

Site Investigation for land at
Trough Laithe Farm, Barrowford Road, Lancashire

Appendix 11

Geotechnical Test Certificates

Murray Rix

(For Coopers)

Certificate reference: MRN 1985/113

Dated: 22 May 2014

(Atterburg Limits and PSD)

And

Certificate reference: MRN 1985/117

Dated: 30 May 2014

(Compaction Analysis)

And

Professional Soils Laboratory (PSL)

(For Capita Symonds)

Certificate reference: PSL/05/1649

Dated: 18 November 2005

(Atterburg Limits, PSD, Hand Vane, Undrained Shear Strength in Triaxial Compression, One Dimensional Consolidation, Dry Density/Moisture Content Relationship and Shear Box)

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING
TEST REPORT



Client Cooper Associates

Address Park House
Sanderpiper Court
Chester Business Park
Chester, CH4 9QU

Contract Trough Laithe Farm, Barrowford

Client Job Ref 5883

Client Purchase Order Number 6274

Job Number MRN 1985/113

Date of Issue 22 May 2014

Page 1 of 9

Approved Signatory

S J Hutchings, A W Hutchings, A Richardson

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.



33C, Vauxhall Industrial Estate, Greg Street, Reddish, Stockport SK5 7BR Tel: 0161 475 0870 Fax: 0161 475 0871

Email: steve@mtt-uk.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

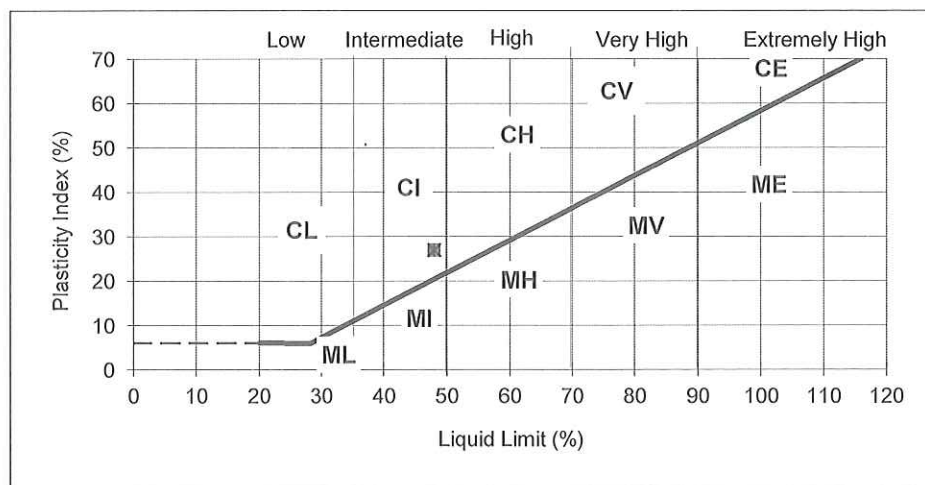
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|--------------|------------|---------------|-----------|
| SAMPLE LABEL | TP101-0.7m | DATE SAMPLED | N/A |
| SAMPLE No. | 58540 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Light brown silty Clay with trace gravel |
| ADVISED SOURCE | Site Won |

| Moisture Content (Natural) (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Passing 425 micron (%) |
|--------------------------------------|---------------------|----------------------|-------------------------|------------------------------|
| 23 | 48 | 21 | 27 | 98 |



REMARKS

Sample was tested in natural condition

SIGNED

NAME

A Richardson

DATE

22-May-14

Page 2 of 9

(Deputy Laboratory Manager)

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

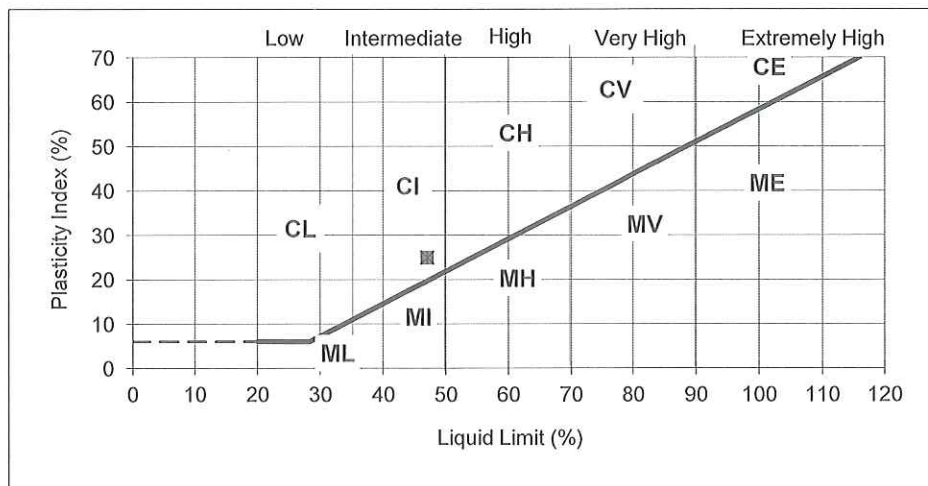
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|--------------|------------|---------------|-----------|
| SAMPLE LABEL | TP137-0.9m | DATE SAMPLED | N/A |
| SAMPLE No. | 58542 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|-----------------------------------|
| MATERIAL | Dark brown Clay with trace gravel |
| ADVISED SOURCE | Site Won |

| Moisture Content (Natural) (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Passing 425 micron (%) |
|--------------------------------------|---------------------|----------------------|-------------------------|------------------------------|
| 28 | 47 | 22 | 25 | 99 |



REMARKS

Sample was tested in natural condition

SIGNED

NAME

Page 3 of 9

A Richardson

(Deputy Laboratory Manager)

DATE

22-May-14

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

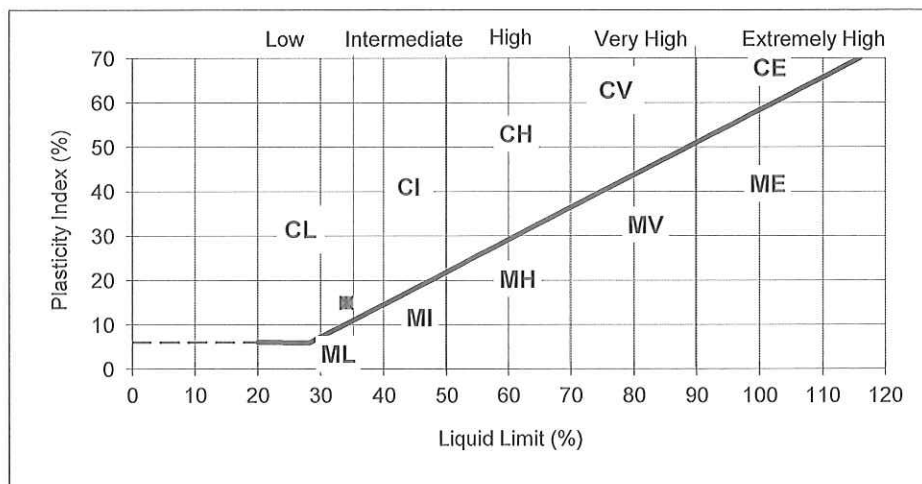
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

| | | | |
|------------|--------------------------------|--|--|
| CLIENT | Cooper Associates | | |
| SITE | Trough Laithe Farm, Barrowford | | |
| JOB NUMBER | MRN 1985/113 | | |

| | | | |
|--------------|------------|---------------|-----------|
| SAMPLE LABEL | TP151-0.8m | DATE SAMPLED | N/A |
| SAMPLE No. | 58544 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | | | |
|----------------|--|--|--|
| MATERIAL | Light brown silty sandy Clay with trace gravel | | |
| ADVISED SOURCE | Site Won | | |

| Moisture Content (Natural) (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Passing 425 micron (%) |
|--------------------------------------|---------------------|----------------------|-------------------------|------------------------------|
| 32 | 34 | 19 | 15 | 98 |



REMARKS

Sample was tested in natural condition

SIGNED

NAME

A Richardson

DATE

22-May-14

Page 4 of 9

(Deputy Laboratory Manager)

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

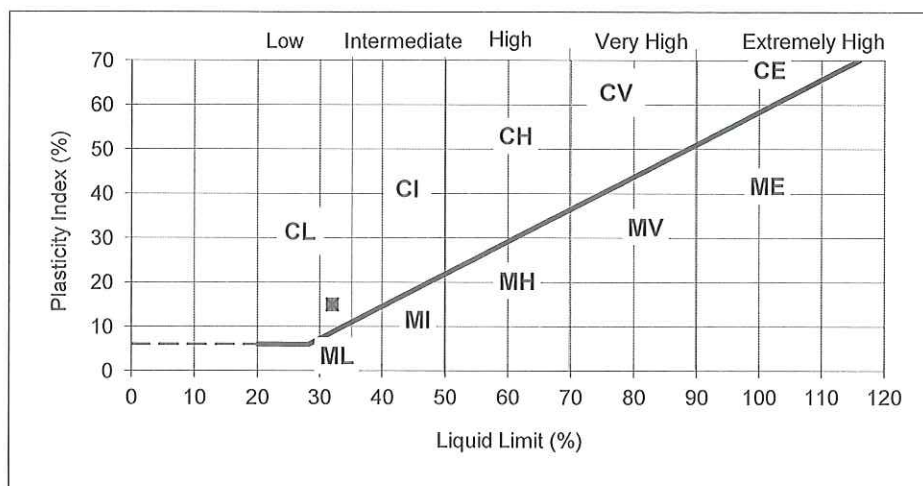
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|--------------|------------|---------------|-----------|
| SAMPLE LABEL | TP155-0.9m | DATE SAMPLED | N/A |
| SAMPLE No. | 58545 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|------------------------------------|
| MATERIAL | Brown silty Clay with trace gravel |
| ADVISED SOURCE | Site Won |

| Moisture Content (Natural) (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Passing 425 micron (%) |
|--------------------------------------|---------------------|----------------------|-------------------------|------------------------------|
| 22 | 32 | 17 | 15 | 97 |



REMARKS

Sample was tested in natural condition

SIGNED

NAME

A Richardson

DATE

22-May-14

Page 5 of 9

(Deputy Laboratory Manager)

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

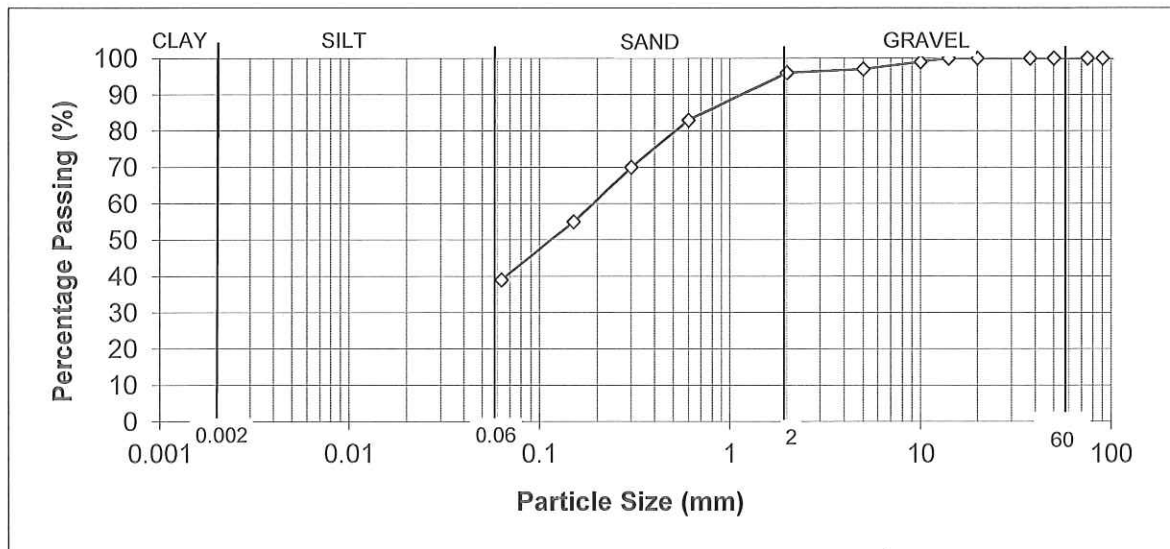
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|---------------|------------|---------------|-----------|
| SAMPLE LABEL | TP128-0.7m | DATE SAMPLED | N/A |
| LAB SAMPLE No | 58541 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|------------|
| MATERIAL | Silty Sand |
| ADVISED SOURCE | Site |

| Sieve Size (mm) | % Passing (%) | Specification (%) | Sieve Size (mm) | % Passing (%) | Specification (%) |
|-----------------|---------------|-------------------|-----------------|---------------|-------------------|
| 125 | 100 | | 10 | 99 | |
| 90 | 100 | | 5 | 97 | |
| 75 | 100 | | 2 | 96 | |
| 50 | 100 | | 0.6 | 83 | |
| 37.5 | 100 | | 0.3 | 70 | |
| 20 | 100 | | 0.15 | 55 | |
| 14 | 100 | | 0.063 | 39 | |



REMARKS

As received moisture content = 20%

SIGNED

NAME

A Richardson
(Deputy Laboratory Manager)

DATE

22-May-14

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

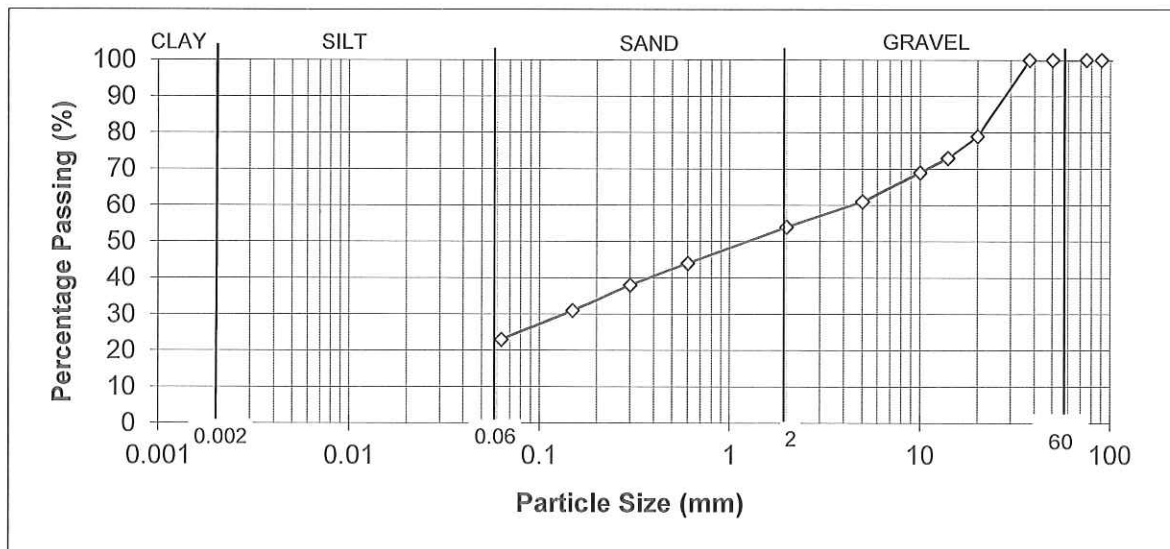
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|---------------|------------|---------------|-----------|
| SAMPLE LABEL | TP141-0.8m | DATE SAMPLED | N/A |
| LAB SAMPLE No | 58543 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|---------------|
| MATERIAL | Sand & Gravel |
| ADVISED SOURCE | Site |

| Sieve Size (mm) | % Passing (%) | Specification (%) | Sieve Size (mm) | % Passing (%) | Specification (%) |
|-----------------|---------------|-------------------|-----------------|---------------|-------------------|
| 125 | 100 | | 10 | 69 | |
| 90 | 100 | | 5 | 61 | |
| 75 | 100 | | 2 | 54 | |
| 50 | 100 | | 0.6 | 44 | |
| 37.5 | 100 | | 0.3 | 38 | |
| 20 | 79 | | 0.15 | 31 | |
| 14 | 73 | | 0.063 | 23 | |



REMARKS

As received moisture content = 19%

SIGNED

NAME

A Richardson
(Deputy Laboratory Manager)

DATE

22-May-14

Page 7 of 9

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

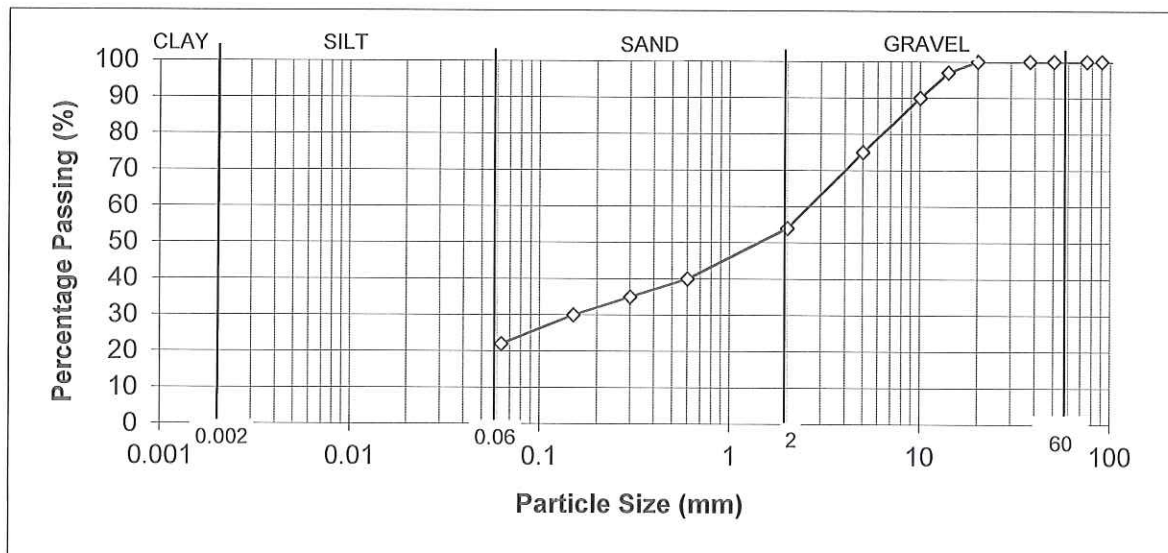
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|---------------|------------|---------------|-----------|
| SAMPLE LABEL | TP158-1.5m | DATE SAMPLED | N/A |
| LAB SAMPLE No | 58546 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|---------------|
| MATERIAL | Sand & Gravel |
| ADVISED SOURCE | Site |

| Sieve Size (mm) | % Passing (%) | Specification (%) | Sieve Size (mm) | % Passing (%) | Specification (%) |
|-----------------|---------------|-------------------|-----------------|---------------|-------------------|
| 125 | 100 | | 10 | 90 | |
| 90 | 100 | | 5 | 75 | |
| 75 | 100 | | 2 | 54 | |
| 50 | 100 | | 0.6 | 40 | |
| 37.5 | 100 | | 0.3 | 35 | |
| 20 | 100 | | 0.15 | 30 | |
| 14 | 97 | | 0.063 | 22 | |



REMARKS

As received moisture content = 17%

SIGNED

NAME

A Richardson
(Deputy Laboratory Manager)

DATE

22-May-14

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871



TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

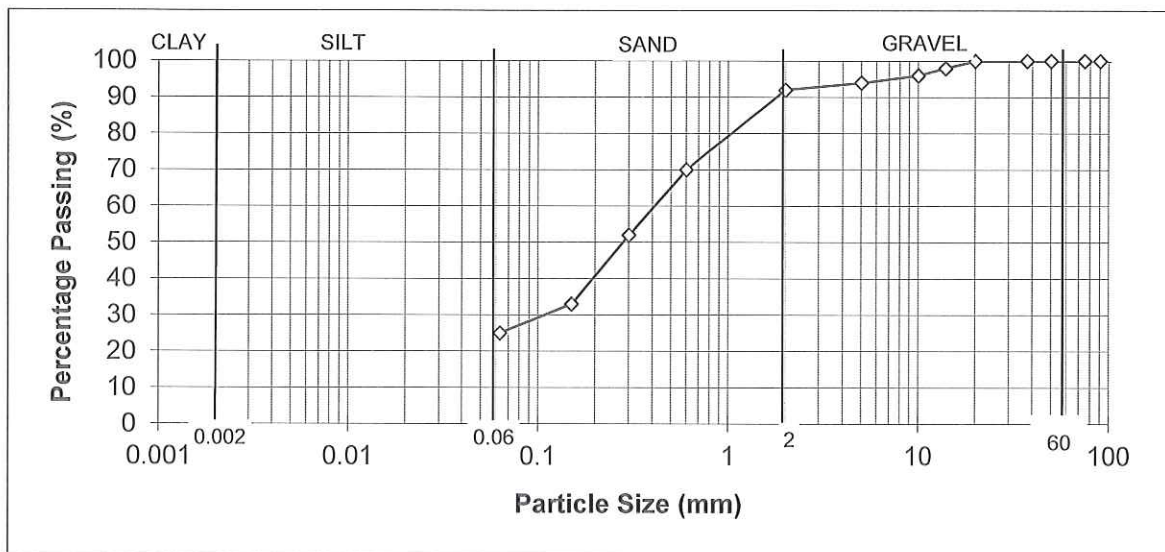
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

| | |
|------------|--------------------------------|
| CLIENT | Cooper Associates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/113 |

| | | | |
|---------------|------------|---------------|-----------|
| SAMPLE LABEL | TP167-0.7m | DATE SAMPLED | N/A |
| LAB SAMPLE No | 58547 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 16-May-14 | SAMPLED BY | Client |

| | |
|----------------|------|
| MATERIAL | Sand |
| ADVISED SOURCE | Site |

| Sieve Size (mm) | % Passing (%) | Specification (%) | Sieve Size (mm) | % Passing (%) | Specification (%) |
|-----------------|---------------|-------------------|-----------------|---------------|-------------------|
| 125 | 100 | | 10 | 96 | |
| 90 | 100 | | 5 | 94 | |
| 75 | 100 | | 2 | 92 | |
| 50 | 100 | | 0.6 | 70 | |
| 37.5 | 100 | | 0.3 | 52 | |
| 20 | 100 | | 0.15 | 33 | |
| 14 | 98 | | 0.063 | 25 | |



REMARKS

As received moisture content = 20%

SIGNED

NAME

A Richardson
(Deputy Laboratory Manager)

DATE

22-May-14

Page 9 of 9

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING
TEST REPORT



Client Cooper Associates

Address Park House
Sanderpiper Court
Chester Business Park
Chester, CH4 9QU

Contract Trough Laithe Farm, Barrowford

Client Job Ref 5883

Client Purchase Order Number 6285

Job Number MRN 1985/117

Date of Issue 30 May 2014

Page 1 of 8

Approved Signatory

S J Hutchings, A W Hutchings, A Richardson

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.



33C, Vauxhall Industrial Estate, Greg Street, Reddish, Stockport SK5 7BR Tel: 0161 475 0870 Fax: 0161 475 0871

Email: steve@mtt-uk.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
GREG STREET, REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

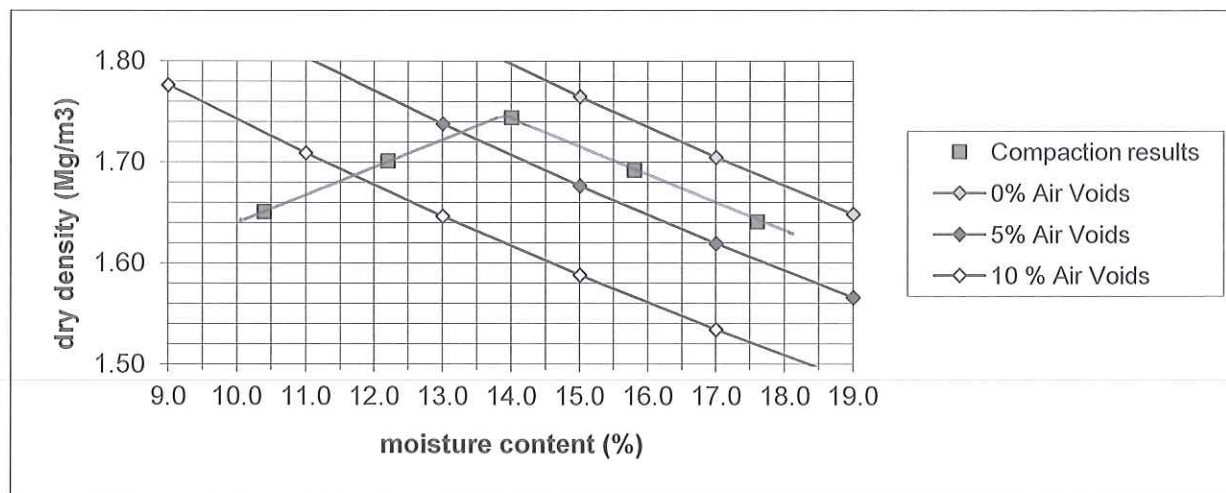
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asasociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|--------------|---------------|-----------|
| SAMPLE LABEL | Test Sands-1 | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58548 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Sand |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m ³) |
|--------------------------|----------------------|----------------------------------|
| 1 | 10.4 | 1.651 |
| 2 | 12.2 | 1.701 |
| 3 | 14.0 | 1.744 |
| 4 | 15.8 | 1.692 |
| 5 | 17.6 | 1.641 |
| Optimum | 14.0 | |
| Maximum Specific Gravity | | 1.74 |
| | 2.4 (Assumed) | |



REMARKS/ABNORMALITIES

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED *JA*

NAME A Richardson
(Deputy Laboratory Manager)

DATE

30-May-14

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
GREG STREET, REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

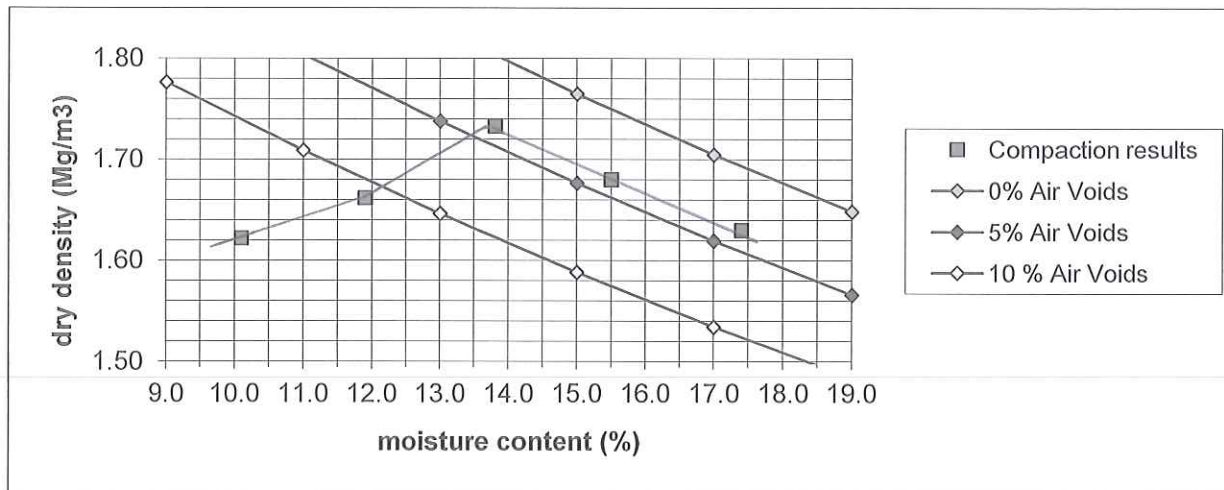
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asasociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|--------------|---------------|-----------|
| SAMPLE LABEL | Test Sands-2 | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58549 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Sand |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m3) |
|------------------|----------------------|---------------------|
| 1 | 10.1 | 1.622 |
| 2 | 11.9 | 1.662 |
| 3 | 13.8 | 1.733 |
| 4 | 15.5 | 1.68 |
| 5 | 17.4 | 1.63 |
| Optimum | 14.0 | |
| Maximum | | 1.73 |
| Specific Gravity | 2.4 (Assumed) | |



REMARKS/ABNORMALITIES

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED

NAME A Richardson
(Deputy Laboratory Manager)

DATE

30-May-14

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
 GREG STREET, REDDISH, STOCKPORT SK5 7BR
 TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

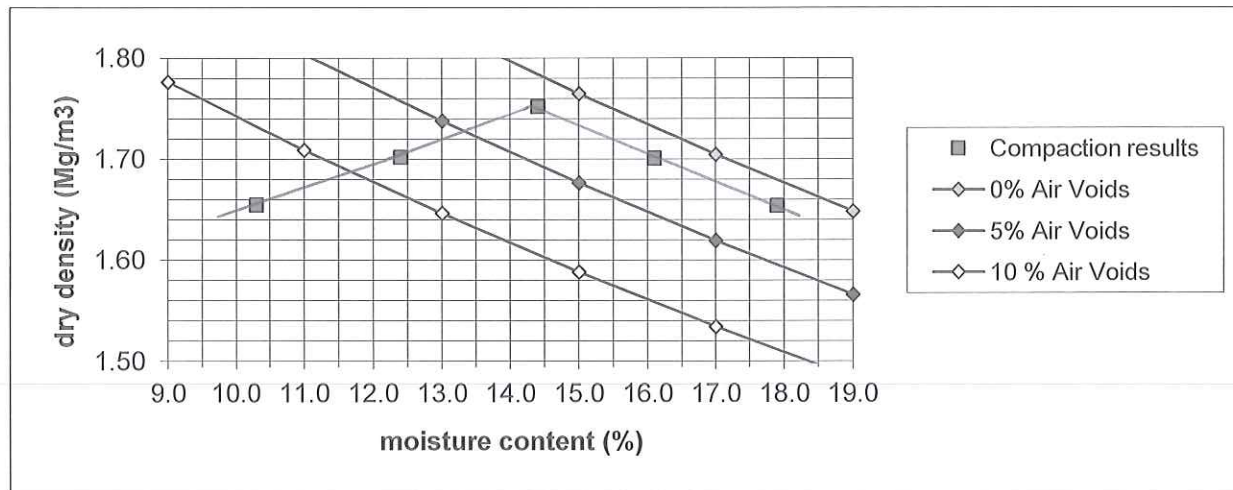
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
 BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asassociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|--------------|---------------|-----------|
| SAMPLE LABEL | Test Sands-3 | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58550 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Sand |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m3) |
|------------------|----------------------|---------------------|
| 1 | 10.3 | 1.655 |
| 2 | 12.4 | 1.702 |
| 3 | 14.4 | 1.752 |
| 4 | 16.1 | 1.701 |
| 5 | 17.9 | 1.654 |
| Optimum | 14.0 | |
| Maximum | | 1.75 |
| Specific Gravity | 2.4 (Assumed) | |

**REMARKS/ABNORMALITIES**

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED

NAME A Richardson
 (Deputy Laboratory Manager)

DATE

30-May-14

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
GREG STREET, REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

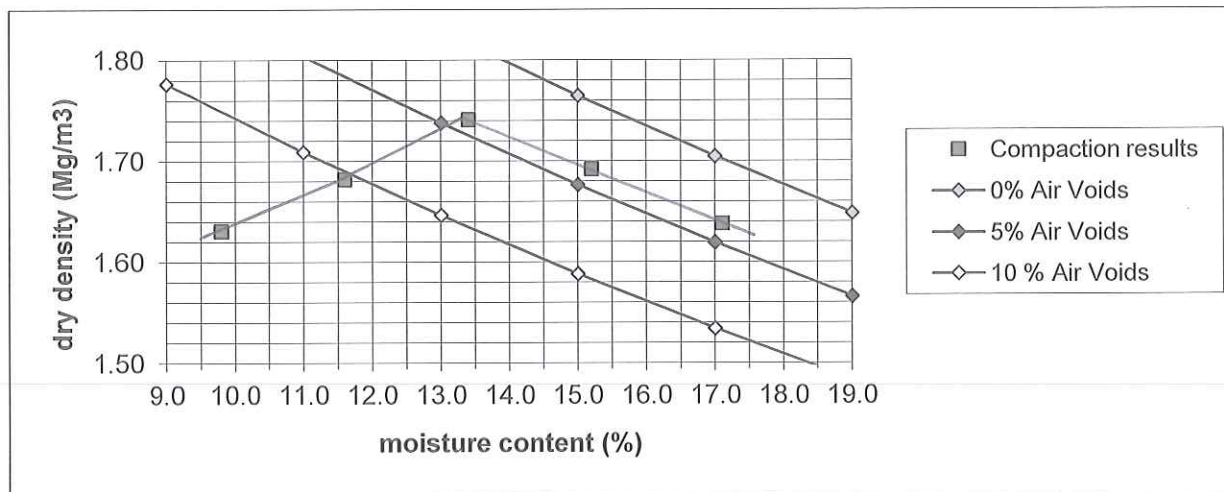
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asasociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|--------------|---------------|-----------|
| SAMPLE LABEL | Test Sands-4 | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58551 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Sand |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m3) |
|------------------|----------------------|---------------------|
| 1 | 9.8 | 1.631 |
| 2 | 11.6 | 1.682 |
| 3 | 13.4 | 1.741 |
| 4 | 15.2 | 1.692 |
| 5 | 17.1 | 1.638 |
| Optimum | 13.0 | |
| Maximum | | 1.74 |
| Specific Gravity | 2.4 (Assumed) | |

**REMARKS/ABNORMALITIES**

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED

NAME A Richardson
(Deputy Laboratory Manager)

DATE

30-May-14

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
GREG STREET, REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

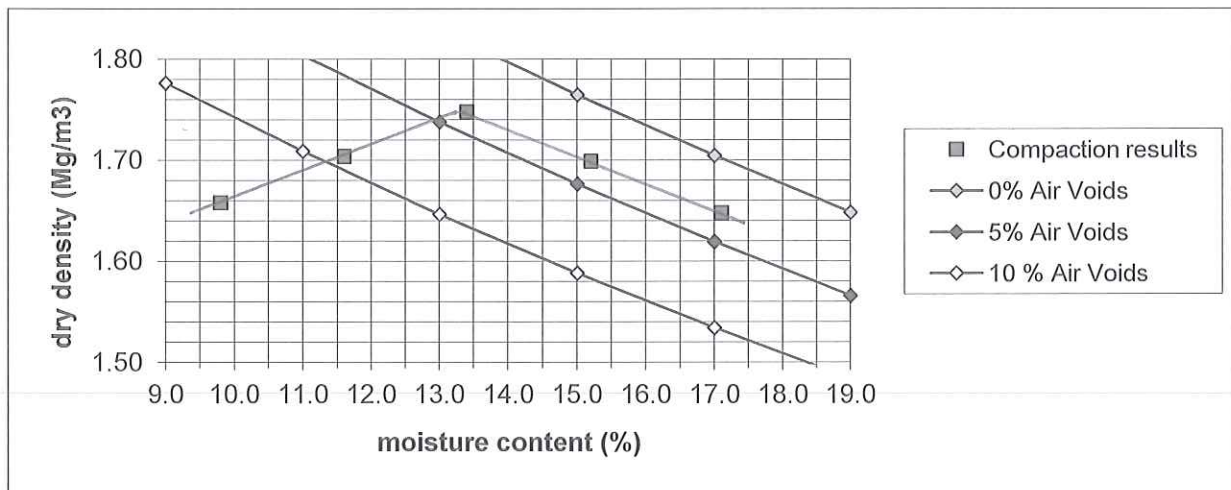
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asasociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|--------------|---------------|-----------|
| SAMPLE LABEL | Test Sands-5 | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58552 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Sand |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m ³) |
|------------------|----------------------|----------------------------------|
| 1 | 9.8 | 1.658 |
| 2 | 11.6 | 1.704 |
| 3 | 13.4 | 1.748 |
| 4 | 15.2 | 1.699 |
| 5 | 17.1 | 1.648 |
| Optimum | 13.0 | |
| Maximum | | 1.75 |
| Specific Gravity | 2.4 (Assumed) | |

**REMARKS/ABNORMALITIES**

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED

NAME A Richardson
(Deputy Laboratory Manager)

DATE

30-May-14

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
GREG STREET, REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

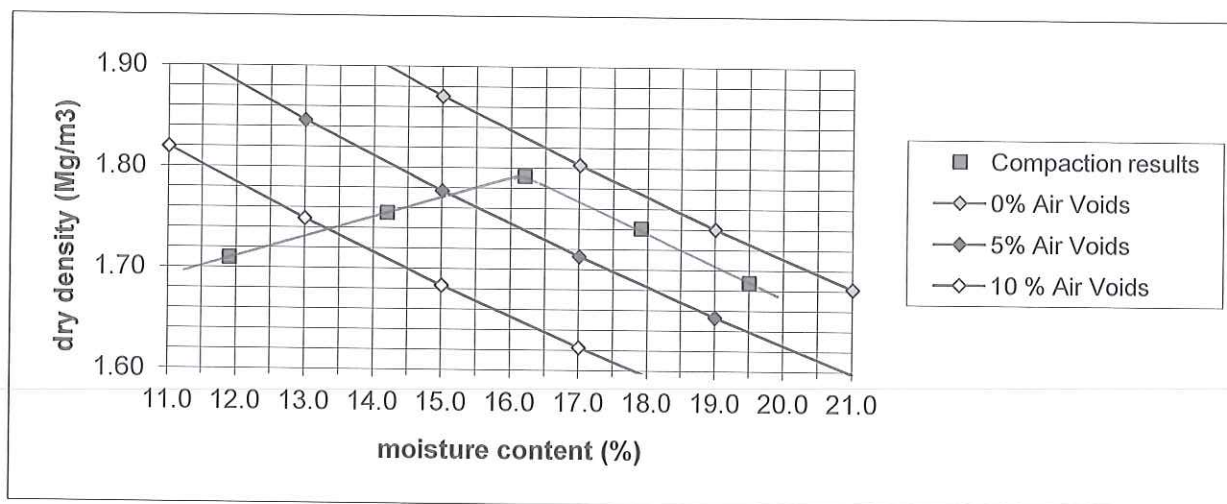
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asasociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|-----------|---------------|-----------|
| SAMPLE LABEL | TP130's | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58553 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Clay |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m3) |
|------------------|----------------------|---------------------|
| 1 | 11.9 | 1.71 |
| 2 | 14.2 | 1.755 |
| 3 | 16.2 | 1.792 |
| 4 | 17.9 | 1.741 |
| 5 | 19.5 | 1.688 |
| Optimum | 16.0 | |
| Maximum | | 1.79 |
| Specific Gravity | 2.6 (Assumed) | |

**REMARKS/ABNORMALITIES**

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED

NAME A Richardson
(Deputy Laboratory Manager)

DATE

30-May-14

MURRAY RIX

33C VAUXHALL INDUSTRIAL ESTATE
GREG STREET, REDDISH, STOCKPORT SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

**TEST CERTIFICATE**

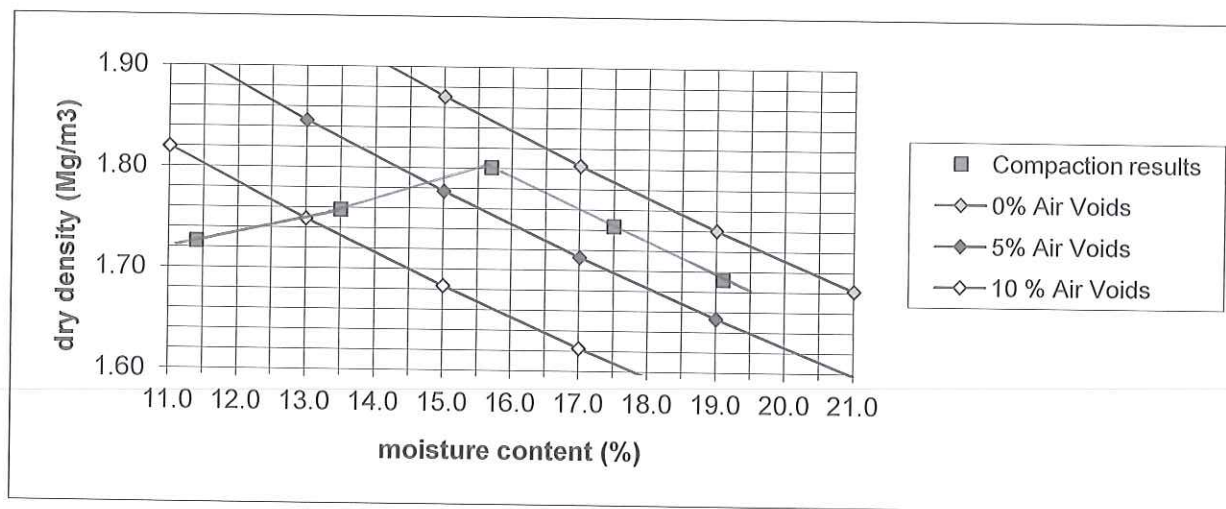
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 4.5 kg RAMMER
BS1377: PART 4: 1990

| | |
|------------|--------------------------------|
| CLIENT | Cooper Asassociates |
| SITE | Trough Laithe Farm, Barrowford |
| JOB NUMBER | MRN 1985/117 |

| | | | |
|---------------|-----------|---------------|-----------|
| SAMPLE LABEL | TP106-107 | DATE SAMPLED | 15-May-14 |
| LAB SAMPLE No | 58554 | DATE RECEIVED | 15-May-14 |
| DATE TESTED | 18-May-14 | SAMPLED BY | Client |

| | |
|----------------|--|
| MATERIAL | Clay |
| ADVISED SOURCE | Site |
| PRE TREATMENT | Air dried/Separate Batch's, sample reduced to <5mm |

| Point Number | Moisture Content (%) | Dry Density (Mg/m ³) |
|------------------|----------------------|----------------------------------|
| 1 | 11.4 | 1.726 |
| 2 | 13.5 | 1.758 |
| 3 | 15.7 | 1.801 |
| 4 | 17.5 | 1.744 |
| 5 | 19.1 | 1.692 |
| Optimum | 16.0 | |
| Maximum | | 1.80 |
| Specific Gravity | | 2.6 (Assumed) |

**REMARKS/ABNORMALITIES**

Percentage of material retained on 37.5mm sieve = 0%

Percentage of material retained on 20mm sieve = 0%

SIGNED



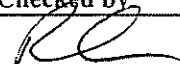
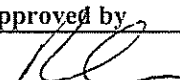
NAME A Richardson
(Deputy Laboratory Manager)

DATE

30-May-14

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Trial Pit Number | Sample Number | Depth m | Description of Sample |
|------------------|---------------|---------|---|
| 1 | | 1.00 | Brown gravelly very sandy silty CLAY. |
| 1 | | 2.10 | Dark grey slightly gravelly sandy clayey SILT. |
| 2 | | 1.00 | Brown slightly gravelly slightly sandy silty CLAY. |
| 3 | | 1.50 | Brown slightly sandy silty CLAY. |
| 4 | | 1.00 | Dark grey gravelly very sandy silty CLAY. |
| 5 | | 1.40 | Dark grey gravelly very clayey silty SAND. |
| 7 | | 1.40 | Brown slightly gravelly slightly sandy silty CLAY. |
| 11 | | 2.50 | Grey very gravelly very sandy silty CLAY. |
| 11 | | 3.20 | Dark grey slightly gravelly slightly sandy very silty CLAY. |
| 12 | | 2.30 | Greyish brown clayey silty SAND AND GRAVEL. |
| 16 | | 1.30 | Dark grey very gravelly sandy silty CLAY. |
| 16 | | 2.50 | Grey very sandy silty CLAY. |
| 18 | | 0.50 | Brown sandy silty CLAY. |
| 18 | | 2.00 | Grey gravelly sandy silty CLAY. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | | | | | | |
|---|--|----------|---|----------|---|-------------------------|
|  Professional Soils Laboratory | Compiled by | Date | Checked by | Date | Approved by | Date |
| |  | 18/11/05 |  | 18/11/05 |  | 18/11/05 |
| | BARROWFORD ROAD, NELSON LANCASHIRE | | | | | Contract No. PSL05/1649 |
| | | | | | | Client Ref: M23701 |

SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

Sheet 1 of 2.



Professional Soils Laboratory

Compiled by

Date _____

Checked by

Date _____

Approved by _____

Date _____

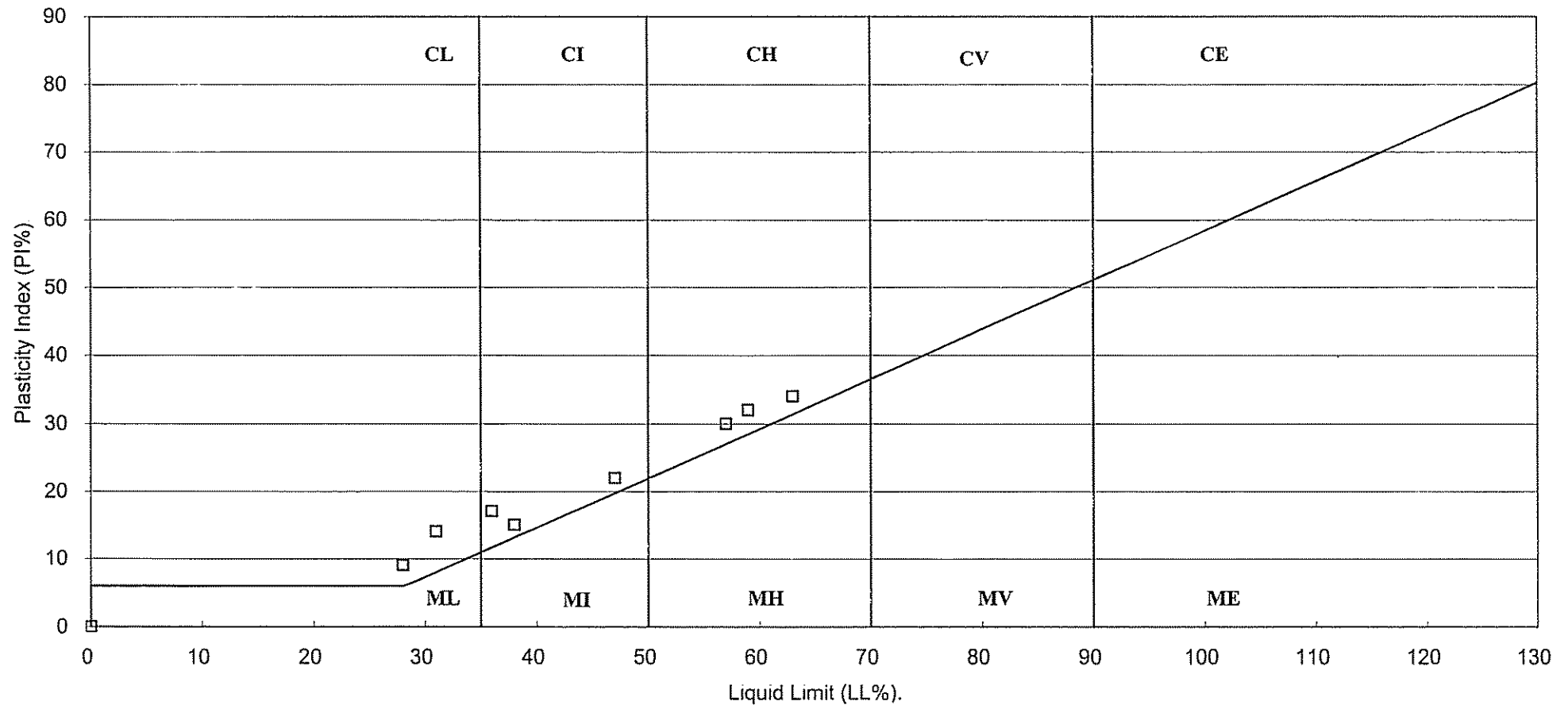
BARROWFORD ROAD, NELSON LANCASHIRE.

Contract No: PSL05/1649

Client Ref: M23701

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



PSL

Professional Soils Laboratory

Compiled by

[Signature]

Date

18/11/05

Checked by

[Signature]

Date

18/11/05

Approved by

[Signature]

Date

18/11/05

BARROWFORD ROAD, NELSON LANCASHIRE.

Contract No: PSL05/1649

Client Ref: M23701

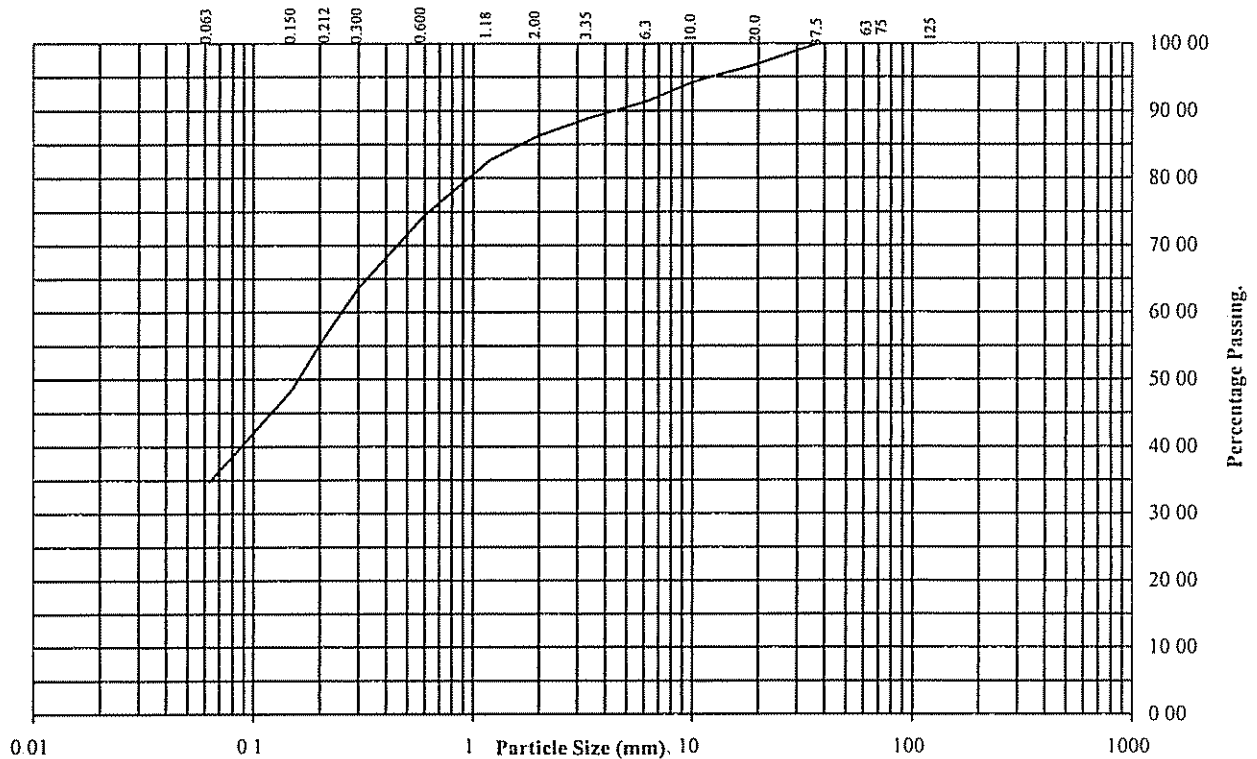
PARTICLE SIZE DISTRIBUTION TEST

BS1377:Part 2:1990

Wet Sieve: Clause 9.2

Trial Pit /Sample Number: 4

Depth (m): 1.00



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125 | 100 |
| 75 | 100 |
| 63 | 100 |
| 37.5 | 100 |
| 20 | 97 |
| 10 | 94 |
| 6.3 | 92 |
| 3.35 | 89 |
| 2 | 86 |
| 1.18 | 83 |
| 0.6 | 74 |
| 0.3 | 64 |
| 0.212 | 56 |
| 0.15 | 48 |
| 0.063 | 35 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles | 0 |
| Gravel | 14 |
| Sand | 51 |
| Silt/Clay | 35 |

Remarks:

See summary of soil descriptions.

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/11/05 | <i>RL</i> | 18/11/05 |

PSL

Professional Soils Laboratory

BARROWFORD ROAD,
NELSON LANCASHIRE

Contract No.:
PSL05/1649

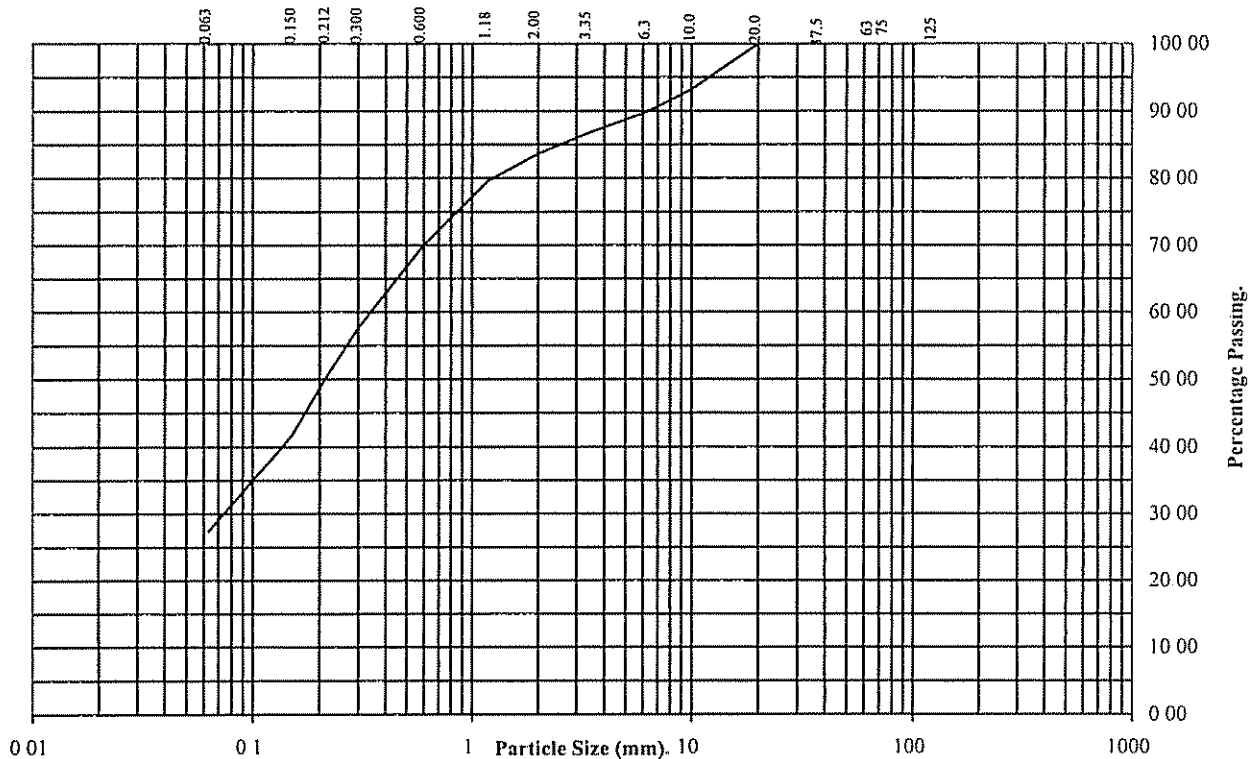
PARTICLE SIZE DISTRIBUTION TEST

BS1377:Part 2:1990

Wet Sieve: Clause 9.2

Trial Pit /Sample Number: 5

Depth (m): 1.40



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125 | 100 |
| 75 | 100 |
| 63 | 100 |
| 37.5 | 100 |
| 20 | 100 |
| 10 | 93 |
| 6.3 | 90 |
| 3.35 | 87 |
| 2 | 84 |
| 1.18 | 80 |
| 0.6 | 70 |
| 0.3 | 58 |
| 0.212 | 50 |
| 0.15 | 42 |
| 0.063 | 27 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles | 0 |
| Gravel | 16 |
| Sand | 57 |
| Silt/Clay | 27 |

Remarks:

See summary of soil descriptions.

| Checked By | Date | Approved By | Date |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 18/11/05 | <i>[Signature]</i> | 18/11/05 |

PSL

Professional Soils Laboratory

BARROWFORD ROAD,
NELSON LANCASHIRE.

Contract No.:
PSL05/1649

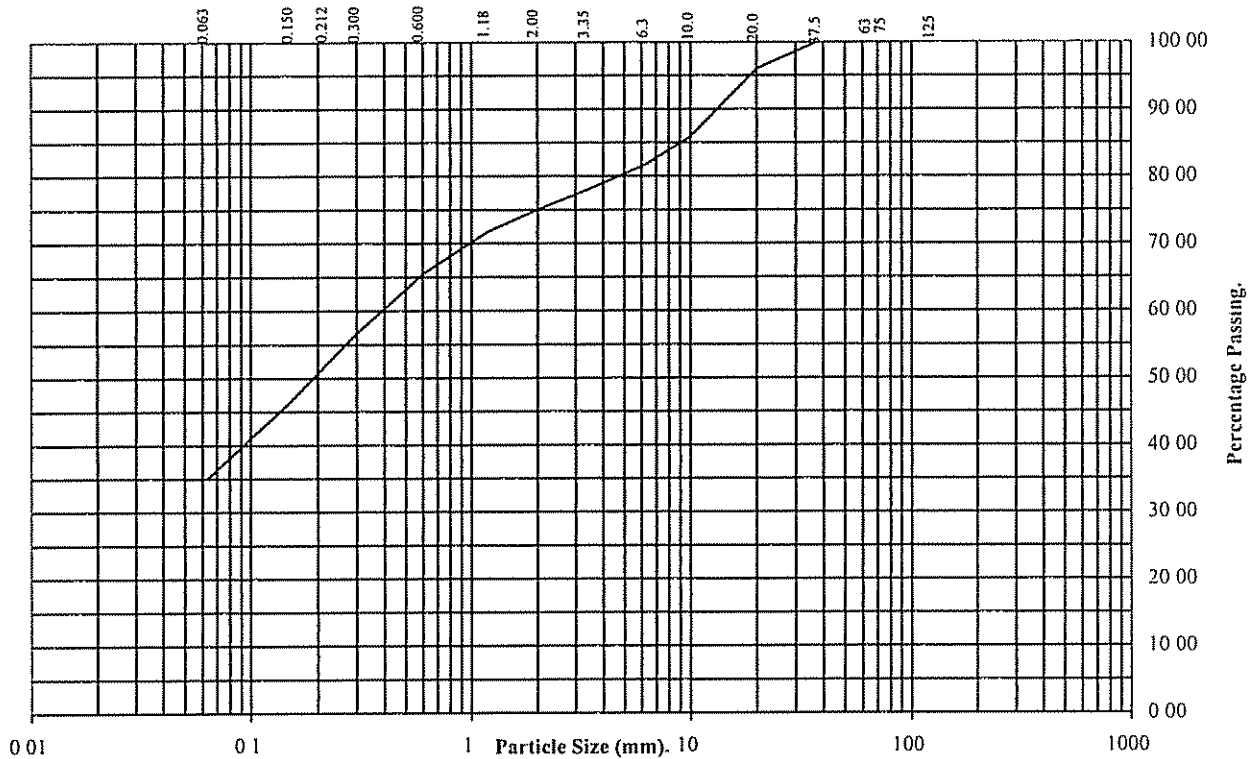
PARTICLE SIZE DISTRIBUTION TEST

BS1377:Part 2:1990

Wet Sieve: Clause 9.2

Trial Pit /Sample Number: 11

Depth (m): 2.50



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125 | 100 |
| 75 | 100 |
| 63 | 100 |
| 37.5 | 100 |
| 20 | 96 |
| 10 | 86 |
| 6.3 | 82 |
| 3.35 | 78 |
| 2 | 75 |
| 1.18 | 72 |
| 0.6 | 65 |
| 0.3 | 57 |
| 0.212 | 52 |
| 0.15 | 47 |
| 0.063 | 35 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles | 0 |
| Gravel | 25 |
| Sand | 40 |
| Silt/Clay | 35 |

Remarks:

See summary of soil descriptions.

| Checked By | Date | Approved By | Date |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 18/11/05 | <i>[Signature]</i> | 18/11/05 |

PSL

Professional Soils Laboratory

BARROWFORD ROAD,
NELSON LANCASHIRE

Contract No.:
PSL05/1649

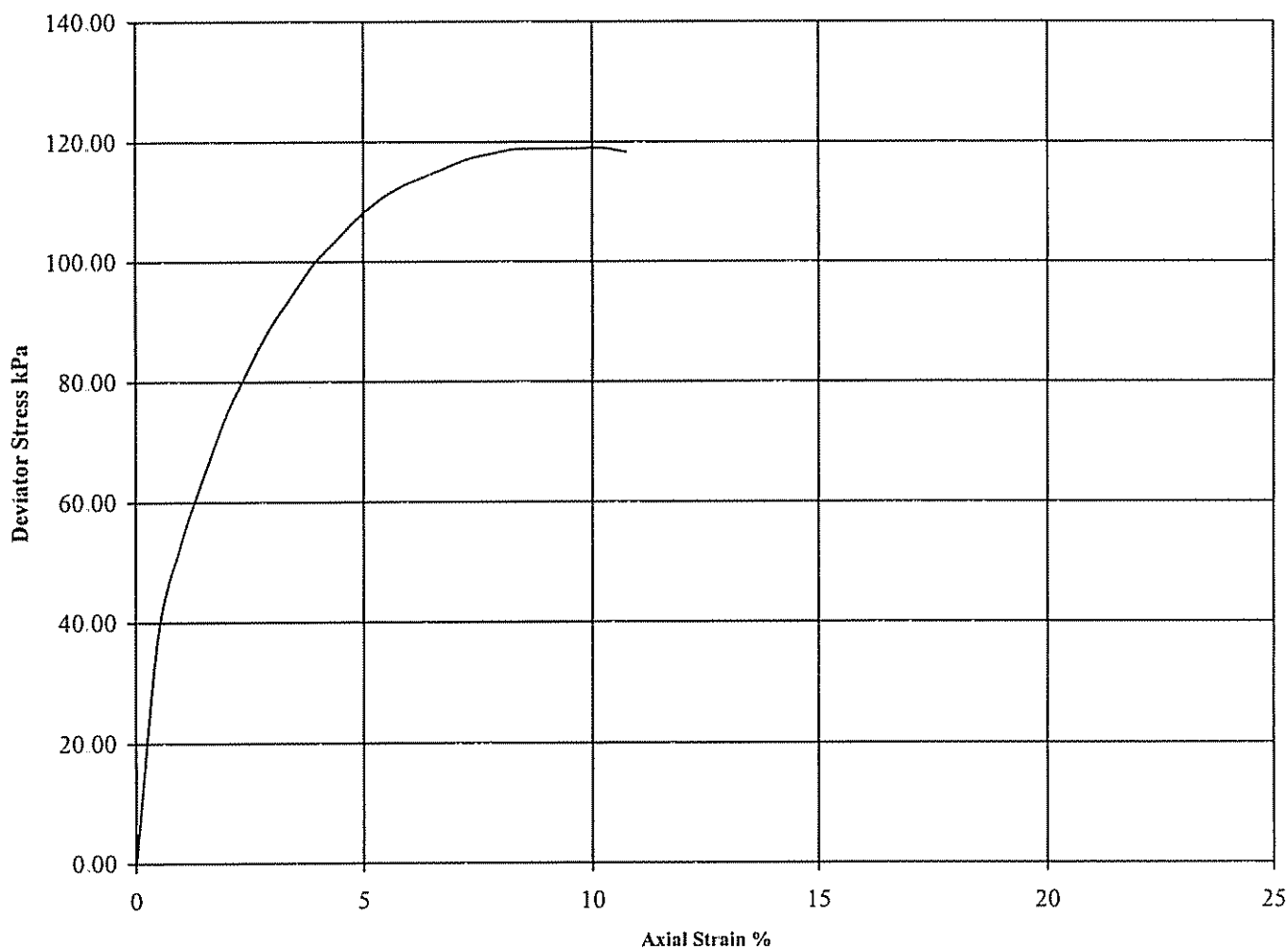
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Borehole / Sample Number: 1

Depth (m): 8.00



| Diameter (mm): | | 102 | Height (mm): | | 205 | Test: | 100 mm Single Stage. | | |
|----------------|----------|---------|--------------|----------|----------|----------|----------------------|---------|----------------------------------|
| Specimen | Moisture | Bulk | Dry | Cell | Deviator | Cohesion | Failure | Mode | Remarks |
| | Content | Density | Density | Pressure | Stress | | Strain | of | |
| | (%) | (Mg/m3) | (Mg/m3) | (kPa) | (kPa) | (kPa) | (%) | Failure | |
| | | | | | | | | | |
| A | 25 | 2.02 | 1.62 | 150 | 119 | 60 | 10.2 | Plastic | See summary of soil descriptions |
| B | | | | | | | | | |
| C | | | | | | | | | |

| Checked | Date | Approved | Date |
|--------------------|-----------|--------------------|-----------|
| <i>[Signature]</i> | 18/Jul/05 | <i>[Signature]</i> | 18/Jul/05 |



BARROWFORD ROAD,
NELSON LANCASHIRE.

Contract No:
PSL05/1649

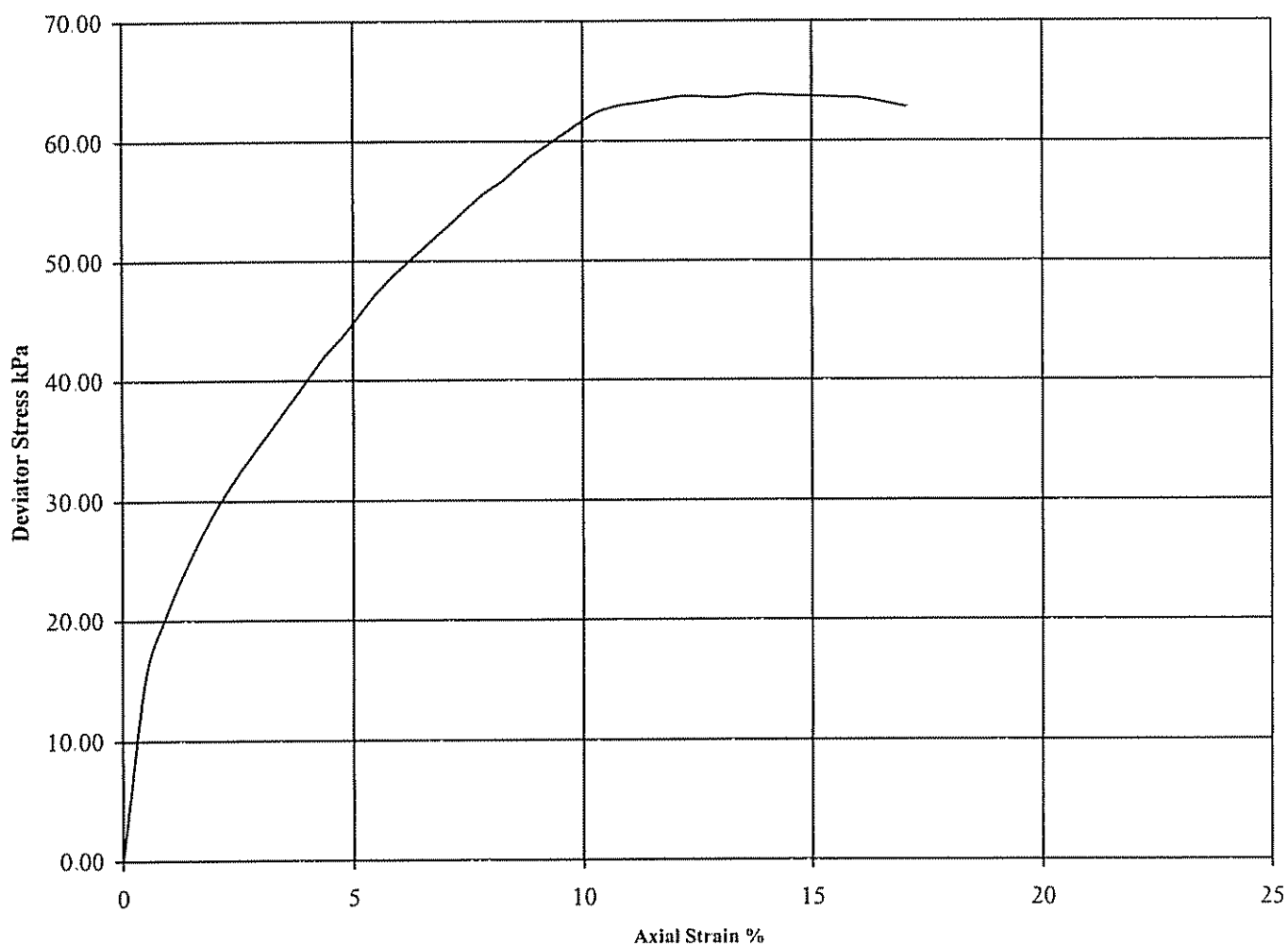
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

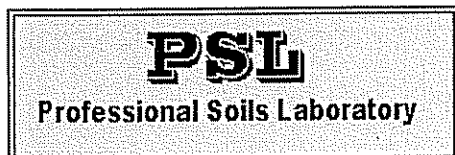
Borehole / Sample Number: 2

Depth (m): 2.00



| Diameter (mm): | | 102 | Height (mm): | | 205 | Test: | 100 mm Single Stage. | | |
|----------------|----------------------|-----------------------------------|----------------------------------|---------------------|-----------------------|----------------|----------------------|-----------------|----------------------------------|
| Specimen | Moisture Content (%) | Bulk Density (Mg/m ³) | Dry Density (Mg/m ³) | Cell Pressure (kPa) | Deviator Stress (kPa) | Cohesion (kPa) | Failure Strain (%) | Mode of Failure | Remarks |
| A | 36 | 1.80 | 1.32 | 40 | 64 | 32 | 13.7 | Plastic | See summary of soil descriptions |
| B | | | | | | | | | |
| C | | | | | | | | | |

| Checked | Date | Approved | Date |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 18/11/05 | <i>[Signature]</i> | 18/11/05 |



BARROWFORD ROAD,
NELSON LANCASHIRE.

Contract No:
PSL05/1649

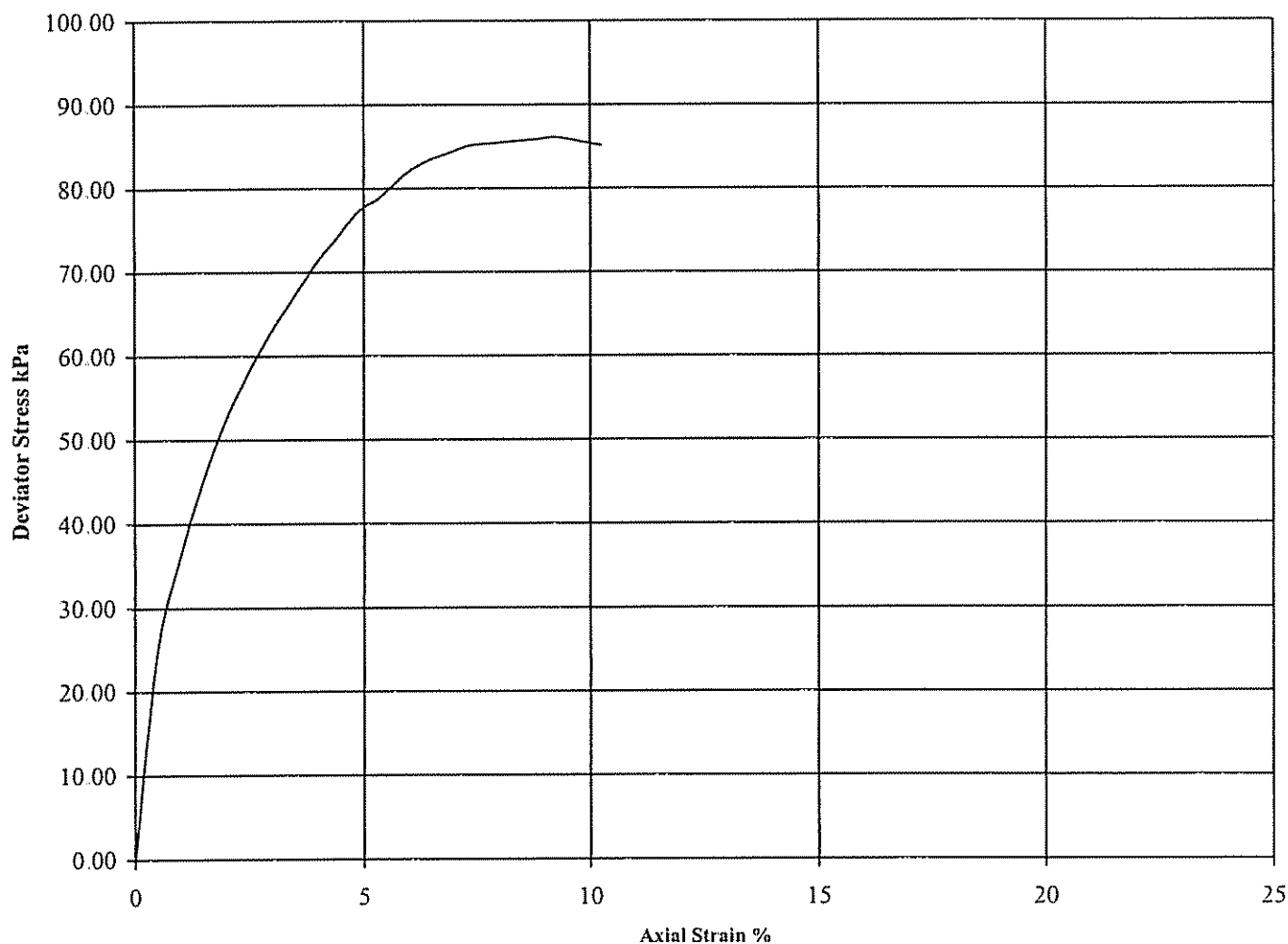
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part 7 : Clause 8 : 1990

Borehole / Sample Number: 4

Depth (m): 4.00



| Diameter (mm): | | 102 | Height (mm): | | 205 | Test: | 100 mm Single Stage. | | |
|----------------|----------------------|-----------------------------------|----------------------------------|---------------------|-----------------------|----------------|----------------------|-----------------|----------------------------------|
| Specimen | Moisture Content (%) | Bulk Density (Mg/m ³) | Dry Density (Mg/m ³) | Cell Pressure (kPa) | Deviator Stress (kPa) | Cohesion (kPa) | Failure Strain (%) | Mode of Failure | Remarks |
| | A | 16 | 2.06 | 1.77 | 80 | 86 | 43 | 9.3 | Plastic |
| | B | | | | | | | | See summary of soil descriptions |
| | C | | | | | | | | |

| Checked | Date | Approved | Date |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 18/11/05 | <i>[Signature]</i> | 18/11/05 |



BARROWFORD ROAD,
NELSON LANCASHIRE.

Contract No:
PSL05/1649

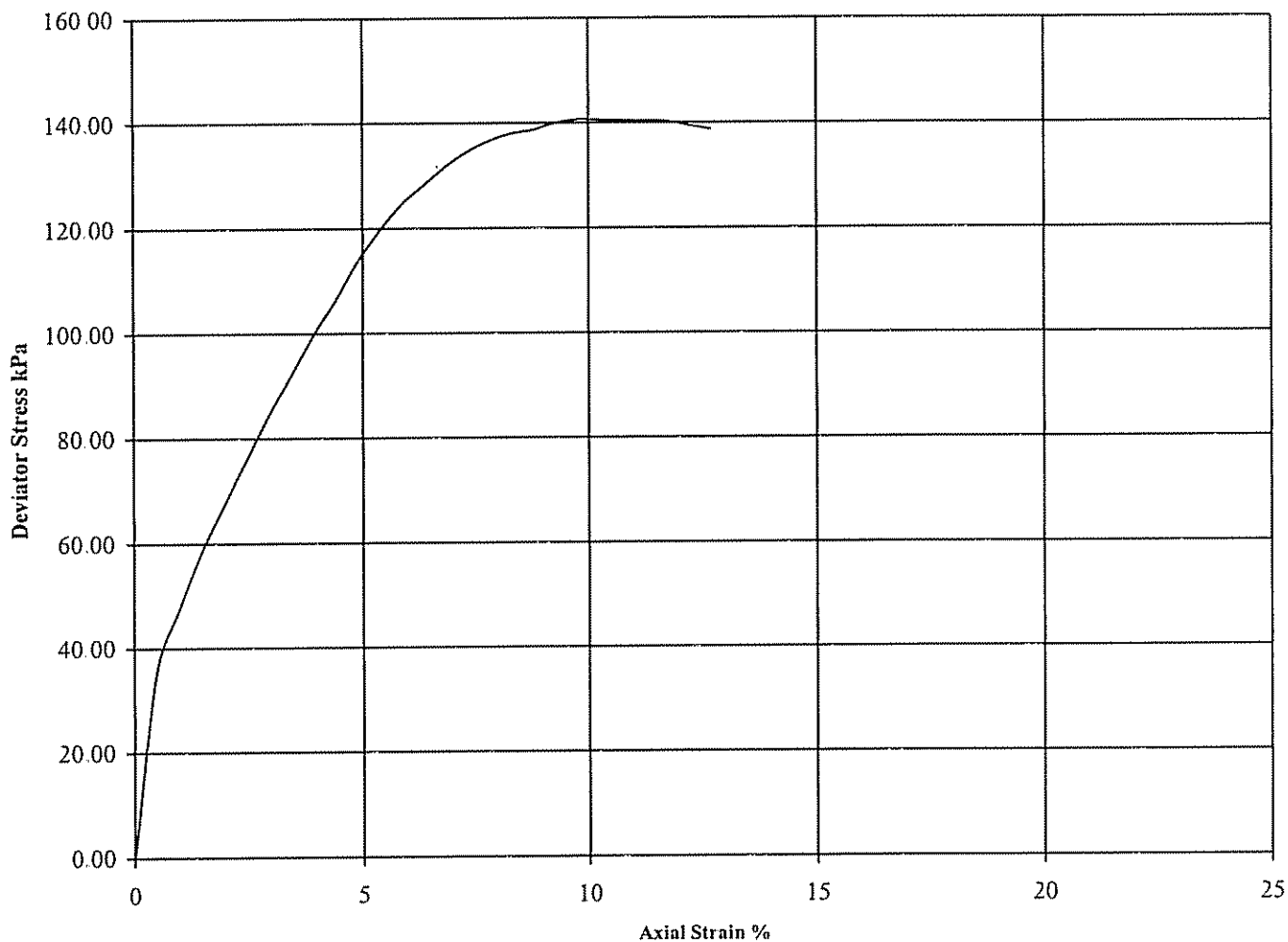
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Borehole / Sample Number: 5

Depth (m): 1.20



| Diameter (mm): | | 102 | Height (mm): | | 205 | Test: | 100 mm Single Stage. | | |
|----------------|----------------------|-----------------------------------|----------------------------------|---------------------|-----------------------|----------------|----------------------|-----------------|----------------------------------|
| Specimen | Moisture Content (%) | Bulk Density (Mg/m ³) | Dry Density (Mg/m ³) | Cell Pressure (kPa) | Deviator Stress (kPa) | Cohesion (kPa) | Failure Strain (%) | Mode of Failure | Remarks |
| A | 21 | 2.01 | 1.67 | 25 | 141 | 70 | 9.8 | Plastic | See summary of soil descriptions |
| B | | | | | | | | | |
| C | | | | | | | | | |

| Checked | Date | Approved | Date |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 18/11/05 | <i>[Signature]</i> | 18/11/05 |



BARROWFORD ROAD,
NELSON LANCASHIRE.

Contract No:
PSL05/1649

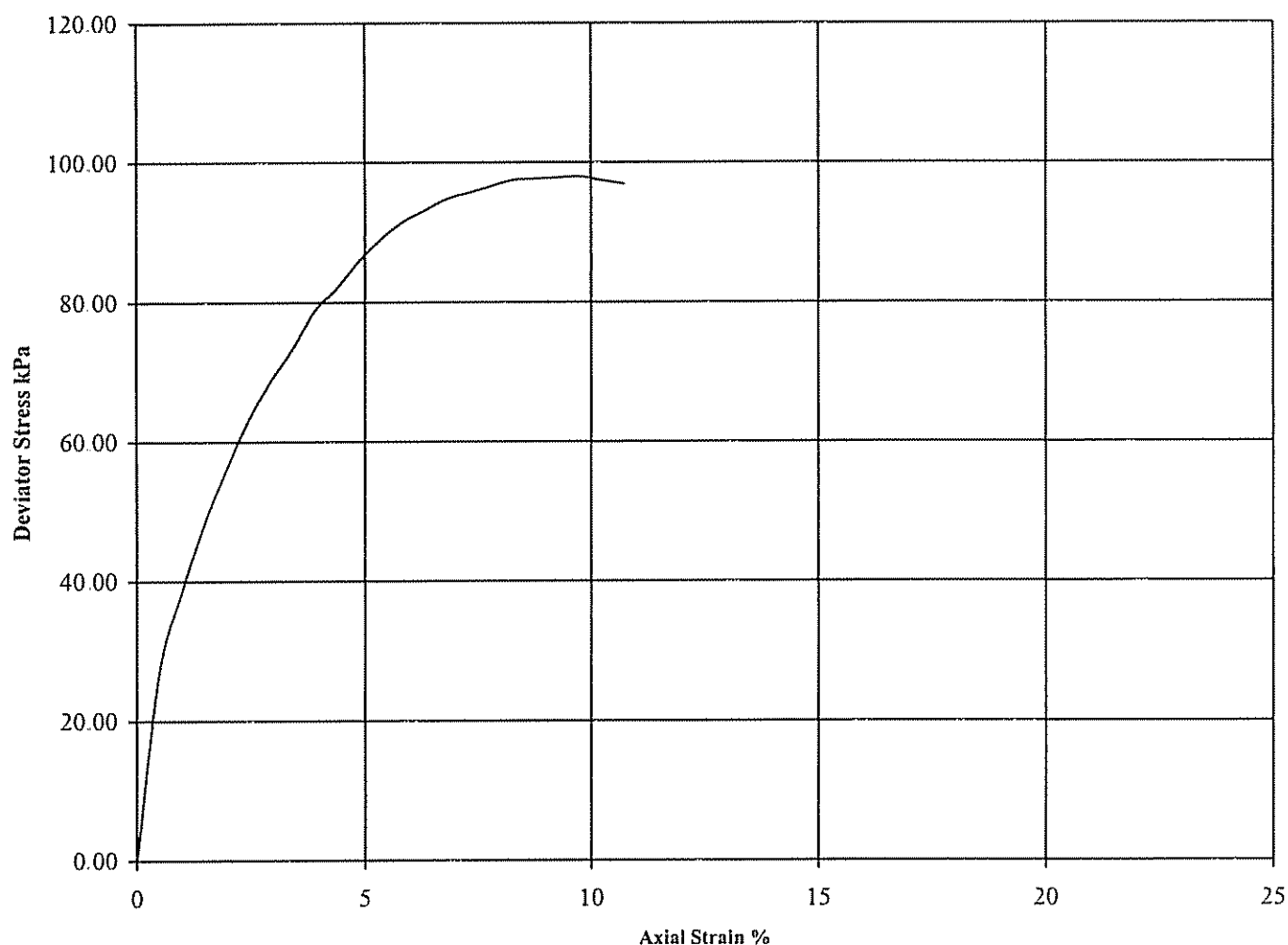
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Borehole / Sample Number: 5

Depth (m): 3.00



| Diameter (mm): | | 102 | Height (mm): | | 205 | Test: | 100 mm Single Stage. | | |
|----------------|----------------------|-----------------------------------|----------------------------------|---------------------|-----------------------|----------------|----------------------|-----------------|----------------------------------|
| Specimen | Moisture Content (%) | Bulk Density (Mg/m ³) | Dry Density (Mg/m ³) | Cell Pressure (kPa) | Deviator Stress (kPa) | Cohesion (kPa) | Failure Strain (%) | Mode of Failure | Remarks |
| | A | 29 | 1.90 | 1.47 | 60 | 98 | 49 | 9.8 | Plastic |
| | B | | | | | | | | See summary of soil descriptions |
| | C | | | | | | | | |

| Checked | Date | Approved | Date |
|-----------|----------|-----------|----------|
| <i>RL</i> | 18/11/05 | <i>RL</i> | 18/11/05 |

| | | | |
|---|--|--|----------------------------|
| PSL Professional Soils Laboratory | | BARROWFORD ROAD, NELSON LANCASHIRE. | Contract No: PSL05/1649 |
|---|--|--|----------------------------|

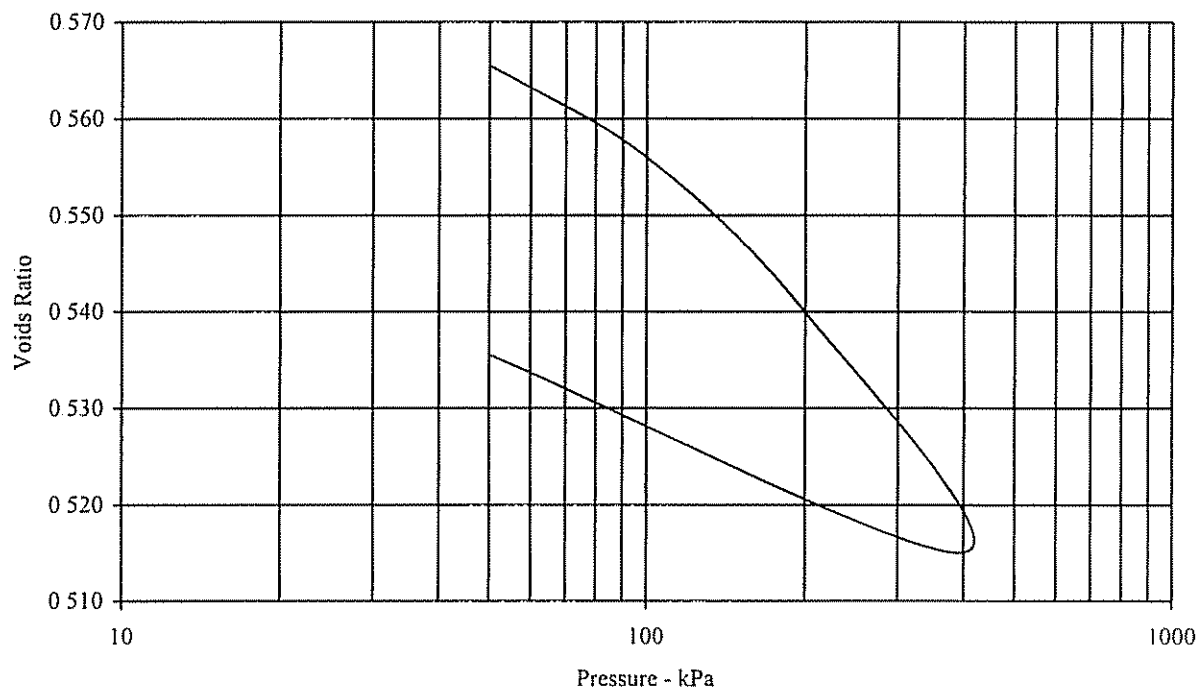
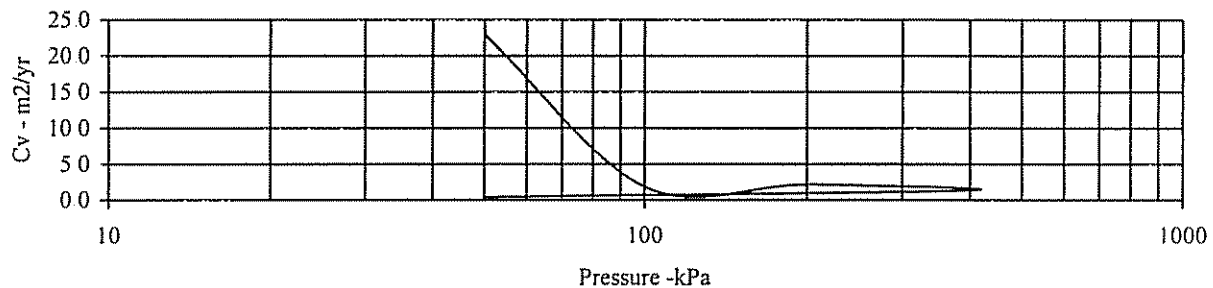
ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Borehole Number: 1

Depth (m): 8.00

| Initial Conditions | | Pressure Range | Mv | Cv | Final Conditions | |
|---------------------------|--------|----------------|-------|--------|----------------------------------|-------|
| Moisture Content (%): | 25 | kPa | m2/MN | m2/yr | Moisture Content (%) : | 24 |
| Bulk Density (Mg/m3): | 2.10 | 0 - 50 | 0.055 | 23.033 | Bulk Density (Mg/m3) : | 2.14 |
| Dry Density (Mg/m3): | 1.69 | 50 - 100 | 0.122 | 1.892 | Dry Density (Mg/m3) | 1.73 |
| Voids Ratio: | 0.5698 | 100 - 200 | 0.103 | 2.197 | Voids Ratio: | 0.536 |
| Degree of saturation: | 114.8 | 200 - 400 | 0.081 | 1.369 | Degree of Saturation: : | 120.1 |
| Height (mm): | 19.78 | 400 - 50 | 0.039 | 0.410 | Height (mm) : | 19.35 |
| Diameter (mm) | 75 | | | | Remarks: | |
| Particle Density (Mg/m3): | 2.65 | | | | See summary of soil descriptions | |
| Assumed | | | | | | |



Checked and Approved By Date

RE

18/11/05



BARROWFORD ROAD,
NELSON, LANCASHIRE.

Contract No PSL05/1649

Page 1 of 1

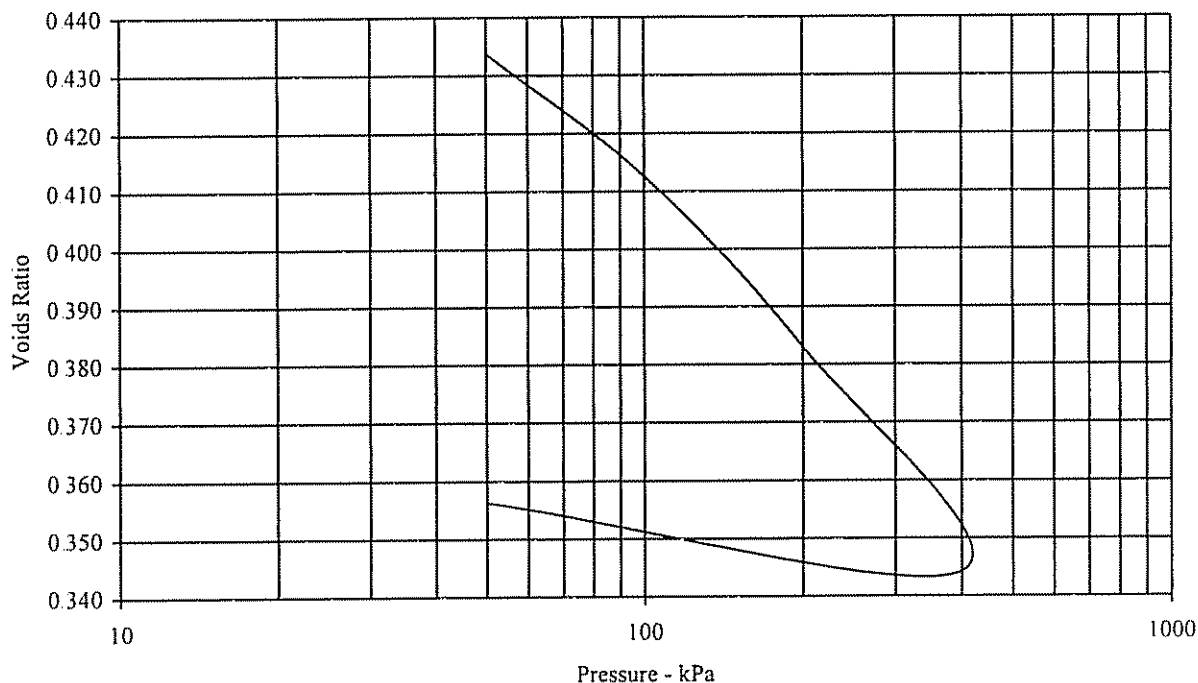
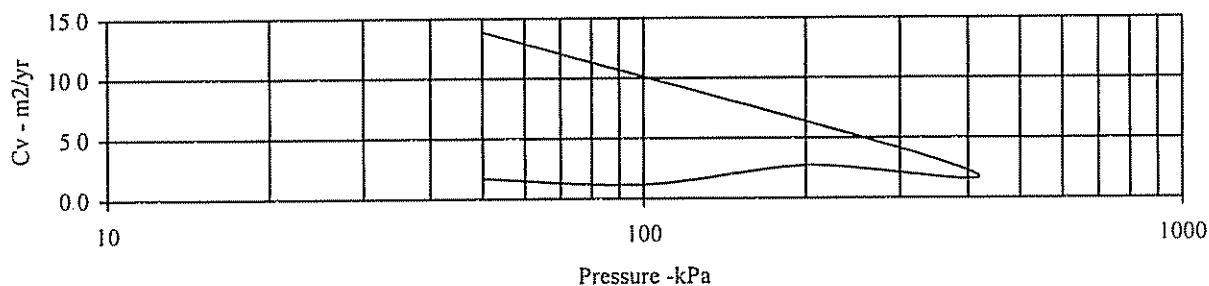
ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Borehole Number: 4

Depth (m): 4.00

| Initial Conditions | | Pressure Range | Mv | Cv | Final Conditions | |
|---------------------------|--------|----------------|-------|--------|----------------------------------|-------|
| Moisture Content (%): | 16 | kPa | m2/MN | m2/yr | Moisture Content (%) : | 14 |
| Bulk Density (Mg/m3): | 2.12 | 0 - 50 | 0.221 | 1.713 | Bulk Density (Mg/m3) : | 2.23 |
| Dry Density (Mg/m3): | 1.83 | 50 - 100 | 0.295 | 1.178 | Dry Density (Mg/m3) | 1.95 |
| Voids Ratio: | 0.4498 | 100 - 200 | 0.210 | 2.737 | Voids Ratio: | 0.356 |
| Degree of saturation: | 93.1 | 200 - 400 | 0.140 | 2.268 | Degree of Saturation: : | 103.5 |
| Height (mm): | 19.75 | 400 - 50 | 0.026 | 13.913 | Height (mm) : | 18.48 |
| Diameter (mm) | 75 | | | | Remarks: | |
| Particle Density (Mg/m3): | 2.65 | | | | See summary of soil descriptions | |
| Assumed | | | | | | |



Checked and Approved By

Date

Re

18/11/05



BARROWFORD ROAD,
NELSON, LANCASHIRE.

Contract No. PSL05/1649

Page 1 of 1

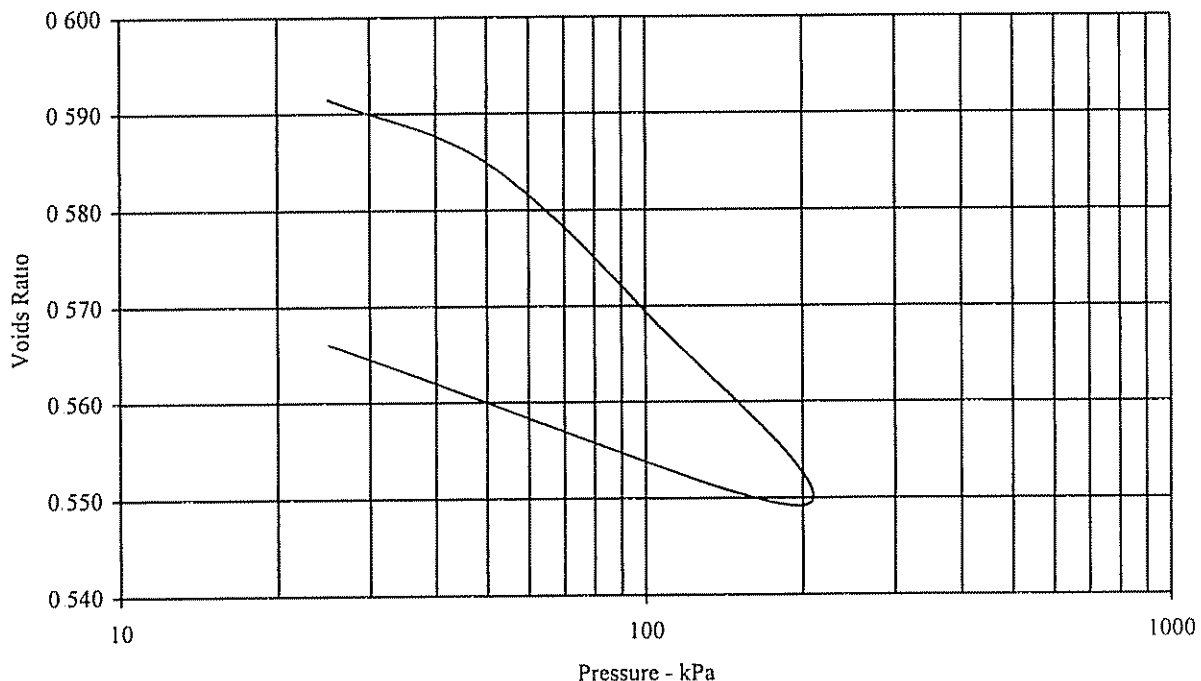
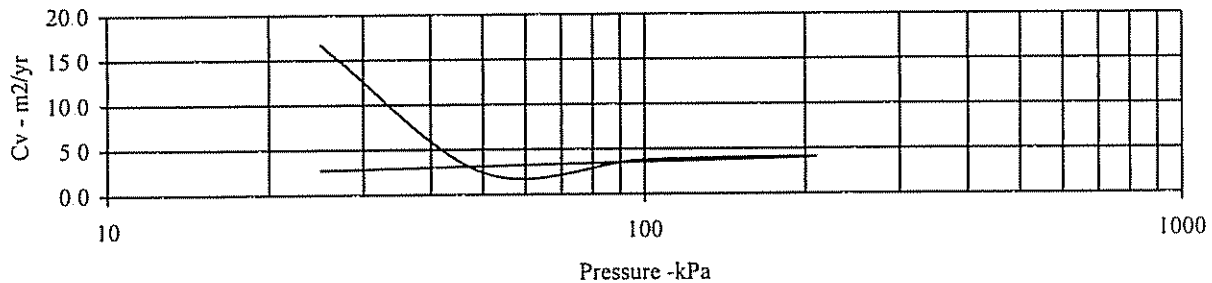
ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Borehole Number: 5

Depth (m): 1.20

| Initial Conditions | | Pressure Range | Mv | Cv | Final Conditions | |
|---------------------------|--------|----------------|-------|--------|----------------------------------|-------|
| Moisture Content (%): | 22 | kPa | m2/MN | m2/yr | Moisture Content (%) : | 19 |
| Bulk Density (Mg/m3): | 2.03 | 0 - 25 | 0.032 | 16.722 | Bulk Density (Mg/m3) : | 2.02 |
| Dry Density (Mg/m3): | 1.66 | 25 - 50 | 0.167 | 2.446 | Dry Density (Mg/m3) | 1.69 |
| Voids Ratio: | 0.5928 | 50 - 100 | 0.195 | 3.777 | Voids Ratio: | 0.566 |
| Degree of saturation: | 98.6 | 100 - 200 | 0.129 | 4.006 | Degree of Saturation: : | 90.9 |
| Height (mm): | 20.18 | 200 - 25 | 0.062 | 2.739 | Height (mm) : | 19.84 |
| Diameter (mm) | 75 | | | | Remarks: | |
| Particle Density (Mg/m3): | 2.65 | | | | See summary of soil descriptions | |
| Assumed | | | | | | |



Checked and Approved By Date

RE

18/11/05



BARROWFORD ROAD,
NELSON, LANCASHIRE.

Contract No PSL05/1649

Page 1 of 1

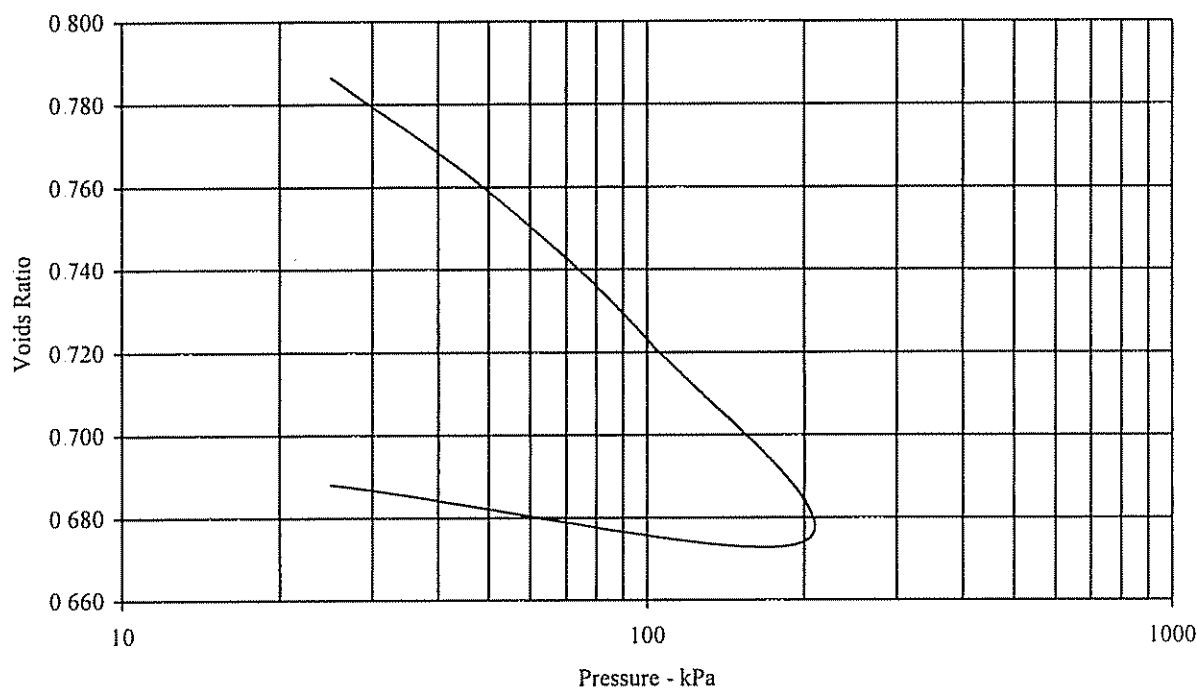
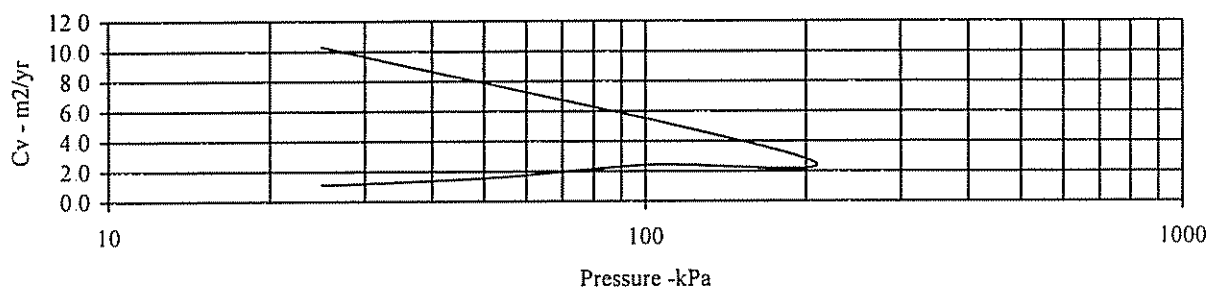
ONE DIMENSIONAL CONSOLIDATION

BS1377: Part 5: 1990

Borehole Number: 6

Depth (m): 1.20

| Initial Conditions | | Pressure Range | Mv | Cv | Final Conditions | |
|---------------------------|--------|----------------|-------|--------|-----------------------------------|-------|
| Moisture Content (%): | 33 | kPa | m2/MN | m2/yr | Moisture Content (%) : | 29 |
| Bulk Density (Mg/m3): | 1.92 | 0 - 25 | 1.117 | 1.109 | Bulk Density (Mg/m3) : | 2.02 |
| Dry Density (Mg/m3): | 1.44 | 25 - 50 | 0.619 | 1.536 | Dry Density (Mg/m3) | 1.57 |
| Voids Ratio: | 0.8379 | 50 - 100 | 0.408 | 2.407 | Voids Ratio: | 0.688 |
| Degree of saturation: | 105.7 | 100 - 200 | 0.284 | 2.829 | Degree of Saturation: : | 111.6 |
| Height (mm): | 20.2 | 200 - 25 | 0.048 | 10.302 | Height (mm) : | 18.56 |
| Diameter (mm) | 75 | | | | Remarks: | |
| Particle Density (Mg/m3): | 2.65 | | | | See summary of soil descriptions. | |
| Assumed | | | | | | |



Checked and Approved By

Date

RE

18/11/05

PSL
Professional Soils Laboratory

BARROWFORD ROAD,
NELSON, LANCASHIRE.

Contract No PSL05/1649

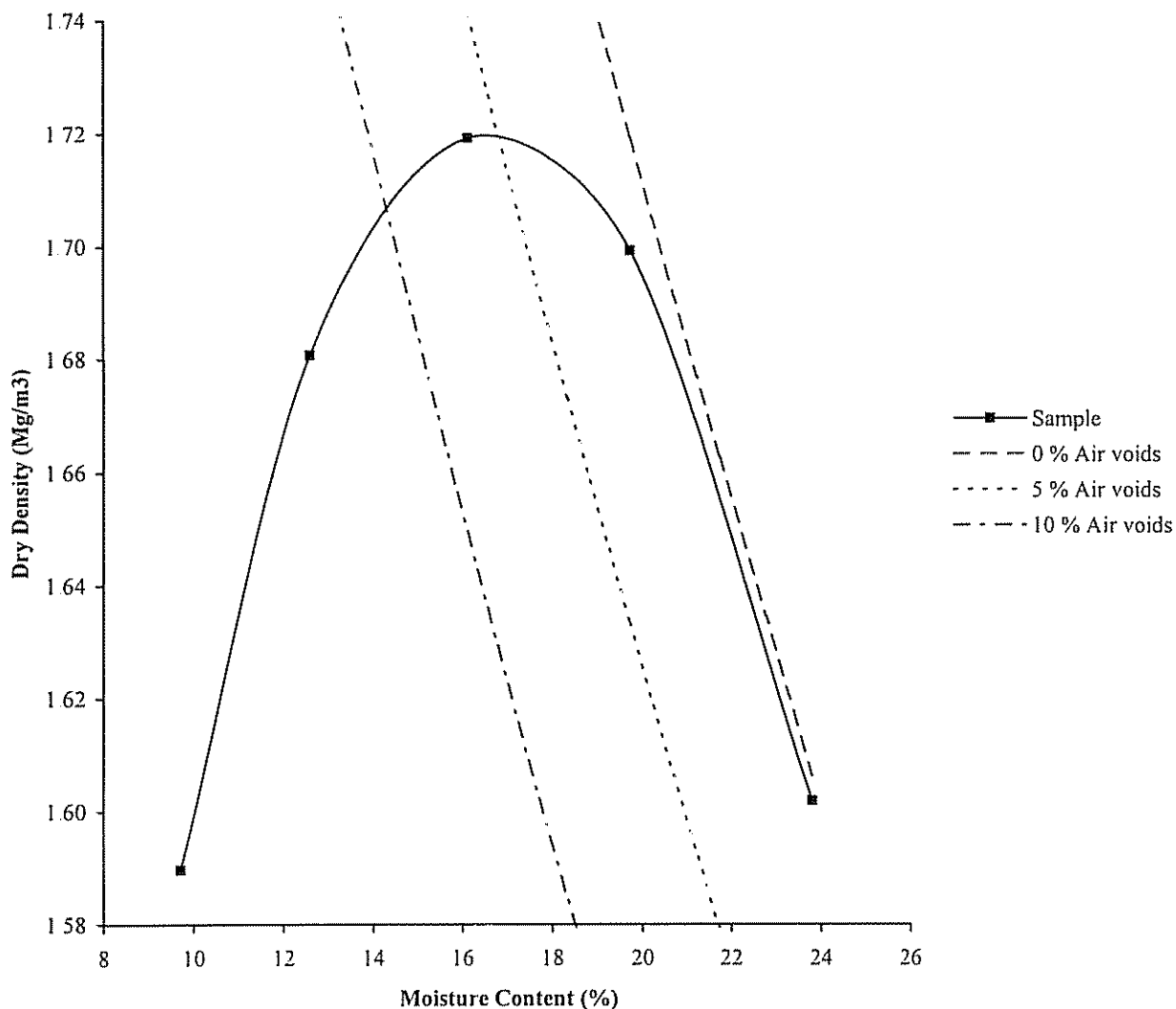
Page 1 of 1

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 1

Depth (m) : 1.00



| | | | | |
|-------------------------------|----------------------------------|----------------------|--|-----------------|
| Initial Moisture Content: | 28 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m3): | 2.60 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 3 |
| Maximum Dry Density (mg/m3): | | 1.72 | Material Retained on 20.0 mm Test Sieve (%): | 4 |
| Optimum Moisture Content (%): | | 17 | | |
| Remarks | See summary of soil descriptions | | | |

| Checked By | Date | Approved By | Date |
|------------|---------|-------------|---------|
| <i>RE</i> | 18/4/05 | <i>RE</i> | 18/4/05 |

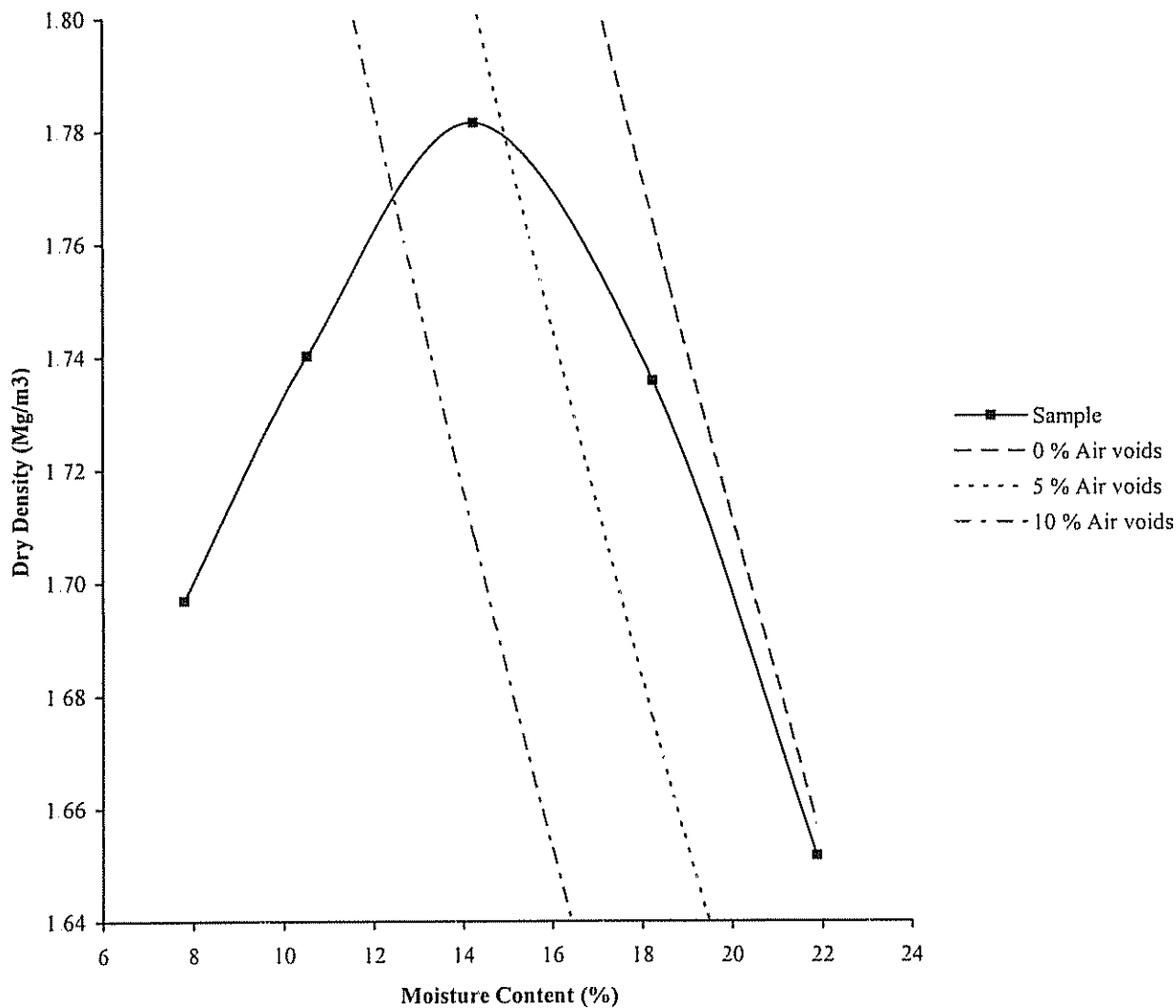
| | | |
|---|---------------------------------------|----------------------------|
| PSL Professional Soils Laboratory | BARROWFORD ROAD, NELSON LANCASHIRE | Contract No. PSL04/1649 |
|---|---------------------------------------|----------------------------|

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 1

Depth (m) : 2.10



| | | | | |
|-------------------------------|-----------------------------------|----------------------|--|-----------------|
| Initial Moisture Content: | 25 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m3): | 2.60 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 0 |
| Maximum Dry Density (mg/m3): | | 1.78 | Material Retained on 20.0 mm Test Sieve (%): | 2 |
| Optimum Moisture Content (%): | | 14 | | |
| Remarks | See summary of soil descriptions. | | | |

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/11/05 | <i>RL</i> | 18/11/05 |

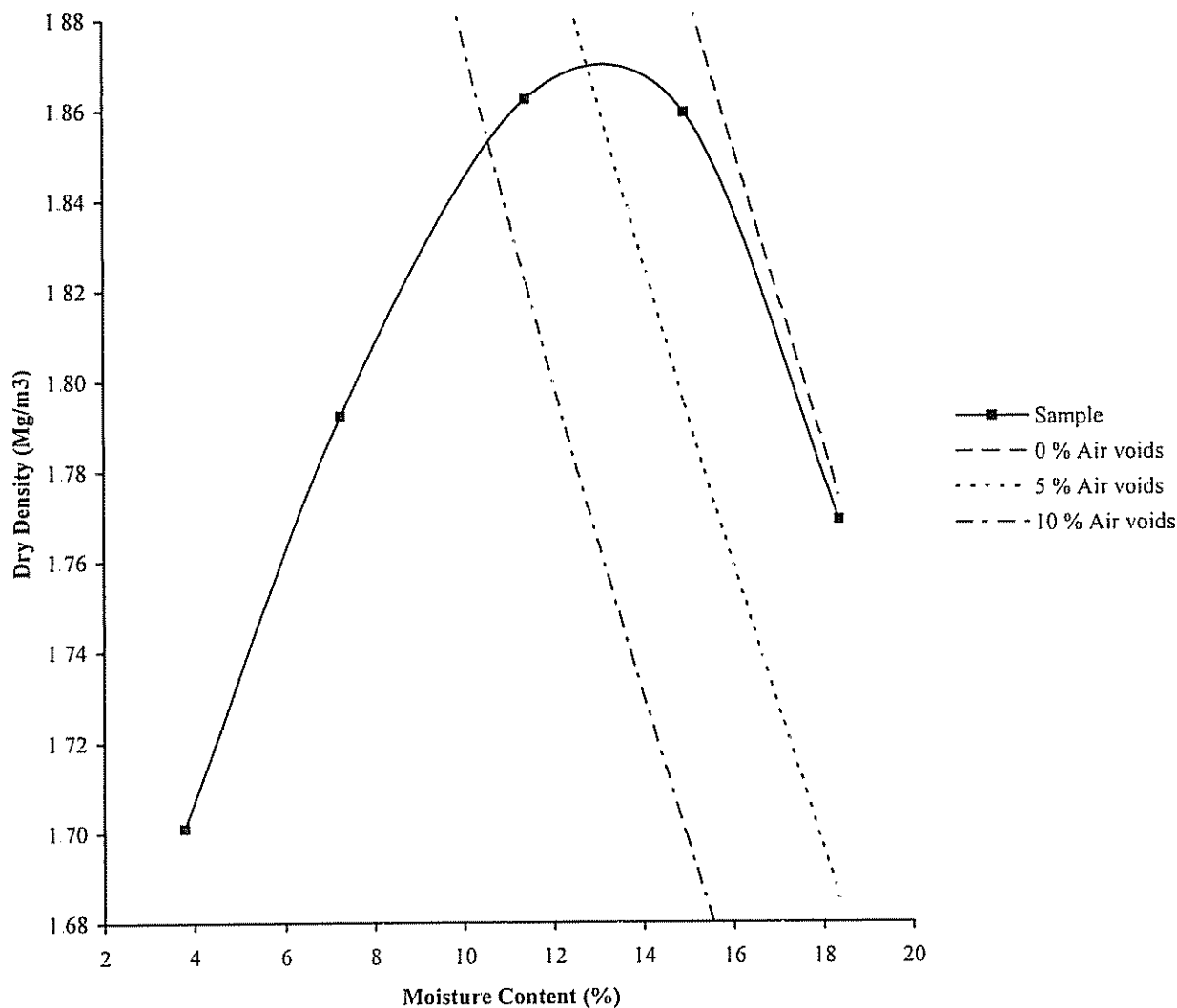
| | | |
|---|---------------------------------------|----------------------------|
| PSL Professional Soils Laboratory | BARROWFORD ROAD, NELSON LANCASHIRE | Contract No. PSL04/1649 |
|---|---------------------------------------|----------------------------|

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 4

Depth (m) : 1.00



| | | | | |
|-------------------------------|-----------------------------------|--|--|-----------------|
| Initial Moisture Content: | 23 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m³): | 2.63 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 0 |
| Maximum Dry Density (mg/m³): | 1.87 | Material Retained on 20.0 mm Test Sieve (%): | 3 | |
| Optimum Moisture Content (%): | 13 | | | |
| Remarks | See summary of soil descriptions. | | | |

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/10/05 | <i>RL</i> | 18/10/05 |

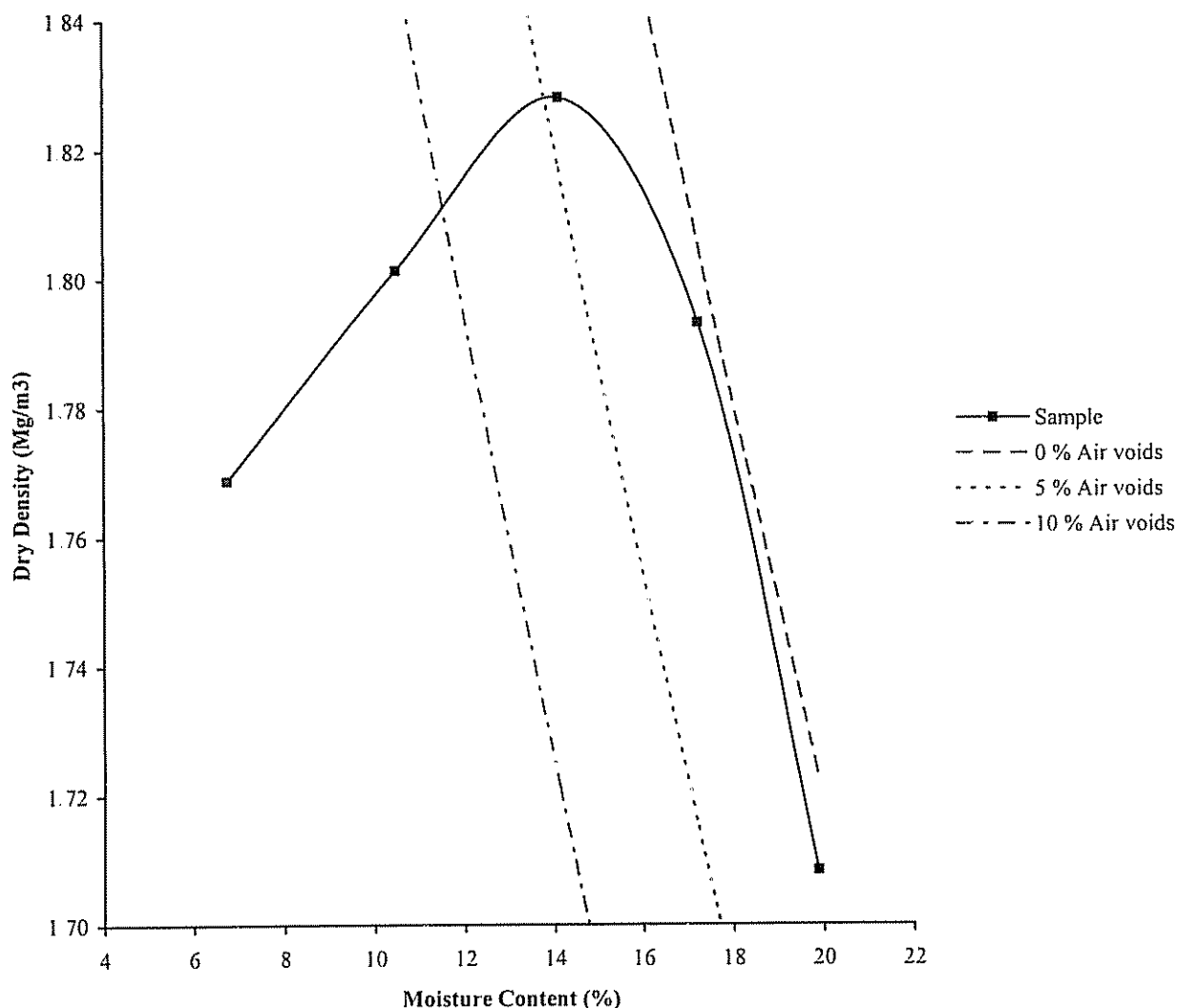
| | | |
|---|---------------------------------------|----------------------------|
| PSL Professional Soils Laboratory | BARROWFORD ROAD, NELSON LANCASHIRE | Contract No. PSL04/1649 |
|---|---------------------------------------|----------------------------|

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 5

Depth (m) : 1.40



| | | | | |
|-------------------------------|-----------------------------------|----------------------|--|-----------------|
| Initial Moisture Content: | 20 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m3): | 2.62 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 0 |
| Maximum Dry Density (mg/m3): | | 1.82 | Material Retained on 20.0 mm Test Sieve (%): | 0 |
| Optimum Moisture Content (%): | | 14 | | |
| Remarks | See summary of soil descriptions. | | | |

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/10/05 | <i>RL</i> | 18/10/05 |

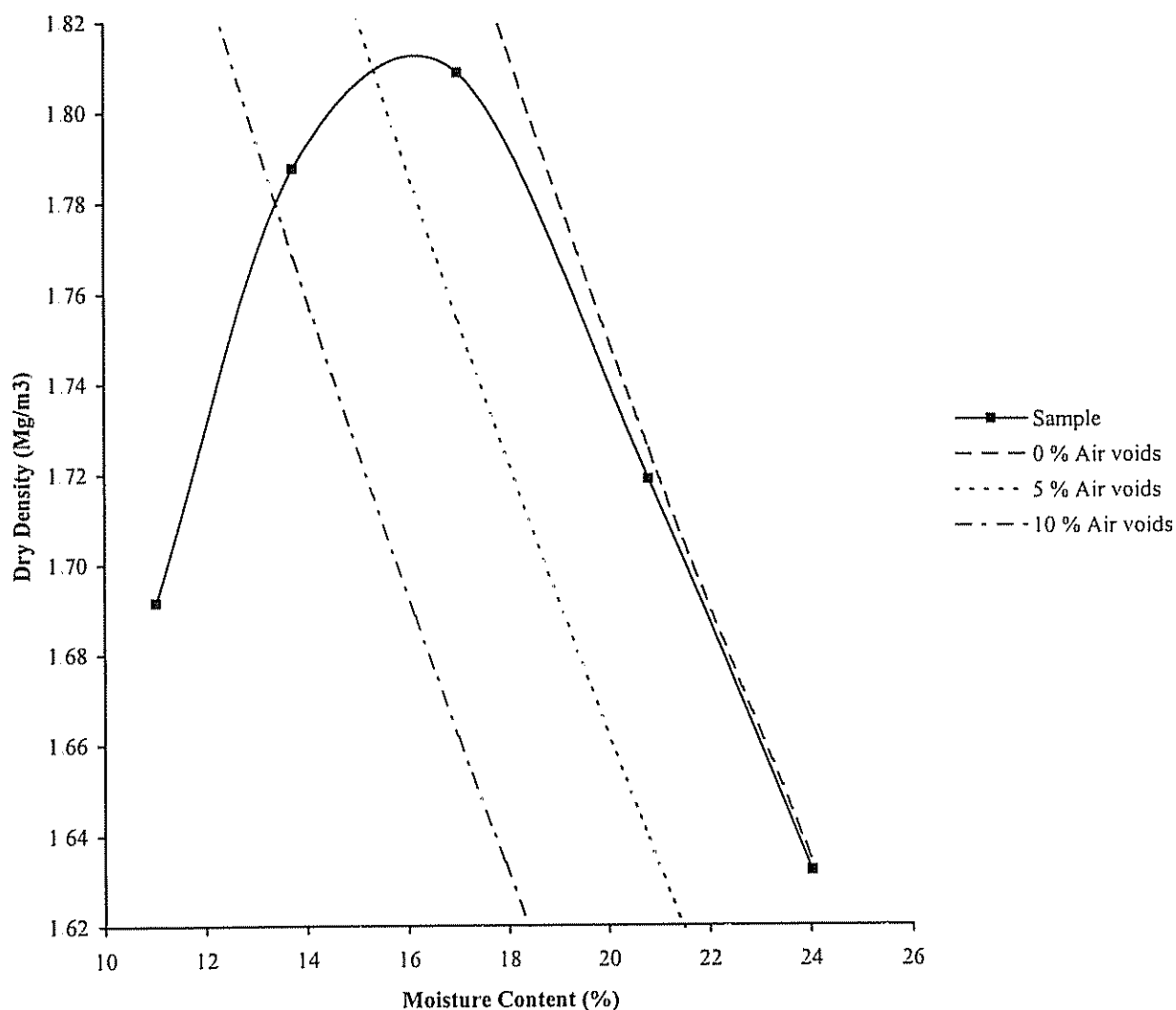
| | | |
|---|--|----------------------------|
| PSL Professional Soils Laboratory | BARROWFORD ROAD, NELSON LANCASHIRE. | Contract No. PSL05/1649 |
|---|--|----------------------------|

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 11

Depth (m) : 3.20



| | | | | |
|-------------------------------|----------------------------------|----------------------|--|-----------------|
| Initial Moisture Content: | 21 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m3): | 2.69 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 0 |
| Maximum Dry Density (mg/m3): | | 1.81 | Material Retained on 20.0 mm Test Sieve (%): | 4 |
| Optimum Moisture Content (%): | | 16 | | |
| Remarks | See summary of soil descriptions | | | |

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/10/05 | <i>RL</i> | 18/10/05 |

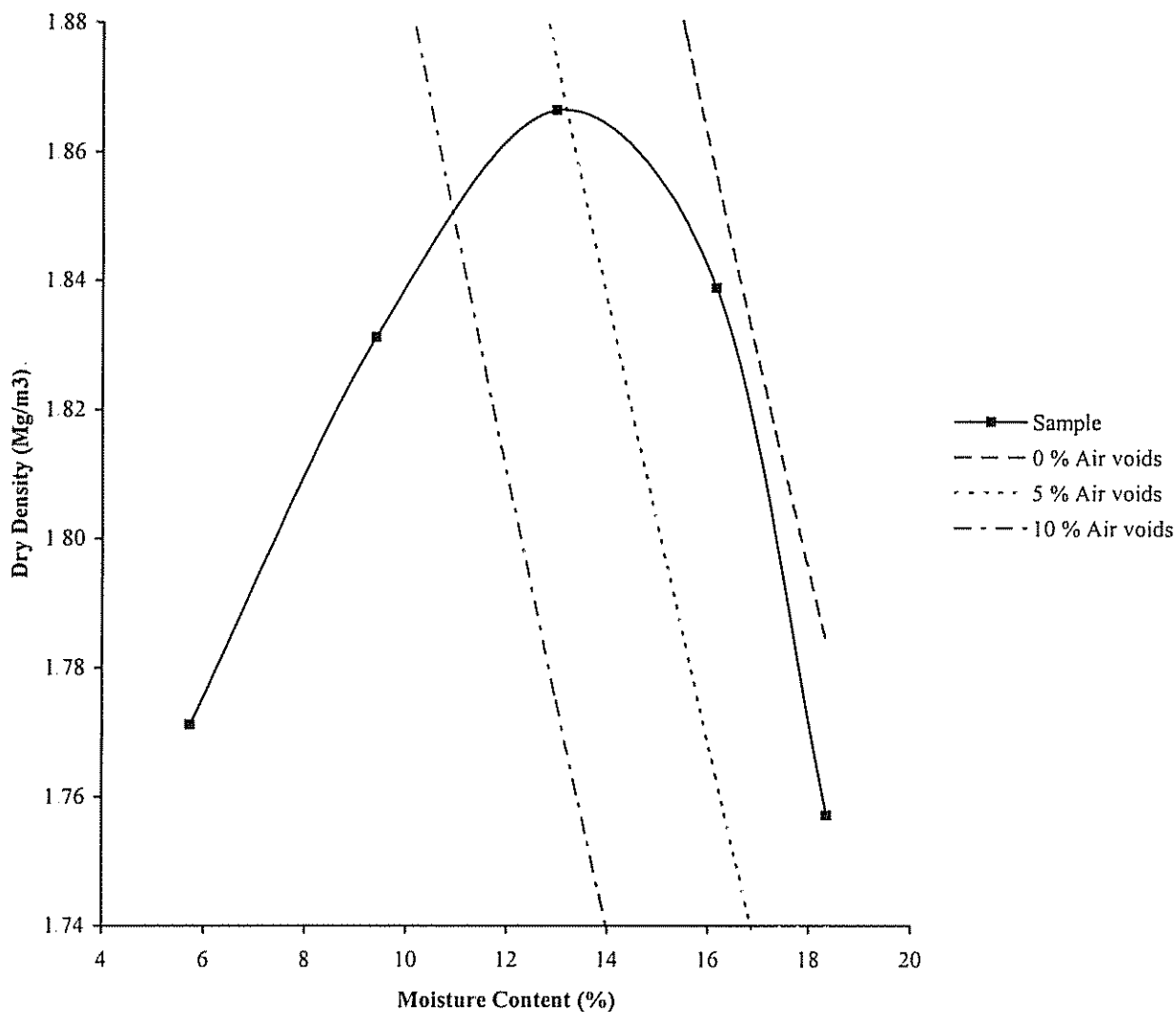
| | | |
|---|---------------------------------------|----------------------------|
| PSL Professional Soils Laboratory | BARROWFORD ROAD, NELSON LANCASHIRE | Contract No. PSL04/1649 |
|---|---------------------------------------|----------------------------|

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 16

Depth (m) : 1.30



| | | | | |
|-------------------------------|-----------------------------------|----------------------|--|-----------------|
| Initial Moisture Content: | 16 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m3): | 2.65 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 0 |
| Maximum Dry Density (mg/m3): | | 1.87 | Material Retained on 20.0 mm Test Sieve (%): | 4 |
| Optimum Moisture Content (%): | | 13 | | |
| Remarks | See summary of soil descriptions. | | | |

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/11/05 | <i>RL</i> | 18/11/05 |

PSL
Professional Soils Laboratory

BARROWFORD ROAD,
NELSON LANCASHIRE

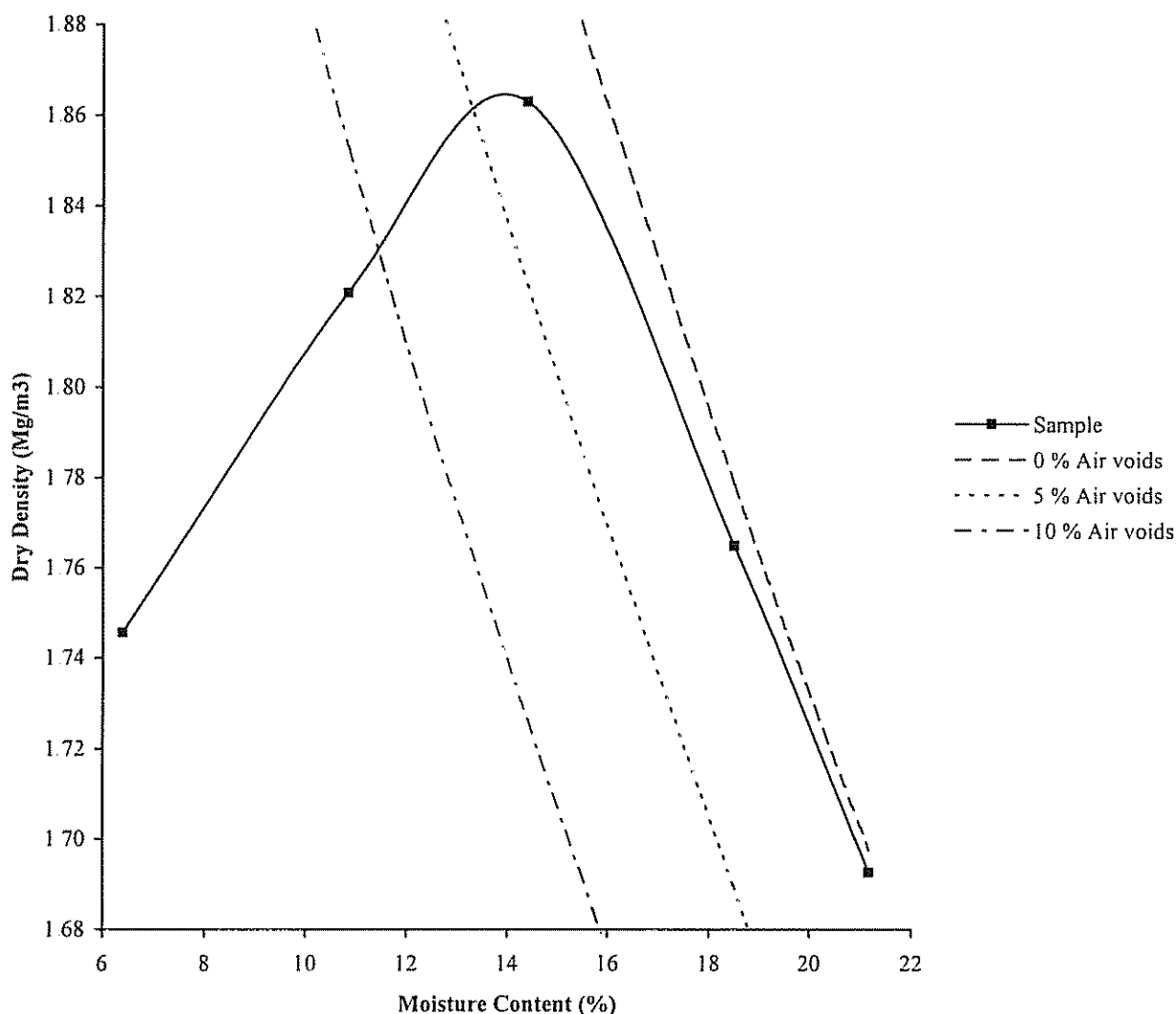
Contract No.
PSL04/1649

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Trial Pit /Sample Number : 18

Depth (m) : 2.00



| | | | | |
|-------------------------------|----------------------------------|----------------------|--|-----------------|
| Initial Moisture Content: | 21 | Method of Compaction | 2.5 Kg Rammer / | Separate Sample |
| Particle Density (Mg/m3): | 2.65 | Assumed | Material Retained on 37.5 mm Test Sieve (%): | 0 |
| Maximum Dry Density (mg/m3): | | 1.86 | Material Retained on 20.0 mm Test Sieve (%): | 5 |
| Optimum Moisture Content (%): | | 14 | | |
| Remarks | See summary of soil descriptions | | | |

| Checked By | Date | Approved By | Date |
|------------|----------|-------------|----------|
| <i>RL</i> | 18/10/05 | <i>RL</i> | 18/10/05 |



BARROWFORD ROAD,
NELSON LANCASHIRE

Contract No.
PSL04/1649

QUICK SHEARBOX TEST.

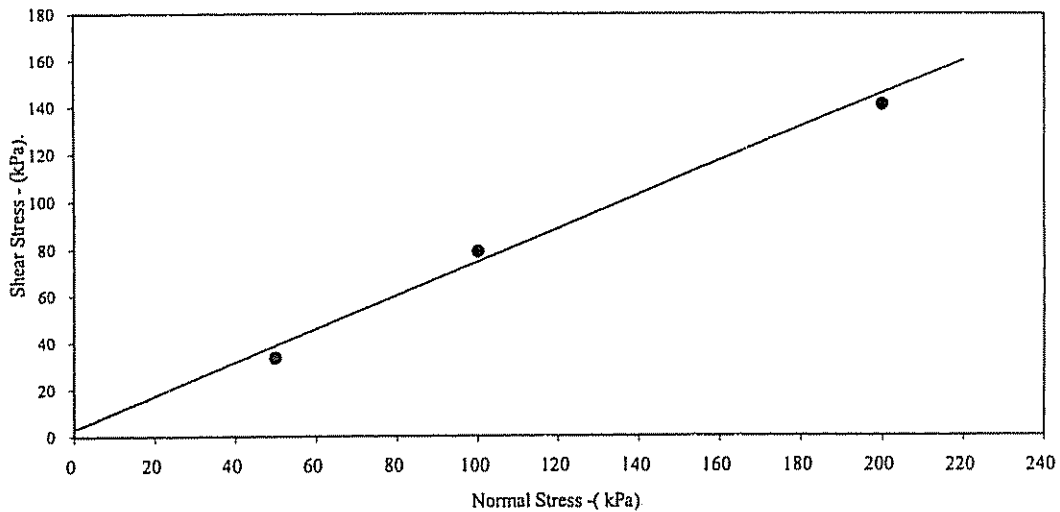
BS1377:Part 7::1990.

Borehole/Sample Number: TP17 Depth (m): 0.50

| | | | |
|---------------------------------|---|--------|--------|
| Sample Type: | Recompacted (by means of light tamping) | | |
| Particle Density - Mg/m3: | 2.65 (Assumed) | | |
| Specimen Tested: | Submerged | | |
| Sample Description: | | | |
| Grey sandy clayey SILT | | | |
| | 1 | 2 | 3 |
| Initial Conditions | | | |
| Height - mm: | 25.00 | 25.00 | 25.00 |
| Length - mm: | 60.00 | 60.00 | 60.00 |
| Moisture Content - %: | 28 | 28 | 28 |
| Bulk Density - Mg/m3: | 1.87 | 1.86 | 1.87 |
| Dry Density - Mg/m3: | 1.46 | 1.45 | 1.45 |
| Voids Ratio: | 0.8198 | 0.8245 | 0.8220 |
| Normal Pressure- kPa | 50 | 100 | 200 |
| Consolidation | | | |
| Consolidated Height - mm: | 24.96 | 24.22 | 23.62 |
| Shear | | | |
| Rate of Strain (mm/min) | 0.250 | 0.250 | 0.250 |
| Strain at peak shear stress (%) | 11.70 | 6.25 | 12.68 |
| Peak shear Stress - kPa: | 33 | 79 | 141 |

| | |
|---|------|
| PEAK | |
| Angle of Shearing Resistance:(θ) | 35.5 |
| Cohesion - kPa: | 0 |

FAILURE CONDITIONS



Checked by *AWD* Date *21/11/05*

Approved by *AWD* Date *21/11/05*



Barrowford Road, Nelson Lancashire

Contract No :
GEO/1490/05

Client Ref Number:
PSL05/1649

Figure
Bynca, Llanelli, SA14 9SU.

QUICK SHEARBOX TEST.

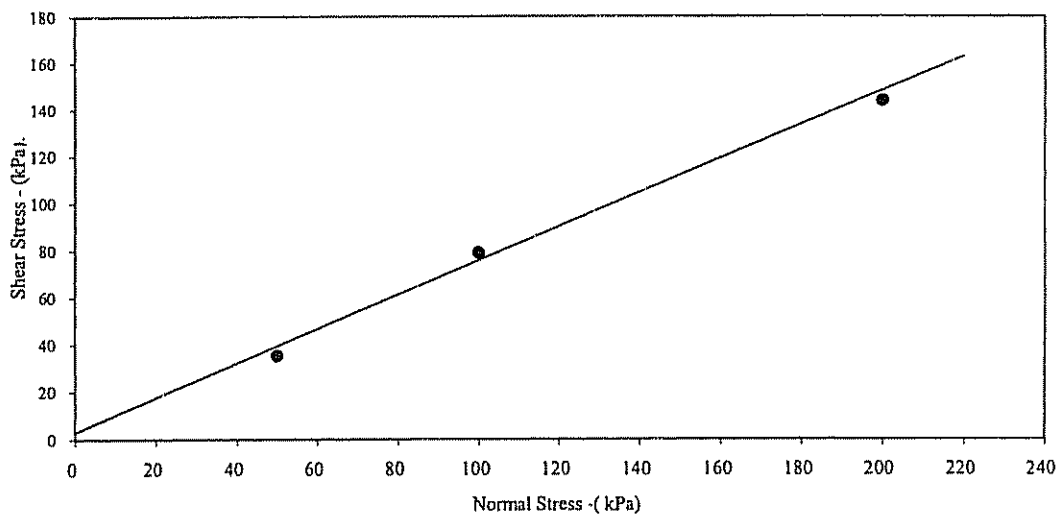
BS1377:Part 7::1990

Borehole/Sample Number: TP15 Depth (m): 2.00

| | | | |
|---------------------------------|---|--------|--------|
| Sample Type: | Recompacted (by means of light tamping) | | |
| Particle Density - Mg/m3: | 2.65 (Assumed) | | |
| Specimen Tested: | Submerged | | |
| Sample Description: | | | |
| Grey sandy clayey SILT | | | |
| | 1 | 2 | 3 |
| Initial Conditions | | | |
| Height - mm: | 25.00 | 25.00 | 25.00 |
| Length - mm: | 60.00 | 60.00 | 60.00 |
| Moisture Content - %: | 33 | 33 | 33 |
| Bulk Density - Mg/m3: | 1.90 | 1.91 | 1.91 |
| Dry Density - Mg/m3: | 1.43 | 1.43 | 1.43 |
| Voids Ratio: | 0.8588 | 0.8491 | 0.8468 |
| Normal Pressure- kPa | 50 | 100 | 200 |
| Consolidation | | | |
| Consolidated Height - mm: | 23.94 | 23.36 | 22.87 |
| Shear | | | |
| Rate of Strain (mm/min) | 0.250 | 0.250 | 0.250 |
| Strain at peak shear stress (%) | 14.11 | 6.25 | 6.36 |
| Peak shear Stress - kPa: | 35 | 79 | 144 |

| | |
|---|------|
| PEAK | |
| Angle of Shearing Resistance:(θ) | 36.0 |
| Cohesion - kPa: | 3 |

FAILURE CONDITIONS



● Peak shear Stress - kPa: — Best Fit Line

Checked by *M. Walker* Date *21/11/05*

Approved by *M. Walker* Date *21/11/05*



Barrowford Road, Nelson Lancashire

Contract No :
GEO/1490/05

Client Ref Number:
PSL05/1649

Figure:
Bynea, Llandili, SA14 9SU

QUICK SHEARBOX TEST.

BS1377:Part 7::1990

Borehole/Sample Number:

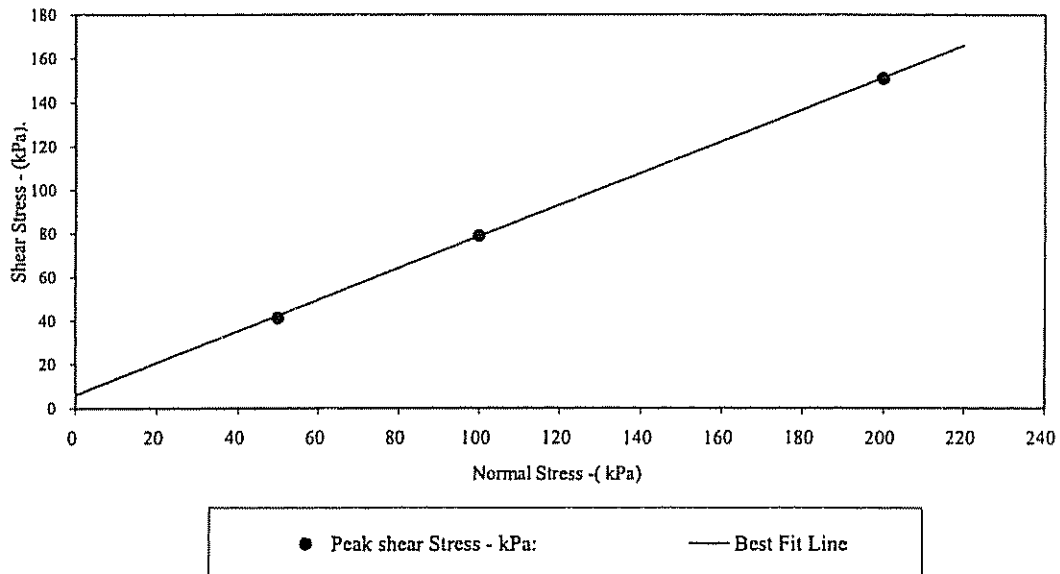
IP14

Depth (m):

1.50

| | | | |
|---|---|--------|--------|
| Sample Type: | Recompacted (by means of light tamping) | | |
| Particle Density - Mg/m3: | 2.65 (Assumed) | | |
| Specimen Tested: | Submerged | | |
| Sample Description: | | | |
| Grey sandy clayey SILT | | | |
| | 1 | 2 | 3 |
| Initial Conditions | | | |
| Height - mm: | 25.00 | 25.00 | 25.00 |
| Length - mm: | 60.00 | 60.00 | 60.00 |
| Moisture Content - %: | 22 | 22 | 22 |
| Bulk Density - Mg/m3: | 1.89 | 1.89 | 1.90 |
| Dry Density - Mg/m3: | 1.55 | 1.55 | 1.56 |
| Voids Ratio: | 0.7104 | 0.7083 | 0.7006 |
| Normal Pressure- kPa | 50 | 100 | 200 |
| Consolidation | | | |
| Consolidated Height - mm: | 24.71 | 23.91 | 23.80 |
| Shear | | | |
| Rate of Strain (mm/min) | 0.250 | 0.250 | 0.250 |
| Strain at peak shear stress (%) | 6.84 | 6.25 | 6.17 |
| Peak shear Stress - kPa: | 41 | 79 | 151 |
| PEAK | | | |
| Angle of Shearing Resistance:(θ) | 36.0 | | |
| Cohesion - kPa: | 6 | | |

FAILURE CONDITIONS



Checked by *[Signature]* Date 21/11/05

Approved by *[Signature]* Date 21/11/05



Barrowford Road, Nelson Lancashire

Contract No.:
GEO/1490/05

Client Ref Number:
PSL05/1649

Figure.
Bynea, Llanelli, SA14 9SU