutes.			Depth Related Remarks From to (m) 3.50 Trial pit terminated on clients instructions			Stability Moderate Shoring None Weather
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortaleva to Menlough KC3210 Project No. KC3210 Carried out for Galway County Council			Trial Pit TP104 Sheet 1 of 1
Scale 1:25			© MESH HBIII (298), 10/02/2004 13:17:58			AGS

Trial Pit Log


Logged by DJB Checked by ROR		Start - End -	Equipment, Methods and Remarks Excavated using a JCB.	Dimensions and Orientation Width 2.20 m Length 2.20 m	Ground Level Coordinates National Grid
					+13.20 mOD E 128505.78 N 228038.65
Samples and Tests			Strata		
Depth	Type & No.	Date Records	Description		Depth, Level/ (Thickness)
0.30	D 1		1 TOPSOIL: Firm brown slightly sandy, slightly gravelly, fibrous CLAY with many cobbles and boulders. Gravel is subrounded to subangular, fine to coarse. Cobbles and boulders are subrounded of limestone, boulders up to 1100mm in length.		(0.35)
			2 Brown clayey very sandy GRAVEL with many cobbles and boulders. Gravel is subangular to subrounded, fine to coarse. Cobbles and boulders are subrounded to subrounded, boulders are up to 90mm in length.		0.35 +12.85
1.00	D 2				(1.05)
1.00-1.30	B 3				
1.00-1.30	B 4				
			EXPLORATORY HOLE ENDS AT 1.40 m		1.40 +11.80
Depth	Type & No.	Records Date			
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 1.40 Trial pit terminated, due to side walls collapsing and boulder at the base of pit.		Stability Poor Shoring None. Weather
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleiva to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP121 Sheet 1 of 1
Scale 1:25			(c) MESH HBIII (298), 27/01/2004 09:54:45		

Trial Pit Log

Logged by DJB Checked by ROR	Start - End -	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.90 m Length 2.75 m  280 (Deg)	Ground Level Coordinates National Grid +16.46 mOD E 128625.40 N 228033.20
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Samples and Tests			Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instrument	
Depth	Type & No.	Date Records	Description					
0.30	D 1		1 TOPSOIL: Firm brown slightly sandy, slightly gravelly fibrous CLAY. Gravel is subangular to subrounded, fine to coarse.		(0.40)			
1.00 1.00-1.30 1.00-1.30	D 2 B 3 B 4		2 Brown clayey very gravelly SAND with many cobbles and boulders. Gravel is subangular to subrounded occasional elongate. Cobbles and boulders are subangular of limestone. Boulders up to 700mm in length.		0.40-1.00 m Occasional Roots.	0.40 +16.06		
1.50 1.50-1.80 1.50-1.80	D 5 B 6 B 7				1.50 m Becoming grey with occasional boulders.			
			EXPLORATORY HOLE ENDS AT 1.80 m		1.80 +14.66			


Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)	Depth Related Remarks From to (m) 1.80 Trial pit terminated due to obstruction, possible limestone bedrock or boulder.	Stability Moderate Shoring None. Weather
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) MESH HBIII (296), 27/01/2004 09:42:11 	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council	Trial Pit TP123 Sheet 1 of 1
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Trial Pit Log

Logged by DJB Checked by ROR	Start End	Equipment, Methods and Remarks Excavated using a JCB.	Dimensions and Orientation Width 0.80 m Length 3.00 m  140 (Deg)	Ground Level +13.83 mOD Coordinates E 128791.40 National Grid N 228017.00
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



Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level (Thickness)	Legend	Backfill/ Instrument
0.20	D 1		1 TOPSOIL: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse.	0.20 +13.63		
0.40 0.40-0.60 0.40-0.60	D 2 B 3 B 4		2 Firm brown slightly sandy gravelly CLAY with occasional cobbles and occasional rocks. Gravel is subangular to subrounded, fine to coarse	(0.40)		
1.50 1.50-1.70 1.50-1.70	D 5 B 6 B 7		3 Grey slightly clayey SAND and GRAVEL with occasional cobbles. Gravel is subangular, fine to coarse. Cobbles are subangular of limestone.	0.60 +13.23		
2.30-2.50 2.30-2.50	B 10 B 9		0.80-0.90 m Occasional pockets of firm grey slightly sandy clay 1.90 m With occasional subrounded boulders of limestone (up to 800mm in length)	(1.90)		
2.50	D 8		EXPLORATORY HOLE ENDS AT 2.50 m	2.50 +11.33		

Depth	Type & No.	Records Date	Depth Related Remarks From to (m) 1.90 Trial pit terminated due to obstruction, possible bedrock or boulder.	Stability Good. Shoring None. Weather
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council	Trial Pit TP125 Sheet 1 of 1
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Scale 1:25	(c) MESH HBH (298), 27/01/2004 09:42:16 



Trial Pit Log

Logged by DJB Checked by ROR		Start 15/10/2003 End 15/10/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.80 m Length 2.50 m <div style="display: inline-block; border: 1px solid black; width: 20px; height: 20px; margin: 5px;"> A B C </div> 110 (Deg)	Ground Level +7.22 mOD Coordinates E 129009.49 National Grid N 228047.30	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.10	D 1		1 MADE GROUND: Firm brown slightly sandy slightly gravelly fibrous CLAY with rare brick fragments. Gravel is subangular to rounded fine to coarse. 2 Very stiff grey slightly sandy slightly gravelly CLAY with many cobbles. Gravel is subangular to angular fine to coarse. Cobbles are subangular of limestone.	0.10 +7.12		
0.50 0.50-0.80 0.50-0.80	D 2 B 3 B 4			(0.70)		
			EXPLORATORY HOLE ENDS AT 0.80 m	0.80 +6.42		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 0.80 Trail pit terminated due to obstruction - presumed bedrock.		Stability Good Shoring None Weather	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP127A Sheet 1 of 1	
Scale 1:25 (c) MESG HBIII (288), 16/02/2004 11:47:42						


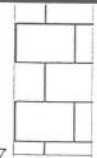

Trial Pit Log

Logged by DB Checked by ROR	Start 07/11/2003 End 07/11/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.90 m Length 3.20 m  272 (Deg)	Ground Level Coordinates National Grid +8.28 mOD E 129058.83 N 227961.17		
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level (Thickness)	Legend	Backfill/Instrument
0.10	D 1		1 TOPSOIL: Brown slightly gravelly CLAY with many roots. Gravel is subangular to subrounded fine to coarse. 2 Stiff brown slightly sandy gravelly CLAY with many cobbles and boulders. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subangular to subrounded of limestone. Boulders are up to 1100mm in length.	0.10 +8.18		
0.50 0.50-1.00 0.50-1.00	D 2 B 3 B 4		3 Weathered LIMESTONE: Recovered as grey GRAVEL with many cobbles. Gravel is angular to subangular fine to coarse. Cobbles are angular to subangular of limestone.	1.20 +7.08 (0.30)		
			EXPLORATORY HOLE ENDS AT 1.50 m	1.50 +6.78		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 1.50 Trial pit terminated due to obstruction - presumed bedrock.		Stability Good Shoring None Weather	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP127B Sheet 1 of 1	
Scale 1:25 (c) MESH HBH (298), 10/02/2004 13:18:52						

Trial Pit Log


Logged by DJB Checked by ROR		Start 14/10/2003 End 14/10/2003		Equipment, Methods and Remarks Excavated using a JCB		Dimensions and Orientation Width 0.85 m Length 2.50 m		Ground Level Coordinates National Grid	
								+20.00 mOD E 129155.76 N 228074.72	
Samples and Tests			Strata						
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument	
0.10	D 1		1 TOPSOIL: Firm brown slightly sandy gravelly slightly fibrous CLAY. Gravel is subrounded to subangular fine to coarse.			0.10 +19.90			
0.20	D 2		2 Stiff grey brown slightly sandy gravelly CLAY with many cobbles. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of limestone. EXPLORATORY HOLE ENDS AT 0.35 m			0.35 +19.65			
0.20-0.30	B 3								
0.20-0.30	B 4								
Depth	Type & No.	Records Date							
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 0.35 Trial pit terminated due to obstruction - presumed bedrock.			Stability Good Shoring None Weather			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortateiva to Menlough Project No. KC3210 Carried out for Galway County Council			Trial Pit TP128 Sheet 1 of 1			


Trial Pit Log

Logged by DB Checked by ROR		Start 14/10/2003 End 14/10/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 1.00 m Length 3.50 m  230 (Deg)	Ground Level Coordinates National Grid	+15.97 mOD E 129229.91 N 228105.04
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level (Thickness)	Legend	Backfill/ Instrument
			1 Strong grey fine to medium grained crystalline LIMESTONE. Weathering: Orange brown discolouration penetrating 2-3mm along fracture surfaces. Discontinuities: No orientation or openings are determinable, surfaces undulating and rough. Recovered as clayey slightly sandy GRAVEL with many cobbles and boulders. Gravel is angular to subangular fine to coarse. Cobbles and boulders are angular to subangular of limestone, boulders up to 500mm.	(0.50) 0.50 +15.47		
			EXPLORATORY HOLE ENDS AT 0.50 m			
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 0.50 - Trial pit terminated due to obstruction - presumed bedrock.			Stability Good Shoring None Weather
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatieva to Menlough Project No. KC3210 Carried out for Galway County Council			Trial Pit TP131 Sheet 1 of 1
Scale 1:25 <small>(c) MEBG HBIII (298), 19/02/2004 13:58:04</small> 						

Trial Pit Log

Logged by DJB Checked by ROR	Start 14/10/2003 End 14/10/2003	Equipment, Methods and Remarks Excavated using JCB	Dimensions and Orientation Width 1.00 m Length 2.80 m  82 (Deg)	Ground Level Coordinates National Grid +11.73 mOD E 129358.80 N 228152.78
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Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.50 0.50-0.80 0.50-0.80	D 1 B 2 B 3		1 MADE GROUND: Grey clayey sandy GRAVEL with many cobbles and boulders. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subangular of limestone, boulders are up to 1000mm in length. (Backfill from quarry)	(0.80)		
			EXPLORATORY HOLE ENDS AT 0.80 m	0.80 +10.93		



Depth	Type & No.	Records Date			
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 0.80 Trial pit terminated due to obstruction - possible limestone bedrock or boulder.		
			Stability Good Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council		
Scale 1:25 (c) MESH HBIII (296), 10/02/2004 13:19:16 			Trial Pit TP134 Sheet 1 of 1		

Trial Pit Log

Logged by DB Checked by ROR		Start 07/11/2003 End 07/11/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.90 m Length 4.00 m		Ground Level Coordinates National Grid	+9.60 mOD E 129365.44 N 228197.29	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.10	D 1		1 TOPSOIL: Firm brown slightly sandy slightly gravelly CLAY with abundant roots. Gravel is subangular to subrounded fine to coarse.			0.20 +9.40		
0.50 0.50-1.00 0.50-1.00	D 2 B 3 B 4		2 Firm to stiff grey slightly sandy slightly gravelly CLAY with many cobbles and boulders. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subrounded of limestone. Boulders are up to 1000mm.			(1.20)		
			EXPLORATORY HOLE ENDS AT 1.40 m			1.40 +8.20		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 1.40 Trial pit terminated due to obstruction - possible rockhead or boulder.			Stability Good Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council			Trial Pit TP134A Sheet 1 of 1		
Scale 1:25 (c) MESH HBIII (298), 27/01/2004 09:42:46			AGS					

Trial Pit Log

Logged by DJB Checked by ROR	Start 14/10/2003 End 14/10/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.85 m Length 2.40 m  47 (Deg)	Ground Level Coordinates National Grid	+13.60 mOD E 129449.65 N 228215.41
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Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.10	D 1		1 MADE GROUND: Soft to firm brown slightly sandy slightly gravelly slightly fibrous CLAY. Gravel is subangular to rounded fine to coarse.	0.10 +13.50		
0.50 0.50-0.90 0.50-0.90	D 2 B 3 B 4		2 MADE GROUND: Firm to stiff grey brown slightly sandy very gravelly CLAY with many cobbles and some boulders. Gravel is subangular fine to coarse. Cobbles and boulders are angular to subangular of limestone, boulders up to 750mm in length	(0.80)		
			EXPLORATORY HOLE ENDS AT 0.90 m	0.90 +12.70		

Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)	Depth Related Remarks From to (m) 0.90 Trial pit terminated due to boulders.	Stability Good Shoring None Weather
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleiva to Menlough Project No. KC3210 Carried out for Galway County Council	Trial Pit TP136 Sheet 1 of 1






Trial Pit Log

Logged by DB Checked by ROR		Start 07/11/2003 End 07/11/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 1.00 m Length 3.10 m		Ground Level Coordinates National Grid		+12.90 mOD E 129501.80 N 228256.50
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.10	D 1		1 TOPSOIL: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to coarse.			0.10 +12.80		
0.20-0.50	B 3		2 Stiff grey brown slightly sandy gravelly SILT with many cobbles and boulders. Gravel is subangular to subrounded fine to coarse. Cobbles and boulder are subrounded of limestone, boulders up to 1100mm in length.			(0.60)		
0.20-0.50	B 4							
0.50	D 2					0.70 +12.20		
			EXPLORATORY HOLE ENDS AT 0.70 m					
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 0.70 Trial pit terminated due to obstruction - presumed bedrock.			Stability Good Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council			Trial Pit TP139 Sheet 1 of 1		


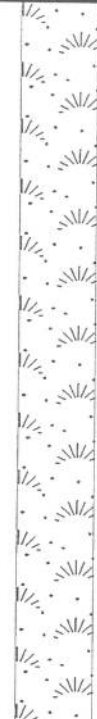

Trial Pit Log

Logged by DJB Checked by ROR		Start 14/10/2003 End 14/10/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.90 m Length 3.20 m		Ground Level Coordinates National Grid	+11.39 mOD E 129551.80 N 228222.90	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.20	D 1		1 TOPSOIL: Firm brown slightly sandy slightly gravelly fibrous CLAY. Gravel is subangular to rounded fine to coarse.			0.20	+11.19	
			2 Stiff grey occasional mottled brown slightly sandy very gravelly SILT with many cobbles and some boulders. Gravel is angular to subangular fine to coarse. Cobbles and boulders are subangular of limestone, boulders are up to 700mm.			(1.20)		
1.00 1.00-1.40 1.00-1.40	D 2 B 3 B 4		EXPLORATORY HOLE ENDS AT 1.40 m			1.40	+9.99	
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 1.40 Trial pit terminated due to obstruction - possible limestone bedrock or boulders.			Stability Good Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council			Trial Pit TP142 Sheet 1 of 1		

Trial Pit Log

Logged by DJB Checked by ROR		Start 18/10/2003 End 18/10/2003	Equipment, Methods and Remarks Excavated using a track machine	Dimensions and Orientation Width 0.80 m Length 3.95 m	Ground Level Coordinates National Grid	+6.15 mOD E 129622.80 N 228145.70
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.50 0.50-0.70 0.50-0.70	D 1 B 2 B 3		1 MADE GROUND: Firm brown slightly sandy gravelly slightly fibrous CLAY with many cobbles, fragments of brick, tile and abundant wood and rare glass. Gravel is subangular to subrounded fine to coarse. Strong organic and oily odour.	(0.75)		
1.00 1.00-1.50 1.00-1.50	D 4 B 5 B 6		2 Firm grey slightly sandy very gravelly SILT with many cobbles and boulders. Gravel is angular to subangular fine to coarse. Cobbles and boulders are subangular of limestone, boulder up to 1100mm in length.	0.75 (1.25)		
			EXPLORATORY HOLE ENDS AT 2.00 m	2.00 +4.15		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 0.70 Fast flow			Depth Related Remarks From to (m) 2.00 Trial pit terminated due to obstruction - presumed bedrock.		Stability Good Shoring None Weather	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatlewa to Menlough Project No. KC3210 Carried out for Galway County Council		Trial Pit TP146 Sheet 1 of 1	
Scale 1:25			(c) MESH HBIII (298), 10/02/2004 13:20:49			

Trial Pit Log

Logged by DJB Checked by ROR		Start 18/10/2003 End 18/10/2003	Equipment, Methods and Remarks Excavated using a track machine	Dimensions and Orientation Width 0.90 m Length 2.75 m	 120 (Deg)		Ground Level Coordinates National Grid	+5.91 mOD E 129604.80 N 228088.80
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
1.00 1.00-1.50 1.00-1.50	D 1 B 2 B 3		1 Spongy brown slightly sandy pseudofibrous PEAT.			(2.45)		
2.00 2.00-2.50 2.00-2.50	D 4 B 5 B 6							
2.50 2.50-2.70 2.50-2.70	D 7 B 8 B 9		2 Soft grey slightly sandy CLAY with interbedded with soft grey / light brown silt (marl).			2.45 +3.46		
			EXPLORATORY HOLE ENDS AT 2.70 m			2.70 +3.21		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 2.70 Trial pit terminated due to soft nature of ground and plant distance from the sidewalls.			Stability Good Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 2 Ground Investigation Gortatleva to Menlough Project No. KC3210 Carried out for Galway County Council			Trial Pit TP148 Sheet 1 of 1		