

Summary of Laboratory Sample Descriptions

[illegible]

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

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20/1/10

Date _____

Alan Walter

Approved by

20/1/10

Date _____

**Contract No.:**

9166/09

Client ref:

PO1929

Pinhoe Quarry

Summary of Laboratory Sample Descriptions

[illegible]

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

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20/1/10

Date**Contract No.:**

9166/09

Client ref:

PO1929

Pinhoe Quarry

Summary of Soil Classification Tests

BS 1377:Part 2:1990

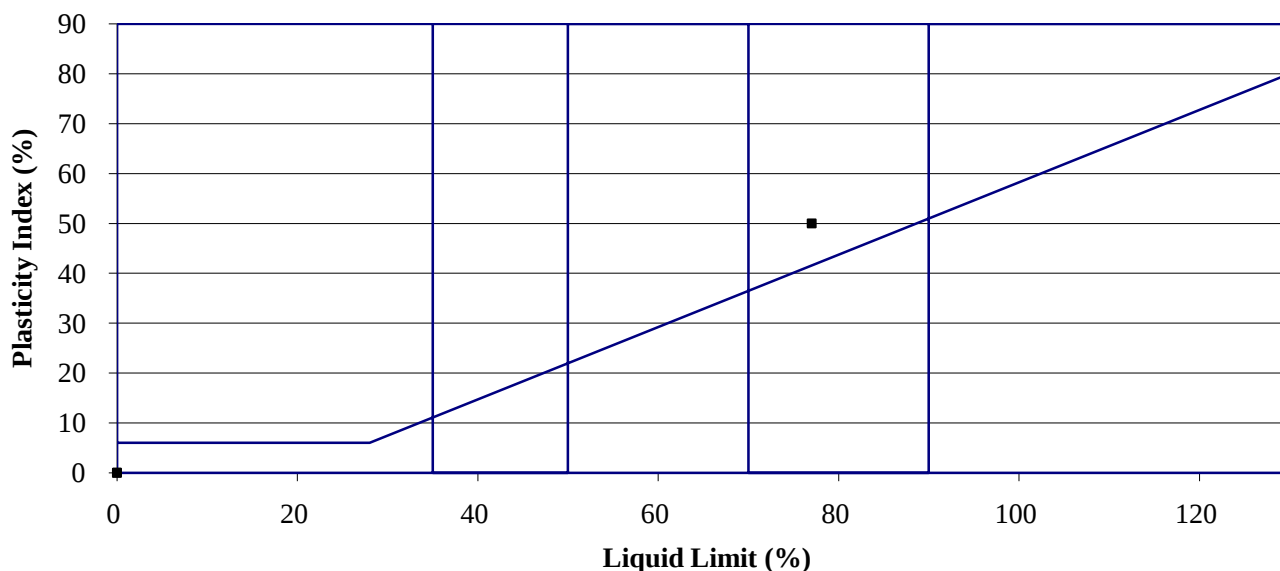
Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
TP1		0.80	7.6					
TP1		2.50	10					
TP2		0.80	9.4					
TP3		0.80	8.1					
TP4		0.80	14					
TP4		3.50	16					
TP8		0.20	6.9					
TP9		0.90	12					
TP9		2.00	13					
TP10		0.80	7.9					
TP11		0.70	21					
TP12		1.00	13					
TP14		0.80	30	77	27	50	90	CV Very High Plasticity
TP14		1.80	16					
TP18		1.80	14					
TP18		2.00	16					

Symbols:

NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

BS 5930:1999



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Contract No.:
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Client Ref No:
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Summary of Soil Classification Tests

BS 1377:Part 2:1990

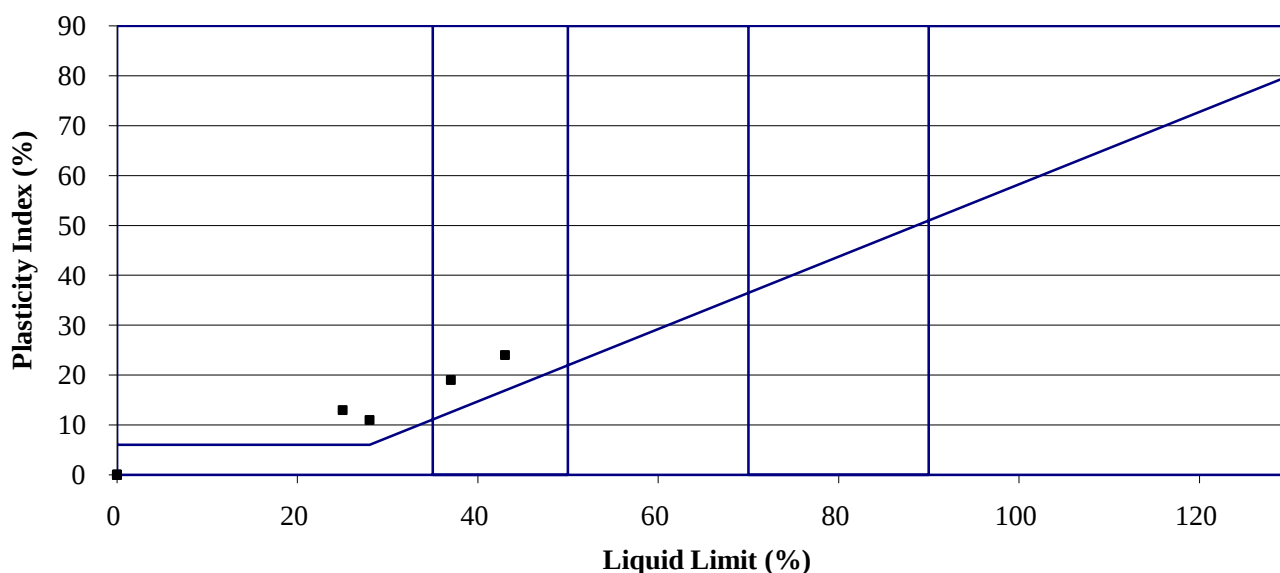
Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
TP19		2.50	23					
TP20		3.00	12					
TP21		2.00	9.3					
TP22		1.80	10					
CP1		1.70	13					
CP1		5.70	18	43	19	24	90	CI Intermediate Plasticity
CP1		6.80	12					
CP1		9.70	16	28	17	11	90	CL Low Plasticity
CP2		0.20	22					
CP2i		0.20	19	37	18	19	94	CI Intermediate Plasticity
CP2i		2.70	16	25	12	13	89	CL Low Plasticity
CP2i		9.50	16					

Symbols:

NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

BS 5930:1999



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Client Ref No:
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Summary of Soil Classification Tests

BS 1377:Part 2:1990

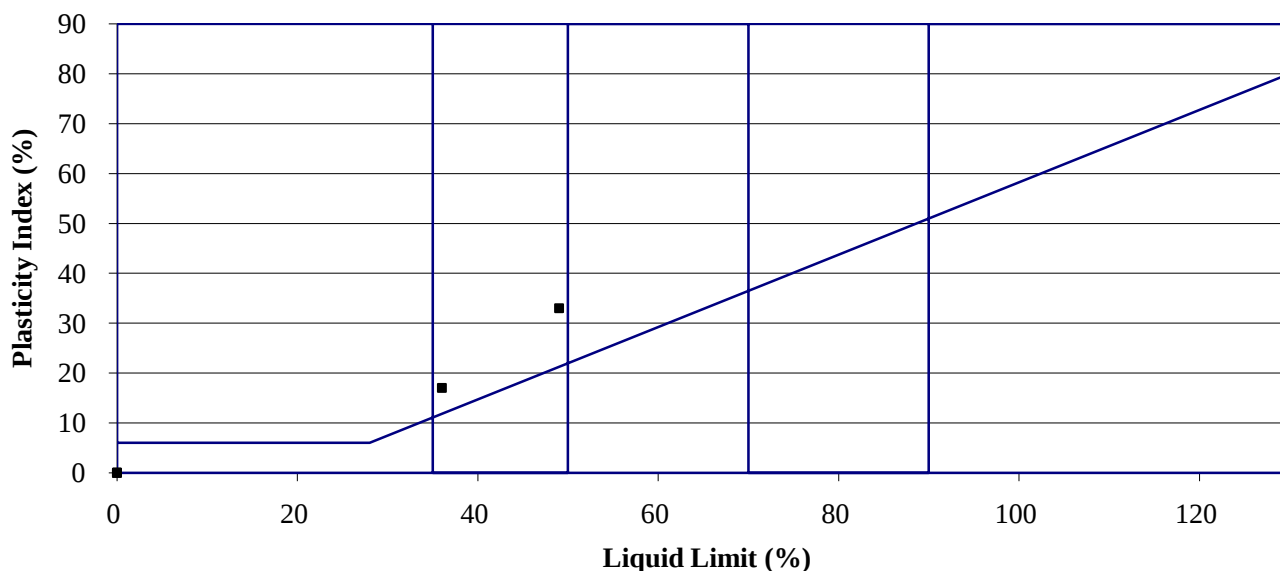
Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
CP3		0.50	16					
CP3		1.70	13					
CP3		5.70	16					
CP3		6.80	14	49	16	33	91	CI Intermediate Plasticity
CP3		8.00	15					
CP4		0.30	21	36	19	17	94	CI Intermediate Plasticity

Symbols:

NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

BS 5930:1999



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Contract No.:
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Client Ref No:
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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

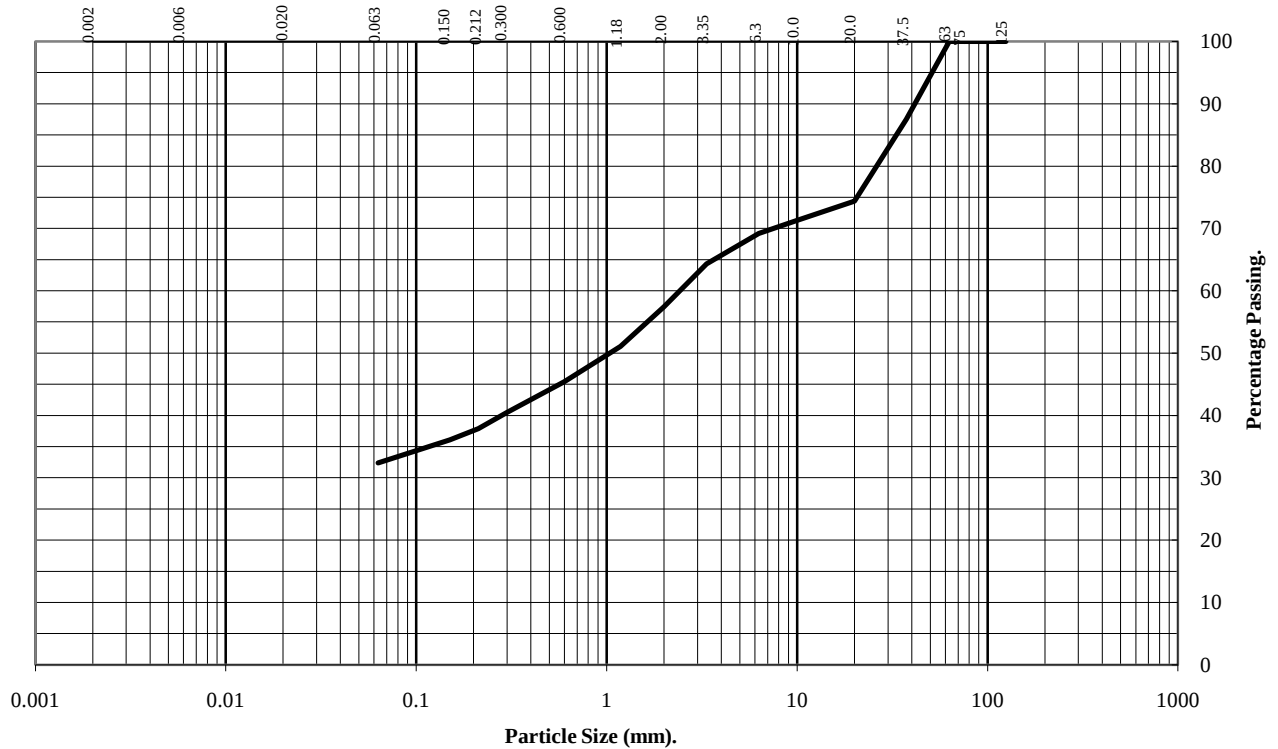
CP1

Type:

B

Depth (m):

1.70



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	88
20	74
10	71
6.3	69
3.35	64
2.00	57
1.18	51
0.60	45
0.30	40
0.21	38
0.15	36
0.06	32

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	43
Sand	25
Silt and Clay	32

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

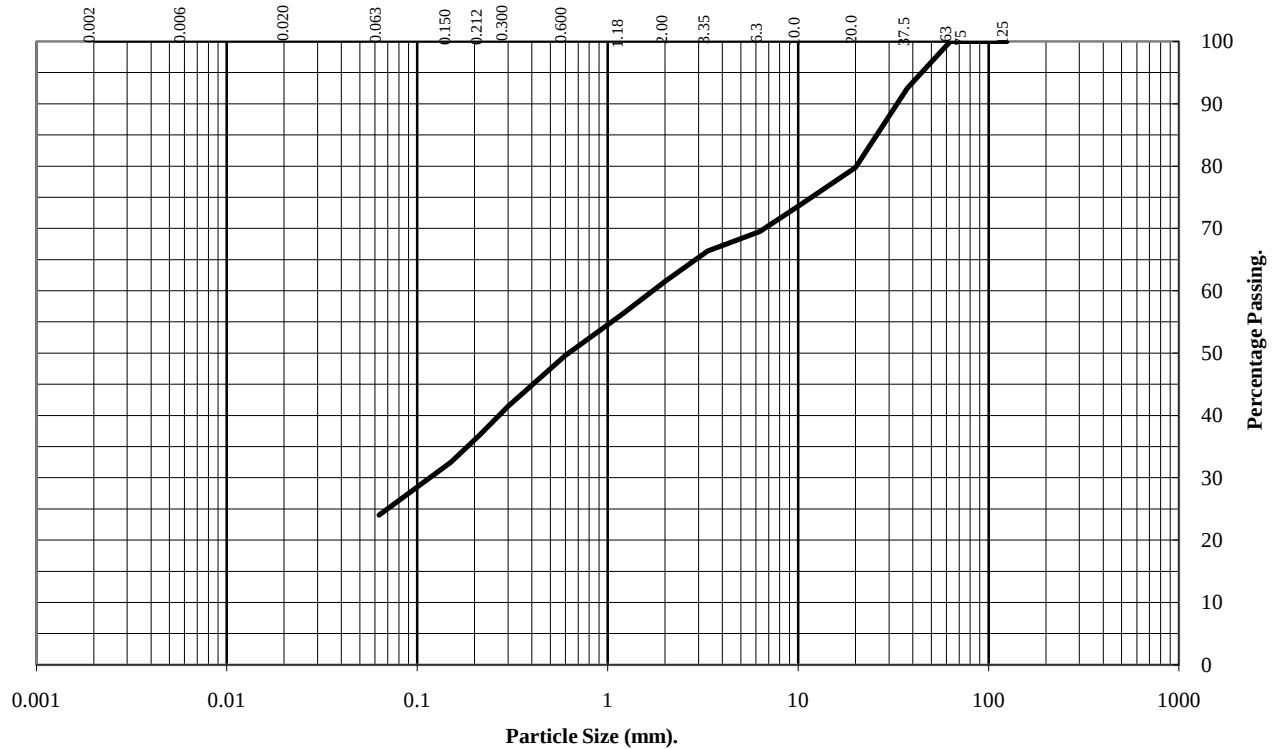
CP1

Type:

B

Depth (m):

3.70



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	93
20	80
10	74
6.3	69
3.35	66
2.00	61
1.18	56
0.60	50
0.30	41
0.21	37
0.15	33
0.06	24

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	39
Sand	37
Silt and Clay	24

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

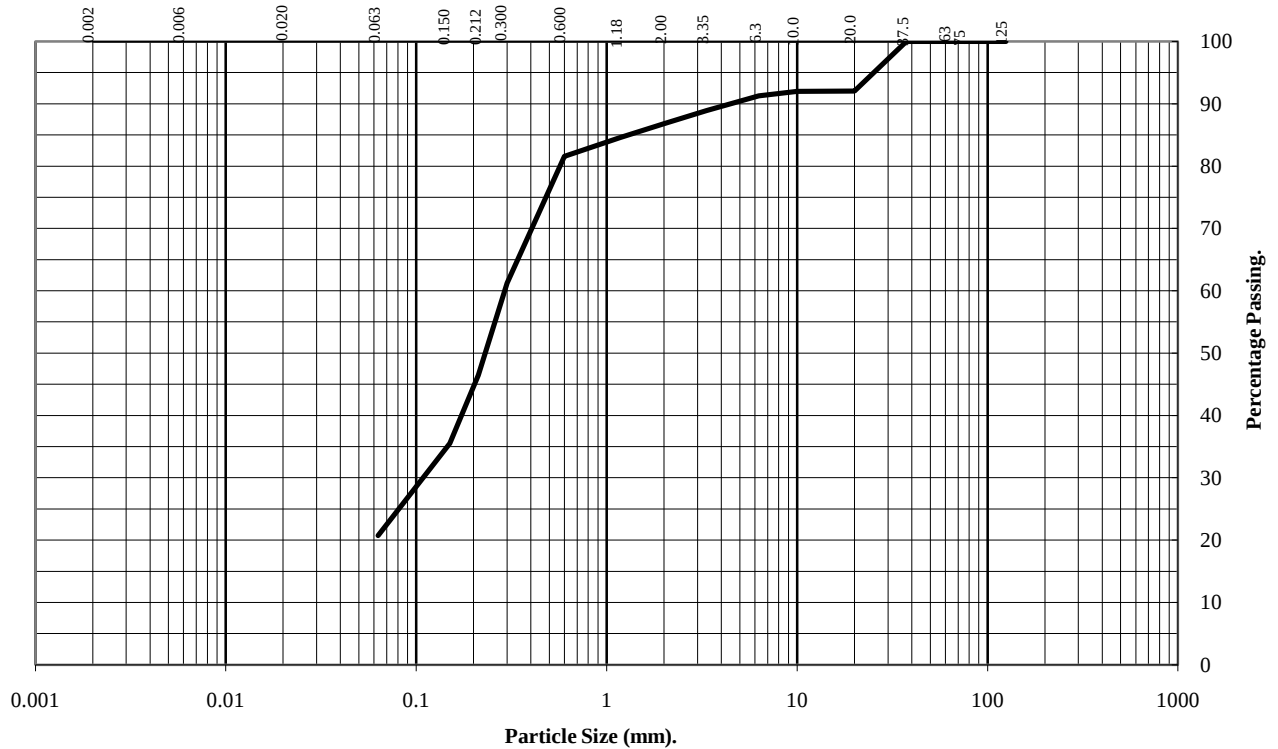
CP1

Type:

B

Depth (m):

6.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	92
10	92
6.3	91
3.35	89
2.00	87
1.18	85
0.60	82
0.30	61
0.21	46
0.15	35
0.06	21

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	13
Sand	66
Silt and Clay	21

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

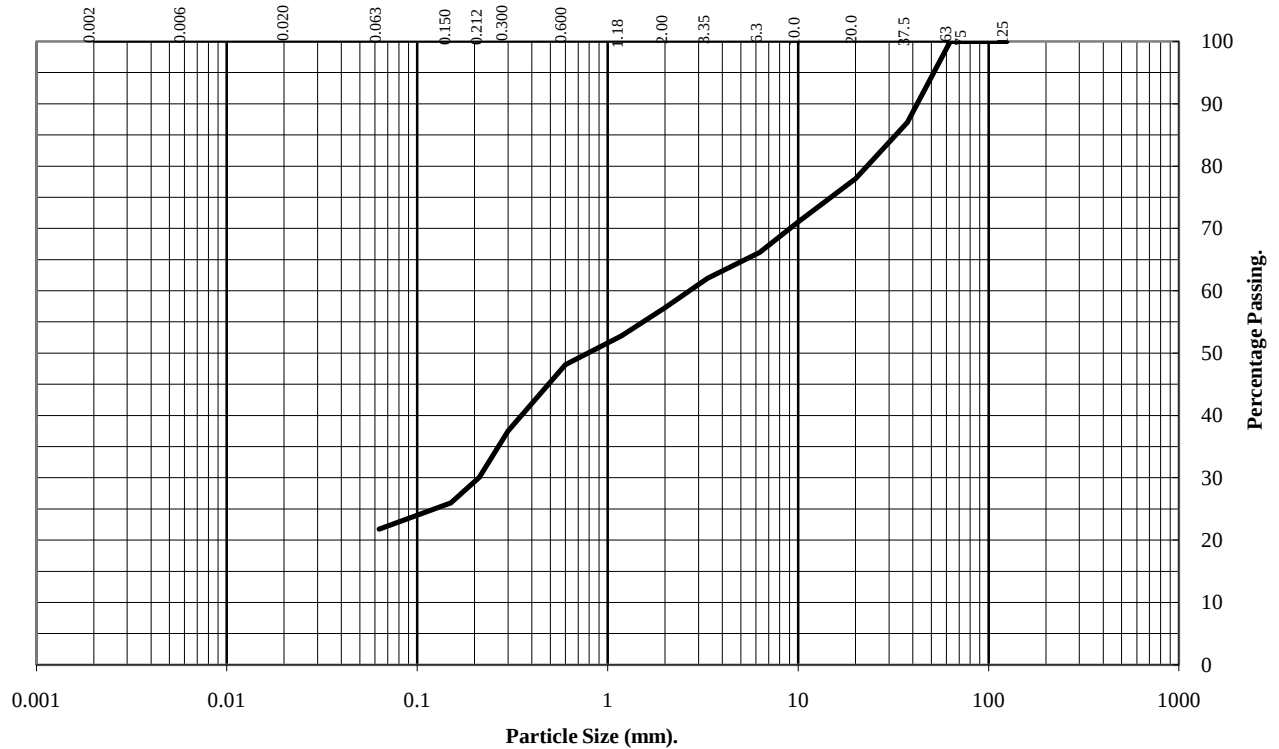
CP1

Type:

B

Depth (m):

9.70



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	87
20	78
10	71
6.3	66
3.35	62
2.00	57
1.18	53
0.60	48
0.30	38
0.21	30
0.15	26
0.06	22

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	43
Sand	35
Silt and Clay	22

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

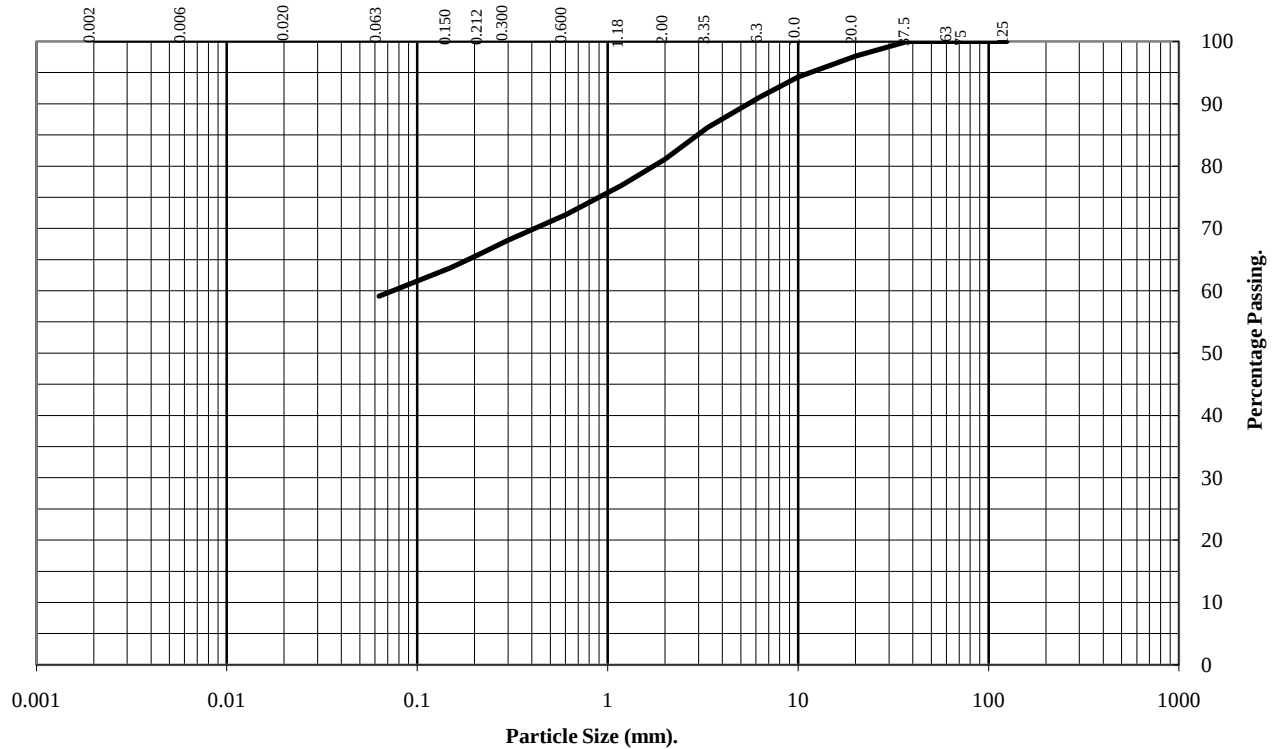
CP2

Type:

B

Depth (m):

0.20



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	98
10	94
6.3	91
3.35	86
2.00	81
1.18	77
0.60	72
0.30	68
0.21	66
0.15	64
0.06	59

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	19
Sand	22
Silt and Clay	59

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

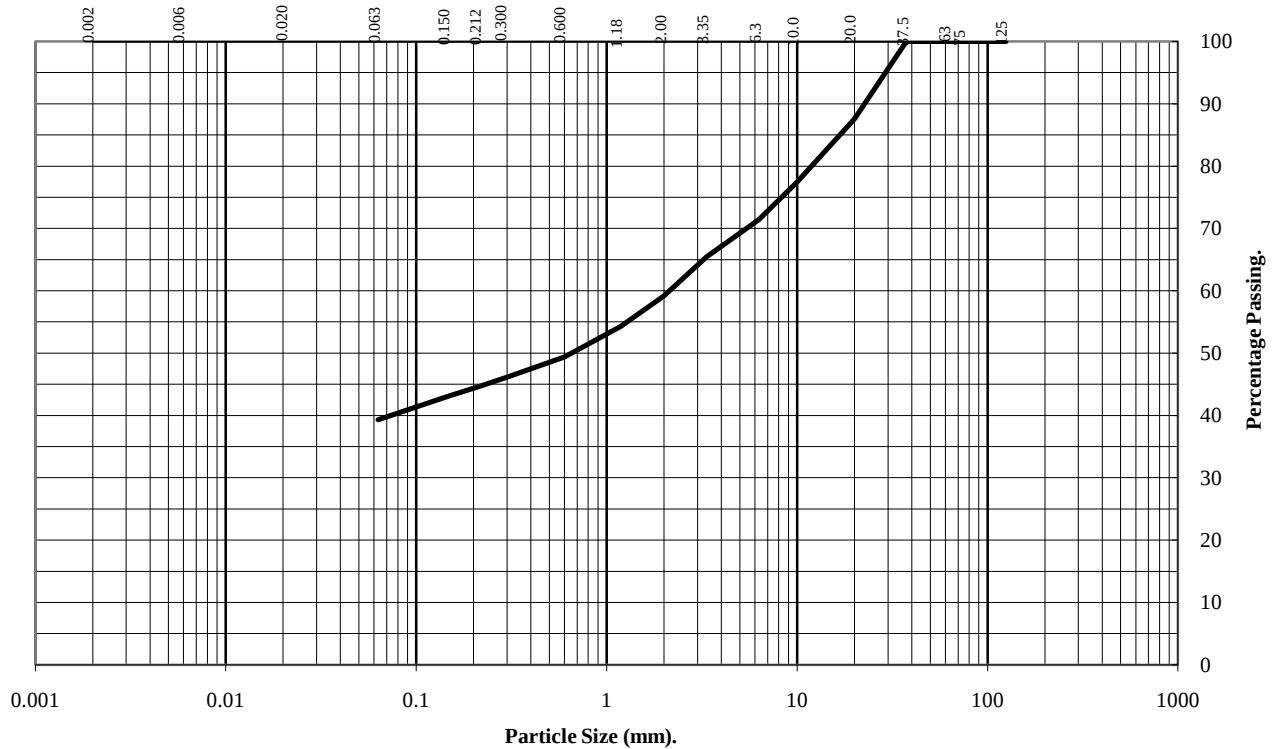
CP2

Type:

B

Depth (m):

4.70



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	88
10	77
6.3	71
3.35	65
2.00	59
1.18	54
0.60	49
0.30	46
0.21	45
0.15	43
0.06	39

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	41
Sand	20
Silt and Clay	39

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

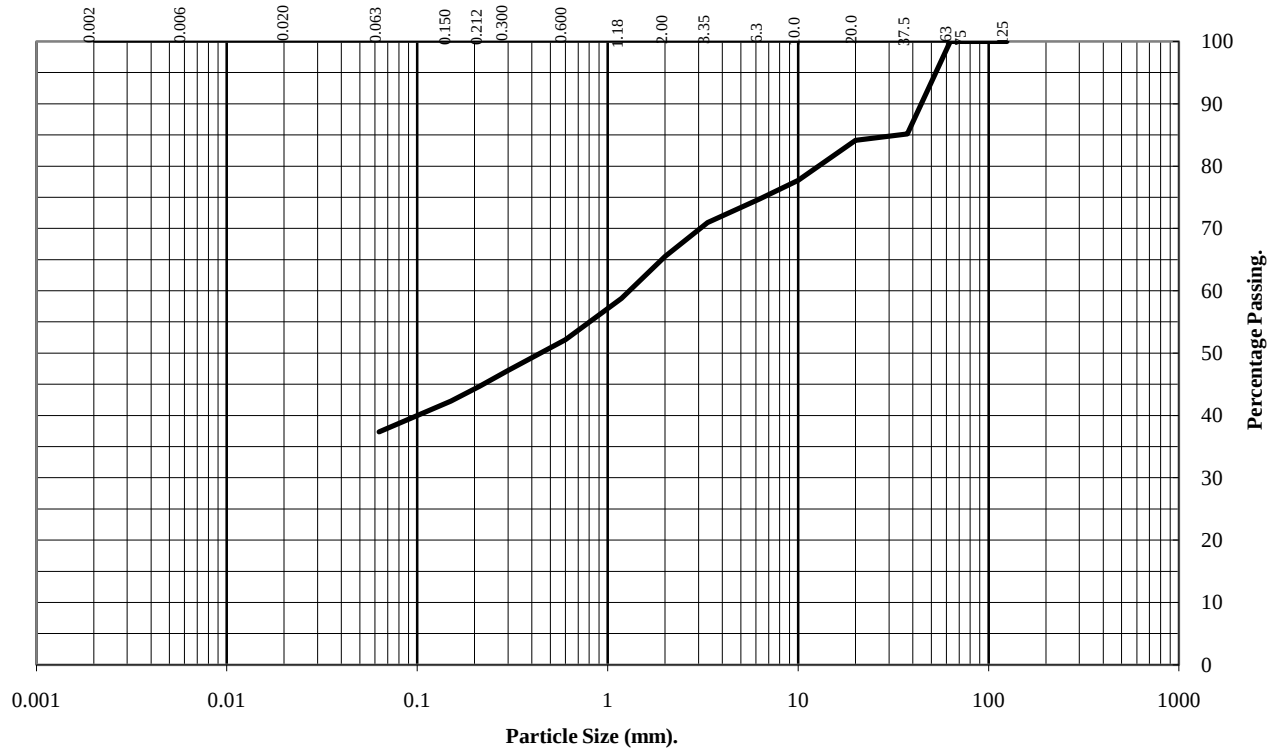
CP2(i)

Type:

B

Depth (m):

0.20



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	85
20	84
10	78
6.3	75
3.35	71
2.00	65
1.18	59
0.60	52
0.30	47
0.21	45
0.15	42
0.06	37

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	35
Sand	28
Silt and Clay	37

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

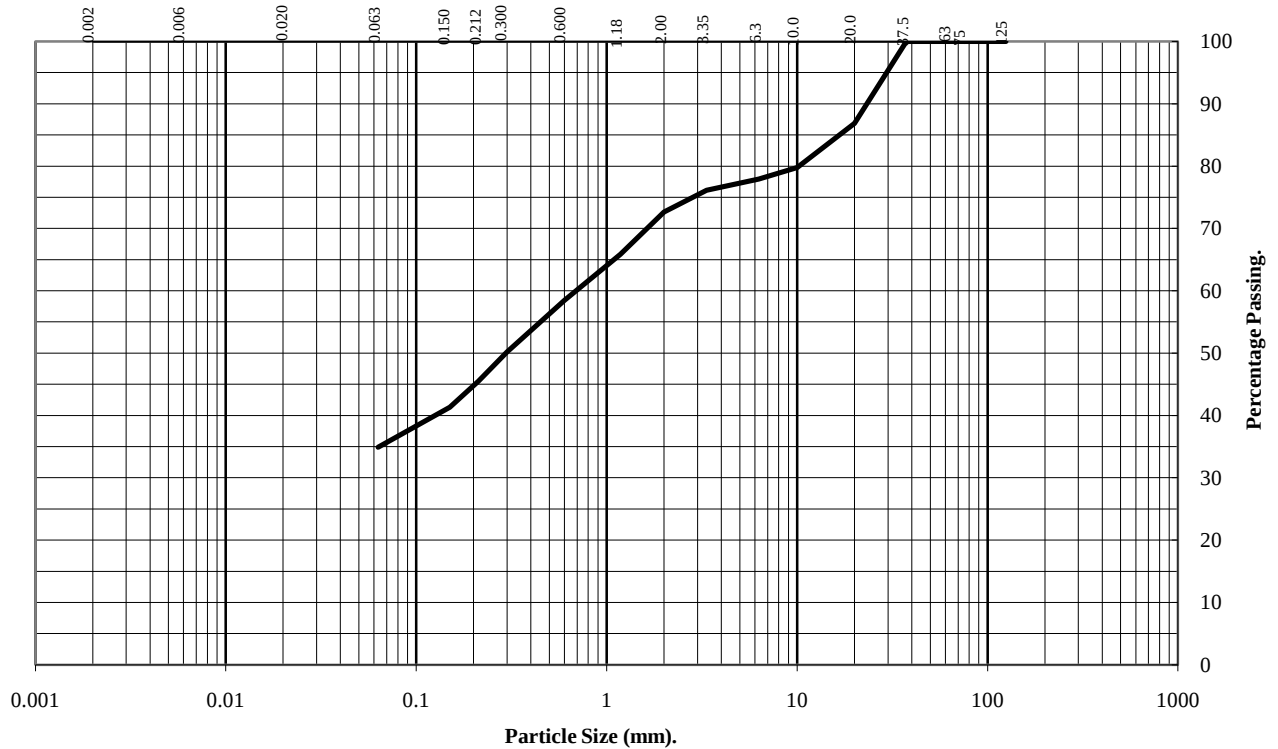
CP2(i)

Type:

B

Depth (m):

2.70



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	87
10	80
6.3	78
3.35	76
2.00	73
1.18	66
0.60	58
0.30	50
0.21	45
0.15	41
0.06	35

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	38
Silt and Clay	35

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

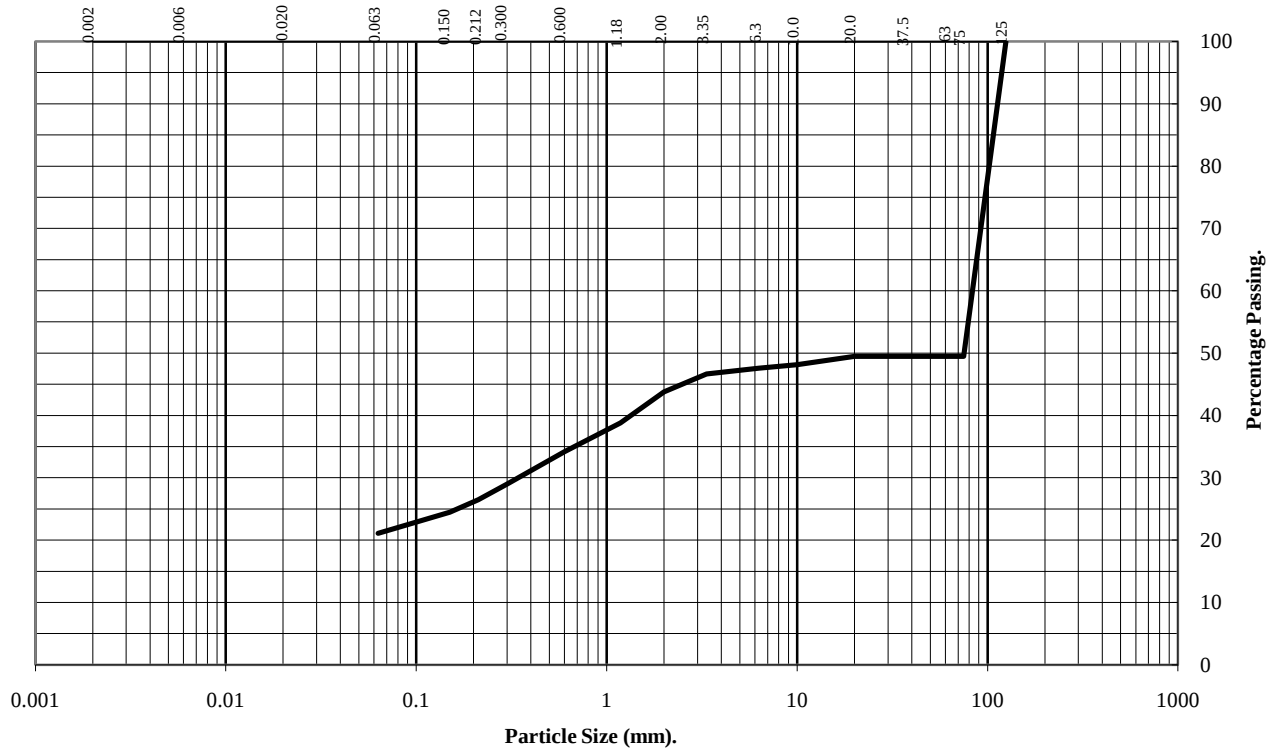
CP2(i)

Type:

B

Depth (m):

6.80



BS Test Sieve	Percentage Passing
125	100
75	49
63	49
38	49
20	49
10	48
6.3	48
3.35	47
2.00	44
1.18	39
0.60	34
0.30	29
0.21	26
0.15	24
0.06	21

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	51
Gravel	5
Sand	23
Silt and Clay	21

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

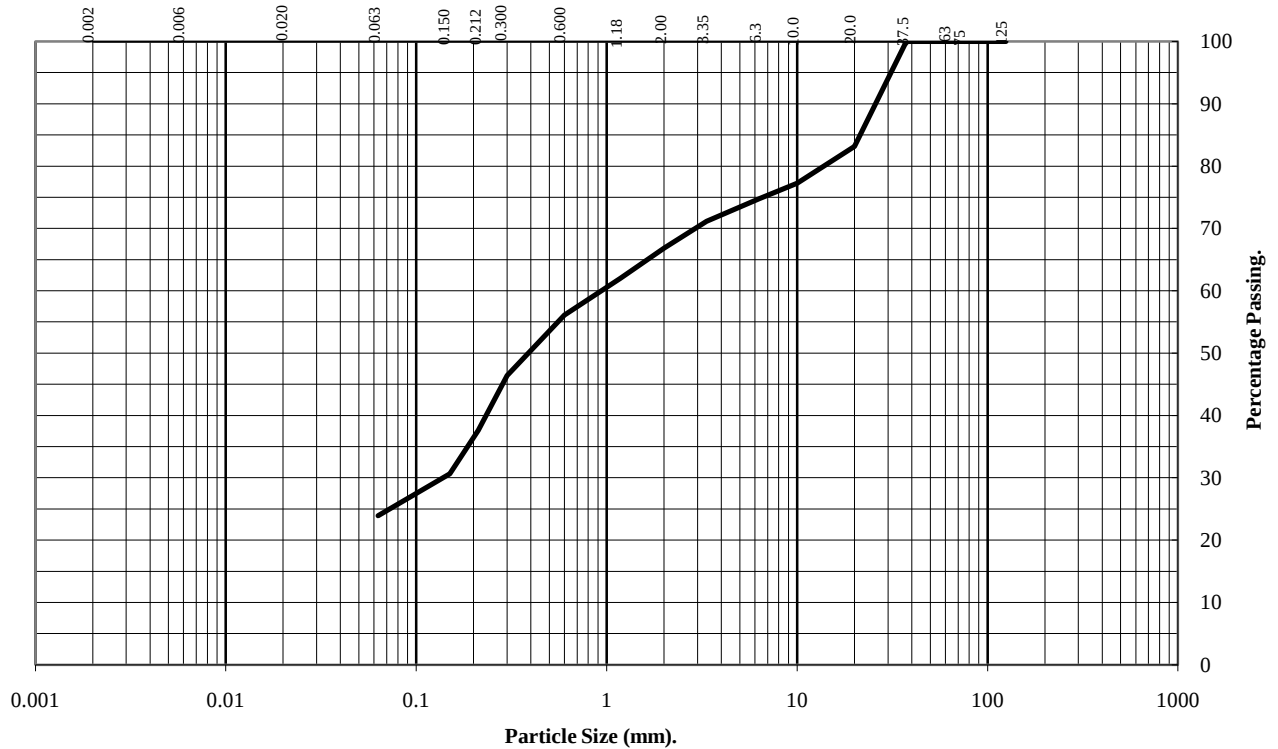
CP3

Type:

B

Depth (m):

1.70



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	83
10	77
6.3	75
3.35	71
2.00	67
1.18	62
0.60	56
0.30	46
0.21	38
0.15	31
0.06	24

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	33
Sand	43
Silt and Clay	24

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

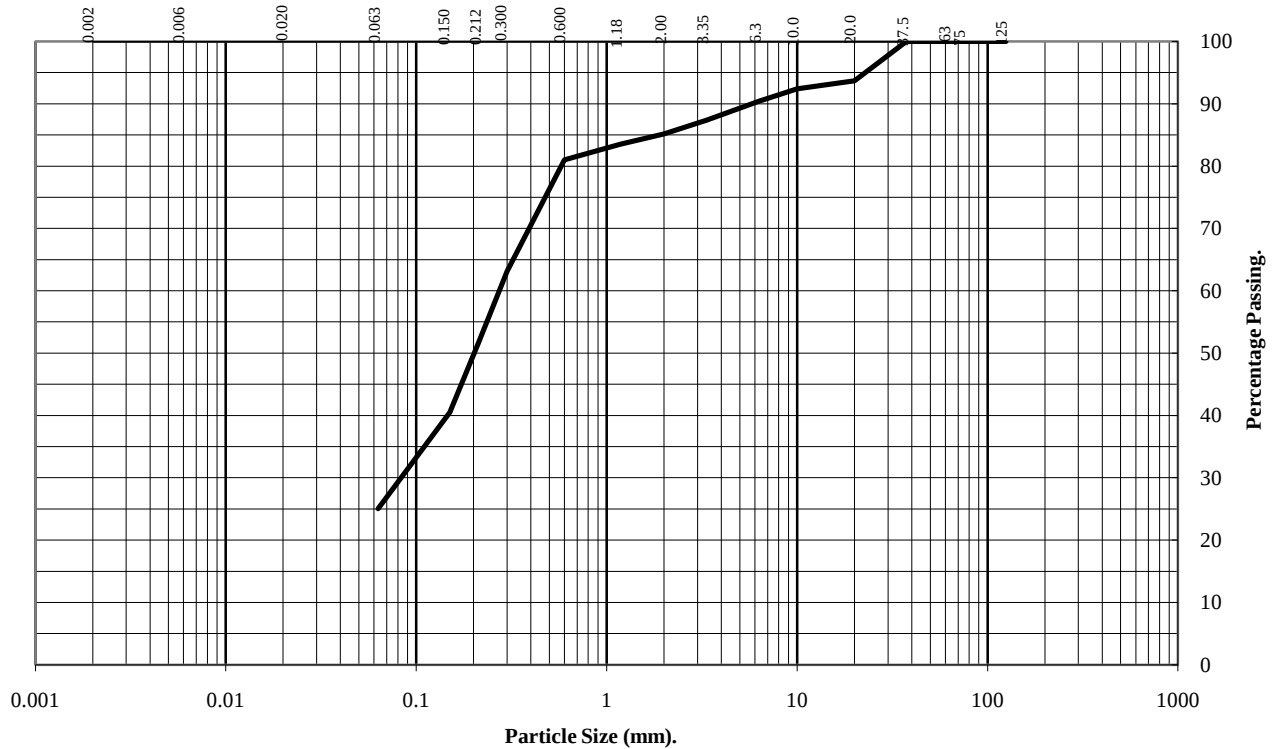
CP3

Type:

B

Depth (m):

8.00



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	94
10	92
6.3	90
3.35	87
2.00	85
1.18	84
0.60	81
0.30	63
0.21	52
0.15	40
0.06	25

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	15
Sand	60
Silt and Clay	25

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

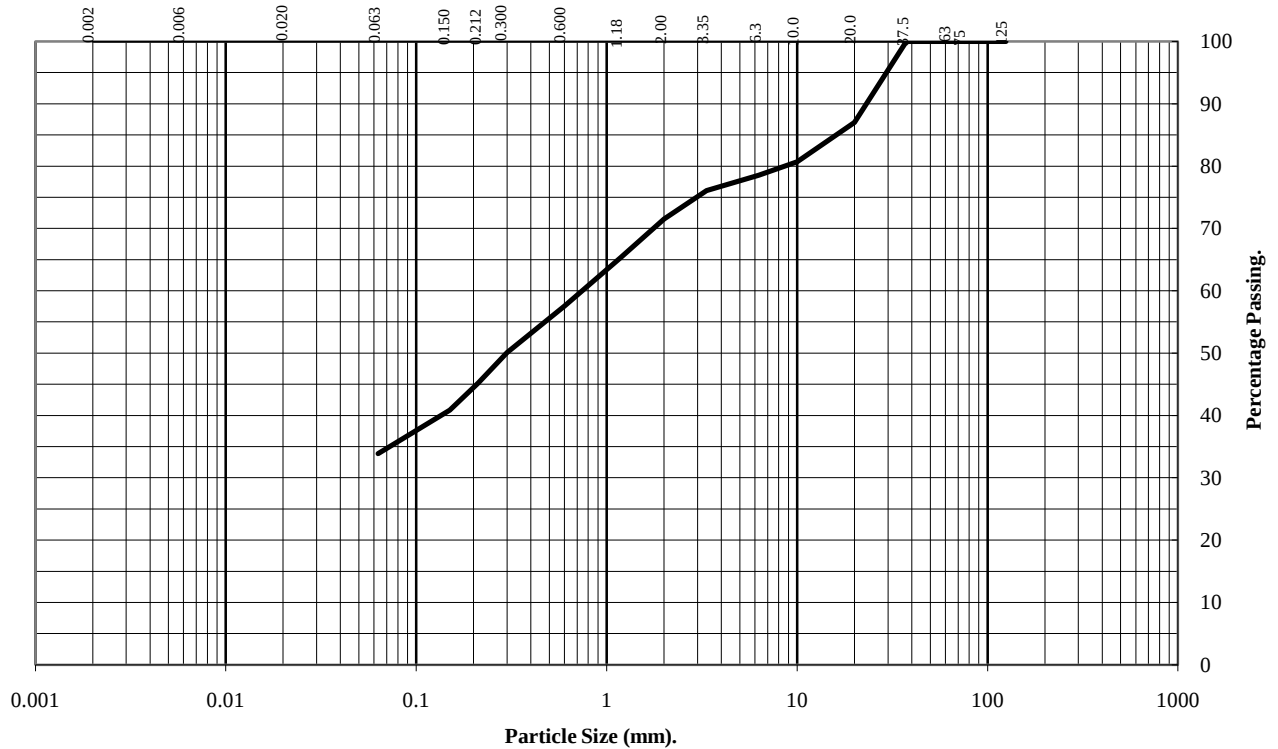
CP4

Type:

B

Depth (m):

0.30



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	87
10	81
6.3	79
3.35	76
2.00	72
1.18	65
0.60	58
0.30	50
0.21	45
0.15	41
0.06	34

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	28
Sand	38
Silt and Clay	34

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

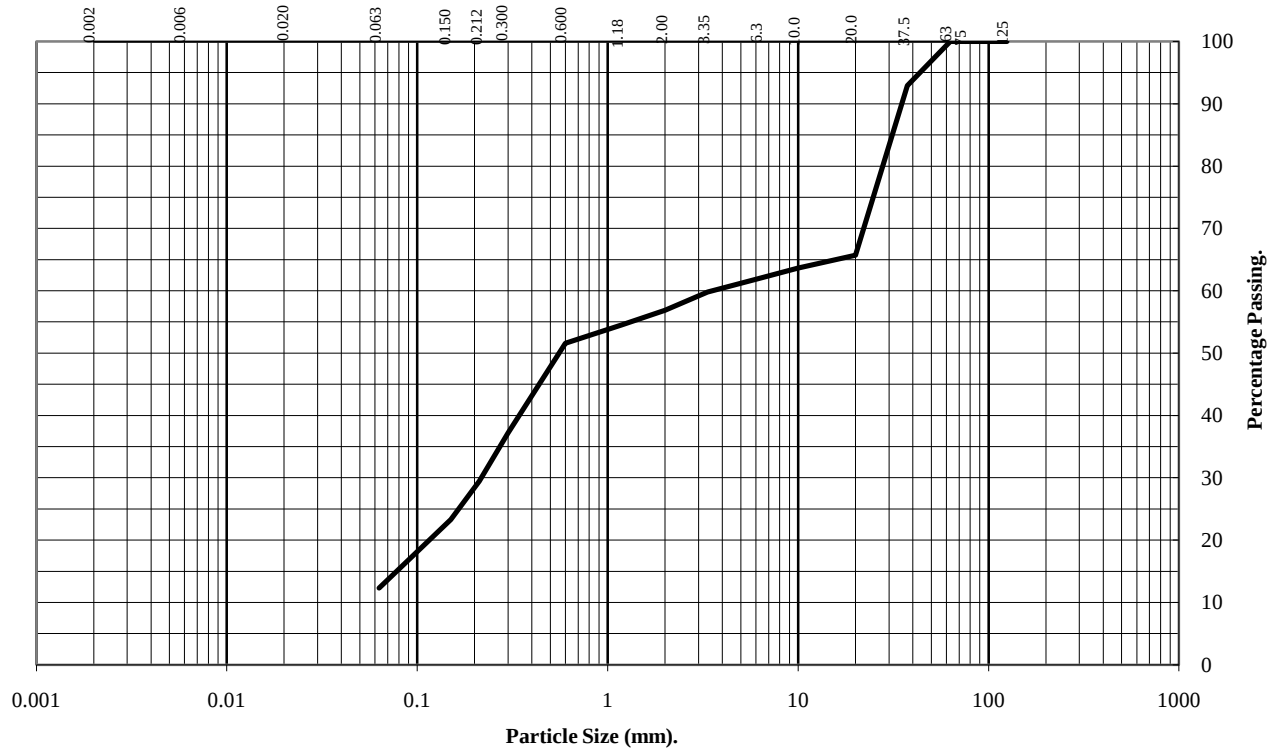
TP1

Type:

B

Depth (m):

0.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	93
20	66
10	64
6.3	62
3.35	60
2.00	57
1.18	55
0.60	52
0.30	37
0.21	29
0.15	23
0.06	12

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	43
Sand	45
Silt and Clay	12

Remarks:

#- not determined

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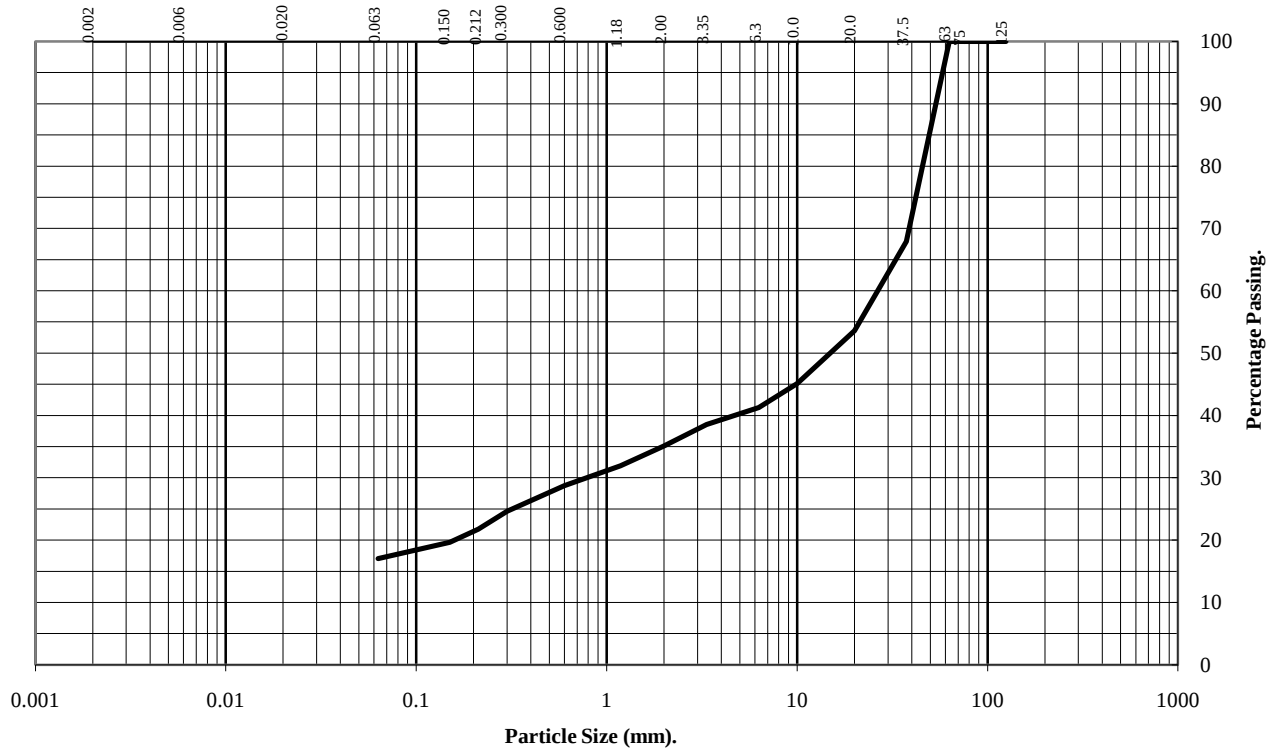
Date

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number: TP1 Type: B Depth (m): 2.50



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	68
20	54
10	45
6.3	41
3.35	39
2.00	35
1.18	32
0.60	29
0.30	25
0.21	22
0.15	20
0.06	17

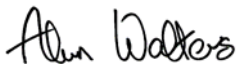
Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	65
Sand	18
Silt and Clay	17

Remarks:

#- not determined

 20/01/10
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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

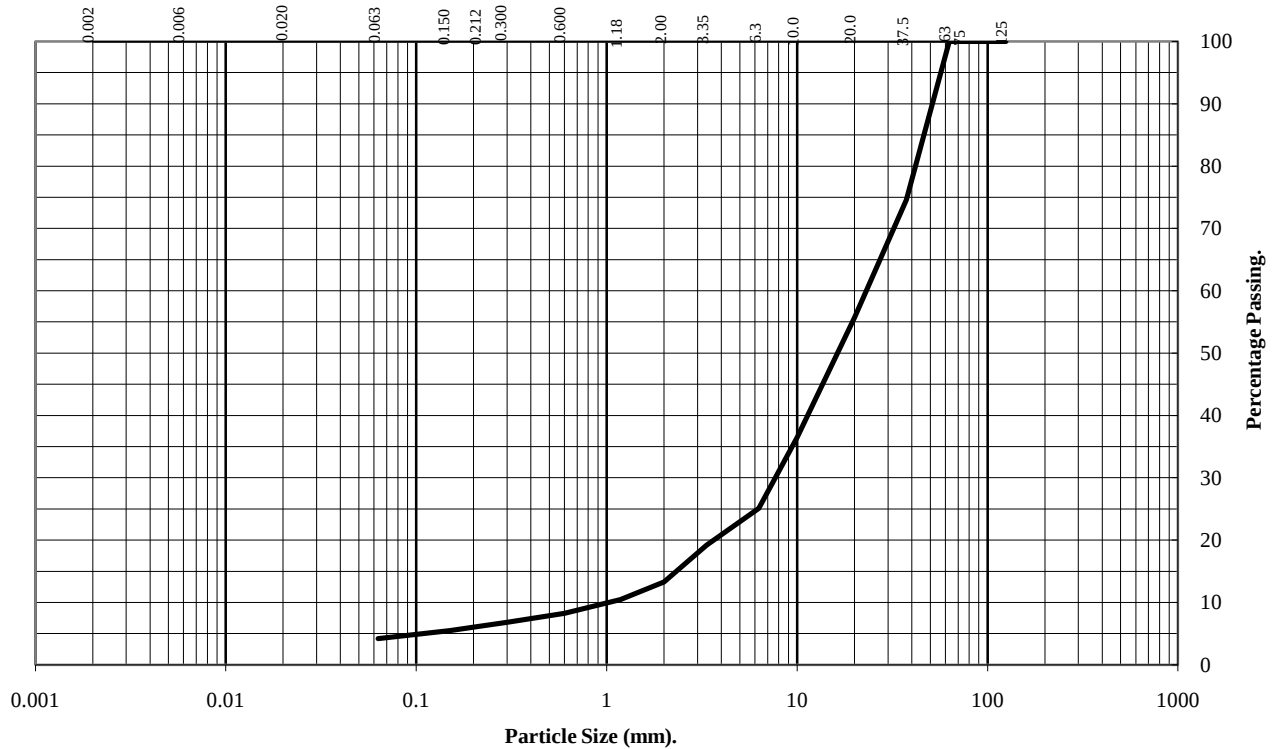
TP10

Type:

B

Depth (m):

0.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	75
20	56
10	37
6.3	25
3.35	19
2.00	13
1.18	10
0.60	8
0.30	7
0.21	6
0.15	5
0.06	4

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	87
Sand	9
Silt and Clay	4

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

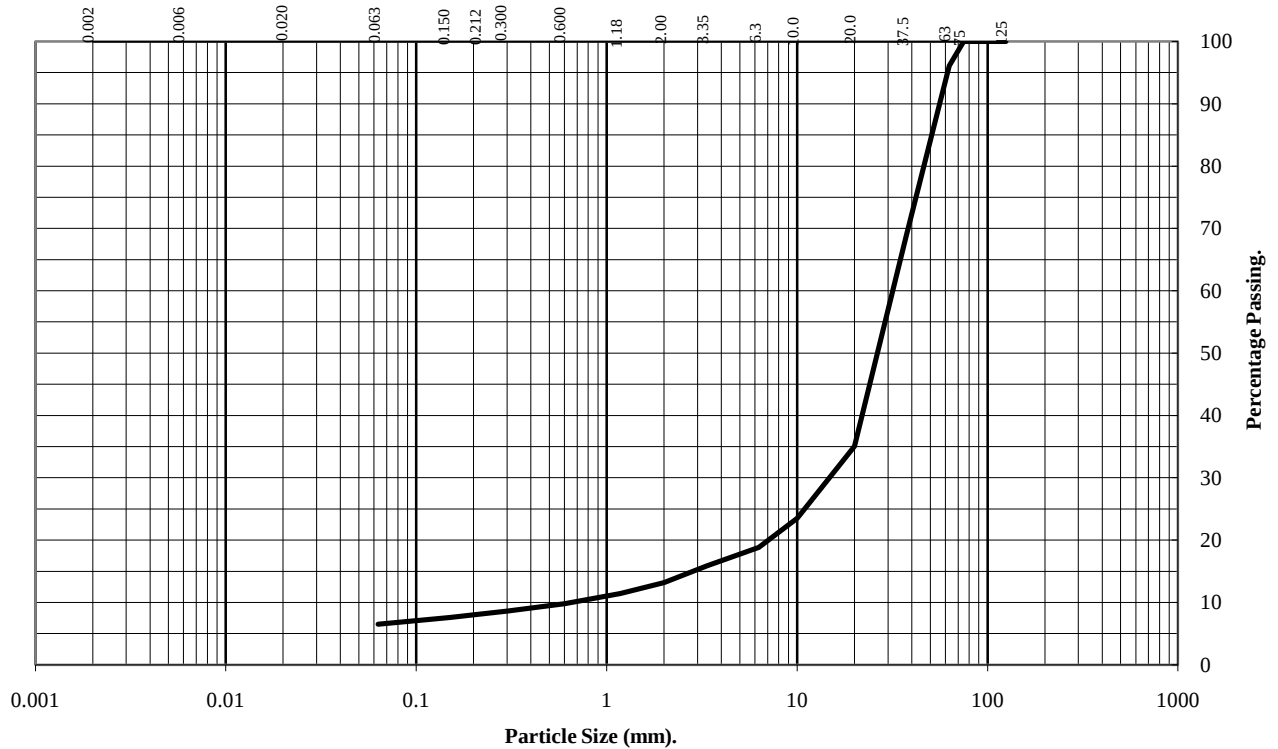
TP12

Type:

B

Depth (m):

1.00



BS Test Sieve	Percentage Passing
125	100
75	100
63	96
38	69
20	35
10	23
6.3	19
3.35	16
2.00	13
1.18	11
0.60	10
0.30	9
0.21	8
0.15	8
0.06	6

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	4
Gravel	83
Sand	7
Silt and Clay	6

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

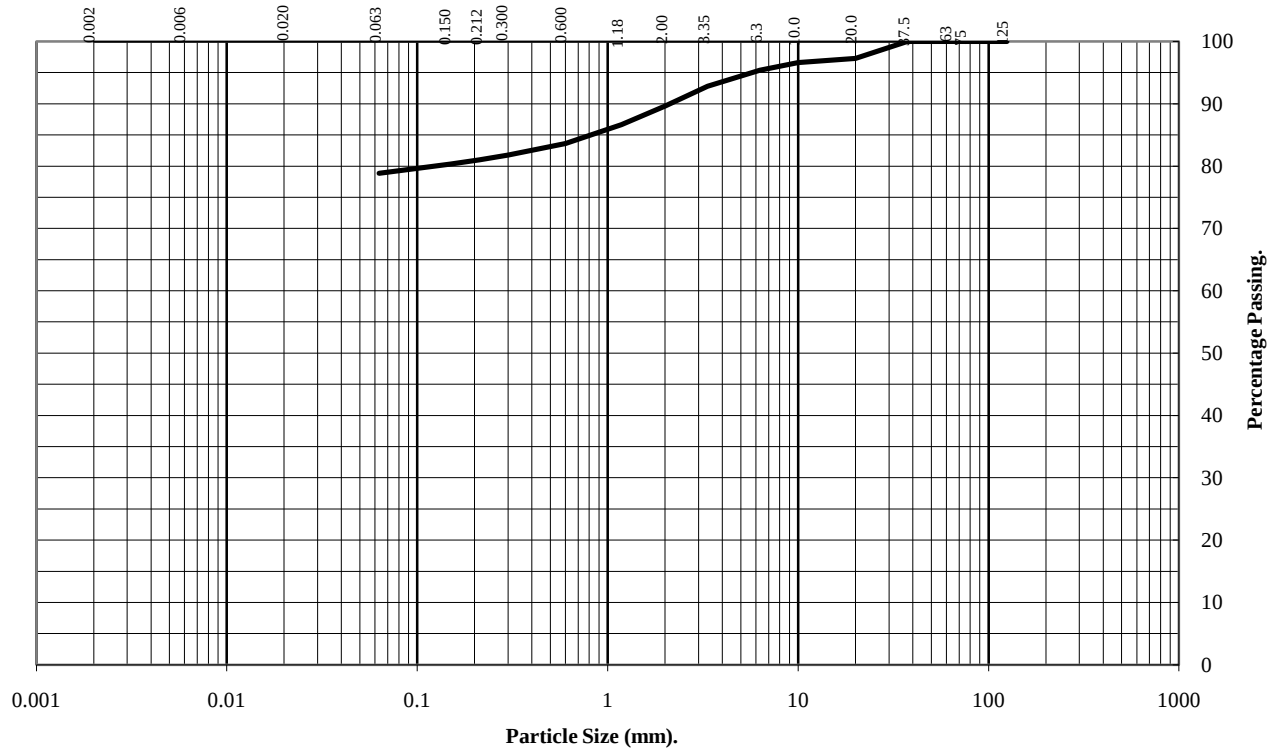
TP14

Type:

B

Depth (m):

0.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	97
10	97
6.3	95
3.35	93
2.00	90
1.18	87
0.60	84
0.30	82
0.21	81
0.15	80
0.06	79

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	10
Sand	11
Silt and Clay	79

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

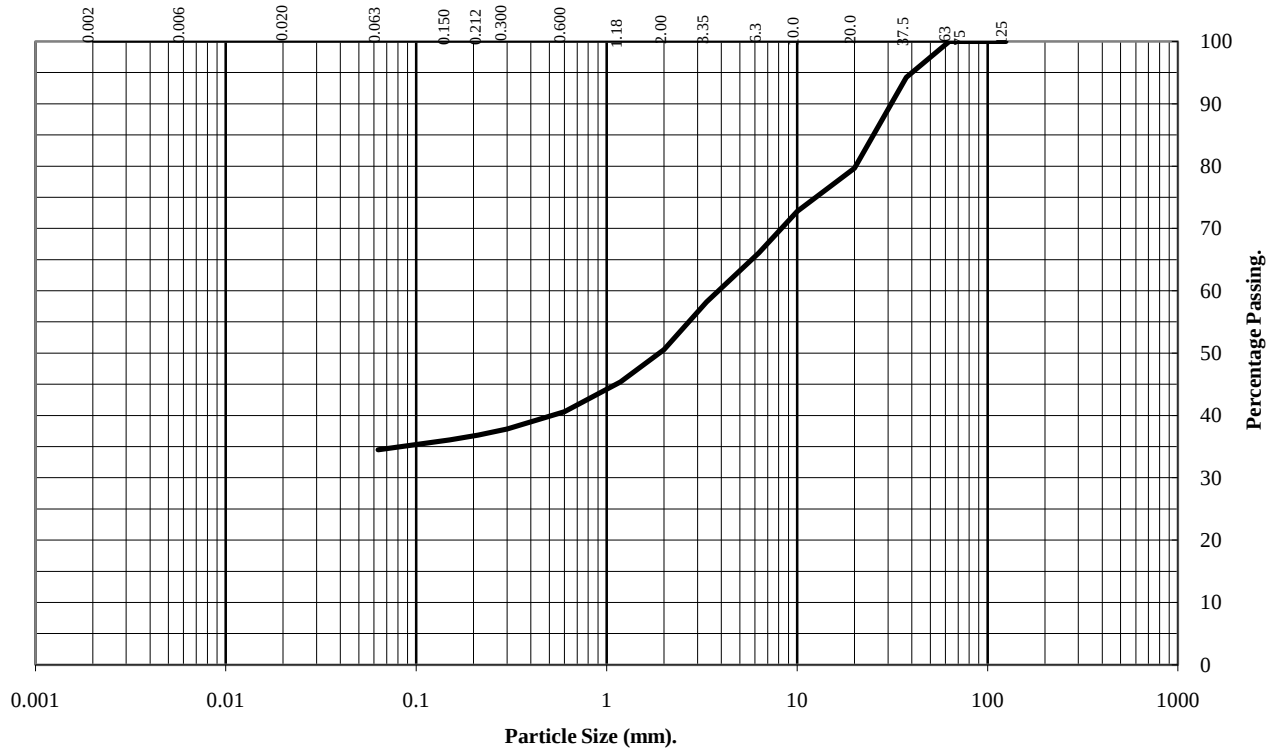
TP14

Type:

B

Depth (m):

0.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	94
20	80
10	73
6.3	66
3.35	58
2.00	51
1.18	45
0.60	41
0.30	38
0.21	37
0.15	36
0.06	35

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	49
Sand	16
Silt and Clay	35

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

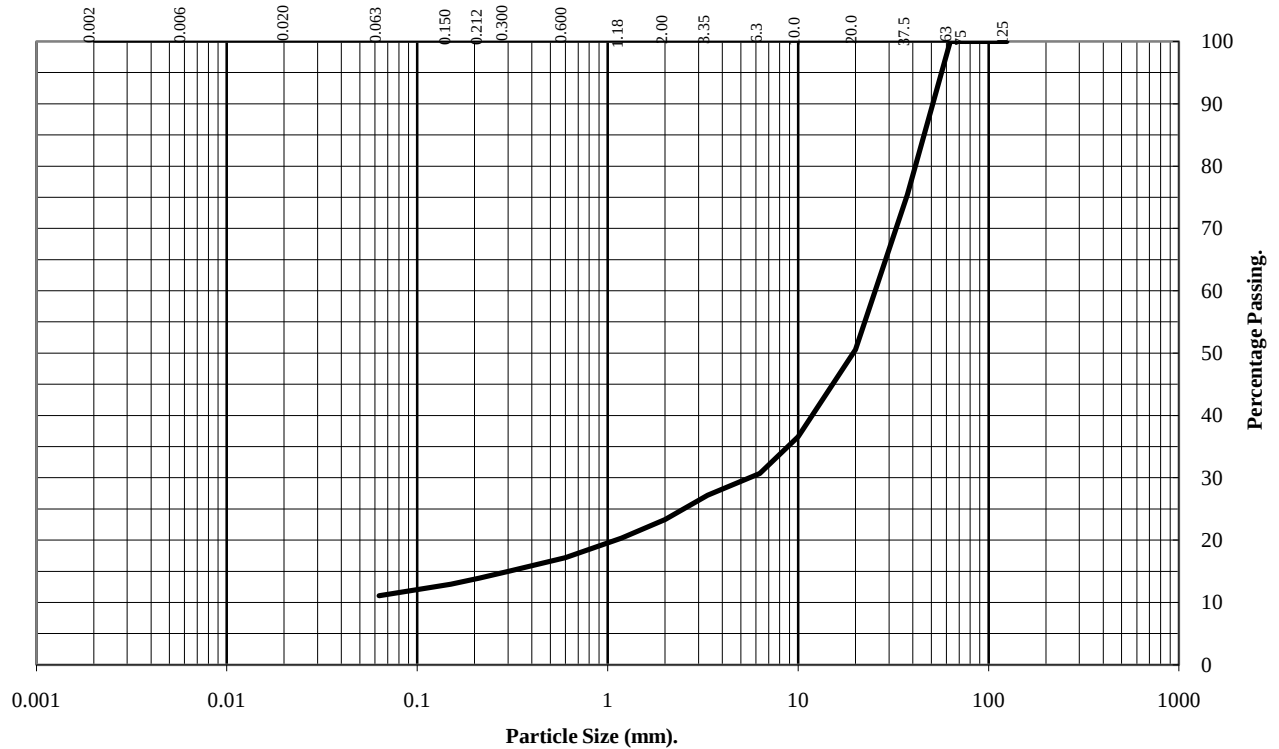
TP18

Type:

B

Depth (m):

1.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	75
20	51
10	37
6.3	31
3.35	27
2.00	23
1.18	20
0.60	17
0.30	15
0.21	14
0.15	13
0.06	11

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	77
Sand	12
Silt and Clay	11

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

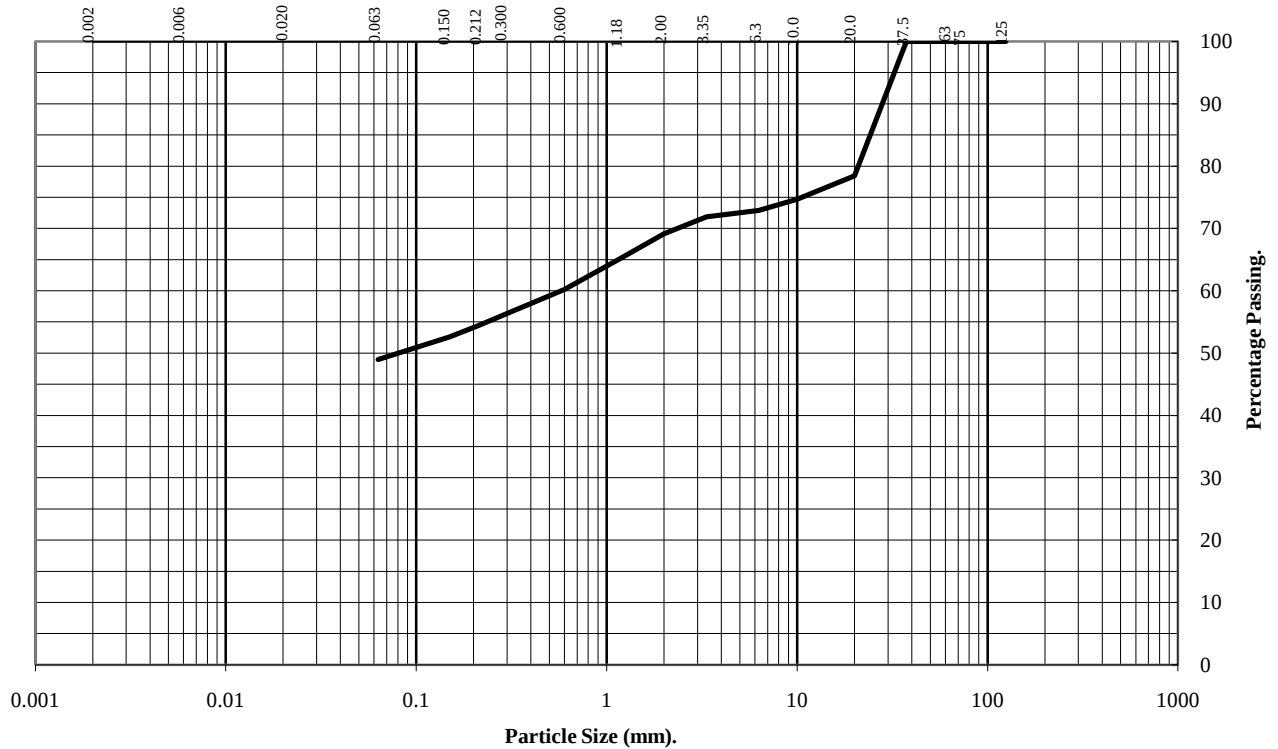
TP19

Type:

B

Depth (m):

2.50



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	100
20	78
10	75
6.3	73
3.35	72
2.00	69
1.18	65
0.60	60
0.30	56
0.21	54
0.15	53
0.06	49

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	31
Sand	20
Silt and Clay	49

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

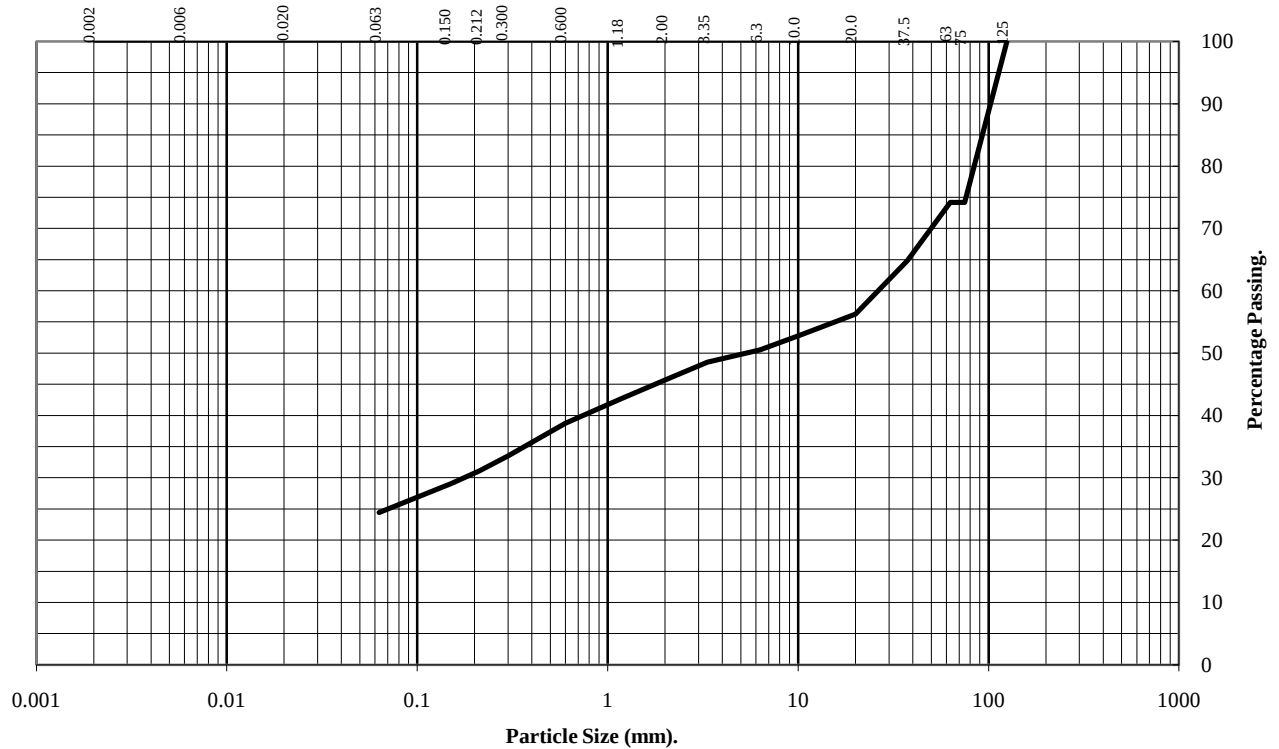
TP2

Type:

B

Depth (m):

0.80



BS Test Sieve	Percentage Passing
125	100
75	74
63	74
38	65
20	56
10	53
6.3	51
3.35	49
2.00	46
1.18	43
0.60	39
0.30	34
0.21	31
0.15	29
0.06	24

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	26
Gravel	28
Sand	22
Silt and Clay	24

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

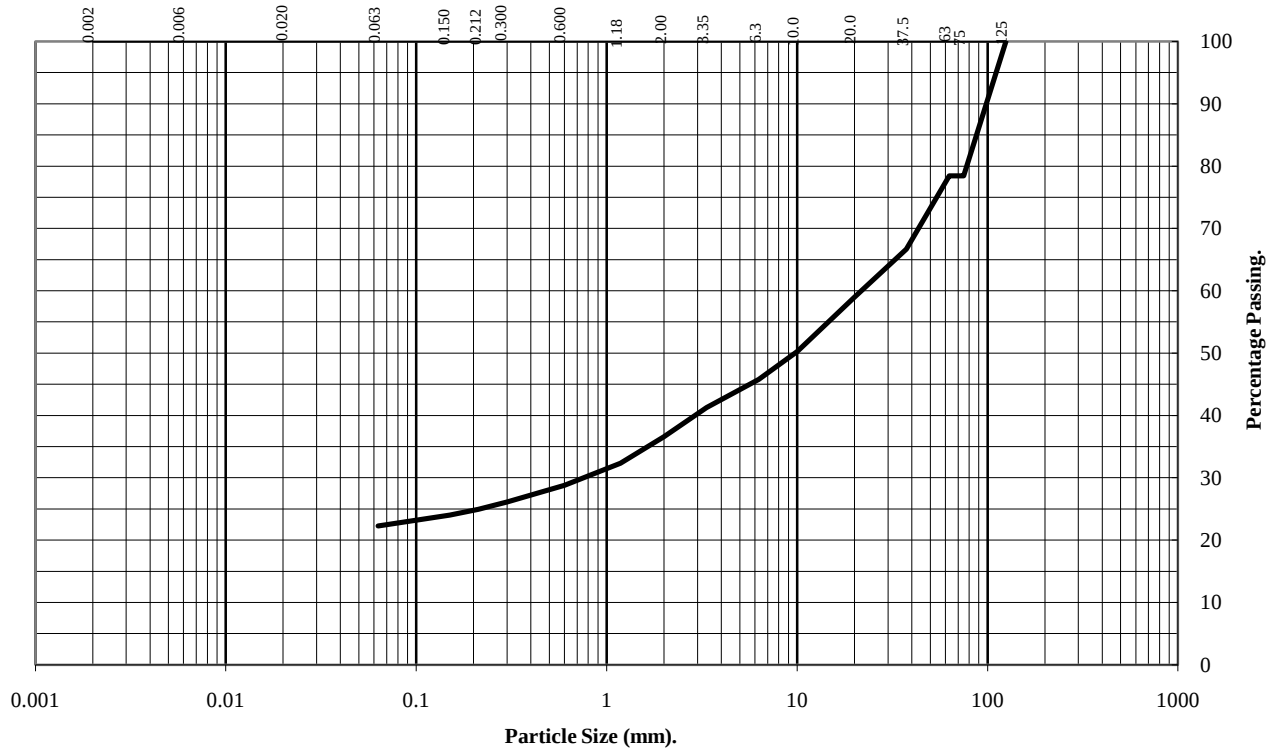
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number: TP20

Type: B

Depth (m): 3.00



BS Test Sieve	Percentage Passing
125	100
75	78
63	78
38	67
20	59
10	50
6.3	46
3.35	41
2.00	37
1.18	32
0.60	29
0.30	26
0.21	25
0.15	24
0.06	22

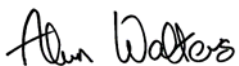
Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	22
Gravel	41
Sand	15
Silt and Clay	22

Remarks:

#- not determined

 20/01/10
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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

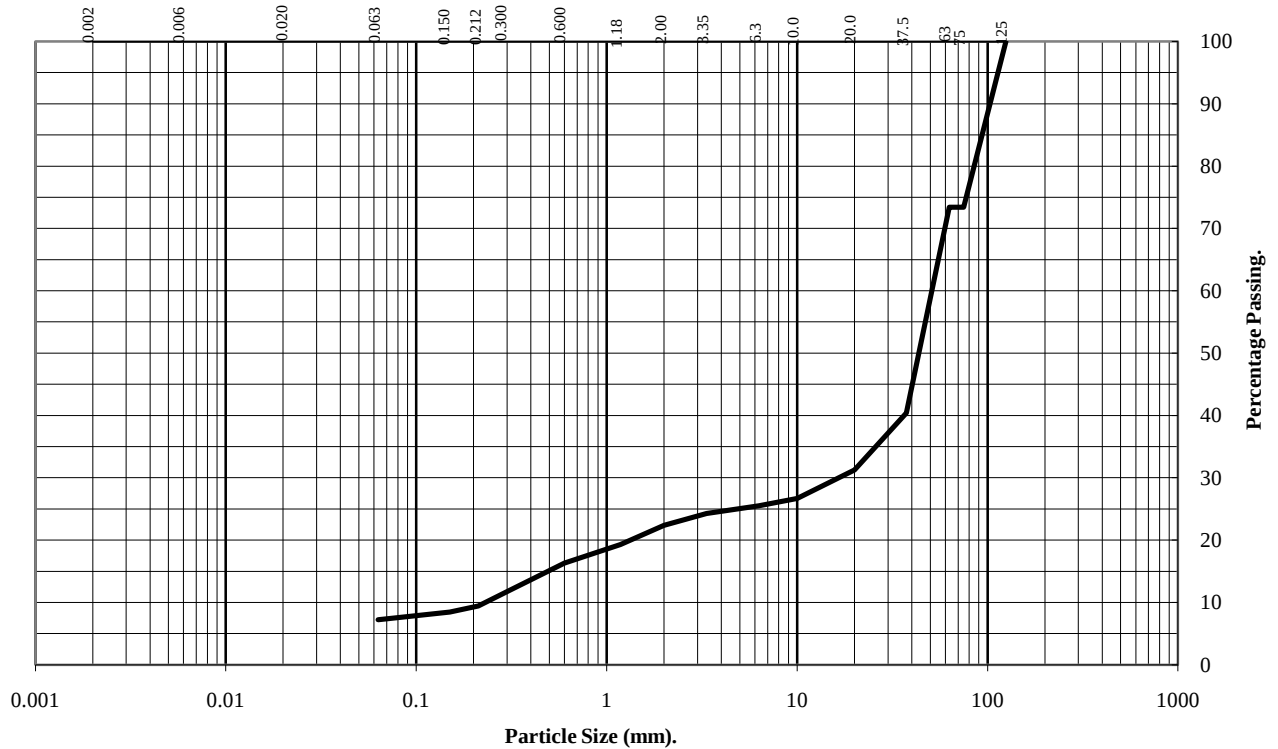
TP21

Type:

B

Depth (m):

2.00



BS Test Sieve	Percentage Passing
125	100
75	73
63	73
38	40
20	31
10	27
6.3	25
3.35	24
2.00	22
1.18	19
0.60	16
0.30	12
0.21	9
0.15	8
0.06	7

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	27
Gravel	51
Sand	15
Silt and Clay	7

Remarks:

#- not determined

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[Signature]

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Approved by

Date

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

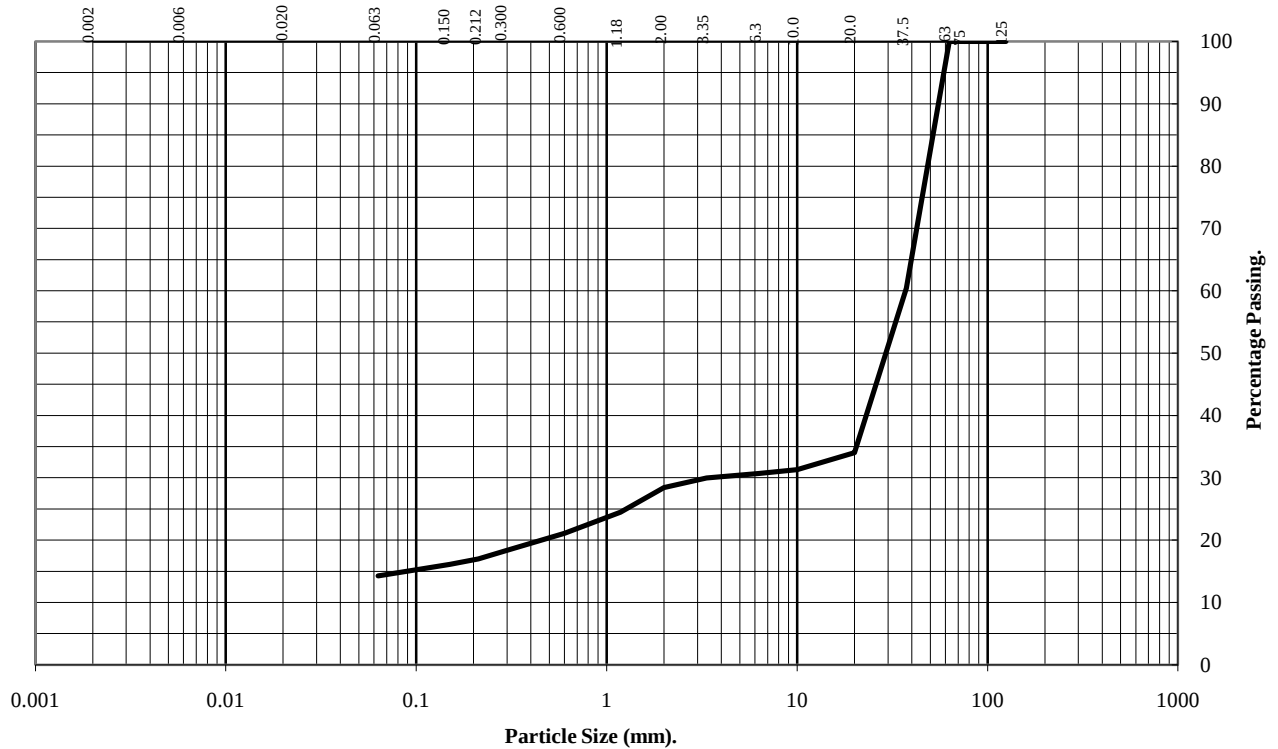
TP22

Type:

B

Depth (m):

1.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	60
20	34
10	31
6.3	31
3.35	30
2.00	28
1.18	24
0.60	21
0.30	18
0.21	17
0.15	16
0.06	14

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	72
Sand	14
Silt and Clay	14

Remarks:

#- not determined

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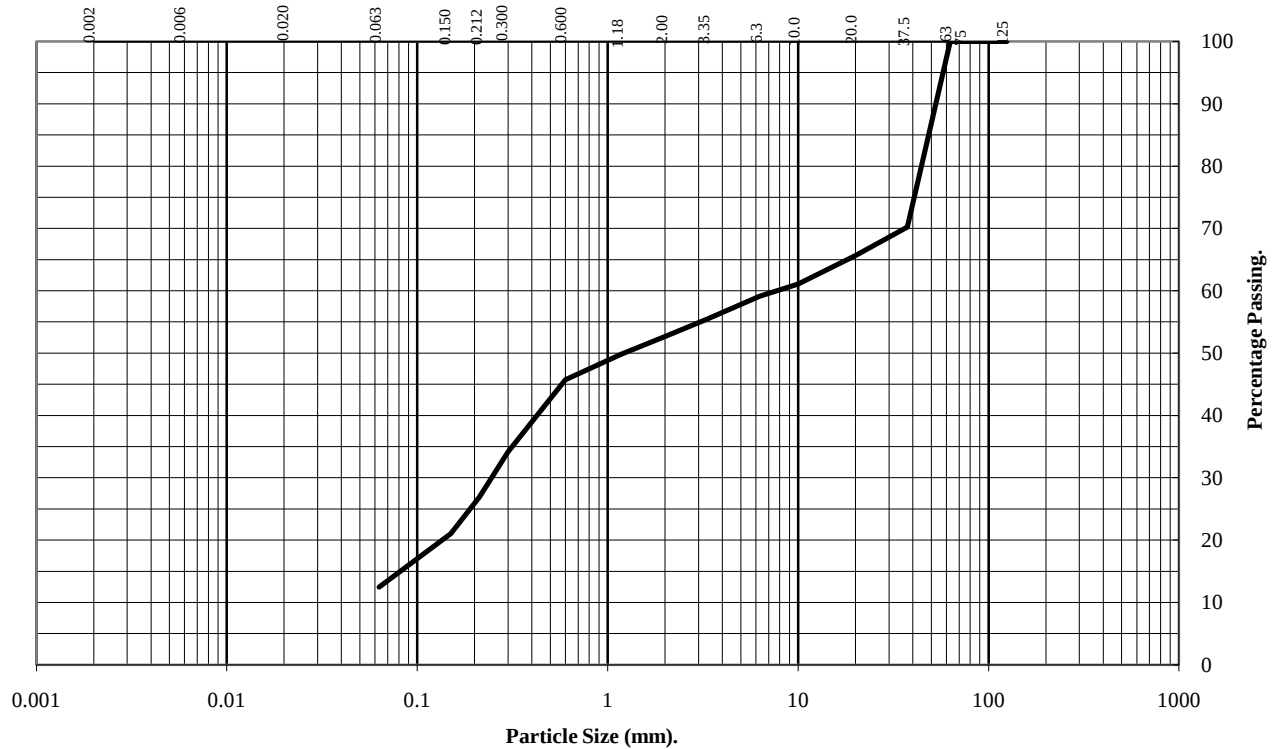
Date

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number: TP3 Type: B Depth (m): 0.80



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	70
20	66
10	61
6.3	59
3.35	56
2.00	53
1.18	50
0.60	46
0.30	34
0.21	27
0.15	21
0.06	12

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	47
Sand	41
Silt and Clay	12

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

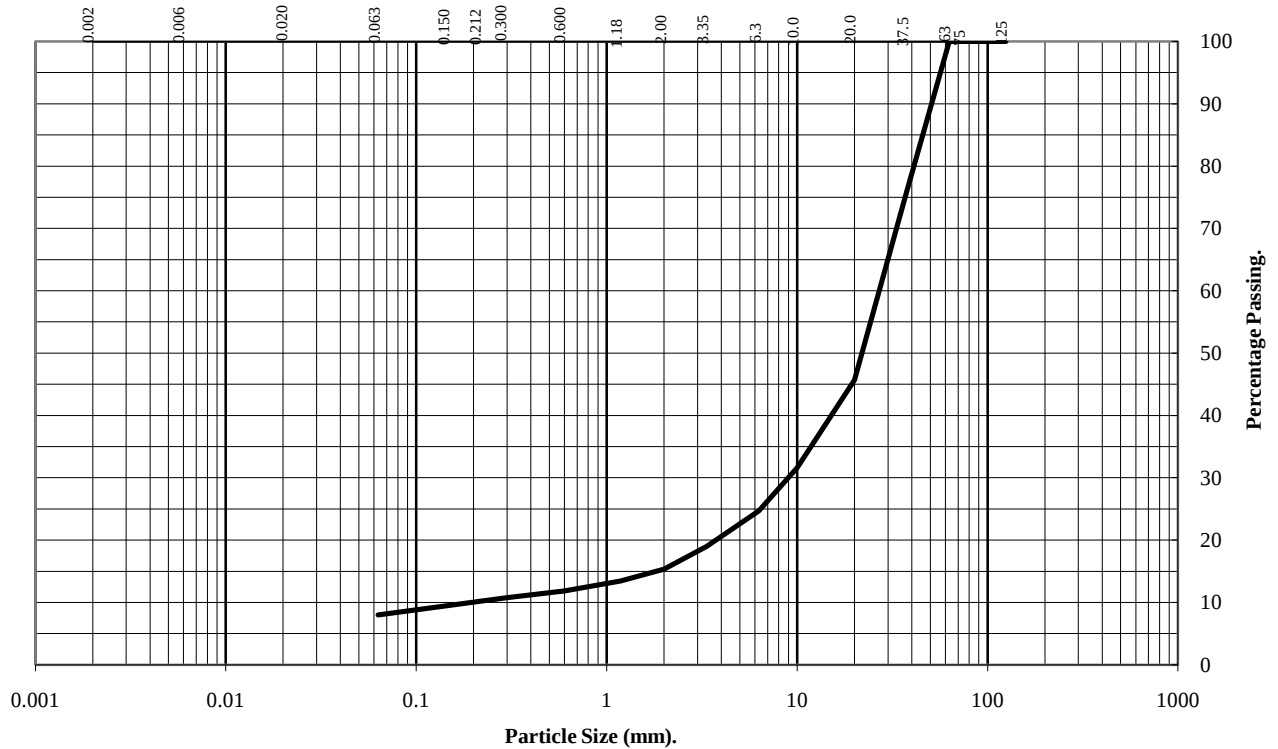
BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number: TP8

Type: B

Depth (m): 0.20



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	76
20	46
10	32
6.3	25
3.35	19
2.00	15
1.18	13
0.60	12
0.30	11
0.21	10
0.15	10
0.06	8

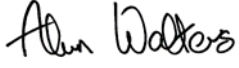
Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	85
Sand	7
Silt and Clay	8

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

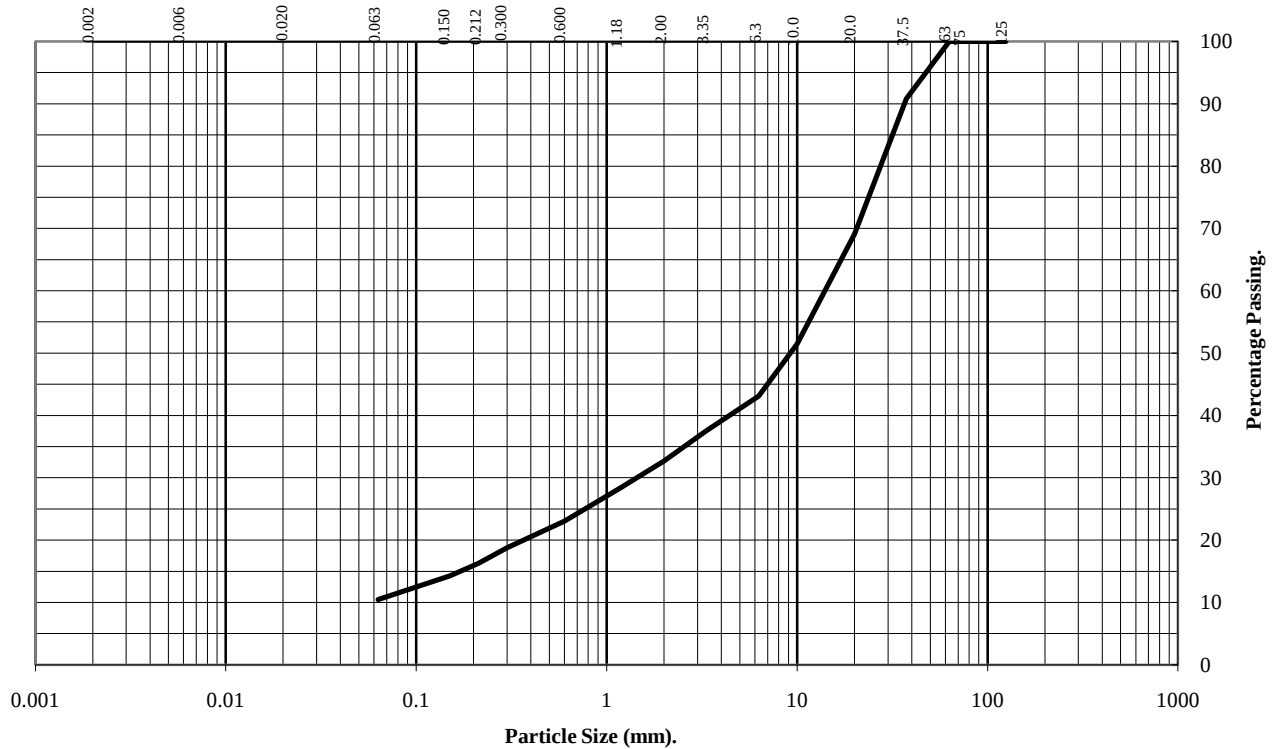
TP9

Type:

B

Depth (m):

0.90



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
38	91
20	69
10	51
6.3	43
3.35	38
2.00	33
1.18	28
0.60	23
0.30	19
0.21	16
0.15	14
0.06	10

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	0
Gravel	67
Sand	23
Silt and Clay	10

Remarks:

#- not determined

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PARTICLE SIZE DISTRIBUTION TEST

BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Hole Number:

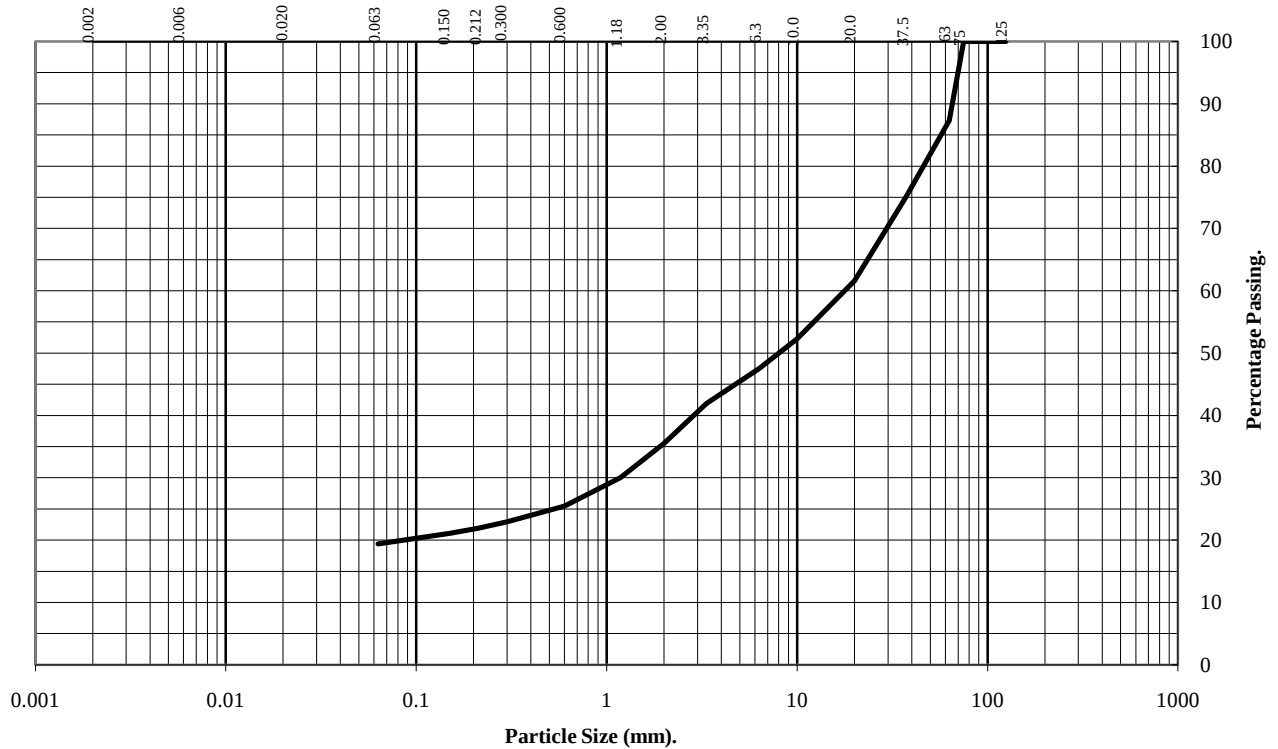
TP9

Type:

B

Depth (m):

2.00



BS Test Sieve	Percentage Passing
125	100
75	100
63	87
38	75
20	62
10	52
6.3	47
3.35	42
2.00	36
1.18	30
0.60	25
0.30	23
0.21	22
0.15	21
0.06	19

Particle Diameter	Percentage Passing
0.02	#
0.006	#
0.002	#

Soil Fraction	Total Percentage
Cobbles	13
Gravel	51
Sand	17
Silt and Clay	19

Remarks:

#- not determined

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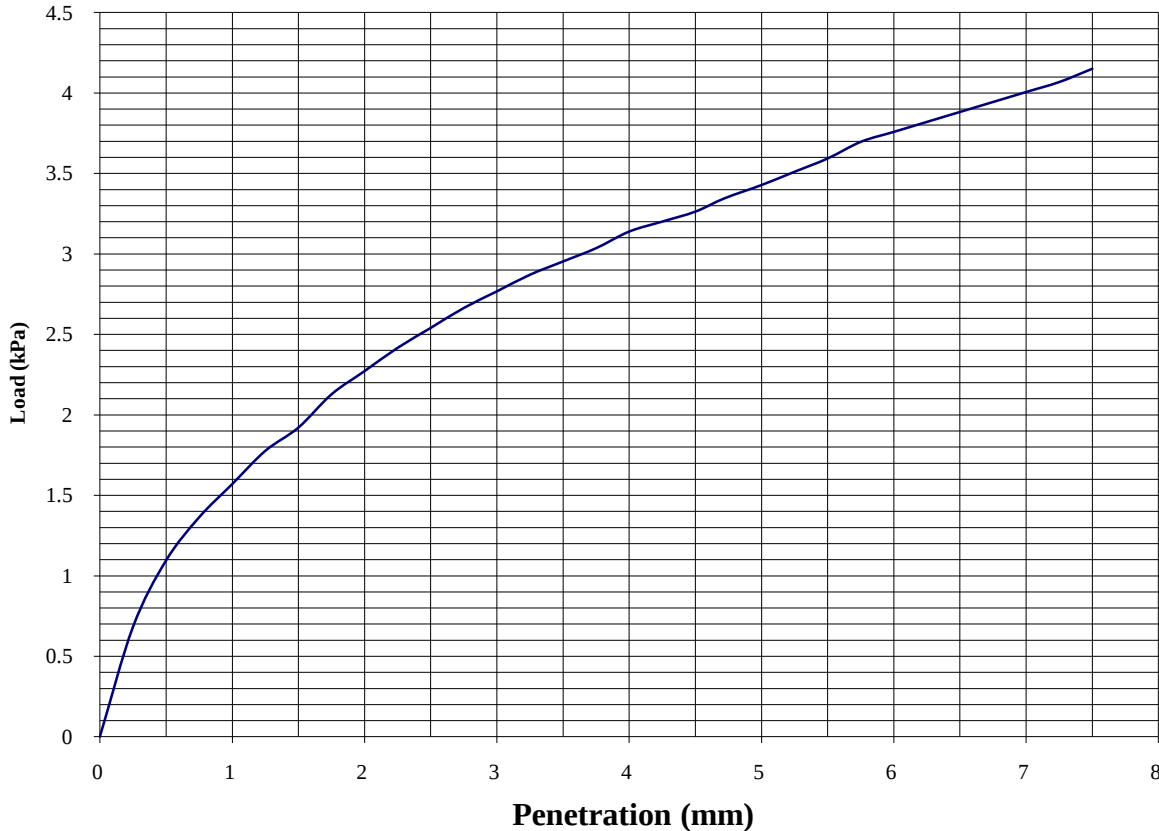
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Date

California Bearing Ratio Test.

BS 1377:Part 4:1990

Hole Number: TP11 Sample Number: N/A Depth (m) 0.70



Initial Sample Conditions		Test Conditions		Method of compaction : 2.5 Kg Rammer	
Moisture Content:	21	Surcharge Kg:	2.0	Final Moisture Content %	
Bulk Density Mg/m3:	2.01	Soaking Time hrs	n/a	Sample Top	20.7
Dry Density Mg/m3:	1.67	Swelling mm:	n/a	Sample Bottom	N/A
C.B.R. Value %		Sample Top		17.1	Sample Bottom
Sample Bottom		N/A			
Percentage retained on 20mm BS test sieve:			0	Remarks:	

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20/01/10

Date



Pinhoe Quarry

Contract No.:

9166/09

Client Ref No:

PO1929

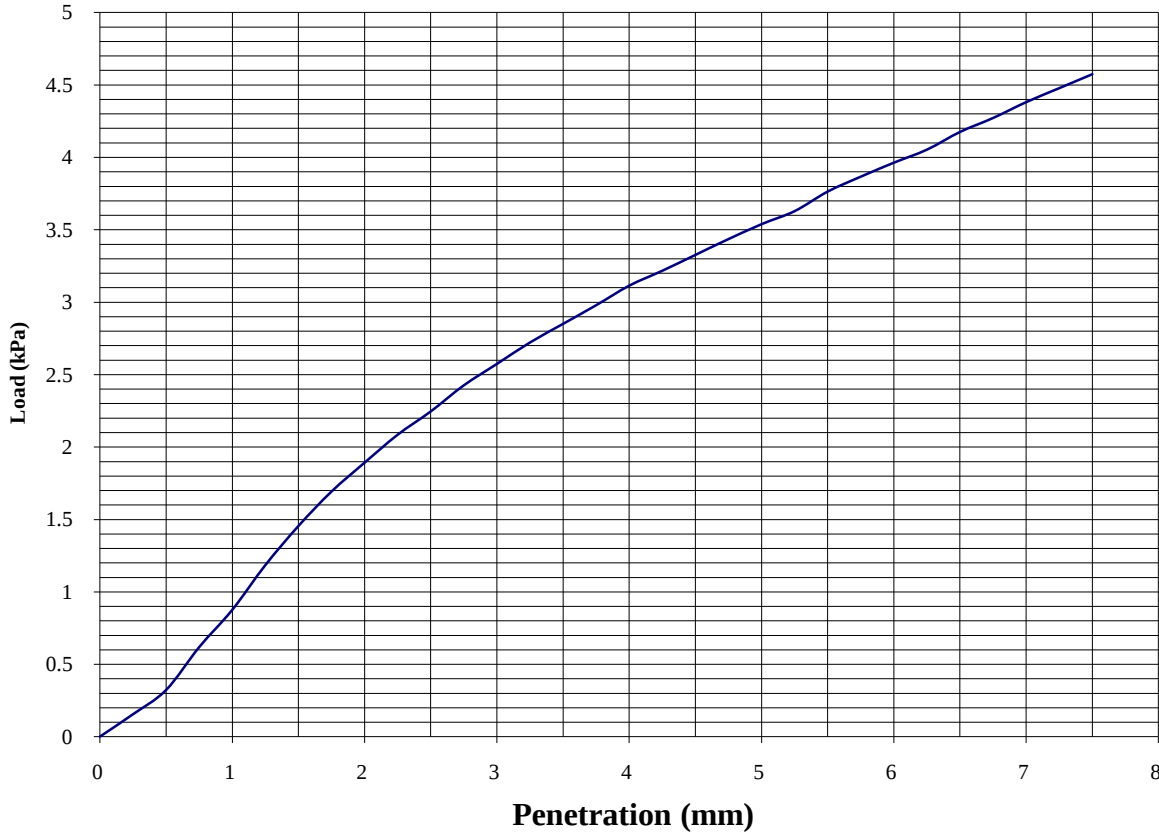


2788

California Bearing Ratio Test.

BS 1377:Part 4:1990

Hole Number: TP3 Sample Number: N/A Depth (m) 0.80



Initial Sample Conditions		Test Conditions		Method of compaction : 2.5 Kg Rammer	
Moisture Content:	8	Surcharge Kg:	2.0	Final Moisture Content %	
Bulk Density Mg/m3:	1.85	Soaking Time hrs	n/a	Sample Top	8.1
Dry Density Mg/m3:	1.71	Swelling mm:	n/a	Sample Bottom	N/A
C.B.R. Value %		Sample Top		17.7	Sample Bottom
Sample Bottom		N/A			
Percentage retained on 20mm BS test sieve:			34	Remarks:	

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20/01/10

Date



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Contract No.:

9166/09

Client Ref No:

PO1929



2788

Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

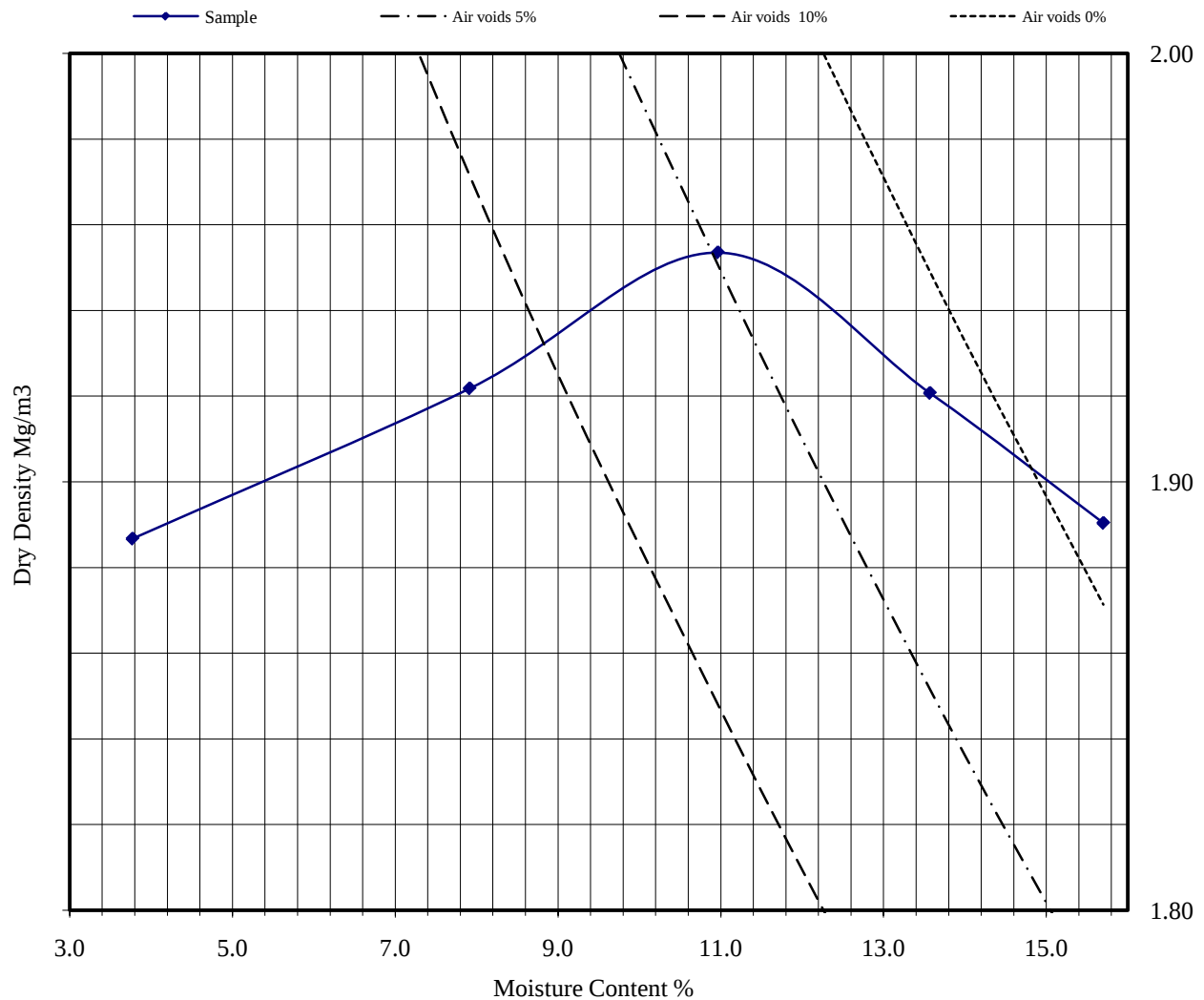
Hole Number:

CP1

Type :

B

Depth (m): 3.70



Initial Moisture Content:	11	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m3):	2.65 Assumed	Material Retained on 37.5 mm Test Sieve (%):	7
Maximum Dry Density (mg/m3):	1.95	Material Retained on 20.0 mm Test Sieve (%):	20
Optimum Moisture Content (%):	11	Sample Preparation Clause :	3.2.4.1

Remarks

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Date

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Date



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Client Ref No:

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Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

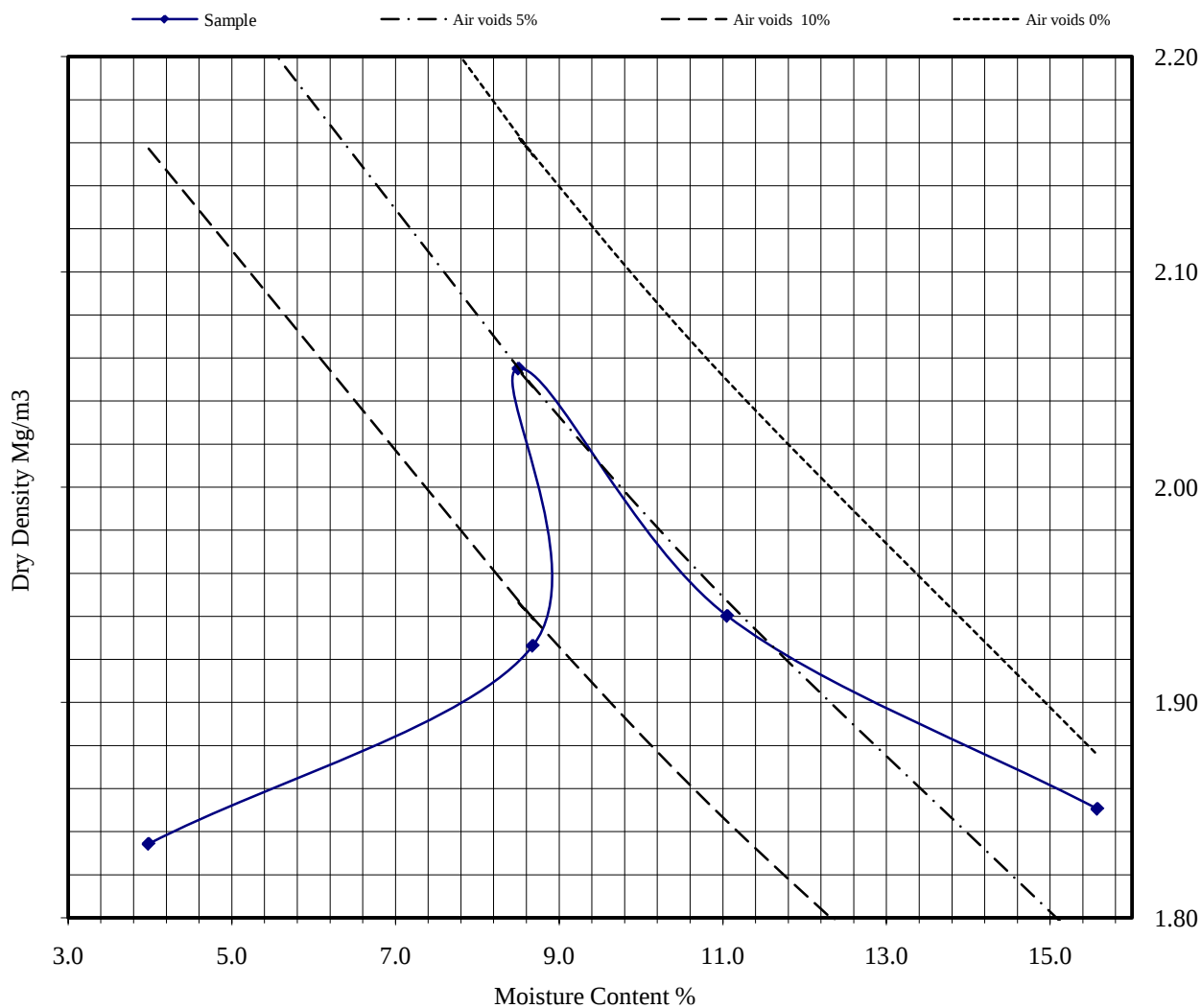
Hole Number:

CP3

Type :

B

Depth (m): 1.70



Initial Moisture Content:	8.5	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m ³):	2.65 Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (mg/m ³):	2.06	Material Retained on 20.0 mm Test Sieve (%):	17
Optimum Moisture Content (%):	8.5	Sample Preparation Clause :	3.2.4.1

Remarks

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Pinhoe Quarry

Contract No.:

9166/09

Client Ref No:

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Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

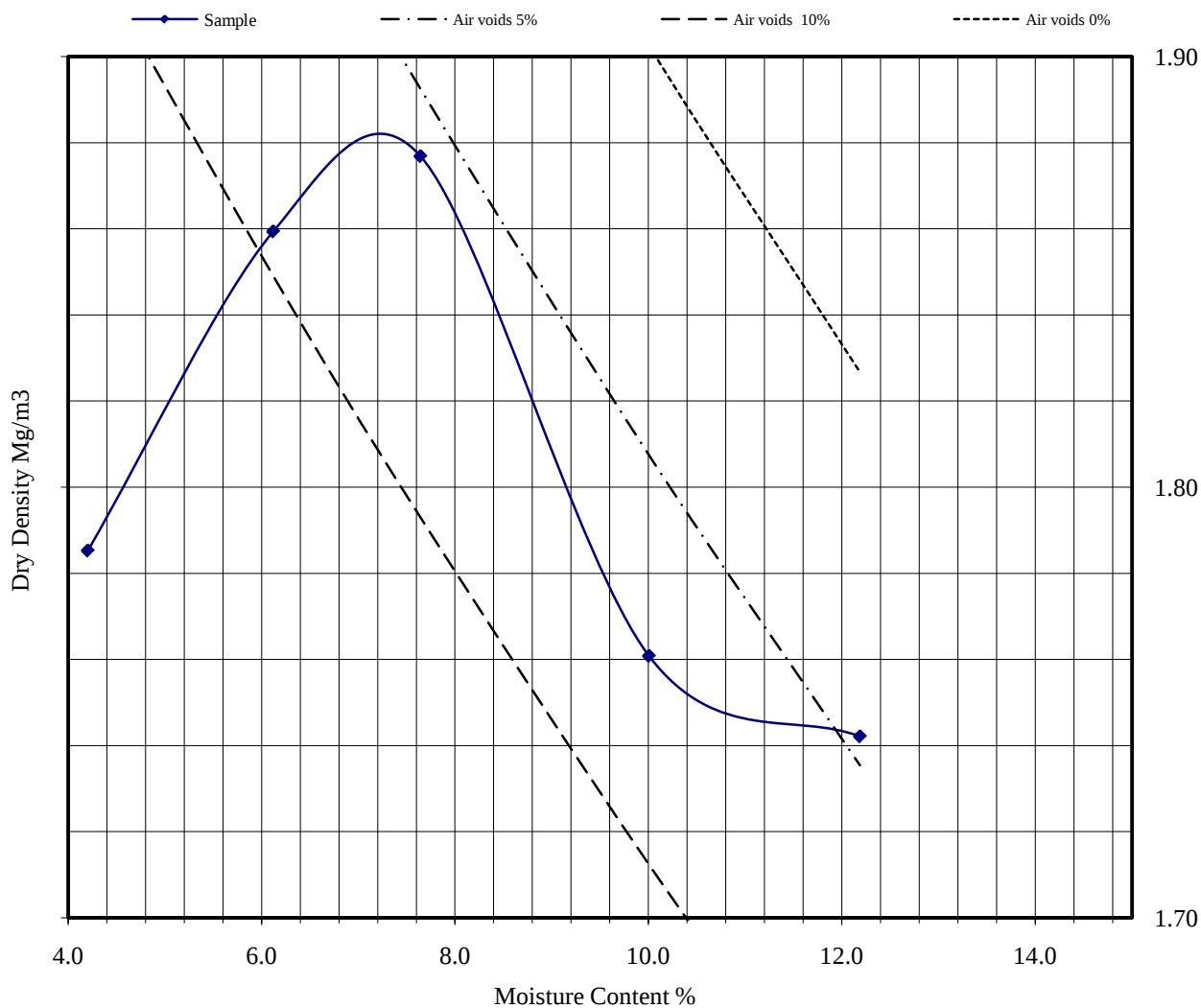
Hole Number:

TP1

Type :

B

Depth (m): 0.80



Initial Moisture Content:	8	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m³):	2.35 Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (mg/m³):	1.88	Material Retained on 20.0 mm Test Sieve (%):	1
Optimum Moisture Content (%):	8	Sample Preparation Clause :	3.2.4.1

Remarks

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Date

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Contract No.:
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Client Ref No:
PO1929



Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

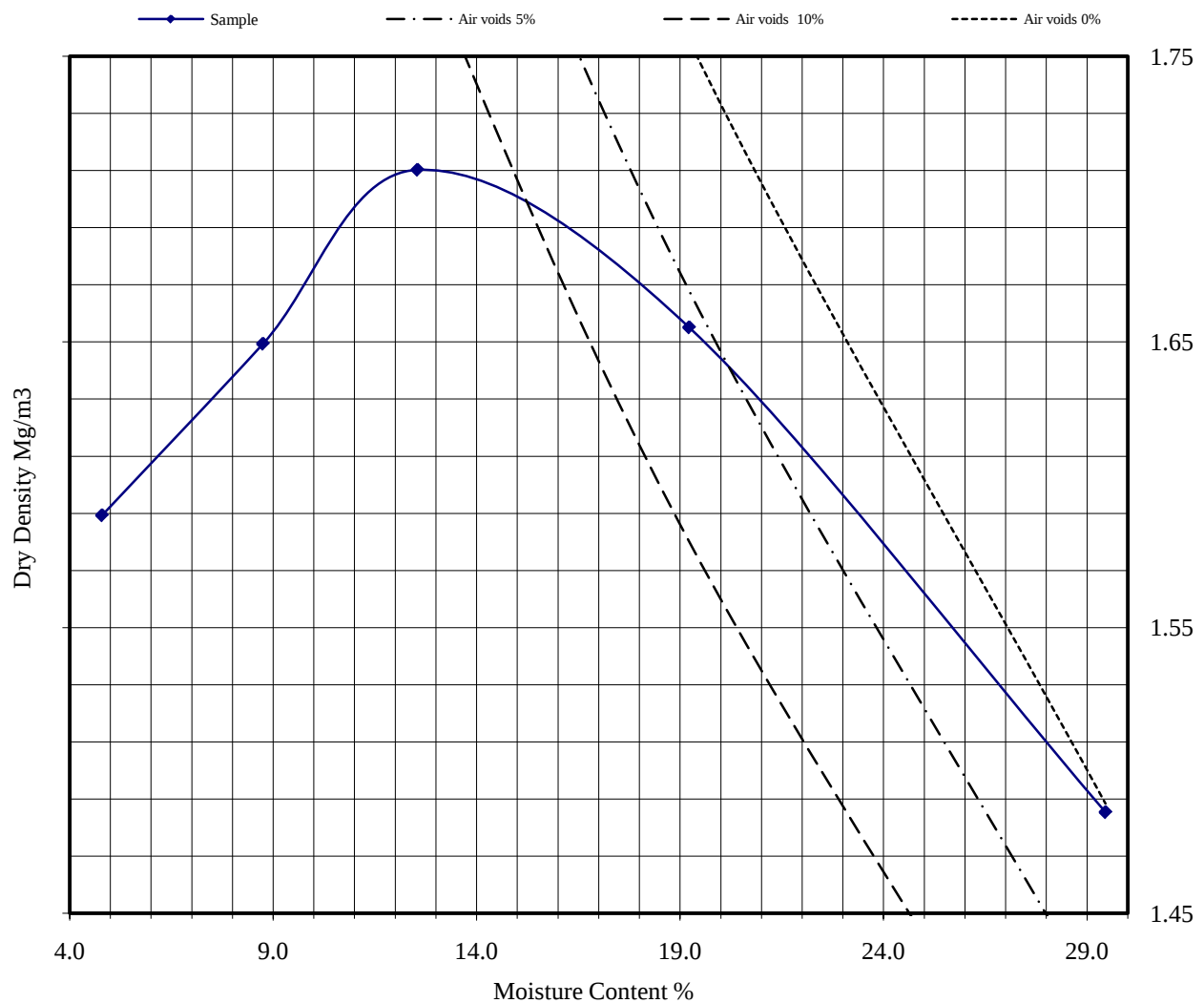
Hole Number:

TP14

Type :

B

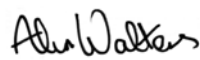
Depth (m): 0.80



Initial Moisture Content:	29	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m³):	2.65 Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (mg/m³):	1.71	Material Retained on 20.0 mm Test Sieve (%):	3
Optimum Moisture Content (%):	13	Sample Preparation Clause :	3.2.4.1

Remarks


 Checked by Date 20/01/10


 Approved by Date 20/01/10



Pinhoe Quarry

Contract No.:
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Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

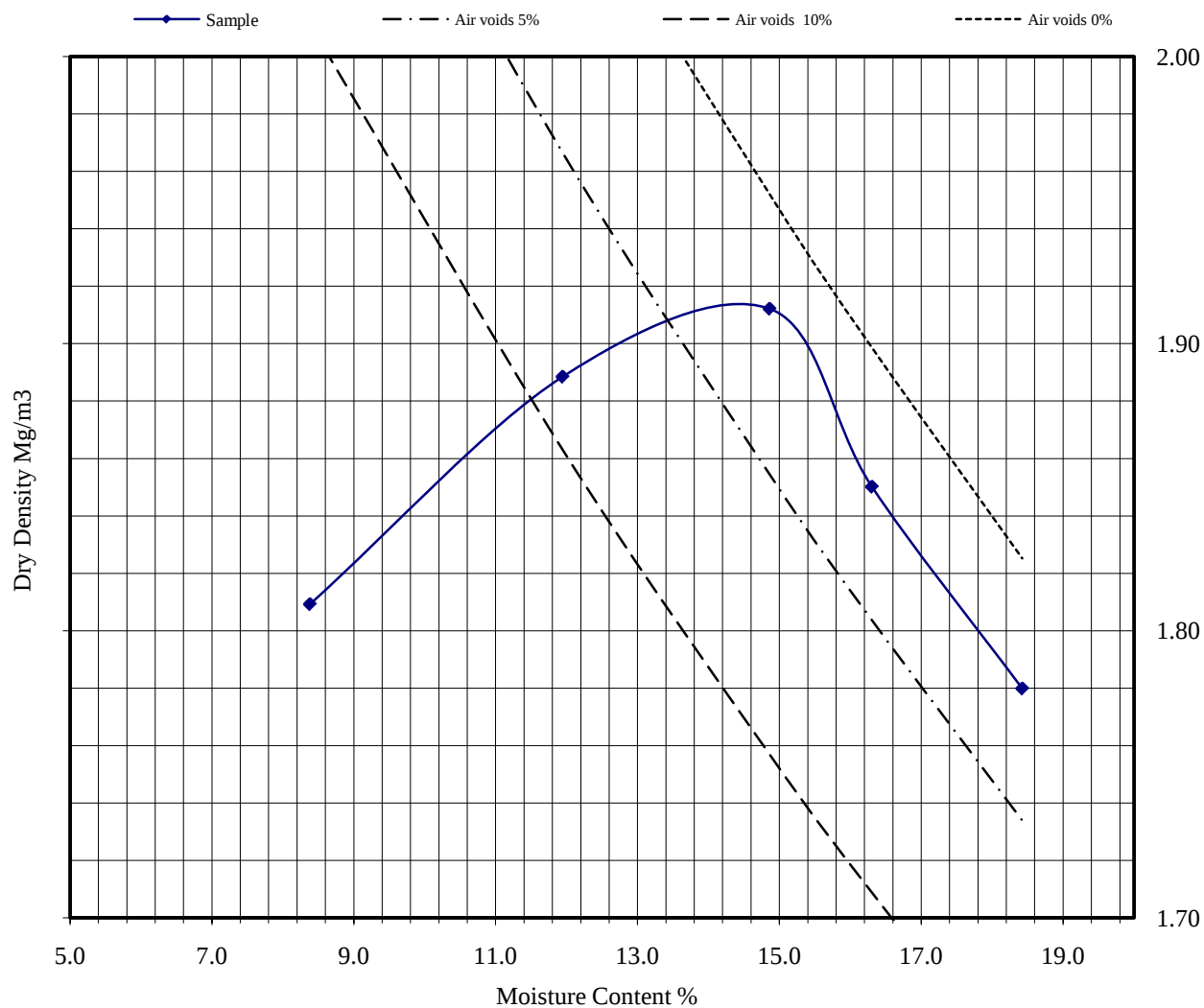
Hole Number:

TP14

Type :

B

Depth (m): 1.80



Initial Moisture Content:	14.9	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m³):	2.75 Assumed	Material Retained on 37.5 mm Test Sieve (%):	6
Maximum Dry Density (mg/m³):	1.91	Material Retained on 20.0 mm Test Sieve (%):	20
Optimum Moisture Content (%):	14.9	Sample Preparation Clause :	3.2.4.2

Remarks

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Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

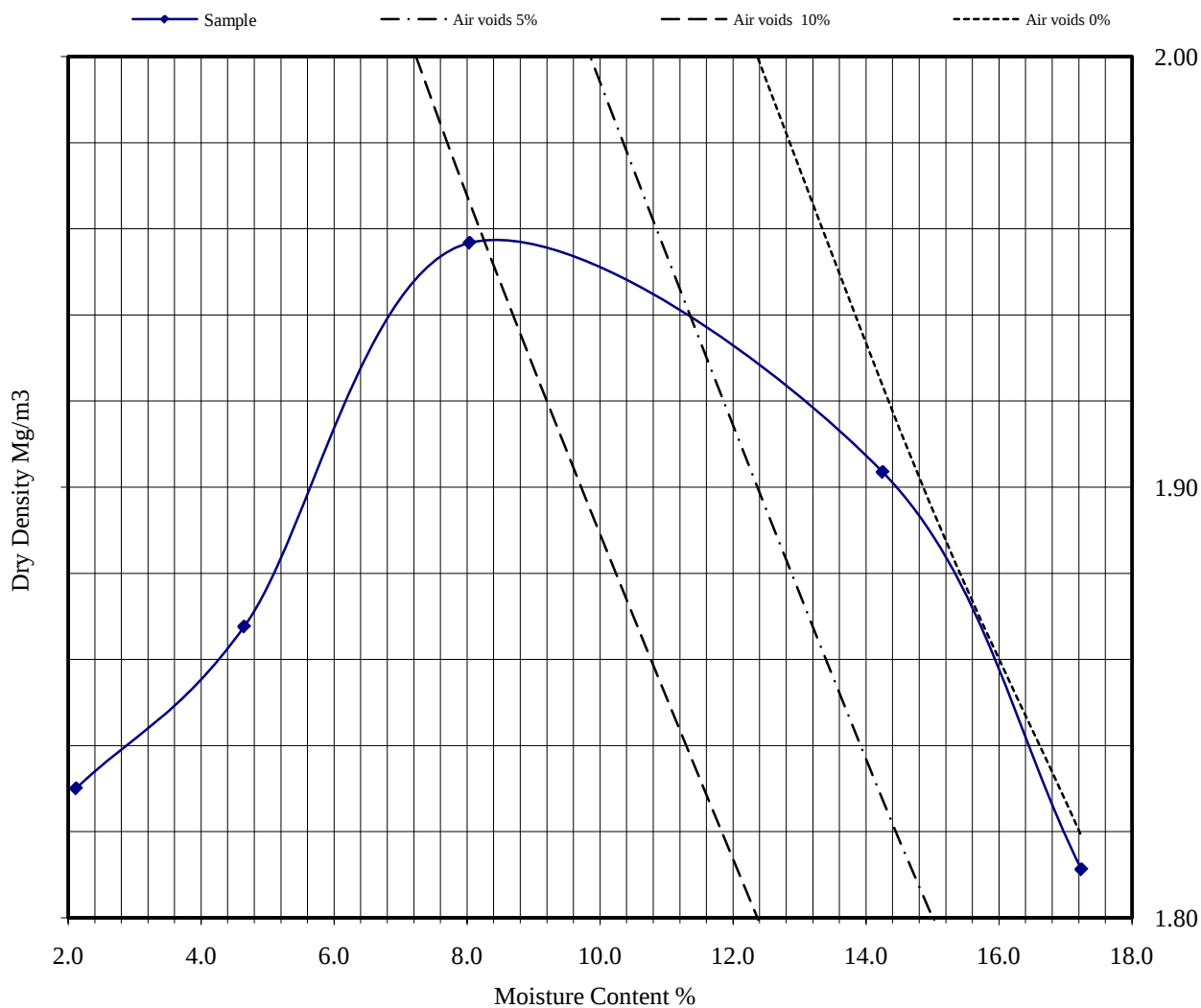
Hole Number:

TP4

Type :

B

Depth (m): 0.80



Initial Moisture Content:	14.3	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m³):	2.65 Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (mg/m³):	1.96	Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	8.0	Sample Preparation Clause :	3.2.4.1

Remarks

[Signature]

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Contract No.:

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Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

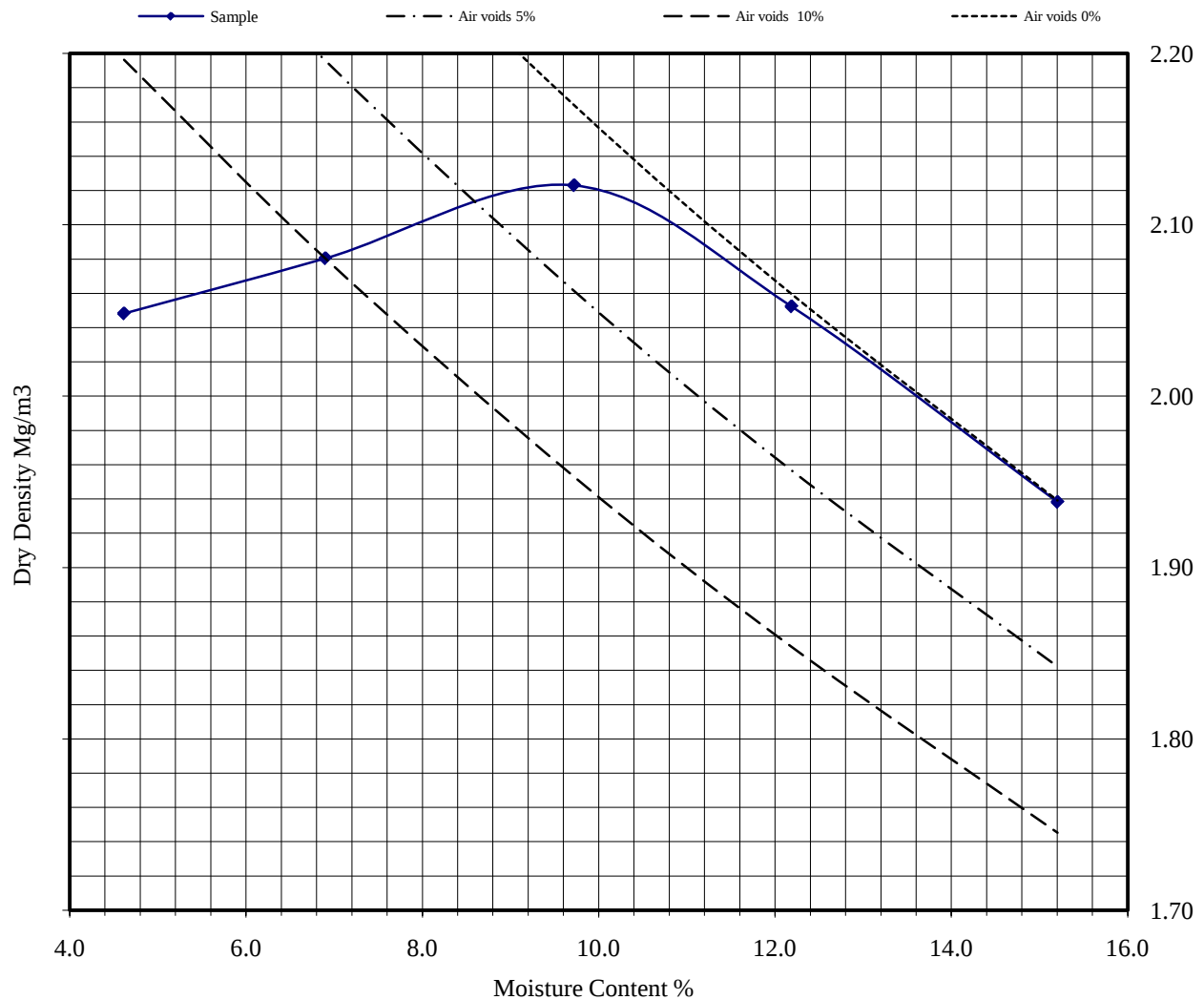
Hole Number:

TP8

Type :

B

Depth (m): 0.20



Initial Moisture Content:	7	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m³):	2.75 Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (mg/m³):	2.12	Material Retained on 20.0 mm Test Sieve (%):	1
Optimum Moisture Content (%):	10	Sample Preparation Clause :	3.2.4.1

Remarks

[Signature]

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20/01/10

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Date



Pinhoe Quarry

Contract No.:
9166/09
Client Ref No:
PO1929



Permeability in a Triaxial Cell

Using the Accelerated Permeability Method (E.A. Report PI-398/TR/2)

Specimen Details

Borehole	TP14
Sample No.	0
Depth m	0.80
Date	11/01/2010
Disturbed / Undisturbed	Disturbed

Note: Recompacted utilising a 2.5kg rammer

Description of Specimen

Reddish brown gravelly silty CLAY

Initial Specimen Conditions

Height	mm	115.40
Diameter	mm	104.90
Area	mm ²	8642.53
Volume	cm ³	997.35
Mass	g	1968.10
Dry Mass	g	1589.80
Density	Mg/m ³	1.97
Dry Density	Mg/m ³	1.59
Moisture Content	%	24
Voids Ratio		0.662
Specific Gravity	kN/m ³	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	24
Density	Mg/m ³	1.97
Dry Density	Mg/m ³	1.59

Test Setup

Date started	18/12/2010
Date Finished	05/01/2010
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P7
Cell Number	C7

Alan Walker

Checked and Approved By

11/01/10
Date

Client Ref
PO1929

Contract No

GEO/8665/09



LABORATORY TESTING SERVICES LIMITED

Pinhoe Quarry

Permeability in a Triaxial Cell

Using the Accelerated Permeability Method (E.A. Report P!-398/TR/2)

Specimen Details

Borehole		TP14
Sample No.		0
Depth	m	0.80
Date		11/01/2010

Saturation Check Post Test

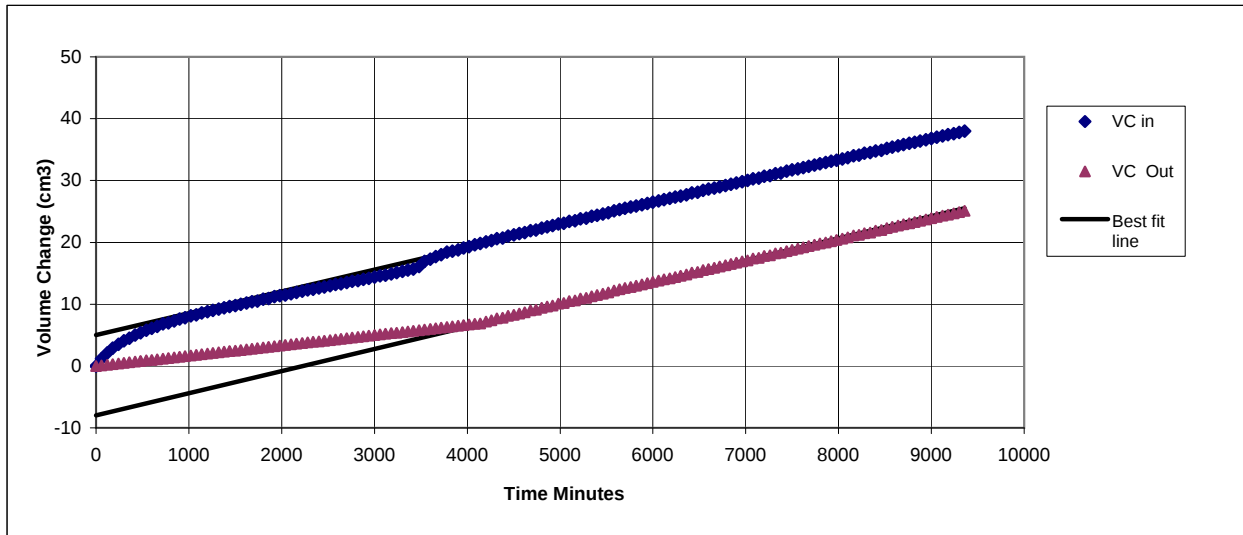
Cell Pressure Incr.	kPa	100.00
Initial Pore Pressure	kPa	376.00
Final Pore Pressure	kPa	470.00
Pore Pressure Diff.	kPa	94.00
Final B Value		0.94

Permeability

Cell Pressure	kPa	550.00
Effective Cell Pressure	kPa	250.00
Back Pressure Diff.	kPa	125.00
Mean Rate of Flow	ml/min	0.00355
Average Temperature	'C	20

Vertical Permeability K_v m/s

6.19×10^{-11}



Alan Walker
Checked and Approved By

11/01/10
Date

Client Ref
PO1929

Contract No

GEO/8665/09



Pinhoe Quarry

Permeability in a Triaxial Cell

Using the Accelerated Permeability Method (E.A. Report PI-398/TR/2)

Specimen Details

Borehole	TP12
Sample No.	0
Depth m	1.00
Date	05/01/2010
Disturbed / Undisturbed	Disturbed

Note: Recompacted utilising a 2.5kg rammer

Description of Specimen

Reddish brown gravelly silty CLAY

Initial Specimen Conditions

Height	mm	116.00
Diameter	mm	105.00
Area	mm ²	8659.01
Volume	cm ³	1004.45
Mass	g	2312.30
Dry Mass	g	2052.20
Density	Mg/m ³	2.30
Dry Density	Mg/m ³	2.04
Moisture Content	%	12.7
Voids Ratio		0.297
Specific Gravity	kN/m ³	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	11.44
Density	Mg/m ³	2.46
Dry Density	Mg/m ³	2.20

Test Setup

Date started	18/12/2010
Date Finished	27/12/2010
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P8
Cell Number	C8

Alan Walker

Checked and Approved By

05/01/10
Date

Client Ref
PO1929

Contract No

GEO/8665/09



LABORATORY TESTING SERVICES LIMITED

Pinhoe Quarry

Permeability in a Triaxial Cell

Using the Accelerated Permeability Method (E.A. Report P!-398/TR/2)

Specimen Details

Borehole		TP12
Sample No.		0
Depth	m	1.00
Date		05/01/2010

Saturation Check Post Test

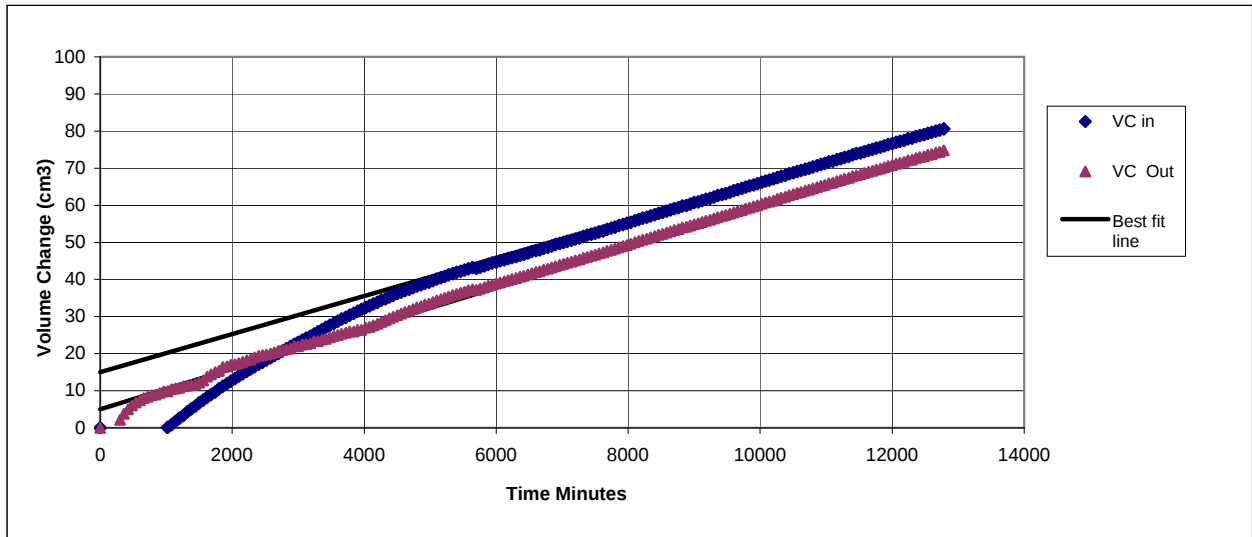
Cell Pressure Incr.	kPa	100.00
Initial Pore Pressure	kPa	391.00
Final Pore Pressure	kPa	487.00
Pore Pressure Diff.	kPa	96.00
Final B Value		0.96

Permeability

Cell Pressure	kPa	550.00
Effective Cell Pressure	kPa	250.00
Back Pressure Diff.	kPa	125.00
Mean Rate of Flow	ml/min	0.00530
Average Temperature	'C	20

Vertical Permeability K_v m/s

9.25×10^{-11}



Alan Walker

Checked and Approved By

05/01/10

Date

Client Ref

PO1929

Contract No

GEO/8665/09



LABORATORY TESTING SERVICES LIMITED

Pinhoe Quarry

Determination of the Slake Durability index.

ISRM Suggested Methods pp 92-94, 1981.

Client: Clarke Bond
 Date Sampled: N/A
 Date tested: 15/01/2010
 Nature of slaking Fluid: Water
 Temperature (°C): 20
 Rock type: 14-10mm
 Operator: Vincent Williams Senior Technician

Borehole Number:	Depth (m):	Slake-Durability index (first cycle) %	Slake-Durability index (second cycle) %	Appearance of fragments retained in drum:	Appearance of material passing through the drum:
TP8	0.2	97.8	96.7	10 no pieces of angular to sub angular aggregate material	Sub angular to well rounded of <2mm sand - clay- SILT.
TP9	0.9	95.9	94.1	10 no pieces of angular to sub angular aggregate material	Sub angular to well rounded of <2mm sand - clay- SILT.
TP10	0.8	98.1	97.1	10 no pieces of angular to sub angular aggregate material	Sub angular to well rounded of <2mm sand - clay- SILT.

Notes:

Alan Waters
 Checked by

20/01/10
 Date

Alan Waters
 Approved by

20/01/10
 Date



Pinhoe Quarry

Contract No.
 9166/09

Client Ref No.
 PO1929



Unit 24-26
The Avenue
Delta lakes
Llanelli
Carmarthenshire
SA15 2DS
tel: +44 (0)1554 749720 / 757734
fax: +44 (0)1554 749845 / 775107
e-mail: info@geolab.org.uk

Certificate of Analysis

Date: 20/01/2010

Client: Clarke Bond

Our Reference: GEO/9166/09

Client Reference: PO1929

Contract Title: Pinhoe Quarry

Description: (Total Samples) 10

Date Received: 14/12/2009

Date Started: 04/01/2010

Date Completed: 07/01/2010

Test Procedures: (B.S. 1377 : PART 3 : 1990 AND BRE CP2/79)

Notes:

Solid samples will be disposed 1 month and liquids 2 weeks
after the date of issue of this test certificate

Approved By:

Authorised Signatories:

Vaughan Edwards
Managing Director

Wayne Honey
Laboratory Technician

Alun Walters
Technical Manager

Contract No:	GEO/9166/09
Client Ref:	PO1929
Location:	Pinhoe Quarry
Date:	20/01/2010



SUMMARY OF CHEMICAL ANALYSES

(B.S. 1377 : PART 3 : 1990 AND BRE CP2/79)

[illegible]

NCP - No Chloride present

DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC1 Sample No. : Sample Type : C Depth (m) : 1.24

Specimen Details

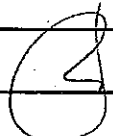
Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red brown grey MUDSTONE

Initial Condition	Water Content	%	1.5			
	Bulk Density	Mg/m ³	2.66			
	Dry Density	Mg/m ³	2.62			
	Height	mm	90.00			
	Diameter	mm	64.00			
	Particle Density	Mg/m ³	2.80			
	Degree of Saturation	%	61			
	Voids Ratio		0.07			
	Moisture Condition during test		As Received			
Joint Roughness Coefficient		Pre Test		Post Test		
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		01:00	01:30	03:30		
Shearing stage		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)	57.5	115	230		
	Shear Stress (kPa)	104.2	138.9	191.0		
	Residual Stress (kPa)					
	Normal Displacement (mm)	-0.1	-0.2	-0.1		
	Shear Displacement (mm)	0.2	0.6	0.4		

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	69	Normal Stress less than	115 kPa	31
Normal Stress greater than	115 kPa	87	Normal Stress greater than	115 kPa	24

Residual Friction Angle (°)	-
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Prepared By	cal	Checked By		Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

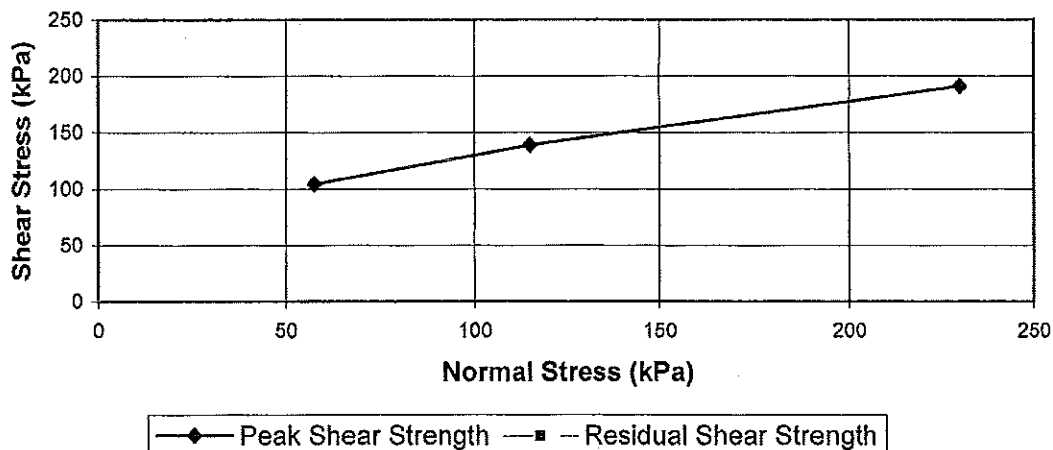
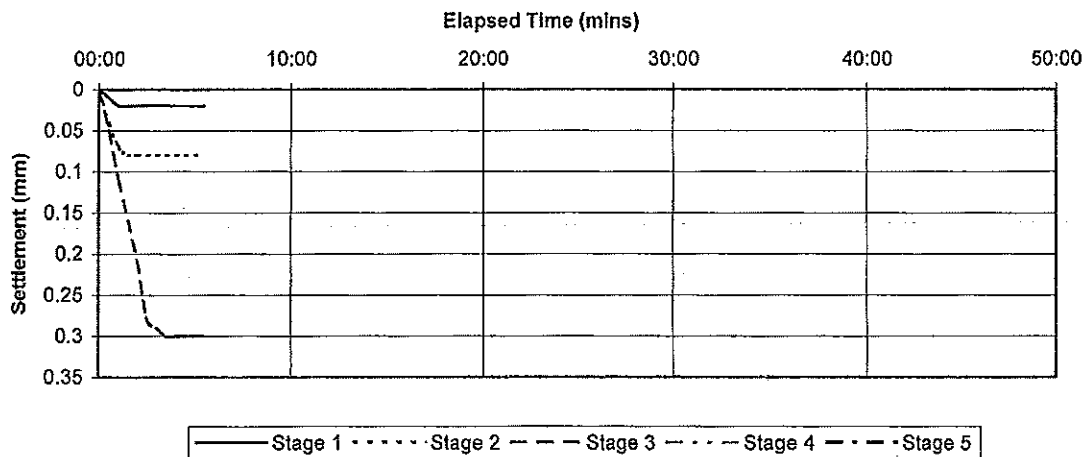
Hole No. : RC1 Sample No. : Sample Type : C Depth (m) : 1.24

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red brown grey MUDSTONE

Consolidation Stage



Prepared By	cal	Checked By	[Signature]	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTUITIES

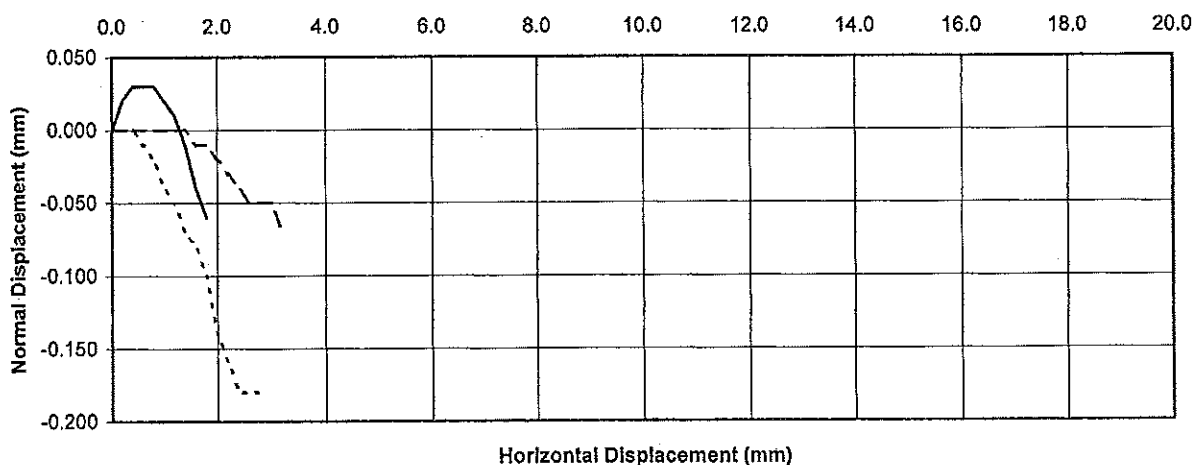
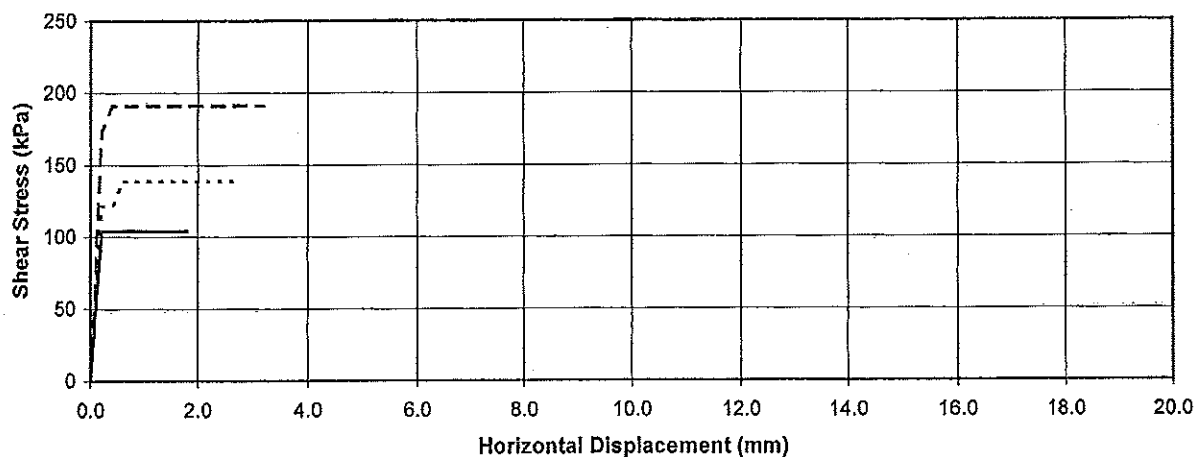
ISRM SUGGESTED METHODS

Hole No. : RC1 Sample No. : Sample Type : C Depth (m) : 1.24

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red brown grey MUDSTONE



Prepared By	CRH	Checked By	[Signature]	Date	6.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC2 Sample No. : Sample Type : C Depth (m) : 2.56

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red brown MUDSTONE

Initial Condition	Water Content		%		1.3	
	Bulk Density		Mg/m ³		2.61	
	Dry Density		Mg/m ³		2.58	
	Height		mm		88.00	
	Diameter		mm		88.00	
	Particle Density		Mg/m ³		2.80	
	Degree of Saturation		%		43	
	Voids Ratio				0.09	
	Moisture Condition during test				As Received	
Joint Roughness Coefficient			Pre Test		Post Test	
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		01:00	01:00	02:00		
Shearing stage		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)	57.5	115	230		
	Shear Stress (kPa)	131.5	197.3	312.4		
	Residual Stress (kPa)					
	Normal Displacement (mm)	-0.1	2.8	2.2		
	Shear Displacement (mm)	1.6	1.2	1.8		

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	66	Normal Stress less than	115 kPa	49
Normal Stress greater than	115 kPa	82	Normal Stress greater than	115 kPa	45

Residual Friction Angle (°)	-
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Prepared By	<i>CRH</i>	Checked By	<i>[Signature]</i>	Date	10.5.10.	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

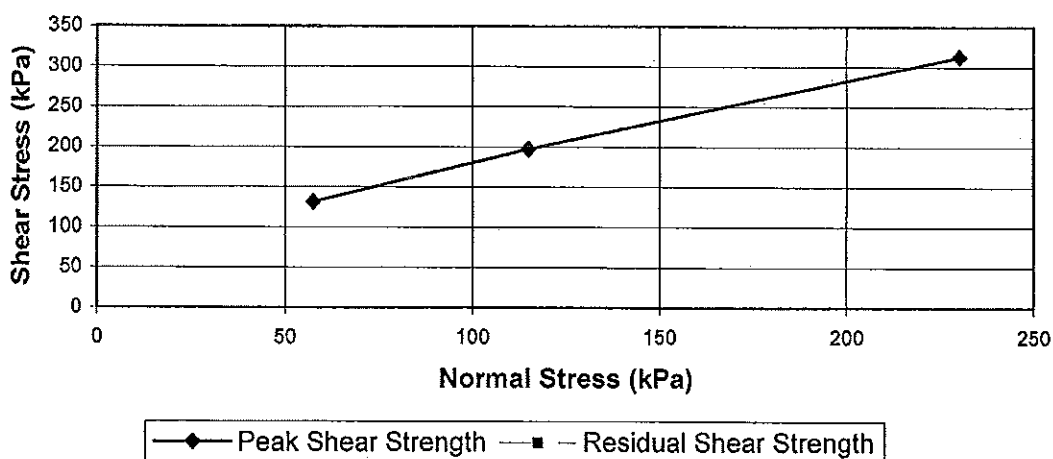
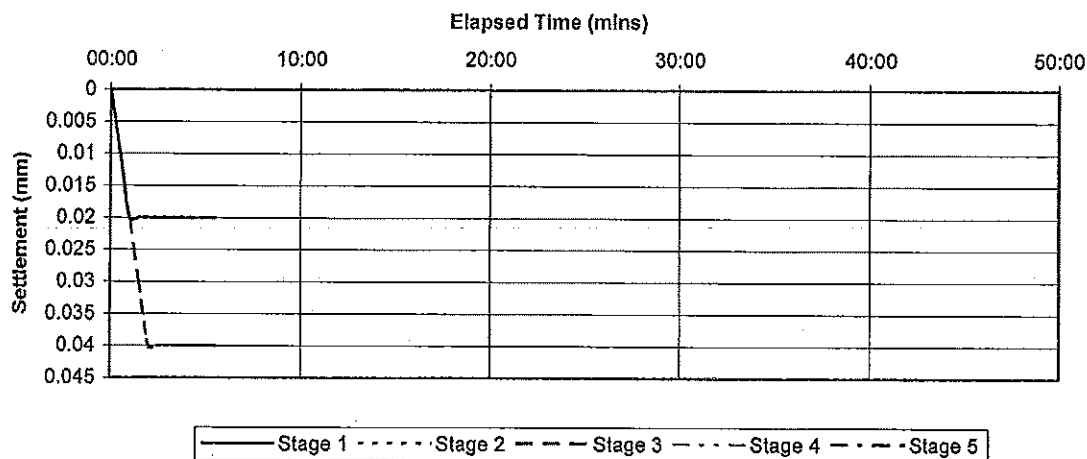
Hole No. : RC2 Sample No. : Sample Type : C Depth (m) : 2.56

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red brown MUDSTONE

Consolidation Stage



Prepared By	cal	Checked By		Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

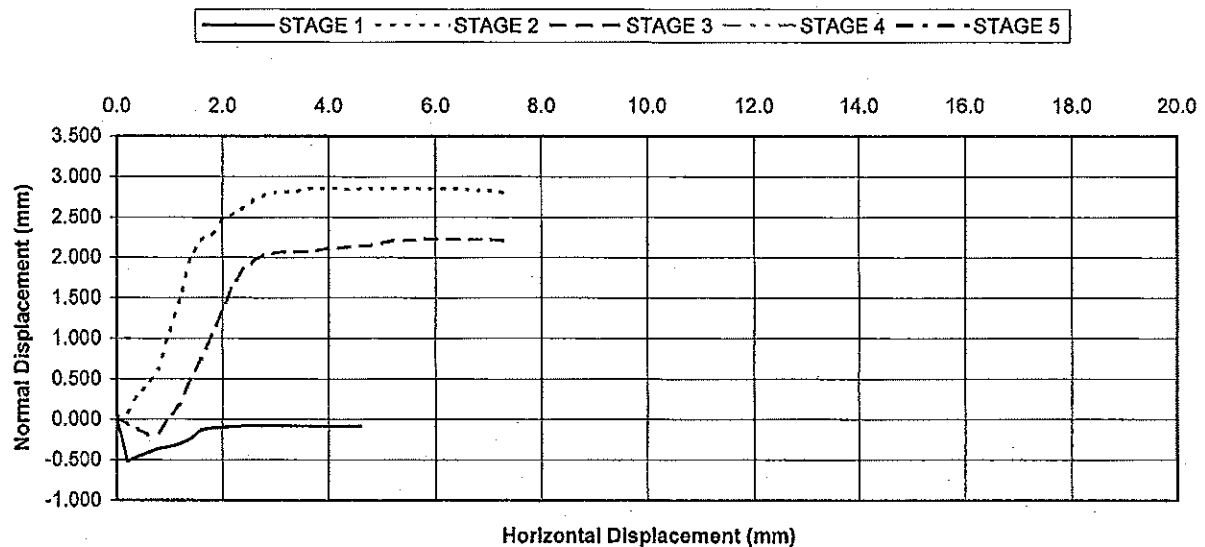
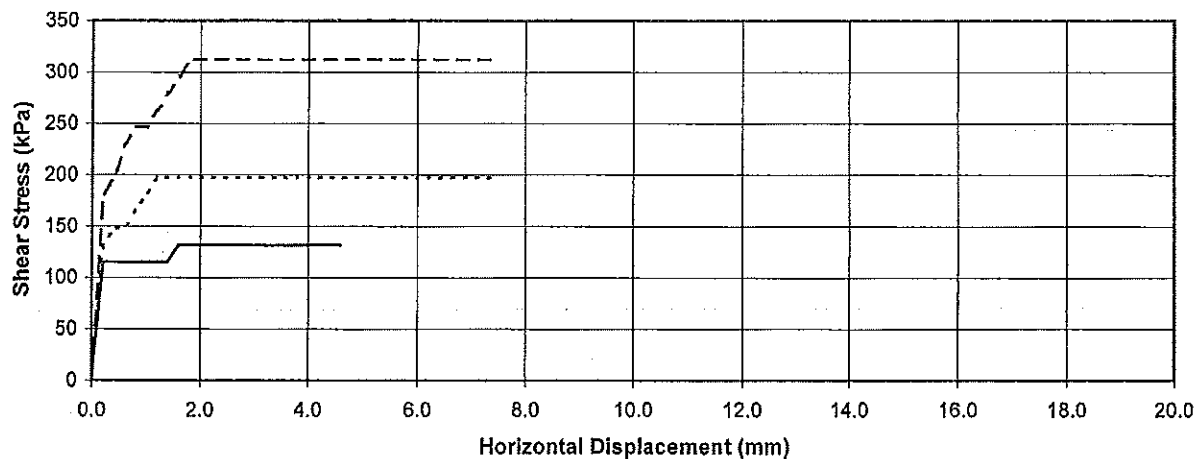
ISRM SUGGESTED METHODS

Hole No. : RC2 Sample No. : Sample Type : C Depth (m) : 2.56

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red brown MUDSTONE



Prepared By	cal	Checked By	[Signature]	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC2 Sample No. : Sample Type : C Depth (m) : 3.40

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Initial Condition	Water Content		%	4.4			
	Bulk Density		Mg/m ³	2.55			
	Dry Density		Mg/m ³	2.45			
	Height		mm	90.00			
	Diameter		mm	65.00			
	Particle Density		Mg/m ³	2.80			
	Degree of Saturation		%	86			
	Voids Ratio			0.14			
	Moisture Condition during test			As Received			
Joint Roughness Coefficient			Pre Test		Post Test		
	Upper Surface of Discontinuity						
	Lower Surface of Discontinuity						
Consolidation Stage	t ₁₀₀ (mins)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
		01:00	01:30	01:00			
Shearing stage	Stage 1		Stage 2	Stage 3	Stage 4	Stage 5	
	Normal Stress (kPa)		57.5	115	230		
	Shear Stress (kPa)		119.7	170.9	239.3		
	Residual Stress (kPa)						
	Normal Displacement (mm)		0.1	0.3	0.1		
	Shear Displacement (mm)		1.2	3.2	2.8		

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	68	Normal Stress less than	115 kPa	42
Normal Stress greater than	115 kPa	103	Normal Stress greater than	115 kPa	31

Residual Friction Angle (°)	-
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Prepared By	<i>Carl</i>	Checked By	<i>[Signature]</i>	Date	10/5/10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

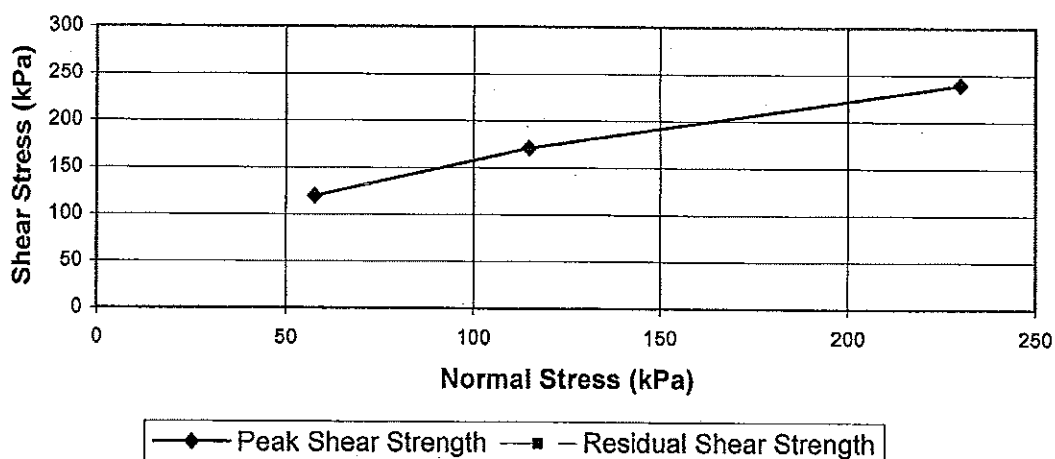
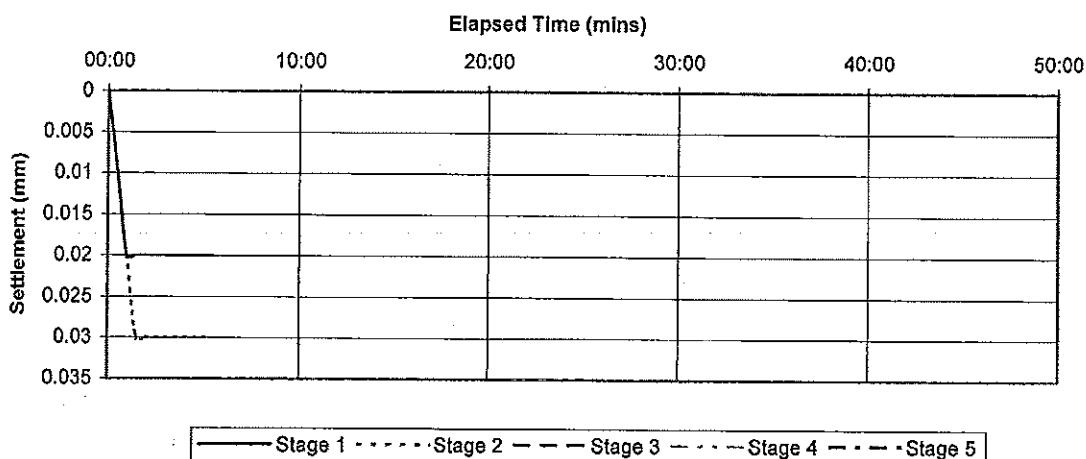
Hole No. : RC2 Sample No. : Sample Type : C Depth (m) : 3.40

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Consolidation Stage



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	6.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

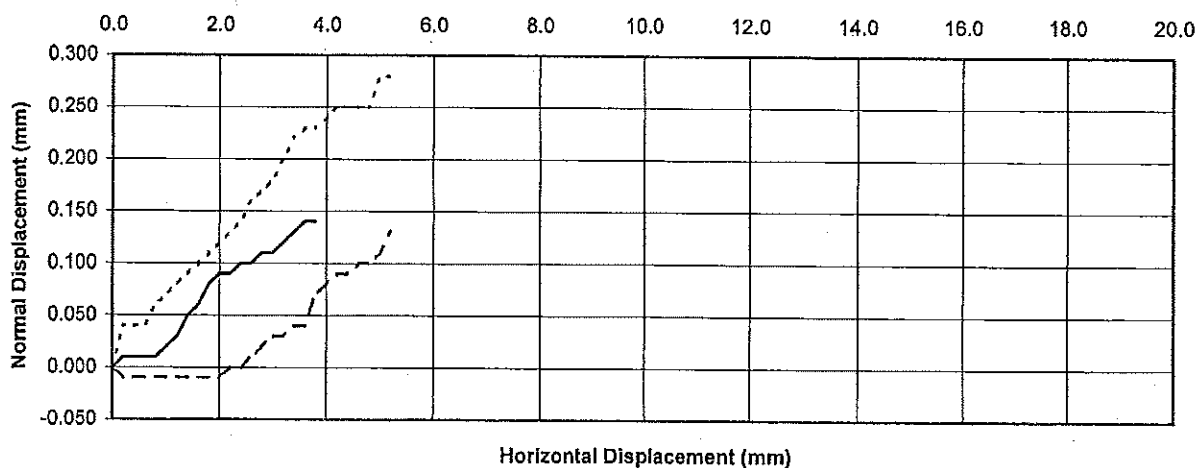
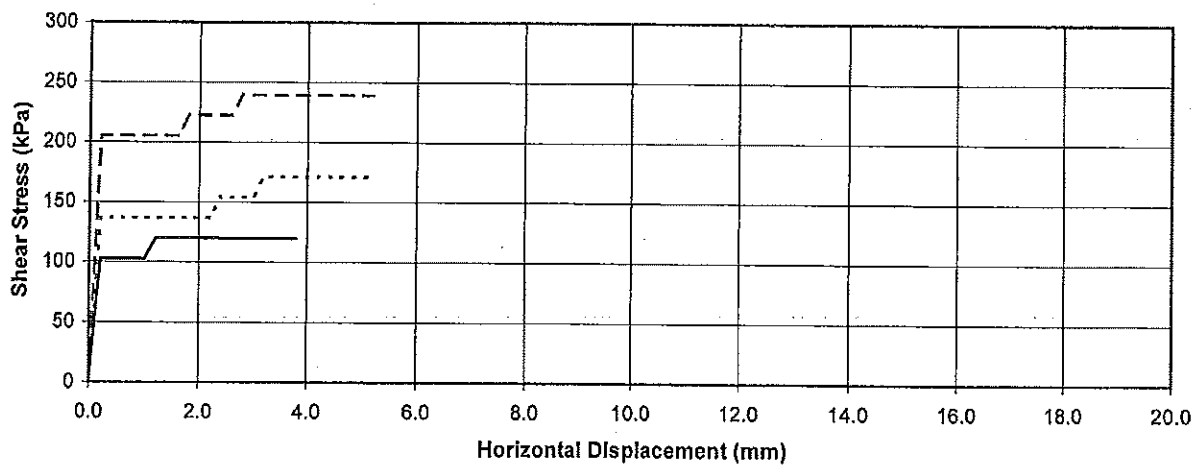
ISRM SUGGESTED METHODS

Hole No. : RC2 Sample No. : Sample Type : C Depth (m) : 3.40

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE



Prepared By	CRL	Checked By	[Signature]	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC3 Sample No. : Sample Type : C Depth (m) : 2.38

Specimen Details

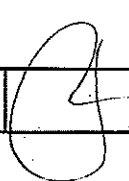
Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Initial Condition	Water Content	%	1.9			
	Bulk Density	Mg/m ³	2.65			
	Dry Density	Mg/m ³	2.61			
	Height	mm	92.00			
	Diameter	mm	85.00			
	Particle Density	Mg/m ³	2.80			
	Degree of Saturation	%	73			
	Voids Ratio		0.07			
Moisture Condition during test			As Received			
Joint Roughness Coefficient		Pre Test		Post Test		
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1 01:00	Stage 2 02:30	Stage 3 02:30	Stage 4	Stage 5
Shearing stage		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)	57.5	115	230		
	Shear Stress (kPa)	102.3	140.7	204.6		
	Residual Stress (kPa)					
	Normal Displacement (mm)	-0.5	0.0	0.8		
	Shear Displacement (mm)	4.4	3.4	3.6		

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	64	Normal Stress less than	115 kPa	34
Normal Stress greater than	115 kPa	77	Normal Stress greater than	115 kPa	29

Residual Friction Angle (°)	-
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Prepared By	CEL	Checked By		Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

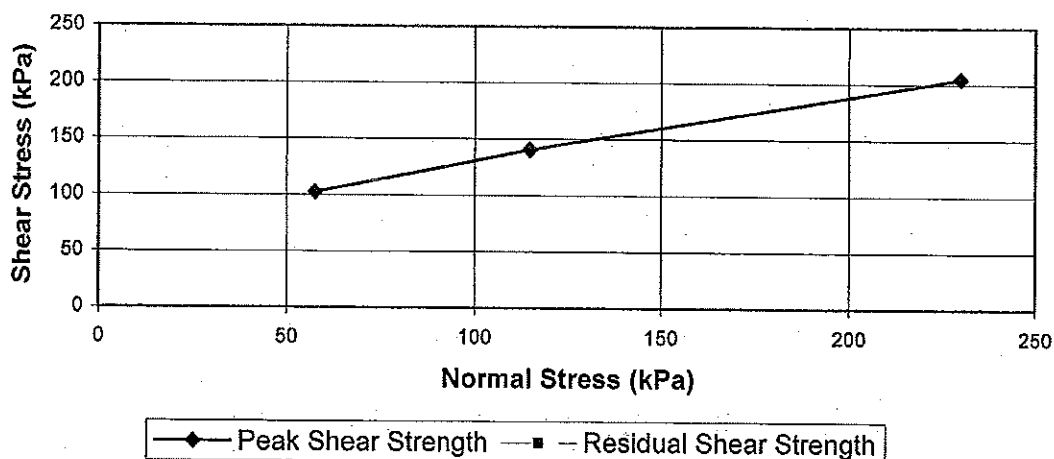
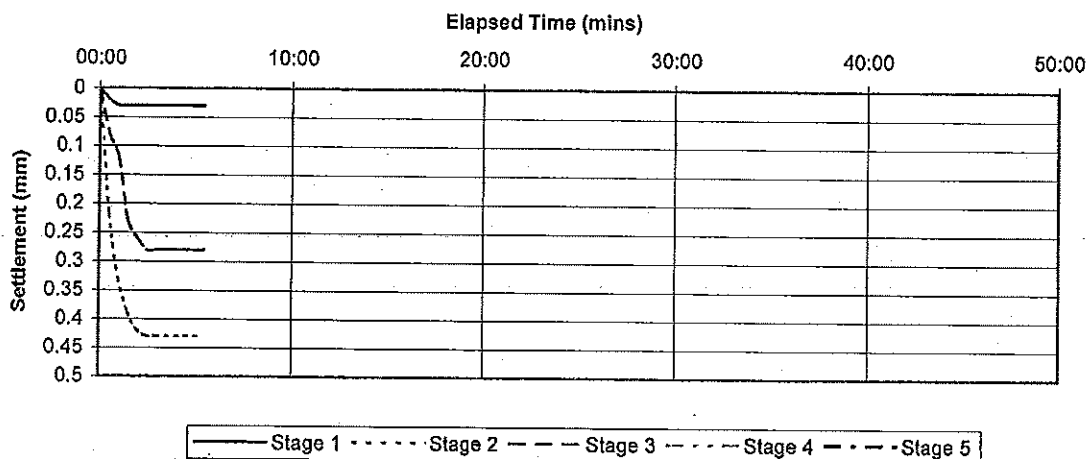
Hole No. : RC3 Sample No. : Sample Type : C Depth (m) : 2.38

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Consolidation Stage



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

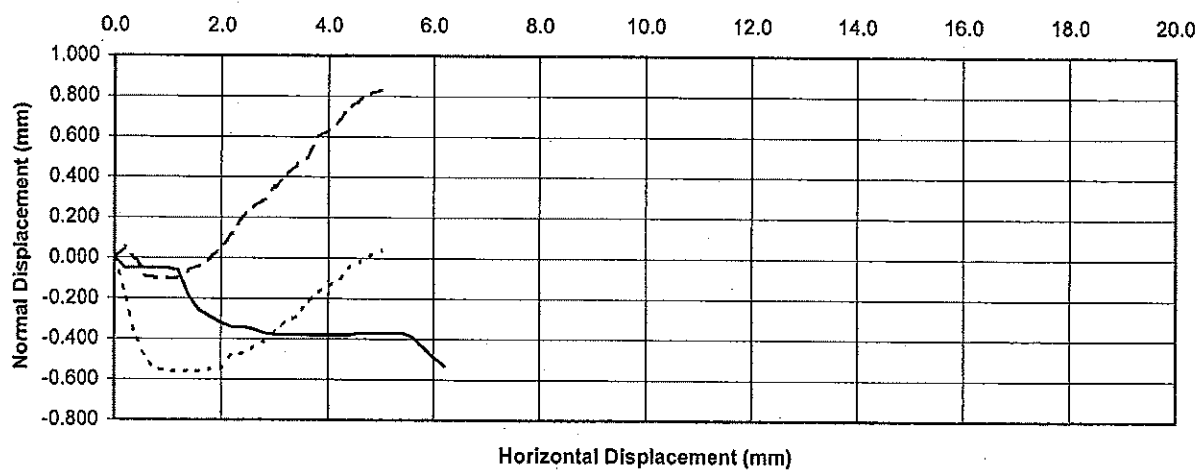
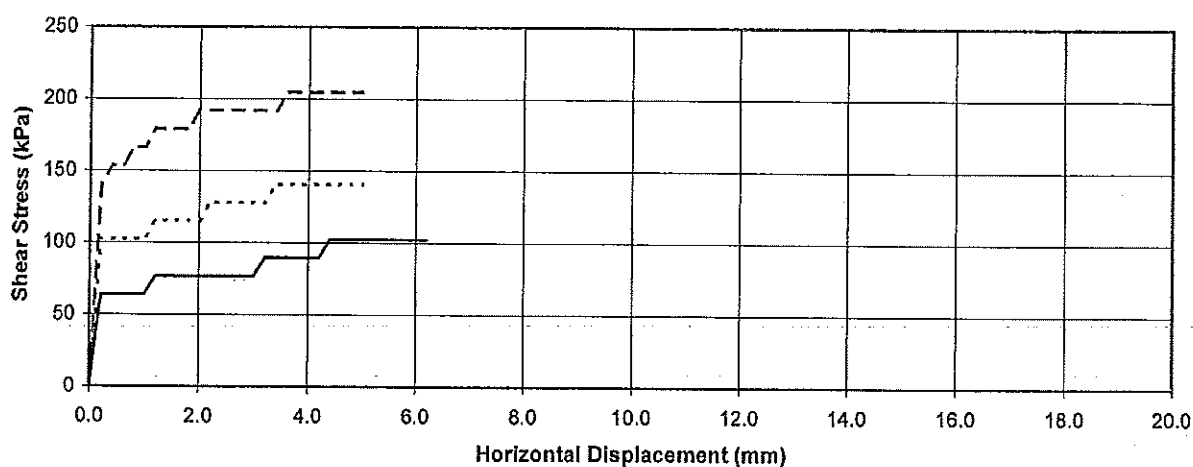
ISRM SUGGESTED METHODS

Hole No. : RC3 Sample No. : Sample Type : C Depth (m) : 2.38

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 1.88

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown grey MUDSTONE

Initial Condition	Water Content		%	1.2		
	Bulk Density		Mg/m ³	2.67		
	Dry Density		Mg/m ³	2.64		
	Height		mm	87.00		
	Diameter		mm	45.00		
	Particle Density		Mg/m ³	2.80		
	Degree of Saturatton		%	55		
	Voids Ratio			0.06		
Moisture Condition during test			As Received			
Joint Roughness Coefficient			Pre Test		Post Test	
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		00:30	01:00	01:30		
Shearing stage	Stage 1		Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)		57.5	115	230	
	Shear Stress (kPa)		153.3	204.3	281.0	
	Residual Stress (kPa)					
	Normal Displacement (mm)		-0.2	0.6	0.7	
	Shear Displacement (mm)		0.4	3.0	3.0	

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	102	Normal Stress less than	115 kPa	42
Normal Stress greater than	115 kPa	128	Normal Stress greater than	115 kPa	34

Residual Friction Angle (°)	-
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Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

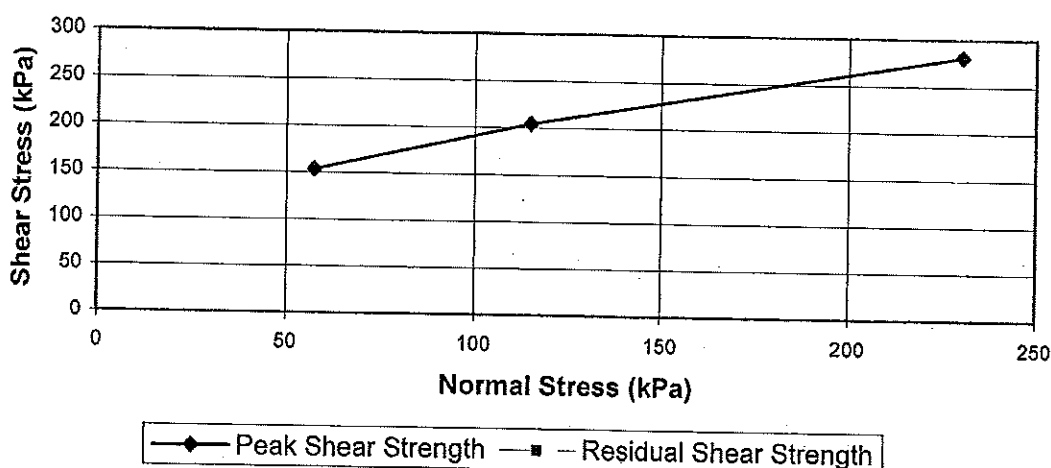
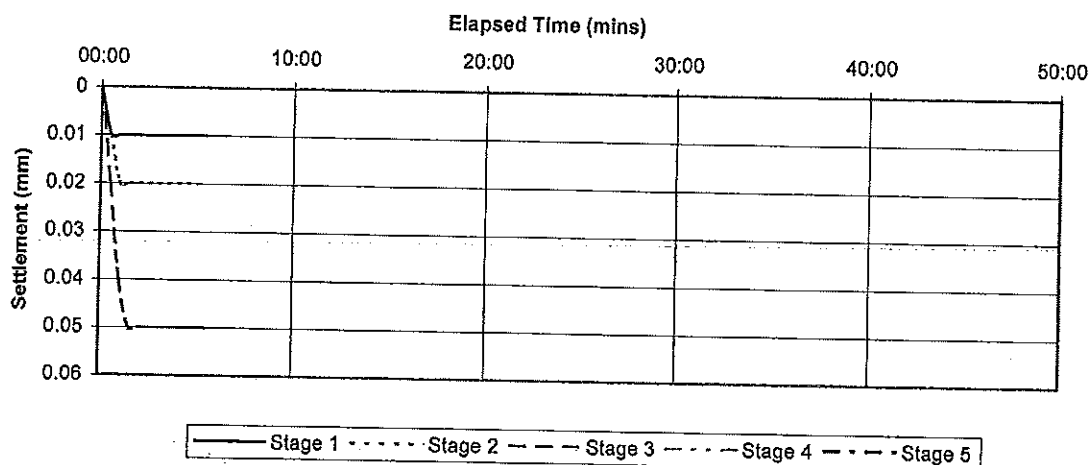
Hole No.: RC4 Sample No.: Sample Type: C Depth (m): 1.88

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description: Brown grey MUDSTONE

Consolidation Stage



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

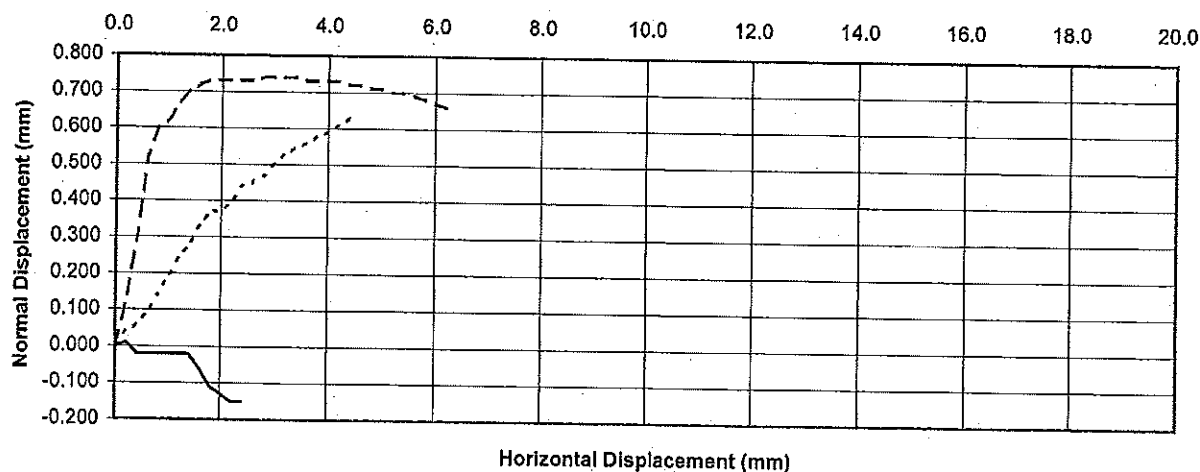
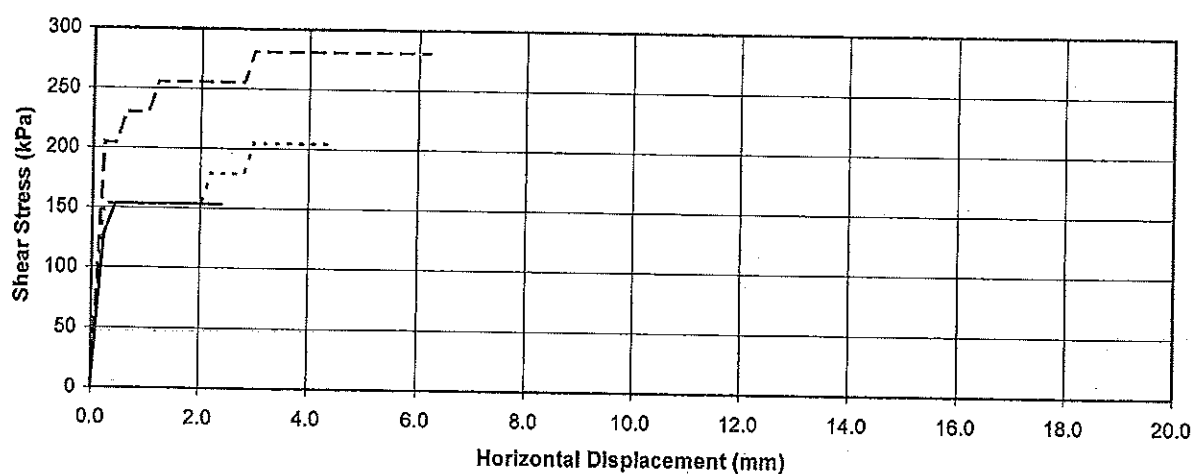
ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 1.88

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown grey MUDSTONE



Prepared By	CEL	Checked By	[Signature]	Date	6-5-10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 3.30

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red MUDSTONE

Initial Condition	Water Content		%	1.5			
	Bulk Density		Mg/m ³	2.61			
	Dry Density		Mg/m ³	2.57			
	Height		mm	88.00			
	Diameter		mm	88.00			
	Particle Density		Mg/m ³	2.80			
	Degree of Saturation		%	47			
	Voids Ratio			0.09			
	Moisture Condition during test			As Received			
Joint Roughness Coefficient			Pre Test	Post Test			
	Upper Surface of Discontinuity						
	Lower Surface of Discontinuity						
Consolidation Stage	t ₁₀₀ (mins)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
		01:30	01:00	02:30			
Shearing stage	Stage 1		Stage 2	Stage 3	Stage 4	Stage 5	
	Normal Stress (kPa)		57.5	115	230		
	Shear Stress (kPa)		65.8	98.6	148.0		
	Residual Stress (kPa)						
	Normal Displacement (mm)		-0.7	-1.2	-1.0		
	Shear Displacement (mm)		1.8	4.2	4.8		

Cohesion (kPa)				Apparent Friction Angle (°)			
Normal Stress less than	115	kPa	33	Normal Stress less than	115	kPa	30
Normal Stress greater than	115	kPa	49	Normal Stress greater than	115	kPa	23

Residual Friction Angle (°)	-
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Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	10.5.10.	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

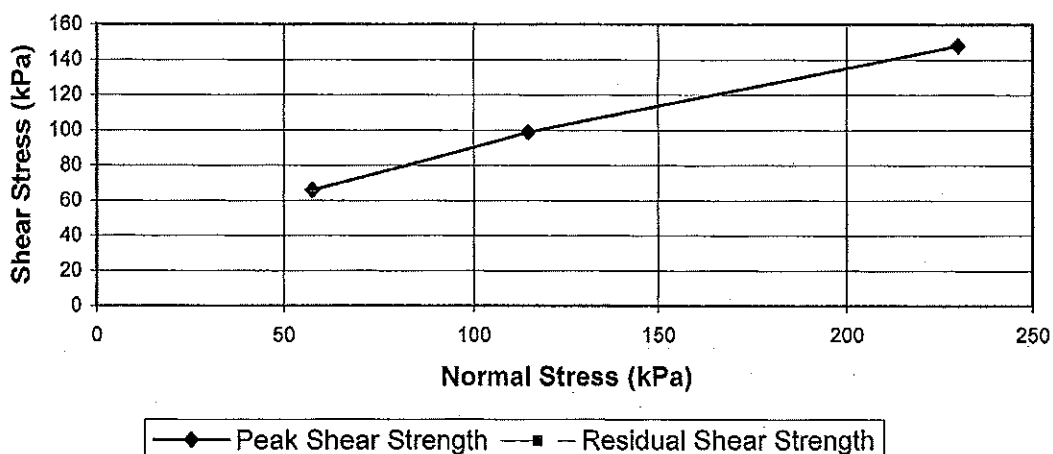
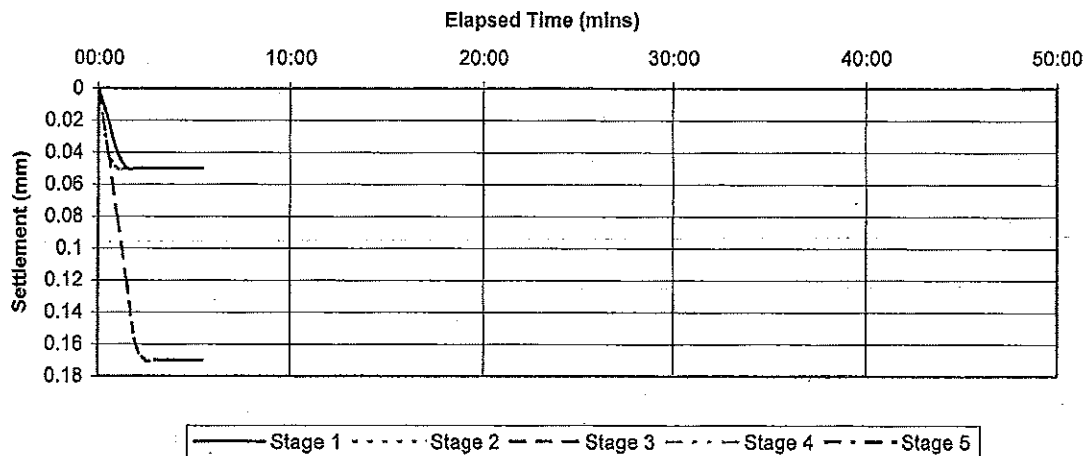
Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 3.30

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red MUDSTONE

Consolidation Stage



Prepared By	<i>cal</i>	Checked By	<i>G</i>	Date	10/5/10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

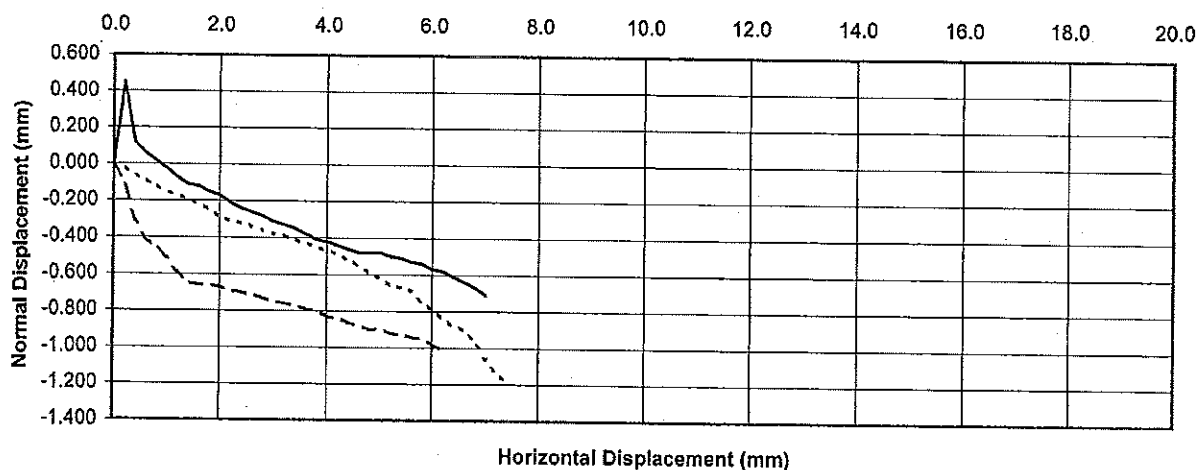
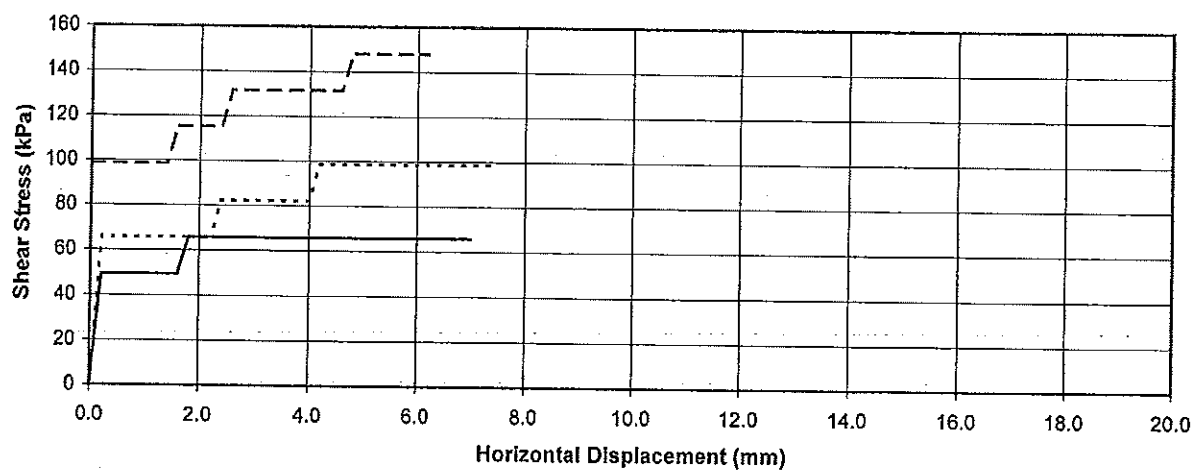
ISRM SUGGESTED METHODS

Hole No.: RC4 Sample No.: Sample Type: C Depth (m): 3.30

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description: Red MUDSTONE



Prepared By	cal	Checked By	[Signature]	Date	10.5.10.	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 6.00

Specimen Details

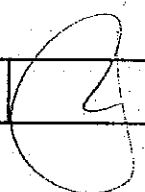
Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Initial Condition	Water Content	%	1.7			
	Bulk Density	Mg/m ³	2.64			
	Dry Density	Mg/m ³	2.60			
	Height	mm	82.00			
	Diameter	mm	58.00			
	Particle Density	Mg/m ³	2.80			
	Degree of Saturation	%	62			
	Voids Ratio		0.08			
	Moisture Condition during test		As Received			
Joint Roughness Coefficient		Pre Test		Post Test		
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1 00:30	Stage 2 02:30	Stage 3 02:00	Stage 4	Stage 5
Shearing stage		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)	57.5	115	230		
	Shear Stress (kPa)	105.1	147.2	210.3		
	Residual Stress (kPa)					
	Normal Displacement (mm)	-2.9	-2.0	-1.5		
	Shear Displacement (mm)	2.8	3.0	2.6		

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	63	Normal Stress less than	115 kPa	36
Normal Stress greater than	115 kPa	84	Normal Stress greater than	115 kPa	29

Residual Friction Angle (°)	-
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Prepared By	cal	Checked By		Date	6-5-10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

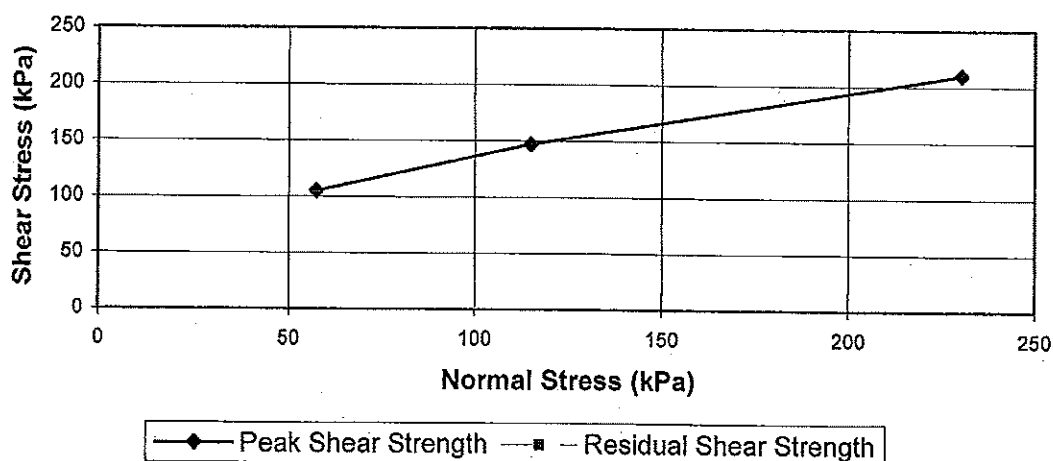
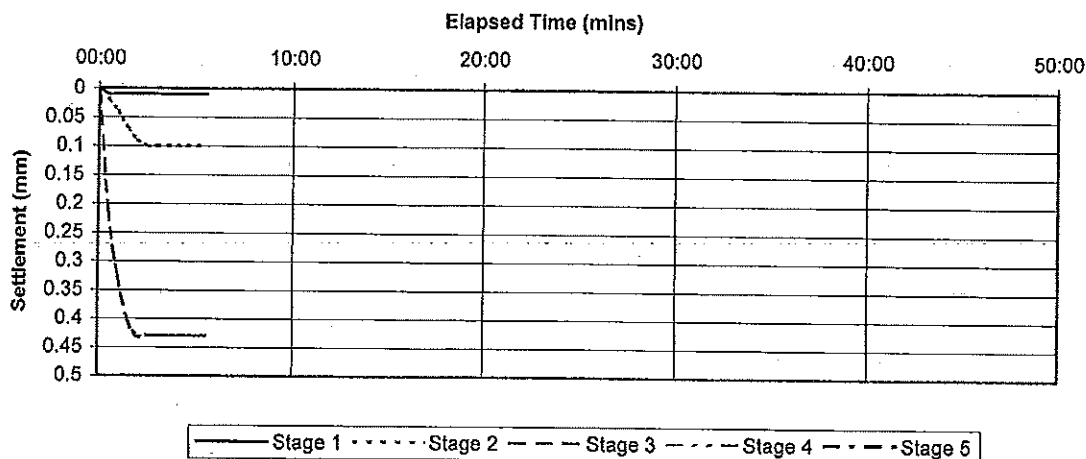
Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 6.00

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Consolidation Stage



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

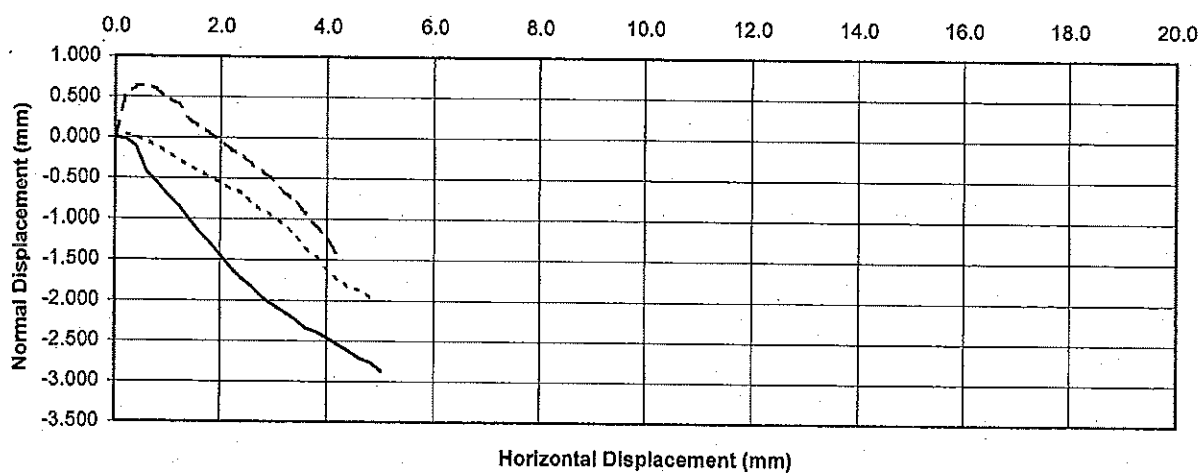
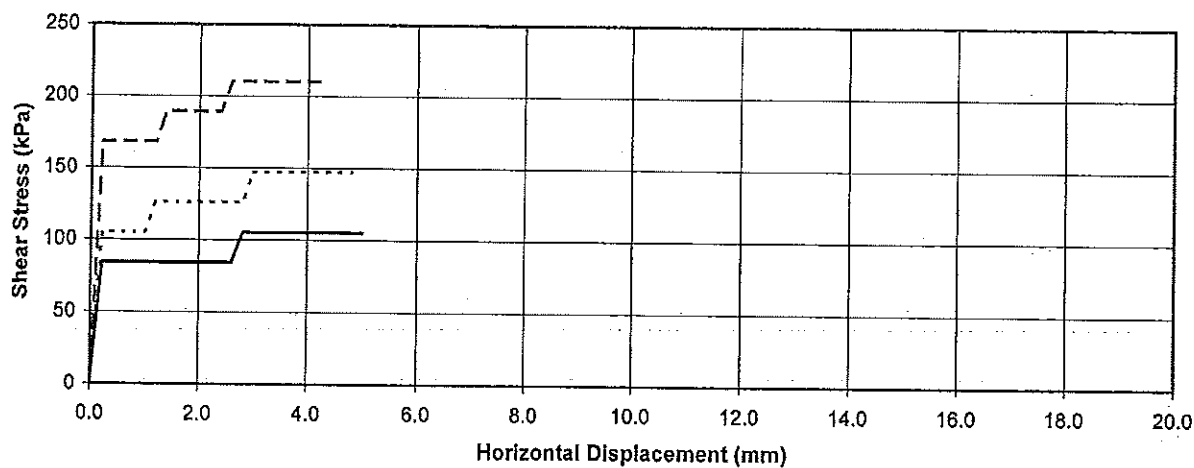
ISRM SUGGESTED METHODS

Hole No.: RC4 Sample No.: Sample Type: C Depth (m): 6.00

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description: Brown red MUDSTONE



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	16.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 11.78

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE

Initial Condition	Water Content	%	4.4			
	Bulk Density	Mg/m ³	2.62			
	Dry Density	Mg/m ³	2.51			
	Height	mm	88.00			
	Diameter	mm	88.00			
	Particle Density	Mg/m ³	2.80			
	Degree of Saturation	%	107			
	Voids Ratio		0.12			
Moisture Condition during test			As Received			
Joint Roughness Coefficient			Pre Test		Post Test	
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1 02:30	Stage 2 02:30	Stage 3 03:30	Stage 4	Stage 5
Shearing stage		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)	57.5	115	230		
	Shear Stress (kPa)	131.5	164.4	230.2		
	Residual Stress (kPa)					
	Normal Displacement (mm)	-0.6	-0.5	-0.3		
	Shear Displacement (mm)	2.2	2.8	2.2		

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	99	Normal Stress less than	115 kPa	30
Normal Stress greater than	115 kPa	99	Normal Stress greater than	115 kPa	30

Residual Friction Angle (°)	-
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Prepared By	<i>Carl</i>	Checked By	<i>[Signature]</i>	Date	05.10.	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

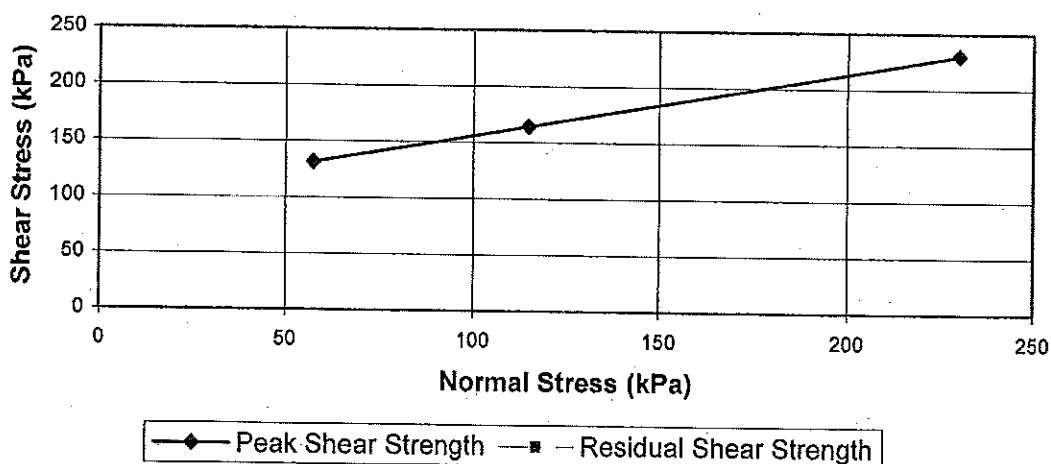
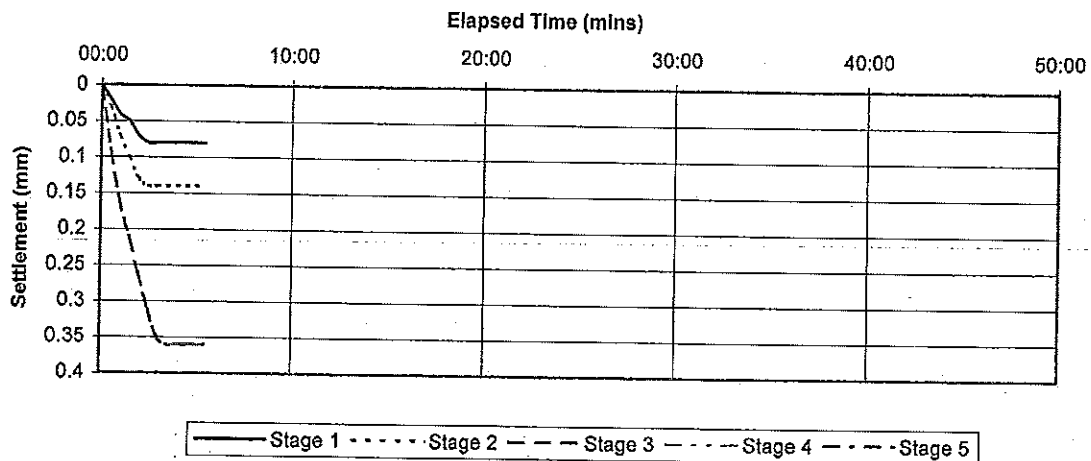
Hole No.: RC4 Sample No.: Sample Type: C Depth (m): 11.78

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description: Brown red MUDSTONE

Consolidation Stage



Prepared By	cal	Checked By	[Signature]	Date	10.5.10	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

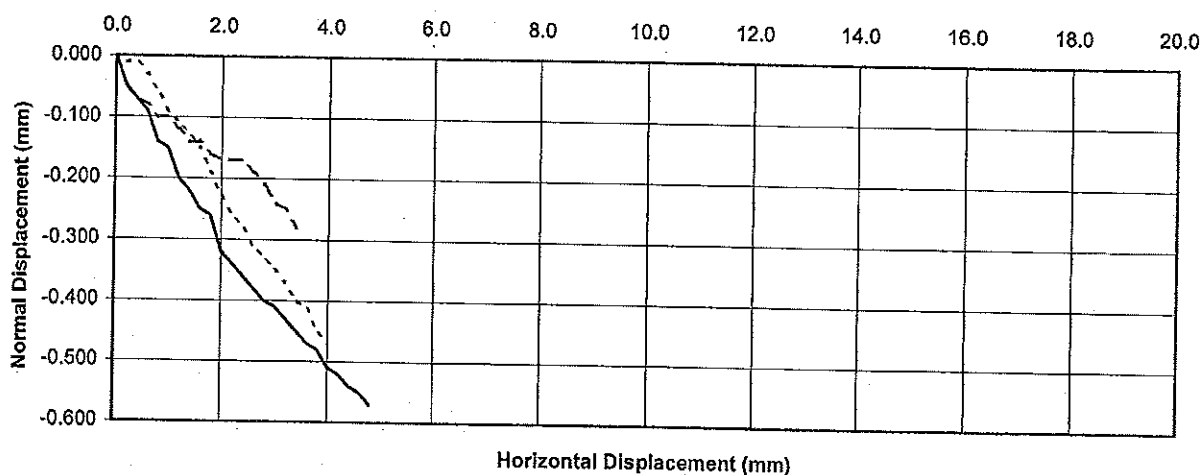
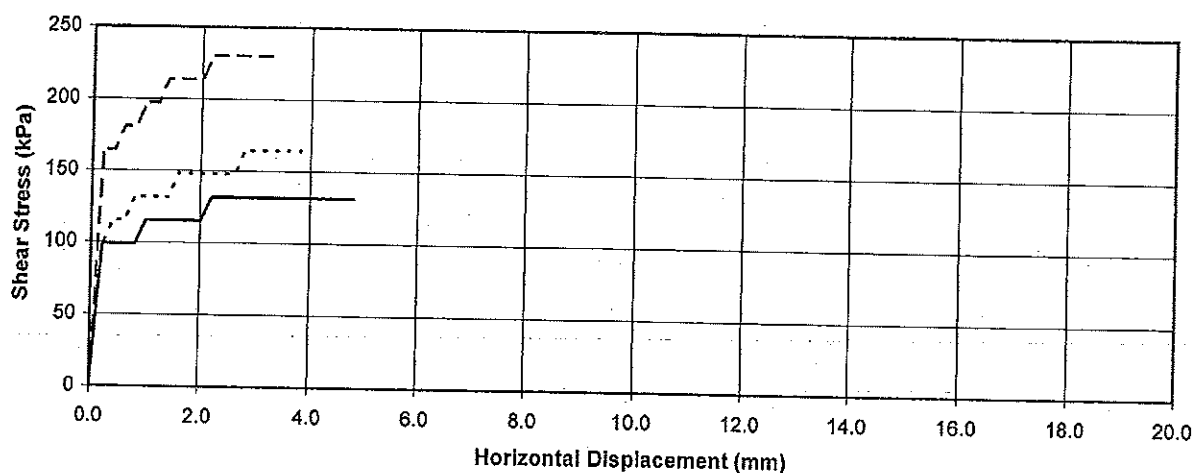
ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 11.78

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Brown red MUDSTONE



Prepared By	<i>cal</i>	Checked By	<i>[Signature]</i>	Date	<i>10/5/10</i>	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 12.60

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red SILTSTONE

Initial Condition	Water Content		%	2.1		
	Bulk Density		Mg/m ³	2.61		
	Dry Density		Mg/m ³	2.55		
	Height		mm	88.00		
	Diameter		mm	88.00		
	Particle Density		Mg/m ³	2.80		
	Degree of Saturation		%	60		
	Voids Ratio			0.10		
Moisture Condition during test				As Received		
Joint Roughness Coefficient			Pre Test		Post Test	
	Upper Surface of Discontinuity					
	Lower Surface of Discontinuity					
Consolidation Stage	t ₁₀₀ (mins)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
		01:30	01:00	03:00		
Shearing stage	Stage 1		Stage 2	Stage 3	Stage 4	Stage 5
	Normal Stress (kPa)		57.5	115	230	
	Shear Stress (kPa)		131.5	180.9	263.1	
	Residual Stress (kPa)					
	Normal Displacement (mm)		-1.7	-0.3	0.2	
	Shear Displacement (mm)		1.4	4.0	2.8	

Cohesion (kPa)			Apparent Friction Angle (°)		
Normal Stress less than	115 kPa	82	Normal Stress less than	115 kPa	41
Normal Stress greater than	115 kPa	99	Normal Stress greater than	115 kPa	36

Residual Friction Angle (°)	-
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Prepared By	<i>Mal</i>	Checked By	<i>CR</i>	Date	10/05/2010	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

ISRM SUGGESTED METHODS

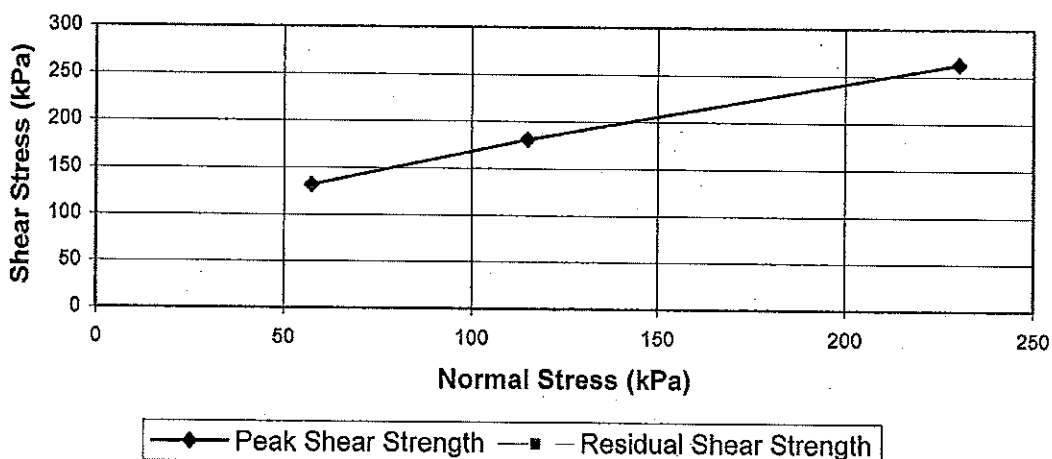
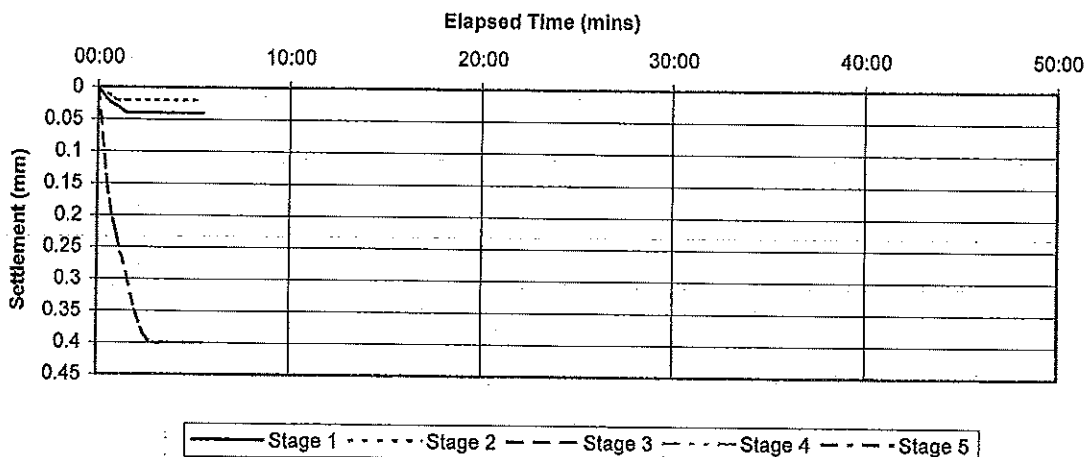
Hole No.: RC4 Sample No.: Sample Type: C Depth (m): 12.60

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description: Red SILTSTONE

Consolidation Stage



Prepared By	<i>[Signature]</i>	Checked By	<i>cal</i>	Date	10/05/2010	Project No	CON103034
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DIRECT SHEAR STRENGTH OF ROCK DISCONTINUITIES

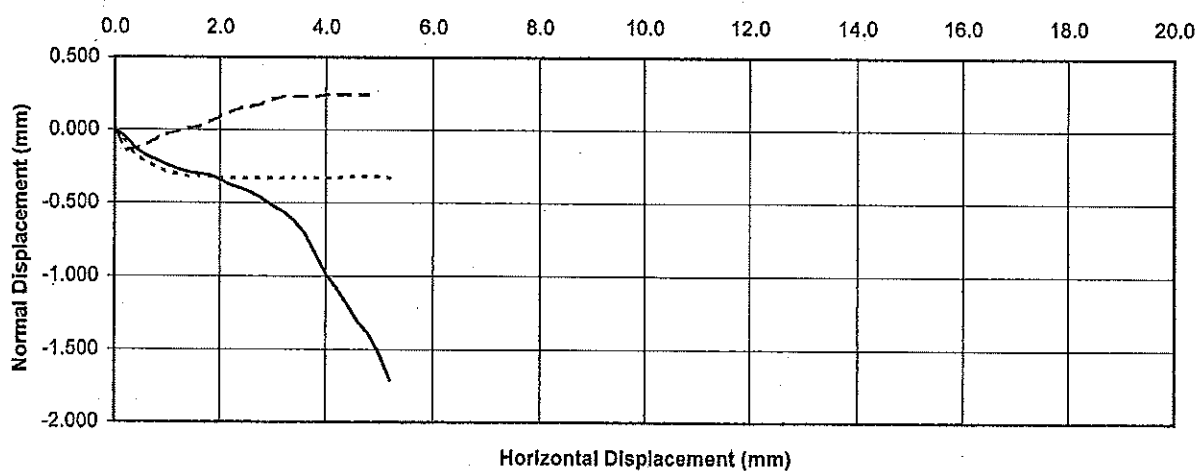
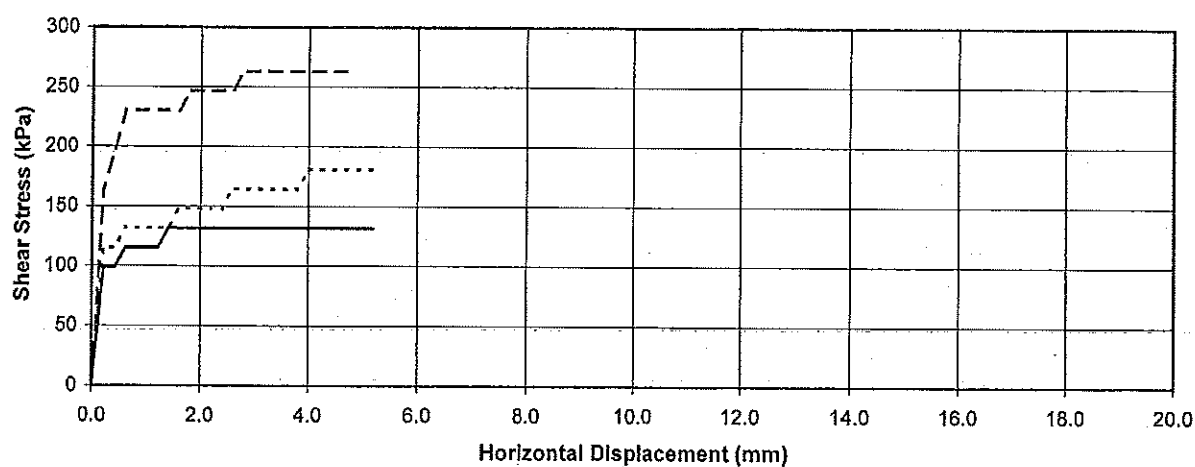
ISRM SUGGESTED METHODS

Hole No. : RC4 Sample No. : Sample Type : C Depth (m) : 12.60

Specimen Details

Source of specimen: Core Discontinuity Type: Saw Cut Encapsulating Material: Cement

Sample Description : Red SILTSTONE



Prepared By	<i>[Signature]</i>	Checked By	<i>[Signature]</i>	Date	10/05/2010	Project No	CON103034
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