

## Appendix A3 – Soakaway Results

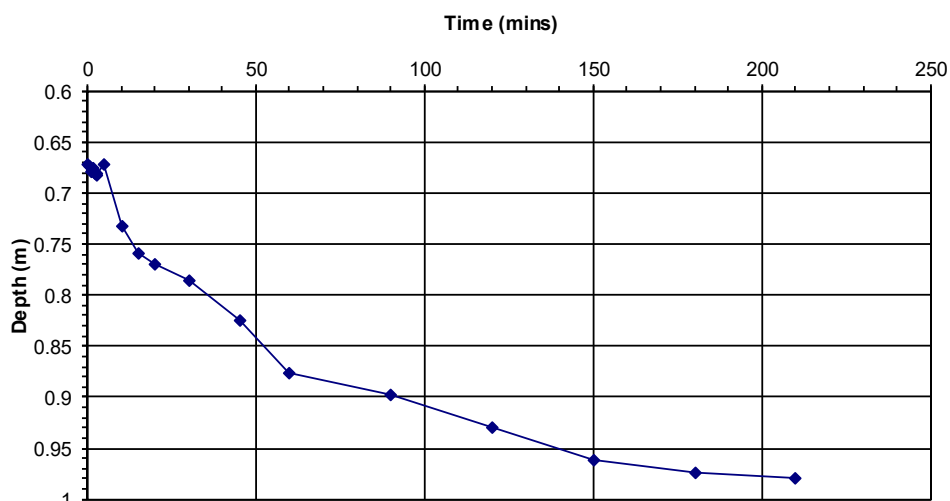
**CALCULATION OF INFILTRATION RATE IN ACCORDANCE WITH BRE DG 365: 2016**

|                |                                                                         |                 |       |
|----------------|-------------------------------------------------------------------------|-----------------|-------|
| <b>Client:</b> | Curtins                                                                 |                 |       |
| <b>Site:</b>   | University of Reading, St Patricks Hall Redevelopment, Reading, RG2 7HB |                 |       |
| <b>Job No:</b> | 52527                                                                   | <b>Test No:</b> | TP1   |
| <b>Date</b>    | 16/08/2016                                                              | <b>Weather:</b> | Sunny |

**INPUT DATA AND CALCULATION**

| Time (min) | Depth (m) |                                                                 | Length (m) = | 1.35                    |
|------------|-----------|-----------------------------------------------------------------|--------------|-------------------------|
| 0          | 0.671     | <b>Size of Trial Pit</b>                                        | Width (m) =  | 0.51                    |
| 0.5        | 0.674     |                                                                 | Depth (m) =  | 2.41                    |
| 1          | 0.678     |                                                                 |              |                         |
| 1.5        | 0.676     | <b>Depth to water at start of test (m) =</b>                    |              | 0.67                    |
| 2          | 0.681     | <b>Depth to water at end of test (m) =</b>                      |              | 0.98                    |
| 2.5        | 0.681     | <b>Depth to water at 75% level (m) =</b>                        |              | 0.75                    |
| 3          | 0.682     | <b>Depth to water at 50% level (m) =</b>                        |              | 0.83                    |
| 5          | 0.671     | <b>Depth to water at 25% level (m) =</b>                        |              | 0.90                    |
| 10         | 0.732     |                                                                 |              |                         |
| 15         | 0.758     | <b>Base area of pit (m<sup>2</sup>) =</b>                       |              | 0.69                    |
| 20         | 0.77      | <b>Effective area of loss a<sub>s50</sub> (m<sup>2</sup>) =</b> |              | 3.92                    |
| 30         | 0.786     | <b>V<sub>P75</sub> - V<sub>P25</sub> (m<sup>3</sup>) =</b>      |              | 0.11                    |
| 45         | 0.824     |                                                                 |              |                         |
| 60         | 0.876     |                                                                 |              |                         |
| 90         | 0.897     |                                                                 |              |                         |
| 120        | 0.929     |                                                                 |              |                         |
| 150        | 0.962     |                                                                 |              |                         |
| 180        | 0.973     |                                                                 |              |                         |
| 210        | 0.98      |                                                                 |              |                         |
|            |           | <b>Soil infiltration rate, f, (m/s) =</b>                       |              | 5.25E-06 normal test    |
|            |           |                                                                 |              | 1.58E-06 pit with stone |
|            |           | <b>Tested by:</b>                                               | FA           | <b>Date:</b> 16/08/2016 |
|            |           | <b>Checked by:</b>                                              | EM           | <b>Date:</b> 30/09/2016 |

| From the graph:                |     |
|--------------------------------|-----|
| <b>t<sub>p75</sub> (min) =</b> | 14  |
| <b>t<sub>p25</sub> (min) =</b> | 100 |



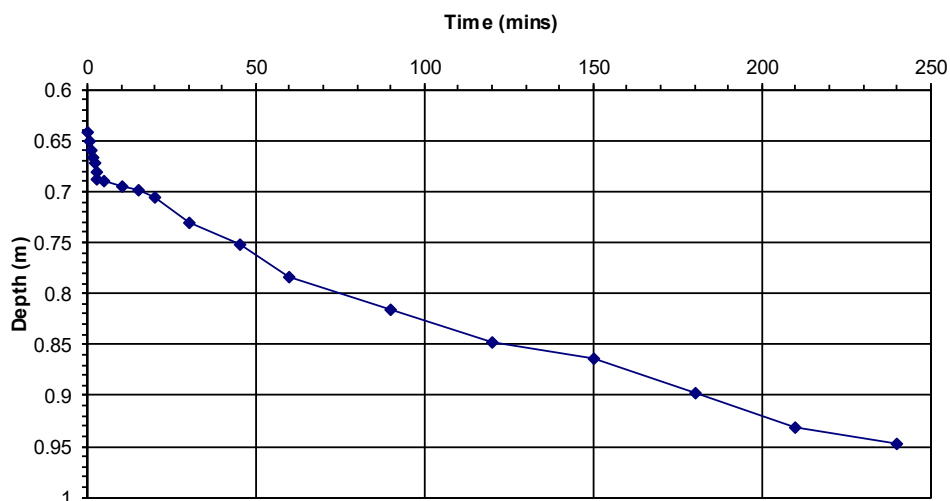
**CALCULATION OF INFILTRATION RATE IN ACCORDANCE WITH BRE DG 365: 2016**

|                |                                                                         |                 |       |
|----------------|-------------------------------------------------------------------------|-----------------|-------|
| <b>Client:</b> | Curtins                                                                 |                 |       |
| <b>Site:</b>   | University of Reading, St Patricks Hall Redevelopment, Reading, RG2 7HB |                 |       |
| <b>Job No:</b> | 52527                                                                   | <b>Test No:</b> | TP2   |
| <b>Date</b>    | 16/08/2016                                                              | <b>Weather:</b> | Sunny |

**INPUT DATA AND CALCULATION**

| Time (min) | Depth (m) |                                                                      | Length (m) = | 1.41                           |
|------------|-----------|----------------------------------------------------------------------|--------------|--------------------------------|
| 0          | 0.641     | <b>Size of Trial Pit</b>                                             | Width (m) =  | 0.53                           |
| 0.5        | 0.651     |                                                                      | Depth (m) =  | 2.37                           |
| 1          | 0.66      |                                                                      |              |                                |
| 1.5        | 0.667     | <b>Depth to water at start of test (m) =</b>                         |              | 0.64                           |
| 2          | 0.672     | <b>Depth to water at end of test (m) =</b>                           |              | 0.95                           |
| 2.5        | 0.681     | <b>Depth to water at 75% level (m) =</b>                             |              | 0.72                           |
| 3          | 0.688     | <b>Depth to water at 50% level (m) =</b>                             |              | 0.79                           |
| 5          | 0.689     | <b>Depth to water at 25% level (m) =</b>                             |              | 0.87                           |
| 10         | 0.694     |                                                                      |              |                                |
| 15         | 0.699     | <b>Base area of pit (m<sup>2</sup>) =</b>                            |              | 0.75                           |
| 20         | 0.705     | <b>Effective area of loss <math>a_{s50}</math> (m<sup>2</sup>) =</b> |              | 4.10                           |
| 30         | 0.731     | <b><math>V_{P75} - V_{P25}</math> (m<sup>3</sup>) =</b>              |              | 0.11                           |
| 45         | 0.752     |                                                                      |              |                                |
| 60         | 0.784     |                                                                      |              |                                |
| 90         | 0.816     |                                                                      |              |                                |
| 120        | 0.848     |                                                                      |              |                                |
| 150        | 0.863     |                                                                      |              |                                |
| 180        | 0.898     |                                                                      |              |                                |
| 210        | 0.931     |                                                                      |              |                                |
| 240        | 0.948     |                                                                      |              |                                |
|            |           | <b>Soil infiltration rate, <math>f</math>, (m/s) =</b>               |              | <b>3.61E-06 normal test</b>    |
|            |           |                                                                      |              | <b>1.08E-06 pit with stone</b> |
|            |           | <b>Tested by:</b>                                                    | FA           | <b>Date:</b> 16/08/2016        |
|            |           | <b>Checked by:</b>                                                   | EM           | <b>Date:</b> 30/09/2016        |

| From the graph:   |     |
|-------------------|-----|
| $t_{p75}$ (min) = | 26  |
| $t_{p25}$ (min) = | 155 |



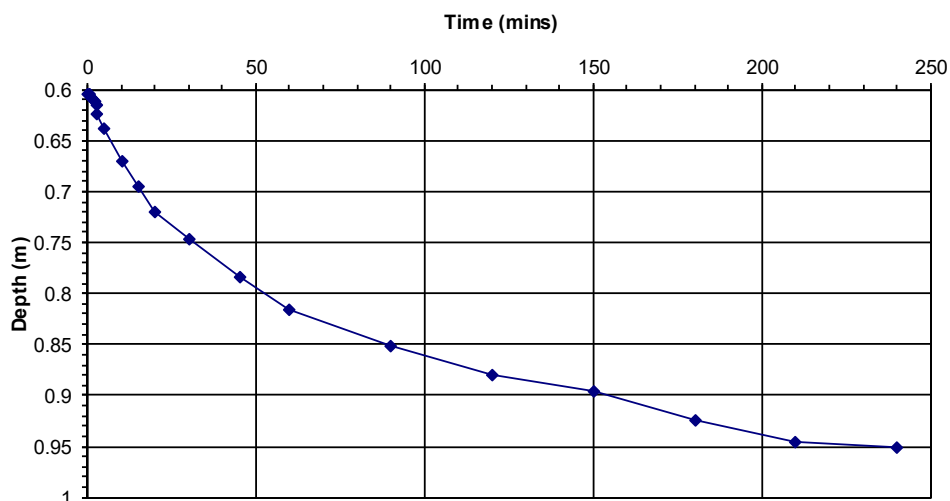
**CALCULATION OF INFILTRATION RATE IN ACCORDANCE WITH BRE DG 365: 2016**

|                |                                                                          |                 |       |
|----------------|--------------------------------------------------------------------------|-----------------|-------|
| <b>Client:</b> | Curtins                                                                  |                 |       |
| <b>Site:</b>   | University of Reading, St. Patricks Hall Redevelopment, Reading, RG2 7HB |                 |       |
| <b>Job No:</b> | 52527                                                                    | <b>Test No:</b> | TP3   |
| <b>Date</b>    | 22.08.2016                                                               | <b>Weather:</b> | Sunny |

**INPUT DATA AND CALCULATION**

| Time (min) | Depth (m) | Size of Trial Pit                                           | Length (m) = | 1.93                    |
|------------|-----------|-------------------------------------------------------------|--------------|-------------------------|
| 0          | 0.604     |                                                             | Width (m) =  | 0.50                    |
| 0.5        | 0.604     |                                                             | Depth (m) =  | 2.19                    |
| 1          | 0.608     |                                                             |              |                         |
| 1.5        | 0.61      | Depth to water at start of test (m) =                       |              | 0.60                    |
| 2          | 0.611     | Depth to water at end of test (m) =                         |              | 0.95                    |
| 2.5        | 0.615     | Depth to water at 75% level (m) =                           |              | 0.69                    |
| 3          | 0.623     | Depth to water at 50% level (m) =                           |              | 0.78                    |
| 5          | 0.638     | Depth to water at 25% level (m) =                           |              | 0.86                    |
| 10         | 0.669     |                                                             |              |                         |
| 15         | 0.695     | Base area of pit (m <sup>2</sup> ) =                        |              | 0.97                    |
| 20         | 0.719     | Effective area of loss a <sub>s50</sub> (m <sup>2</sup> ) = |              | 4.82                    |
| 30         | 0.746     | V <sub>P75</sub> - V <sub>P25</sub> (m <sup>3</sup> ) =     |              | 0.17                    |
| 45         | 0.783     |                                                             |              |                         |
| 60         | 0.816     |                                                             |              |                         |
| 90         | 0.851     | From the graph:                                             |              |                         |
| 120        | 0.879     | t <sub>p75</sub> (min) =                                    |              | 14                      |
| 150        | 0.896     | t <sub>p25</sub> (min) =                                    |              | 100                     |
| 180        | 0.924     |                                                             |              |                         |
| 210        | 0.946     |                                                             |              |                         |
| 240        | 0.951     | Soil infiltration rate, f, (m/s) =                          |              | 6.73E-06 normal test    |
|            |           |                                                             |              | 2.02E-06 pit with stone |
|            |           | Tested by:                                                  | FA           | Date: 16.08.2016        |
|            |           | Checked by:                                                 |              | Date:                   |

| From the graph:   |     |
|-------------------|-----|
| $t_{p75}$ (min) = | 14  |
| $t_{p25}$ (min) = | 100 |



## Appendix A4 – Geotechnical Laboratory Test Results

## APPENDIX 3

### GENERAL NOTES ON LABORATORY TESTS ON SOILS

#### A3.1 GENERAL

- A3.1.1 Where applicable all tests are carried out in accordance with the relevant British Standard. The laboratory test procedures are given in the laboratory test reports.
- A3.1.2 Any discussion in this report is based on the values and results obtained from the appropriate tests. Due allowance should be made, when considering any result in isolation, of the possible inaccuracy of any such individual result. Details of the accuracy of results are included in this section, where applicable.

#### A3.2 SOIL CLASSIFICATION

- A3.2.1 Classification of soils is usually undertaken by means of the Plasticity Classification Chart, sometimes called the A-Line Chart. This is graphical plot of PI against LL with the A-Line defined as  $PI = 0.73(LL - 20)$ .
- A3.2.2 This line is defined from experimental evidence and does not represent a well-defined boundary between soil types, but forms a useful reference datum. When the values of LL and PI for inorganic clays are plotted on the chart they generally lie just above the A-Line in a narrow band parallel to it, while silts and organic clays plot below this line.
- A3.2.3 Clays and silts are divided into five zones of plasticity:

|                               |                      |
|-------------------------------|----------------------|
| Low Plasticity (L)            | LL less than 35      |
| Intermediate Plasticity (I)   | LL between 35 and 50 |
| High Plasticity (H)           | LL between 50 and 70 |
| Very High Plasticity (V)      | LL between 70 and 90 |
| Extremely High Plasticity (E) | LL greater than 90   |

- A3.2.4 In general, clays of high plasticity are likely to have a lower permeability, are more compressible and consolidate over a longer period of time under load than clays of low plasticity. Clays of high plasticity are more difficult to compact as fill material.

|                                                                                                                                |        | <b>Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results</b>                           |      |      |                                                                                                       |                                                                                                                                                              |                       |                   |            |         |                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|------------|---------|-------------------------------------------------------------------------|
| Job No.<br>21488                                                                                                                                                                                               |        | Project Name<br>University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |      |      |                                                                                                       |                                                                                                                                                              |                       | Programme         |            |         |                                                                         |
|                                                                                                                                                                                                                |        |                                                                                                              |      |      |                                                                                                       |                                                                                                                                                              |                       | Samples received  | 26/08/2016 |         |                                                                         |
|                                                                                                                                                                                                                |        |                                                                                                              |      |      |                                                                                                       |                                                                                                                                                              |                       | Schedule received | 26/08/2016 |         |                                                                         |
| Project No.<br>52527                                                                                                                                                                                           |        | Client<br>Ian Farmer Associates                                                                              |      |      |                                                                                                       |                                                                                                                                                              |                       | Project started   | 26/08/2016 |         |                                                                         |
|                                                                                                                                                                                                                |        |                                                                                                              |      |      |                                                                                                       |                                                                                                                                                              |                       | Testing Started   | 15/09/2016 |         |                                                                         |
| Hole No.                                                                                                                                                                                                       | Sample |                                                                                                              |      |      | Soil Description                                                                                      | NMC<br>%                                                                                                                                                     | Passing<br>425µm<br>% | LL<br>%           | PL<br>%    | PI<br>% | Remarks                                                                 |
|                                                                                                                                                                                                                | Ref    | Top                                                                                                          | Base | Type |                                                                                                       |                                                                                                                                                              |                       |                   |            |         |                                                                         |
| BH1                                                                                                                                                                                                            | 1      | 0.60                                                                                                         | -    | B    | Brown sandy CLAY with rare fm sub-angular gravel                                                      | 21                                                                                                                                                           | 80                    | 40                | 18         | 22      |                                                                         |
| BH1                                                                                                                                                                                                            | 4      | 4.30                                                                                                         | -    | B    | Brown slightly sandy CLAY with rare fm sub-angular gravel                                             | 30                                                                                                                                                           | 95                    | 75                | 29         | 46      |                                                                         |
| BH2                                                                                                                                                                                                            | 1      | 5.00                                                                                                         | -    | U    | High strength fissured dark grey silty CLAY                                                           | 28                                                                                                                                                           | 100                   | 70                | 23         | 47      |                                                                         |
| BH3                                                                                                                                                                                                            | 1      | 6.50                                                                                                         | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                        | 26                                                                                                                                                           | 100                   | 70                | 23         | 47      |                                                                         |
| BH4                                                                                                                                                                                                            | 2      | 1.20                                                                                                         | -    | B    | Brown, reddish brown and grey slightly sandy gravelly CLAY (gravel is fmc and sub-angular to angular) | 16                                                                                                                                                           | 60                    | 38                | 13         | 25      |                                                                         |
| BH4                                                                                                                                                                                                            | 1      | 4.40                                                                                                         | -    | D    | Brown CLAY with rare fm sub-angular gravel and occasional sandy patches                               | 34                                                                                                                                                           | 98                    | 79                | 32         | 47      |                                                                         |
| BH5                                                                                                                                                                                                            | 1      | 7.00                                                                                                         | -    | U    | High strength fissured dark grey silty CLAY                                                           | 27                                                                                                                                                           | 100                   | 75                | 23         | 52      |                                                                         |
| BH7                                                                                                                                                                                                            | 3      | 2.25                                                                                                         | -    | B    | Brown sandy silty CLAY                                                                                | 27                                                                                                                                                           | 100                   | 40                | 20         | 20      |                                                                         |
| BH7                                                                                                                                                                                                            | 6      | 5.50                                                                                                         | -    | B    | Brown CLAY with occasional sandy patches                                                              | 30                                                                                                                                                           | 100                   | 67                | 28         | 39      |                                                                         |
| WS7                                                                                                                                                                                                            | 2      | 1.00                                                                                                         | -    | D    | Dark brown, orange brown and pale grey slightly sandy CLAY                                            | 32                                                                                                                                                           | 100                   | 67                | 26         | 41      |                                                                         |
| WS8                                                                                                                                                                                                            | 9      | 3.50                                                                                                         | -    | D    | Brown CLAY with orange brown sandy patches                                                            | 30                                                                                                                                                           | 100                   | 67                | 29         | 38      |                                                                         |
| WS9                                                                                                                                                                                                            | 4      | 1.20                                                                                                         | -    | D    | Brown, orange brown and pale grey slightly sandy silty CLAY                                           | 19                                                                                                                                                           | 99                    | 52                | 21         | 31      |                                                                         |
|  <b>Test Methods: BS1377: Part 2: 1990:</b><br>Natural Moisture Content : clause 3.2<br>Atterberg Limits: clause 4.3 and 5.0 |        |                                                                                                              |      |      |                                                                                                       | <b>Test Report by K4 SOILS LABORATORY</b><br>Unit 8 Olds Close Olds Approach<br>Watford Herts WD18 9RU<br><br>Tel: 01923 711 288<br>Email: James@k4soils.com |                       |                   |            |         | <b>Checked and Approved</b><br><br>Initials J.P<br><br>Date: 20/09/2016 |
| 2519                                                                                                                                                                                                           |        |                                                                                                              |      |      |                                                                                                       | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                                                                                 |                       |                   |            |         | MSF-5-R1                                                                |

Figure A3.1

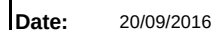
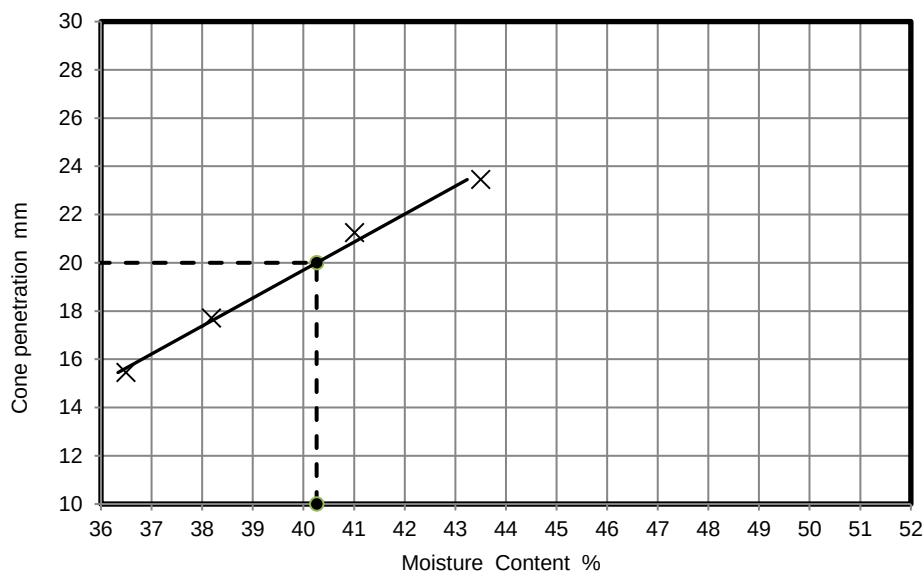
[illegible]

Figure A3.1

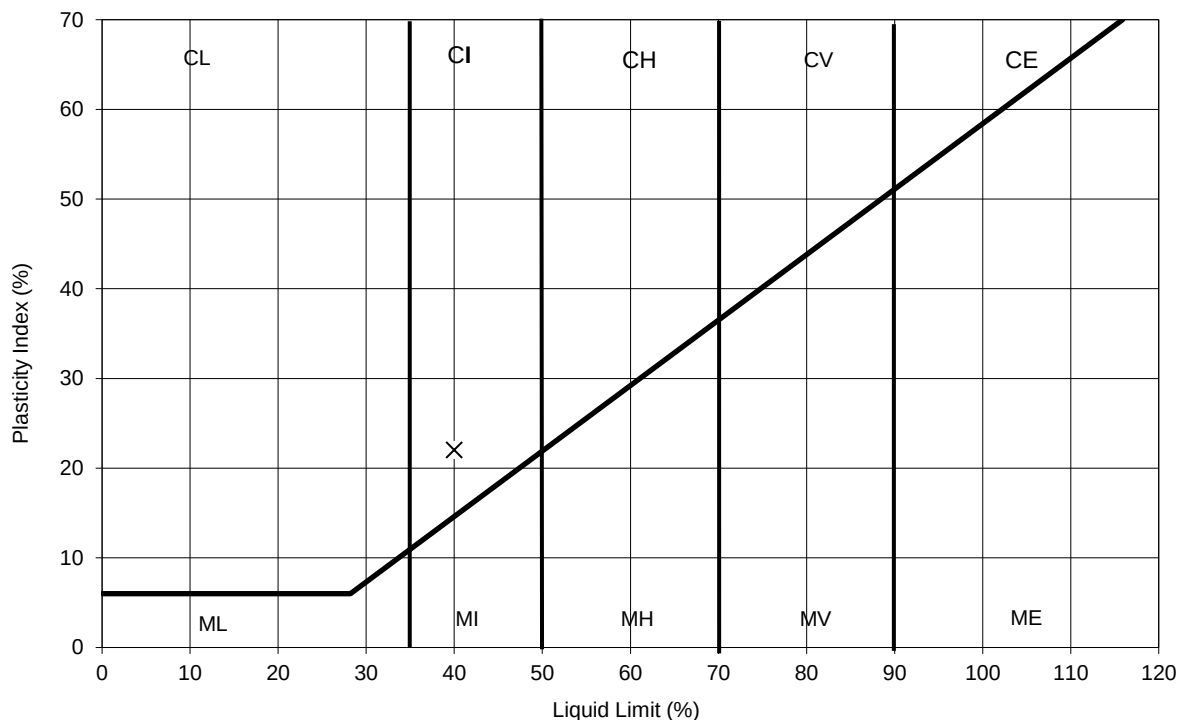
|                                                                                   |                                                                                              |        |                       |                    |            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        | Job No.               | 21488              |            |
|                                                                                   |                                                                                              |        | Borehole/Pit No.      | BH1                |            |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        | Sample No.            | 1                  |            |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 0.60 m     |
| Soil Description                                                                  | Brown sandy CLAY with rare fm sub-angular gravel                                             |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | B          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |    |   |
|--------------------------|----|---|
| NATURAL MOISTURE CONTENT | 21 | % |
| % PASSING 425µm SIEVE    | 80 | % |
| LIQUID LIMIT             | 40 | % |
| PLASTIC LIMIT            | 18 | % |
| PLASTICITY INDEX         | 22 | % |

Remarks

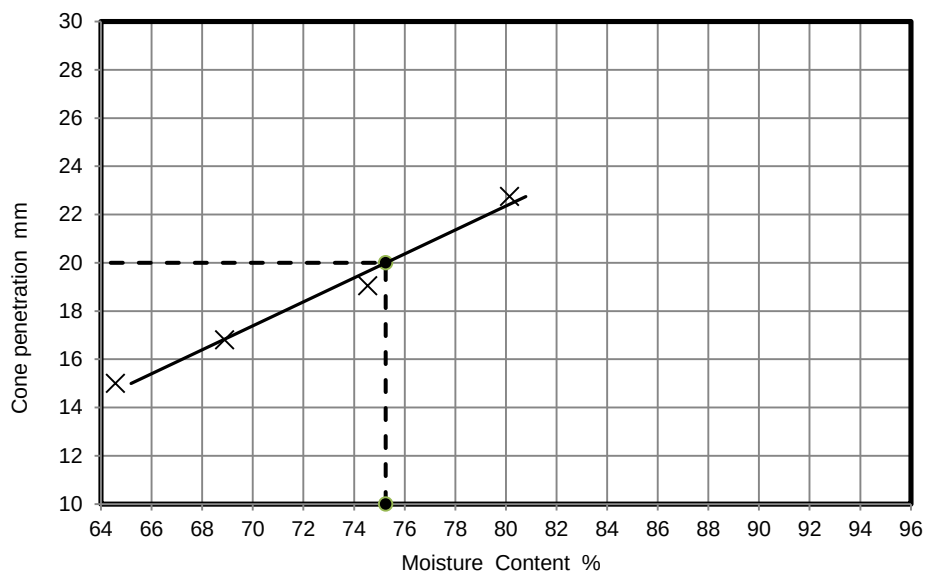
#### PLASTICITY INDEX



|                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                              |                                                                  |          |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|----------|
|  | <b>TEST METHOD</b><br>BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method<br>BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index<br>BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying |                                                              | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 20/09/2016 |          |
|                                                                                     | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com                                                                                                                                                                              |                                                              |                                                                  |          |
|                                                                                     | 2519                                                                                                                                                                                                                                                                                                                  | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) |                                                                  | MSF-5 R2 |

Figure A3.1

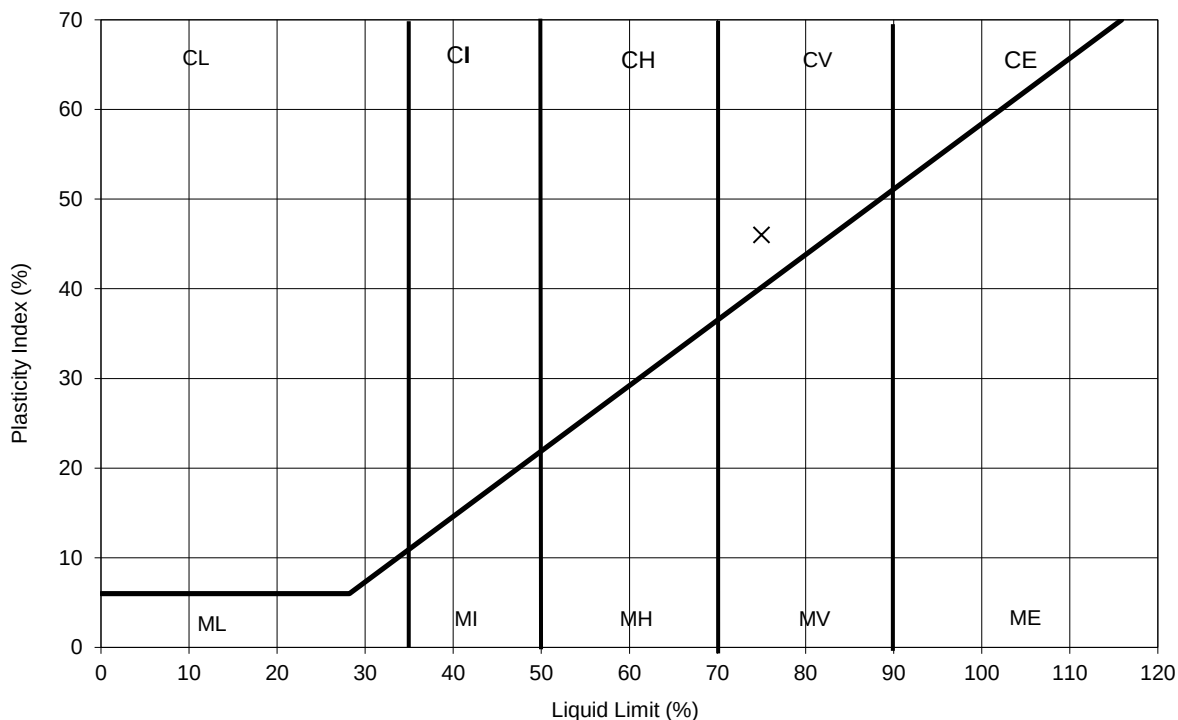
|                                                                                   |                                                                                              |        |                       |                    |            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | BH1        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 4          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 4.30 m     |
| Soil Description                                                                  | Brown slightly sandy CLAY with rare fm sub-angular gravel                                    |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | B          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |    |   |
|--------------------------|----|---|
| NATURAL MOISTURE CONTENT | 30 | % |
| % PASSING 425µm SIEVE    | 95 | % |
| LIQUID LIMIT             | 75 | % |
| PLASTIC LIMIT            | 29 | % |
| PLASTICITY INDEX         | 46 | % |

Remarks

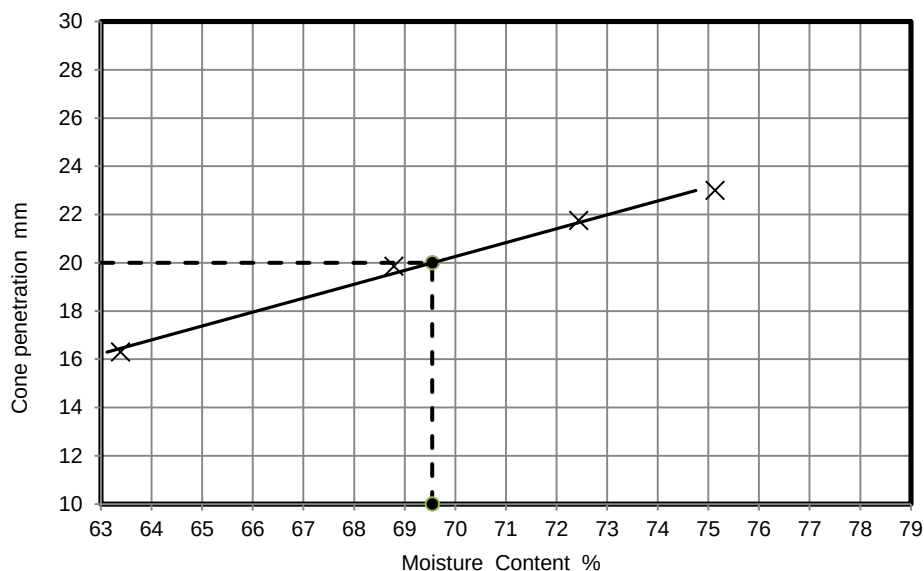
#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |          |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |          | Checked and<br>Approved           |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |          |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |          | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |          |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |          |                                   |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          | MSF-5 R2 |                                   |

Figure A3.1

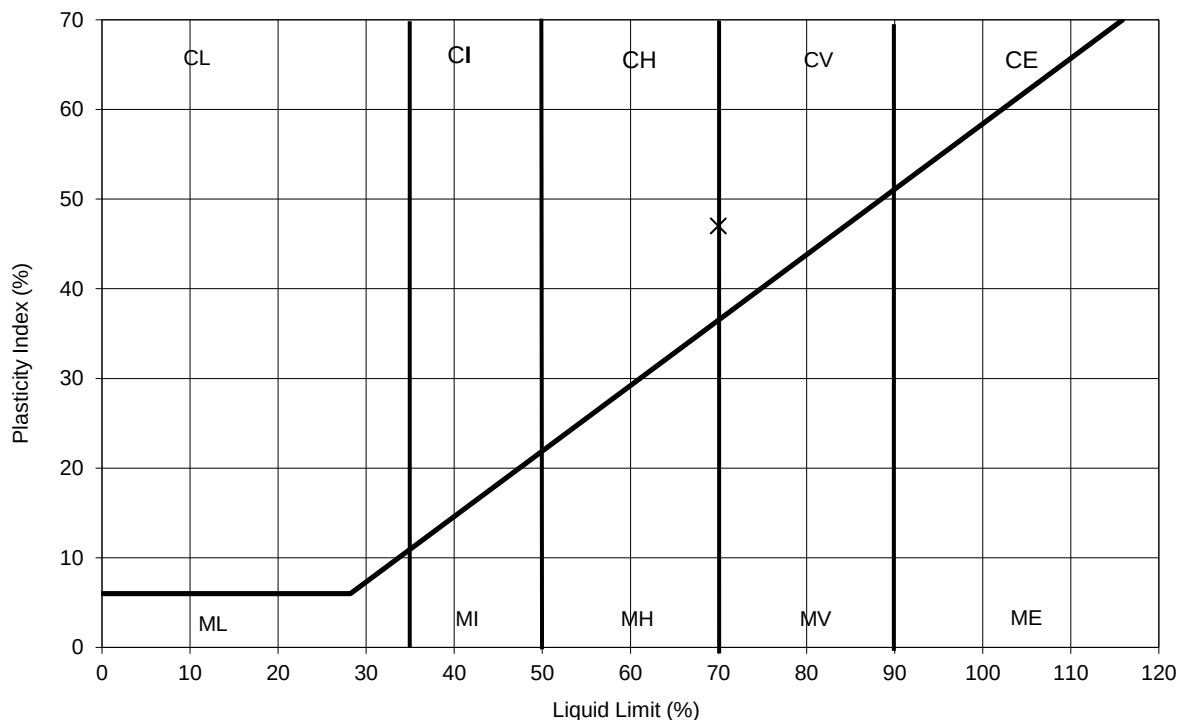
|                                                                                   |                                                                                              |        |                       |                    |            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | BH2        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 1          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 5.00 m     |
| Soil Description                                                                  | High strength fissured dark grey silty CLAY                                                  |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | U          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 28  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 70  | % |
| PLASTIC LIMIT            | 23  | % |
| PLASTICITY INDEX         | 47  | % |

Remarks

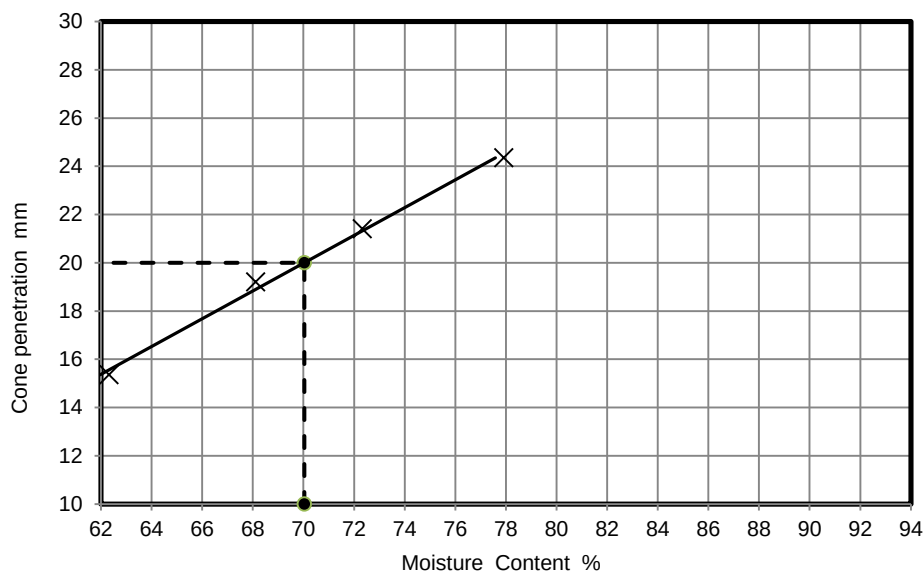
#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |          |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |          | Checked and<br>Approved           |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |          |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |          | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |          |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |          |                                   |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          | MSF-5 R2 |                                   |

Figure A3.1

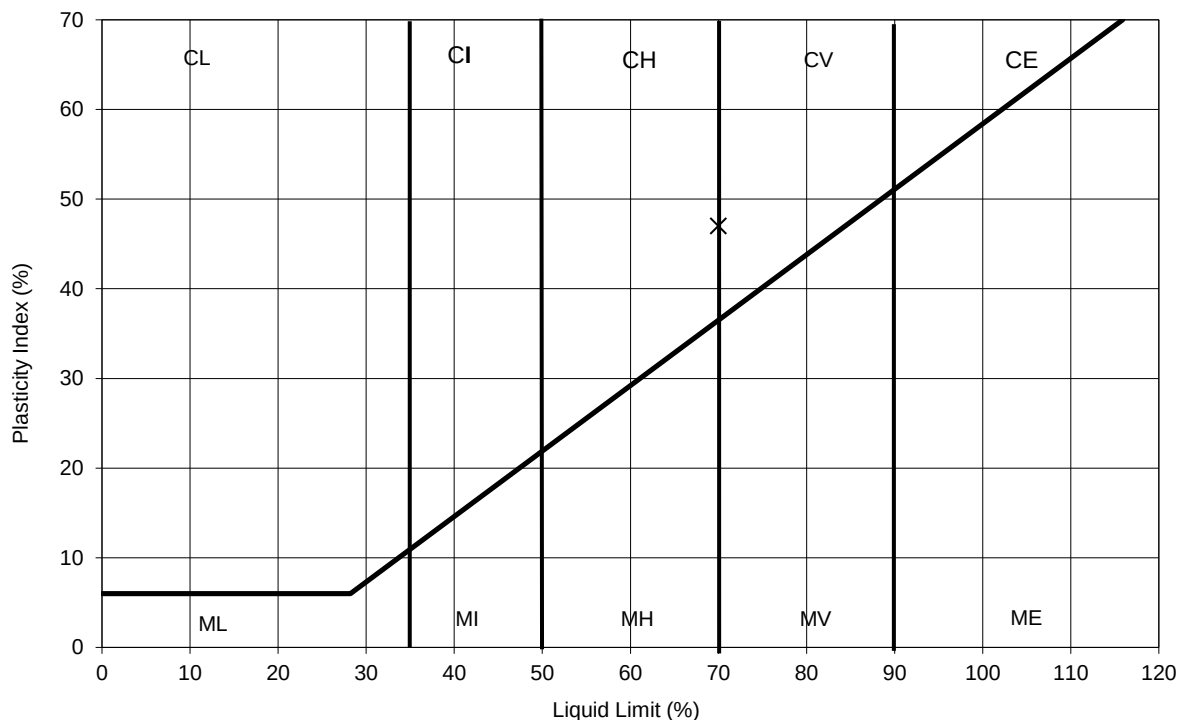
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|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | BH3        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 1          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 6.50 m     |
| Soil Description                                                                  | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | U          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 26  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 70  | % |
| PLASTIC LIMIT            | 23  | % |
| PLASTICITY INDEX         | 47  | % |

Remarks

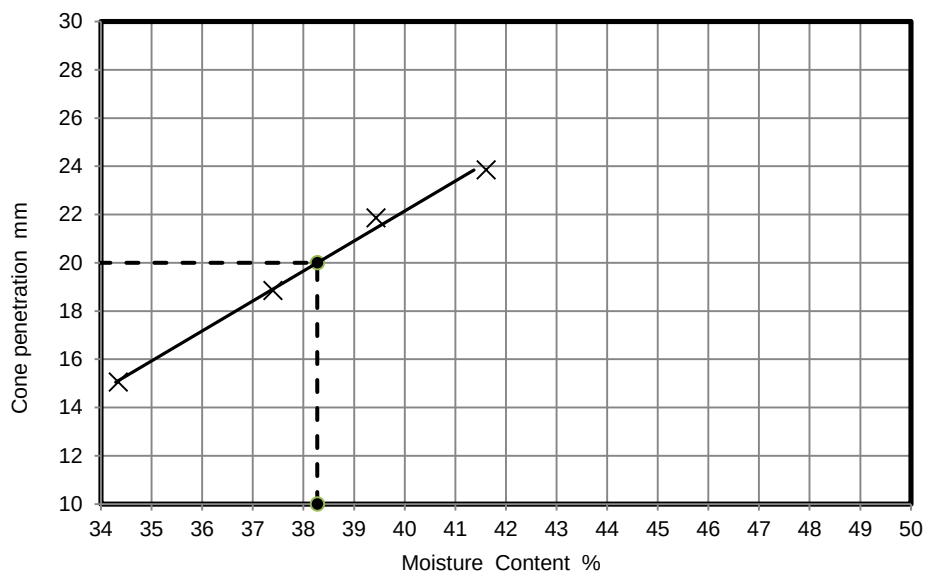
#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |  |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |  | Checked and Approved              |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |  |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |  | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |  |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |  | MSF-5 R2                          |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          |  |                                   |

Figure A3.1

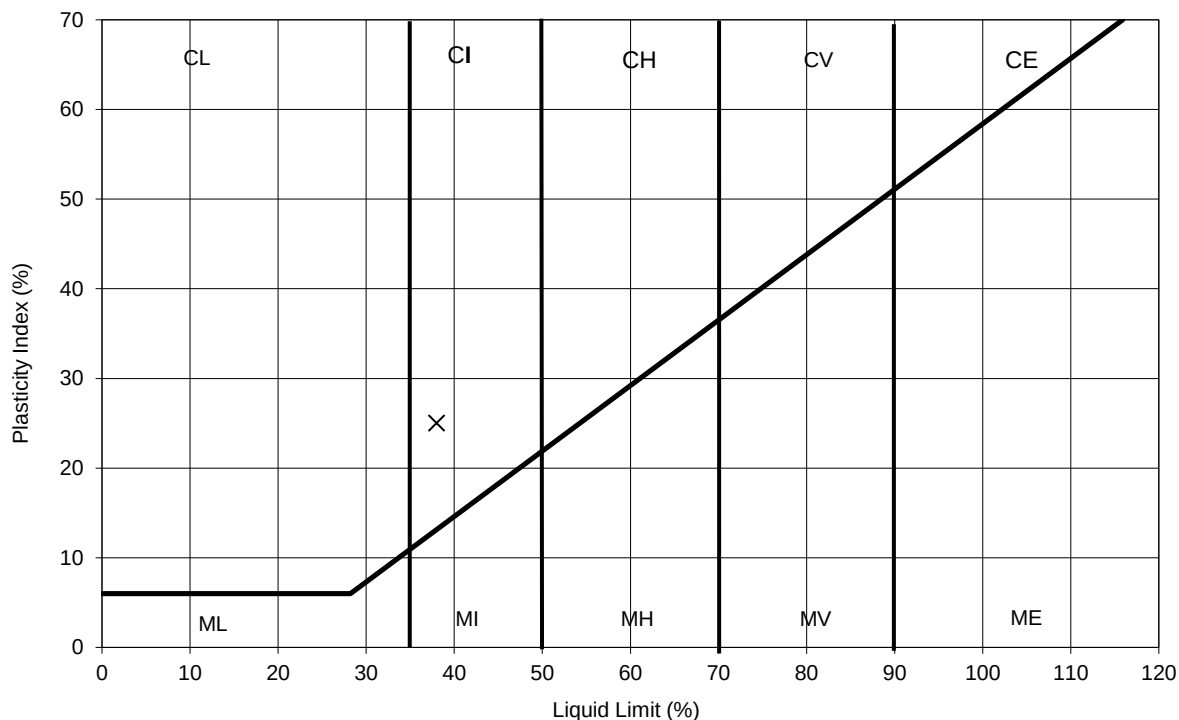
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|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                               |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                                       |        |                       | Borehole/Pit No.   | BH4        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB          |        |                       | Sample No.         | 2          |
| Project No.                                                                       | 52527                                                                                                 | Client | Ian Farmer Associates | Depth Top          | 1.20 m     |
| Soil Description                                                                  | Brown, reddish brown and grey slightly sandy gravelly CLAY (gravel is fmc and sub-angular to angular) |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                                       |        |                       | Sample Type        | B          |
|                                                                                   |                                                                                                       |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                                       |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                                       |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                                       |        |                       | Date Tested        | 15/09/2016 |



|                          |    |   |
|--------------------------|----|---|
| NATURAL MOISTURE CONTENT | 16 | % |
| % PASSING 425µm SIEVE    | 60 | % |
| LIQUID LIMIT             | 38 | % |
| PLASTIC LIMIT            | 13 | % |
| PLASTICITY INDEX         | 25 | % |

Remarks

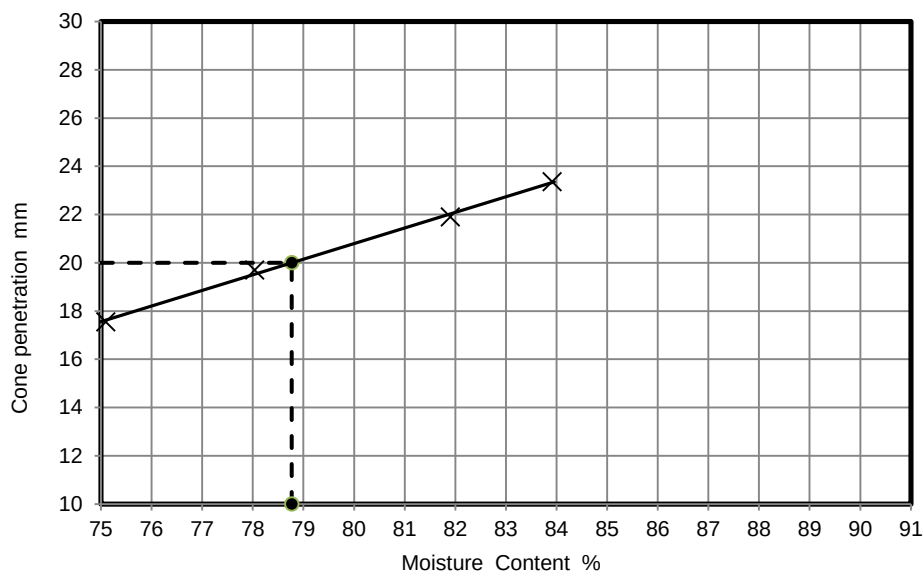
#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |          |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |          | Checked and Approved              |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |          |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |          | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |          |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |          |                                   |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          | MSF-5 R2 |                                   |

Figure A3.1

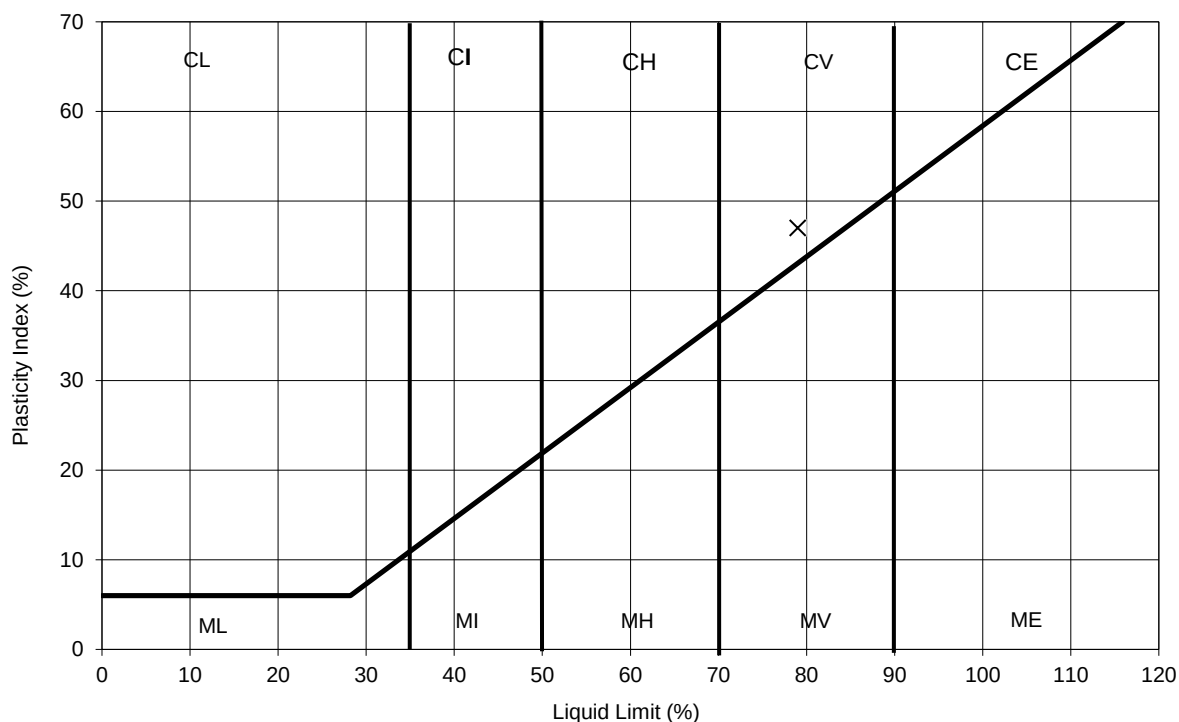
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|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | BH4        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 1          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 4.40 m     |
| Soil Description                                                                  | Brown CLAY with rare fm sub-angular gravel and occasional sandy patches                      |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | D          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |    |   |
|--------------------------|----|---|
| NATURAL MOISTURE CONTENT | 34 | % |
| % PASSING 425µm SIEVE    | 98 | % |
| LIQUID LIMIT             | 79 | % |
| PLASTIC LIMIT            | 32 | % |
| PLASTICITY INDEX         | 47 | % |

Remarks

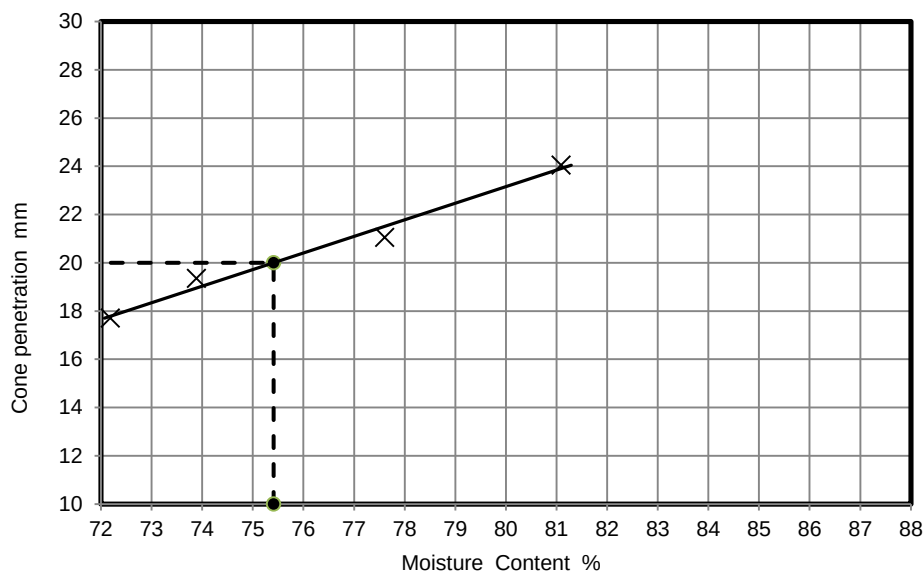
#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |  |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |  | Checked and<br>Approved           |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |  |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |  | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |  |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |  | MSF-5 R2                          |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          |  |                                   |

Figure A3.1

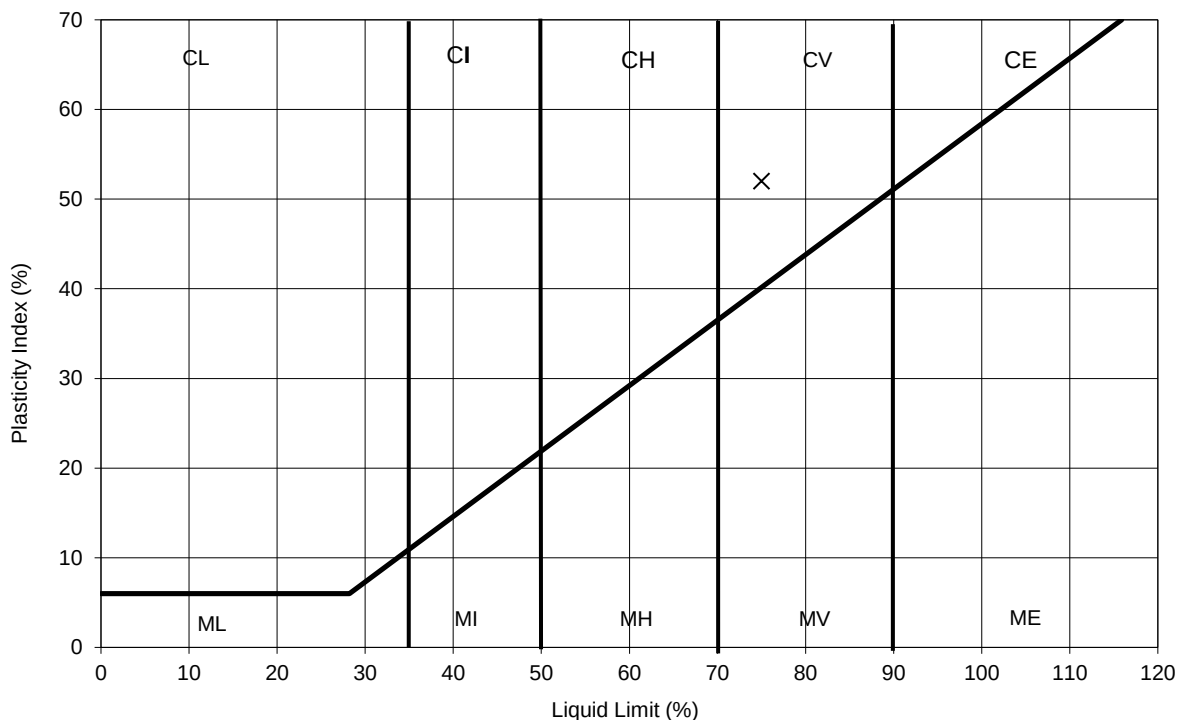
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|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | BH5        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 1          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 7.00 m     |
| Soil Description                                                                  | High strength fissured dark grey silty CLAY                                                  |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | U          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 27  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 75  | % |
| PLASTIC LIMIT            | 23  | % |
| PLASTICITY INDEX         | 52  | % |

Remarks

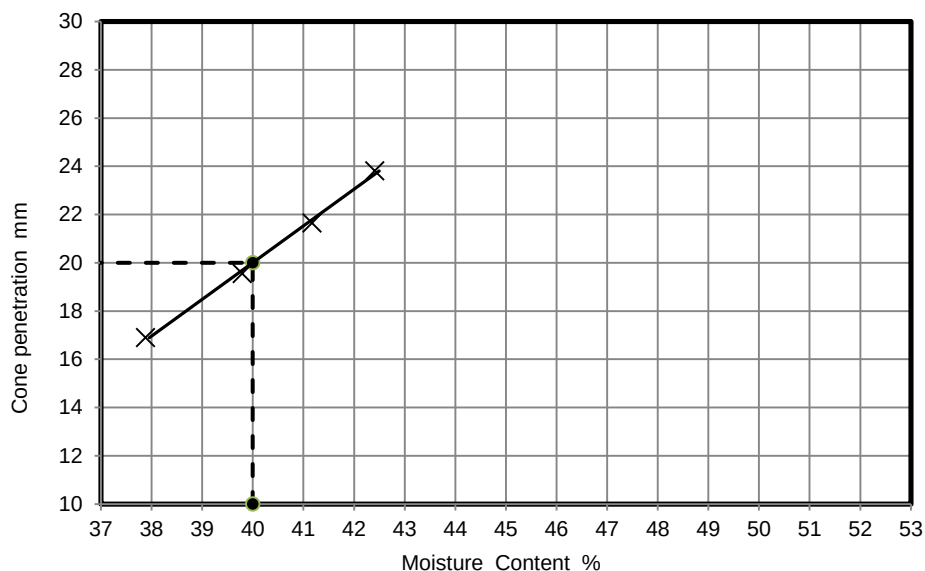
#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |          |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |          | Checked and<br>Approved           |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |          |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |          | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |          |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |          |                                   |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          | MSF-5 R2 |                                   |

Figure A3.1

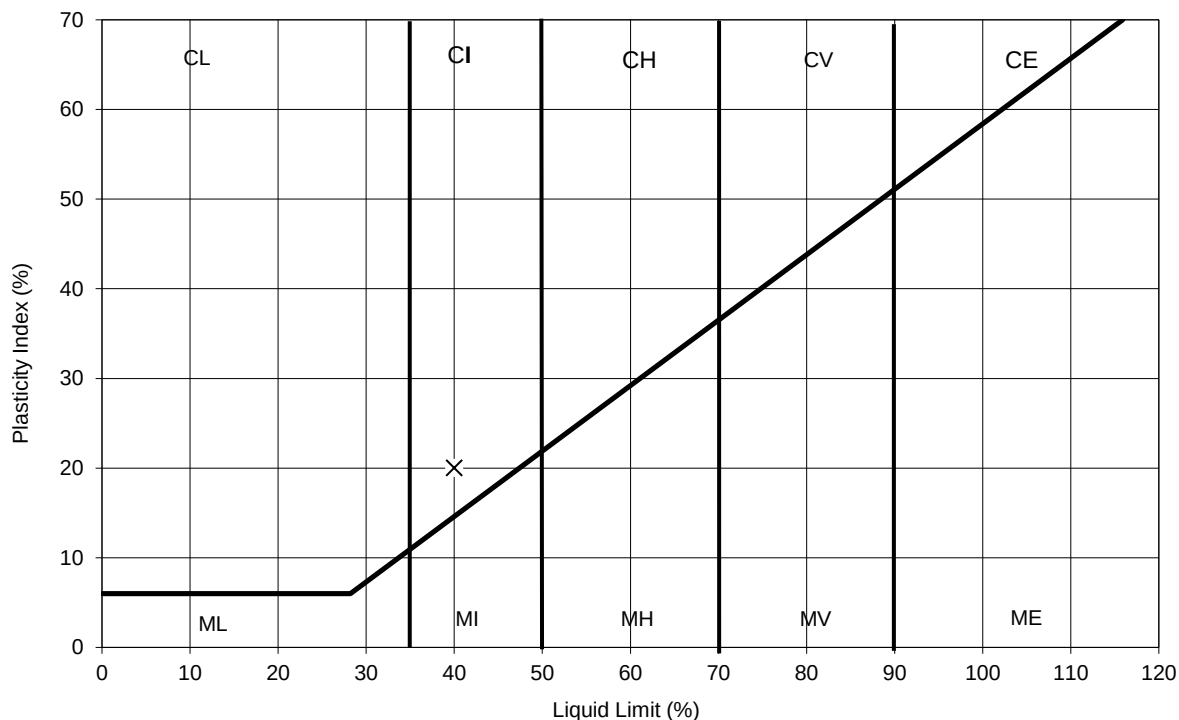
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|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        | Job No.               | 21488              |            |
|                                                                                   |                                                                                              |        | Borehole/Pit No.      | BH7                |            |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        | Sample No.            | 3                  |            |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 2.25 m     |
| Soil Description                                                                  | Brown sandy silty CLAY                                                                       |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | B          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 27  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 40  | % |
| PLASTIC LIMIT            | 20  | % |
| PLASTICITY INDEX         | 20  | % |

Remarks

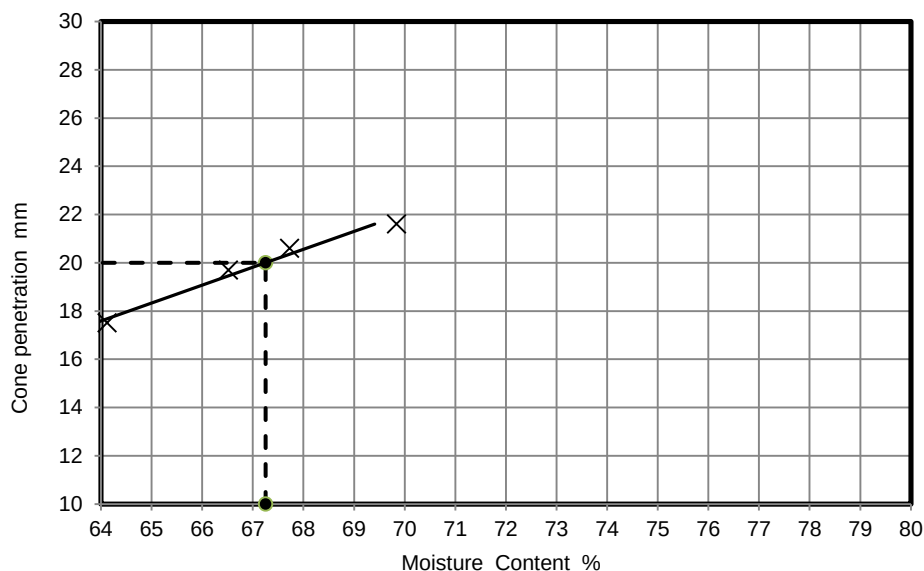
### PLASTICITY INDEX



|                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                              |                                                                  |          |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|----------|
|  | <b>TEST METHOD</b><br>BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method<br>BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index<br>BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying |                                                              | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 20/09/2016 |          |
|                                                                                     | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com                                                                                                                                                                              |                                                              |                                                                  |          |
|                                                                                     | 2519                                                                                                                                                                                                                                                                                                                  | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) |                                                                  | MSF-5 R2 |

Figure A3.1

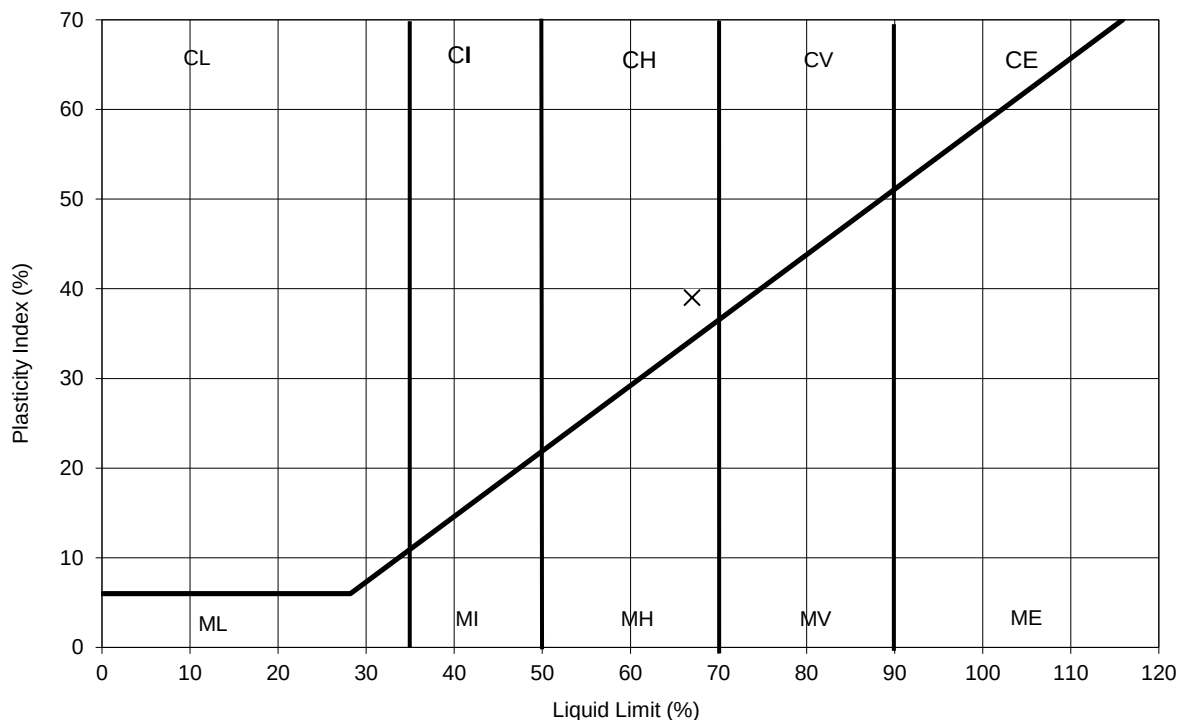
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|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | BH7        |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 6          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 5.50 m     |
| Soil Description                                                                  | Brown CLAY with occasional sandy patches                                                     |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | B          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 30  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 67  | % |
| PLASTIC LIMIT            | 28  | % |
| PLASTICITY INDEX         | 39  | % |

Remarks

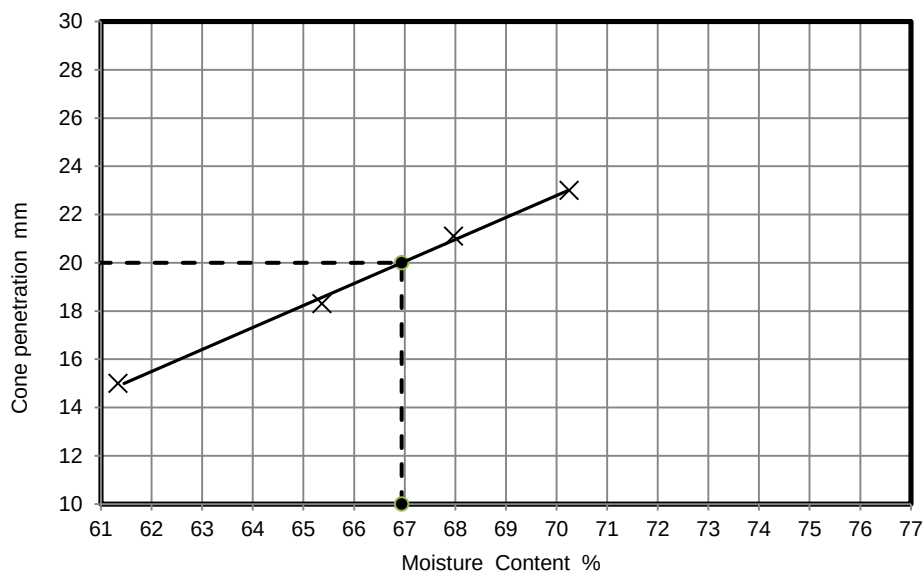
#### PLASTICITY INDEX



|                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                                      |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|  | <b>TEST METHOD</b><br>BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method<br>BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index<br>BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying | <b>Checked and Approved</b><br><br>Initials: J.P<br>Date: 20/09/2016 |
|                                                                                     | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com                                                                                                                                                                              |                                                                      |
|                                                                                     | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                                                                                                                                                                                                                                          | MSF-5 R2                                                             |

Figure A3.1

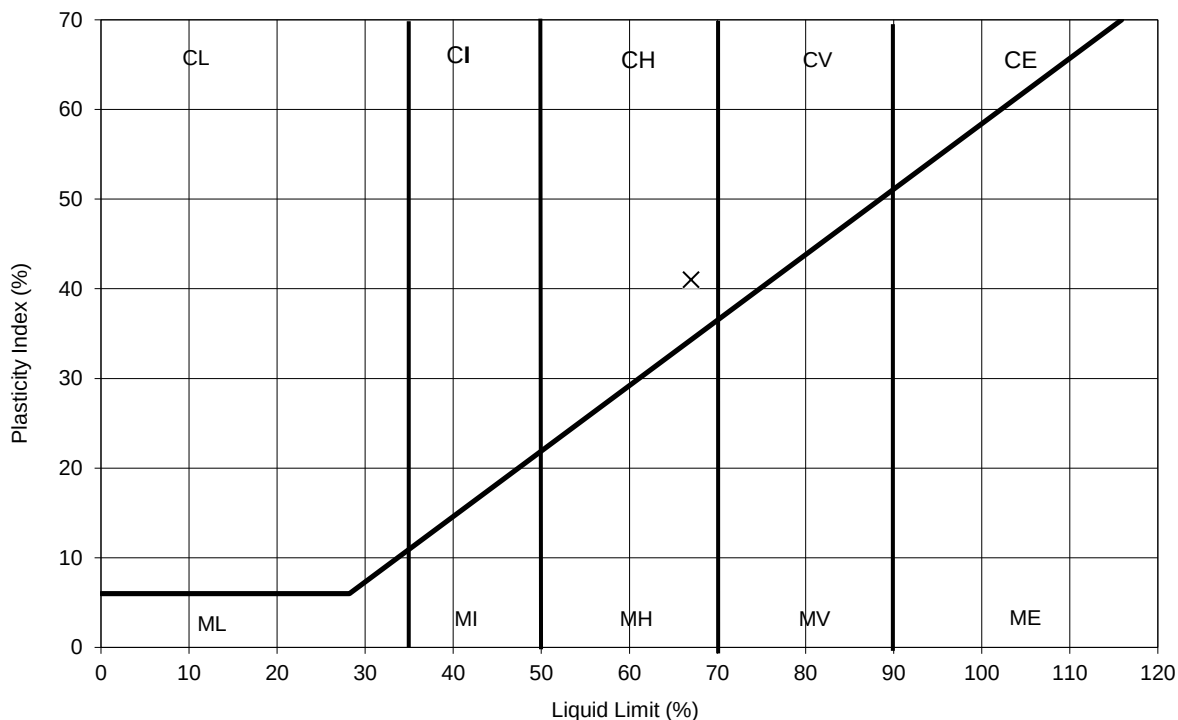
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|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        | Job No.               | 21488              |            |
|                                                                                   |                                                                                              |        | Borehole/Pit No.      | WS7                |            |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        | Sample No.            | 2                  |            |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 1.00 m     |
| Soil Description                                                                  | Dark brown, orange brown and pale grey slightly sandy CLAY                                   |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | D          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 32  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 67  | % |
| PLASTIC LIMIT            | 26  | % |
| PLASTICITY INDEX         | 41  | % |

Remarks

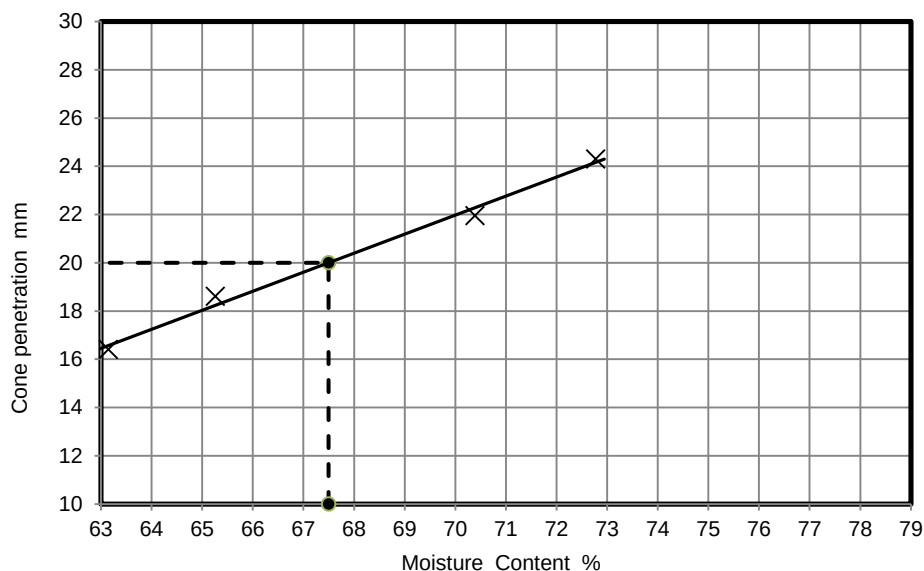
#### PLASTICITY INDEX



|                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                                  |          |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------|
|  | <b>TEST METHOD</b><br>BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method<br>BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index<br>BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 20/09/2016 |          |
|                                                                                     | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com                                                                                                                                                                              |                                                                  |          |
|                                                                                     | 2519                                                                                                                                                                                                                                                                                                                  | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)     | MSF-5 R2 |

Figure A3.1

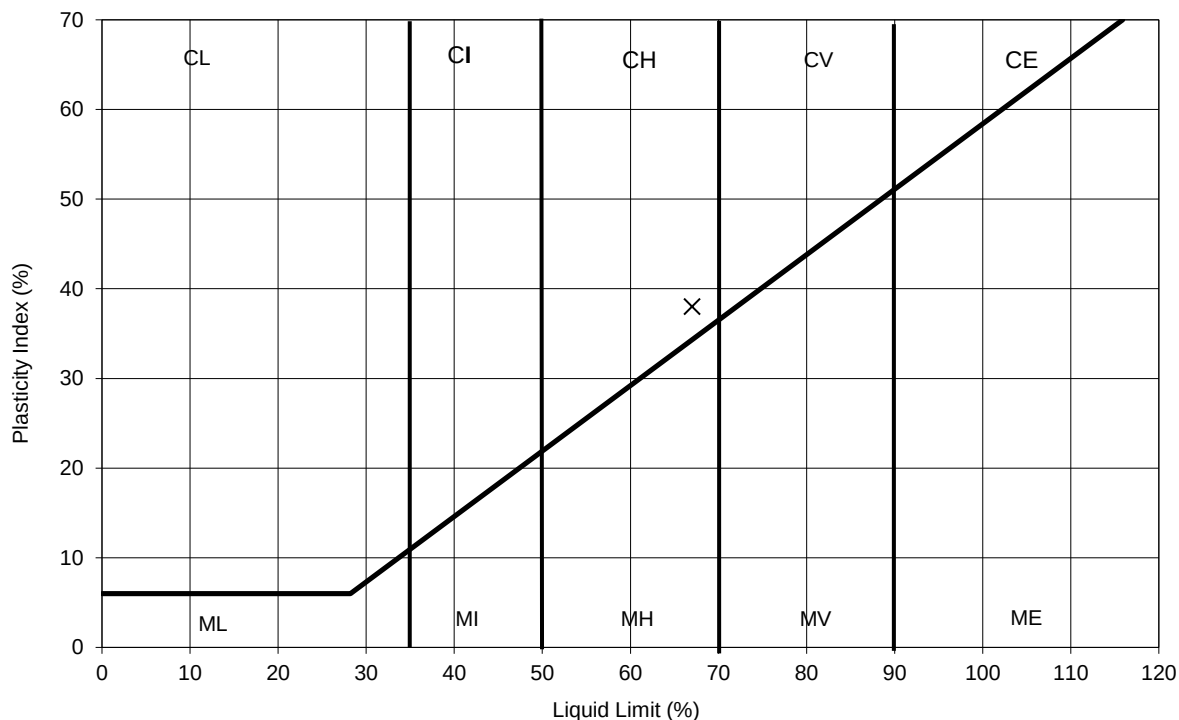
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|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        | Job No.               | 21488              |            |
|                                                                                   |                                                                                              |        | Borehole/Pit No.      | WS8                |            |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        | Sample No.            | 9                  |            |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 3.50 m     |
| Soil Description                                                                  | Brown CLAY with orange brown sandy patches                                                   |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | D          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 30  | % |
| % PASSING 425µm SIEVE    | 100 | % |
| LIQUID LIMIT             | 67  | % |
| PLASTIC LIMIT            | 29  | % |
| PLASTICITY INDEX         | 38  | % |

Remarks

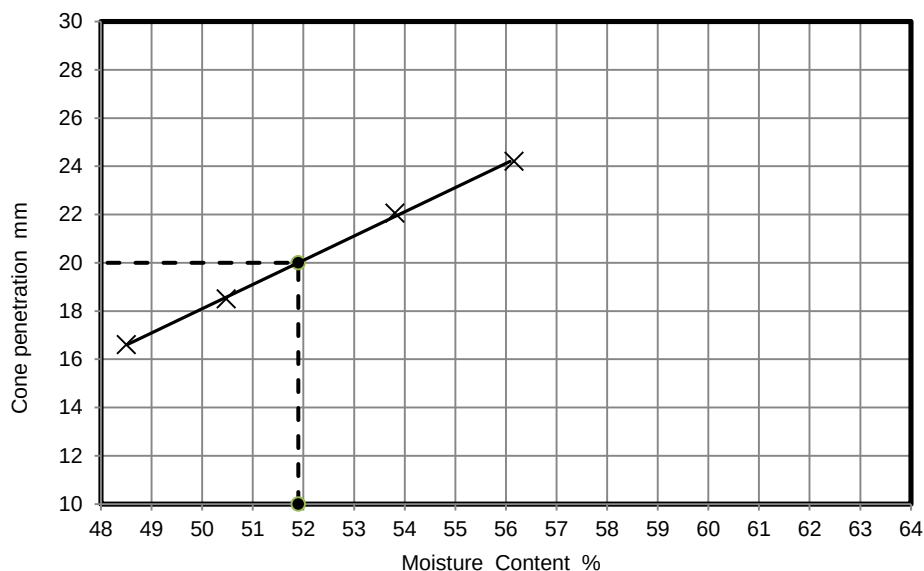
#### PLASTICITY INDEX



|                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                              |                                                                      |          |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------|----------|
|  | <b>TEST METHOD</b><br>BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method<br>BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index<br>BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying |                                                              | <b>Checked and Approved</b><br><br>Initials: J.P<br>Date: 20/09/2016 |          |
|                                                                                     | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com                                                                                                                                                                              |                                                              |                                                                      |          |
|                                                                                     | 2519                                                                                                                                                                                                                                                                                                                  | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) |                                                                      | MSF-5 R2 |

Figure A3.1

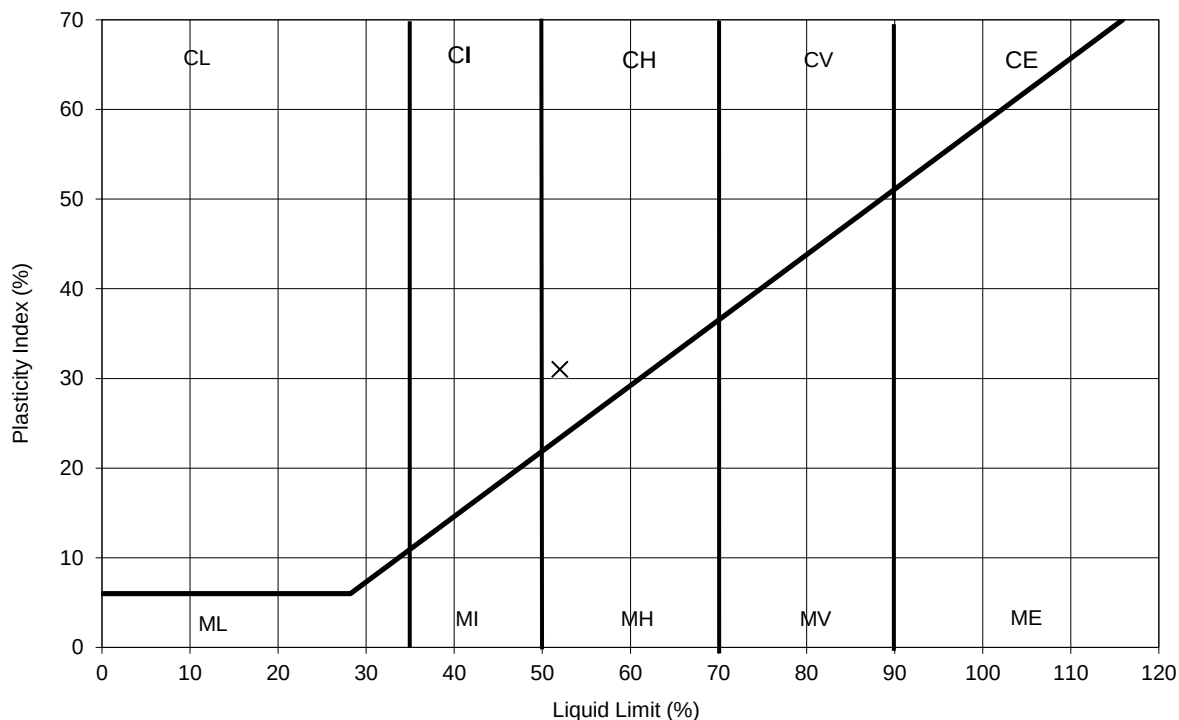
|                                                                                   |                                                                                              |        |                       |                    |            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        | Job No.               | 21488              |            |
|                                                                                   |                                                                                              |        | Borehole/Pit No.      | WS9                |            |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        | Sample No.            | 4                  |            |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 1.20 m     |
| Soil Description                                                                  | Brown, orange brown and pale grey slightly sandy silty CLAY                                  |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | D          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |    |   |
|--------------------------|----|---|
| NATURAL MOISTURE CONTENT | 19 | % |
| % PASSING 425µm SIEVE    | 99 | % |
| LIQUID LIMIT             | 52 | % |
| PLASTIC LIMIT            | 21 | % |
| PLASTICITY INDEX         | 31 | % |

Remarks

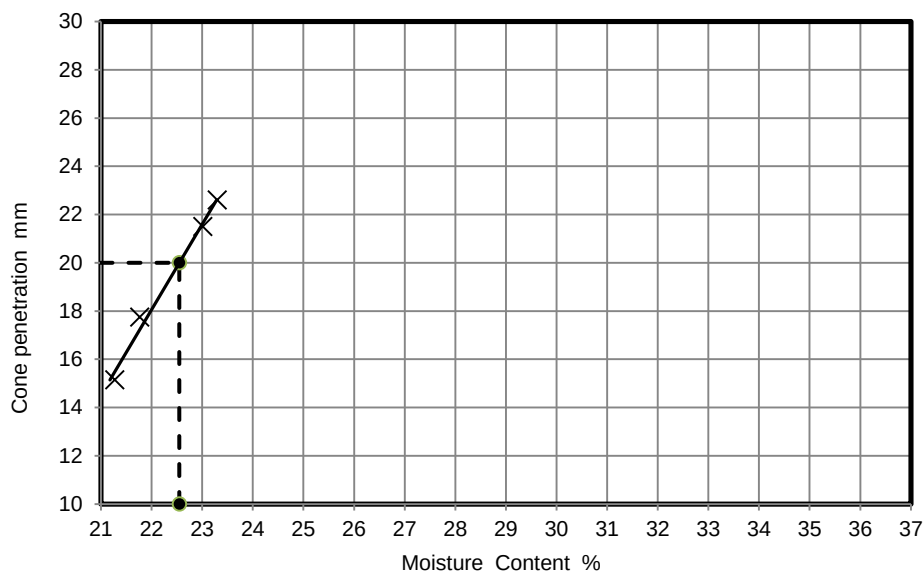
#### PLASTICITY INDEX



|                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                              |                                                                      |          |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------|----------|
|  | <b>TEST METHOD</b><br>BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method<br>BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index<br>BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying |                                                              | <b>Checked and Approved</b><br><br>Initials: J.P<br>Date: 20/09/2016 |          |
|                                                                                     | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com                                                                                                                                                                              |                                                              |                                                                      |          |
|                                                                                     | 2519                                                                                                                                                                                                                                                                                                                  | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) |                                                                      | MSF-5 R2 |

Figure A3.1

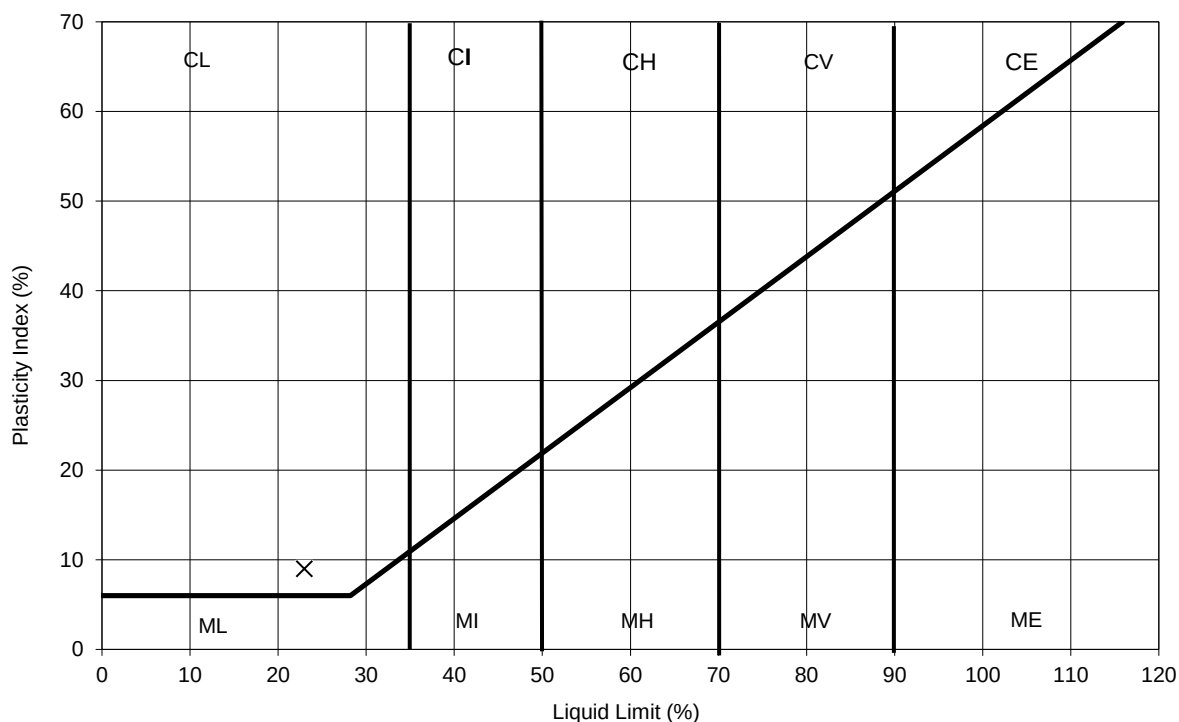
|                                                                                   |                                                                                              |        |                       |                    |            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|--------------------|------------|
|  | <b>LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX</b>                                      |        |                       | Job No.            | 21488      |
|                                                                                   |                                                                                              |        |                       | Borehole/Pit No.   | WS10       |
| Site Name                                                                         | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       | Sample No.         | 1          |
| Project No.                                                                       | 52527                                                                                        | Client | Ian Farmer Associates | Depth Top          | 0.50 m     |
| Soil Description                                                                  | Brown clayey SAND with rare fine gravel                                                      |        |                       | Depth Base         | - m        |
|                                                                                   |                                                                                              |        |                       | Sample Type        | D          |
|                                                                                   |                                                                                              |        |                       | Samples received   | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Schedules received | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Project Started    | 26/08/2016 |
|                                                                                   |                                                                                              |        |                       | Date Tested        | 15/09/2016 |



|                          |     |   |
|--------------------------|-----|---|
| NATURAL MOISTURE CONTENT | 7.9 | % |
| % PASSING 425µm SIEVE    | 99  | % |
| LIQUID LIMIT             | 23  | % |
| PLASTIC LIMIT            | 14  | % |
| PLASTICITY INDEX         | 9   | % |

Remarks

#### PLASTICITY INDEX



|                                                                                             |                                                                                                                                          |          |                                   |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|
| <br>2519 | <b>TEST METHOD</b>                                                                                                                       |          | <b>Checked and Approved</b>       |
|                                                                                             | BS1377: Part 2 :Clause 4.4 : 1990 Determination of the liquid limit by the cone penetrometer method                                      |          |                                   |
|                                                                                             | BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index                                               |          | Initials: J.P<br>Date: 20/09/2016 |
|                                                                                             | BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying                                               |          |                                   |
|                                                                                             | Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Tel: 01923 711 288 Email: James@k4soils.com |          |                                   |
| Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                |                                                                                                                                          | MSF-5 R2 |                                   |

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH1

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 2

Project No. 52527 Client Ian Farmer Associates

Depth 1.20 m

Soil Description

Brown silty clayey very sandy GRAVEL (gravel is fmc and sub-angular to sub-rounded)

Sample Type B

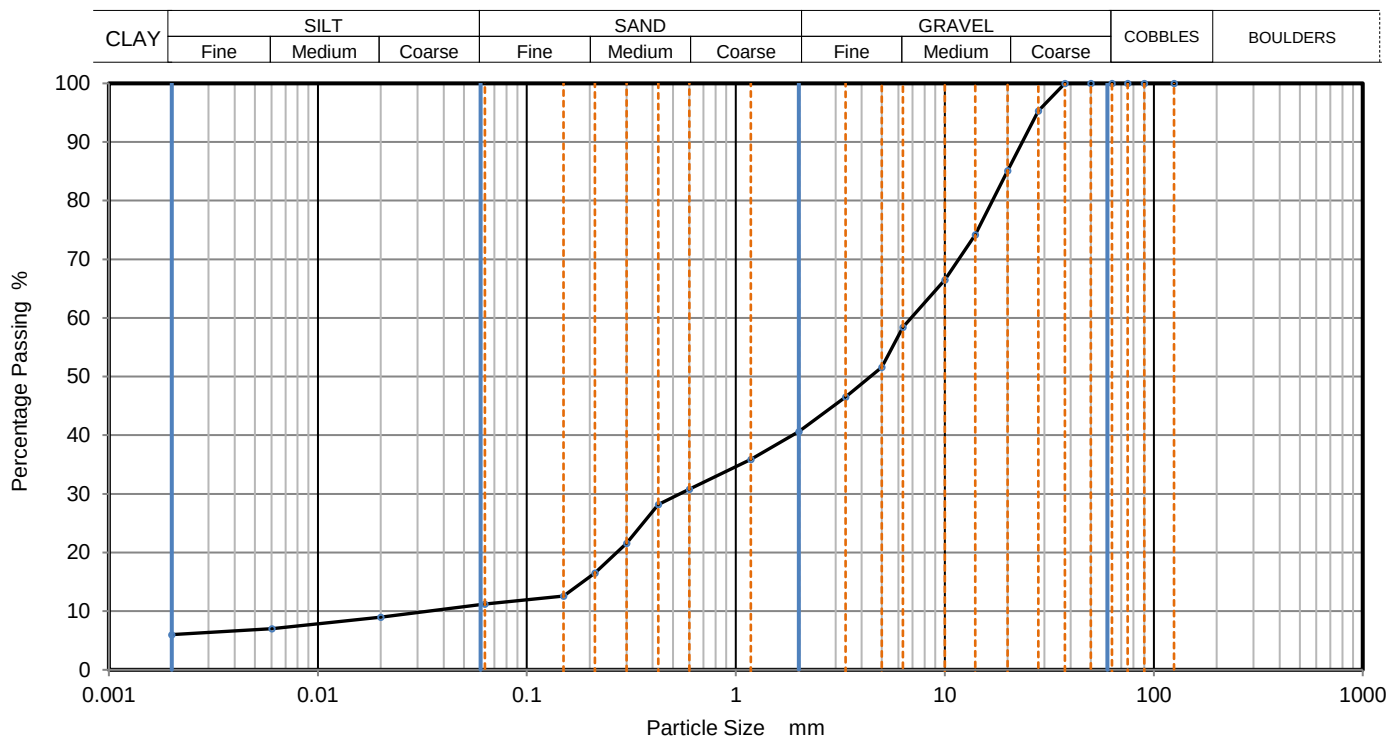
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation                                        |           |
|------------------|-----------|------------------------------------------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm                                     | % Passing |
| 125              | 100       | 0.0200                                               | 9         |
| 90               | 100       | 0.0060                                               | 7         |
| 75               | 100       | 0.0020                                               | 6         |
| 63               | 100       |                                                      |           |
| 50               | 100       |                                                      |           |
| 37.5             | 100       |                                                      |           |
| 28               | 95        |                                                      |           |
| 20               | 85        |                                                      |           |
| 14               | 74        |                                                      |           |
| 10               | 67        |                                                      |           |
| 6.3              | 58        |                                                      |           |
| 5                | 52        |                                                      |           |
| 3.35             | 47        |                                                      |           |
| 2                | 41        |                                                      |           |
| 1.18             | 36        |                                                      |           |
| 0.6              | 31        | Particle density (assumed)<br>2.70 Mg/m <sup>3</sup> |           |
| 0.425            | 28        |                                                      |           |
| 0.3              | 22        |                                                      |           |
| 0.212            | 17        |                                                      |           |
| 0.15             | 13        |                                                      |           |
| 0.063            | 11        |                                                      |           |

Dry Mass of sample, g 2606

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 59.4       |
| Sand               | 29.4       |
| Silt               | 5.3        |
| Clay               | 5.9        |

| Grading Analysis       |          |
|------------------------|----------|
| D100                   | mm       |
| D60                    | mm 6.91  |
| D30                    | mm 0.538 |
| D10                    | mm 0.036 |
| Uniformity Coefficient | 190      |
| Curvature Coefficient  | 1.2      |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Initials: J.P

Date: 20/09/2016

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Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH2

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 2

Project No. 52527 Client Ian Farmer Associates

Depth 1.20 m

Soil Description Brown clayey very sandy GRAVEL (gravel is fmc and angular to sub-rounded)

Sample Type B

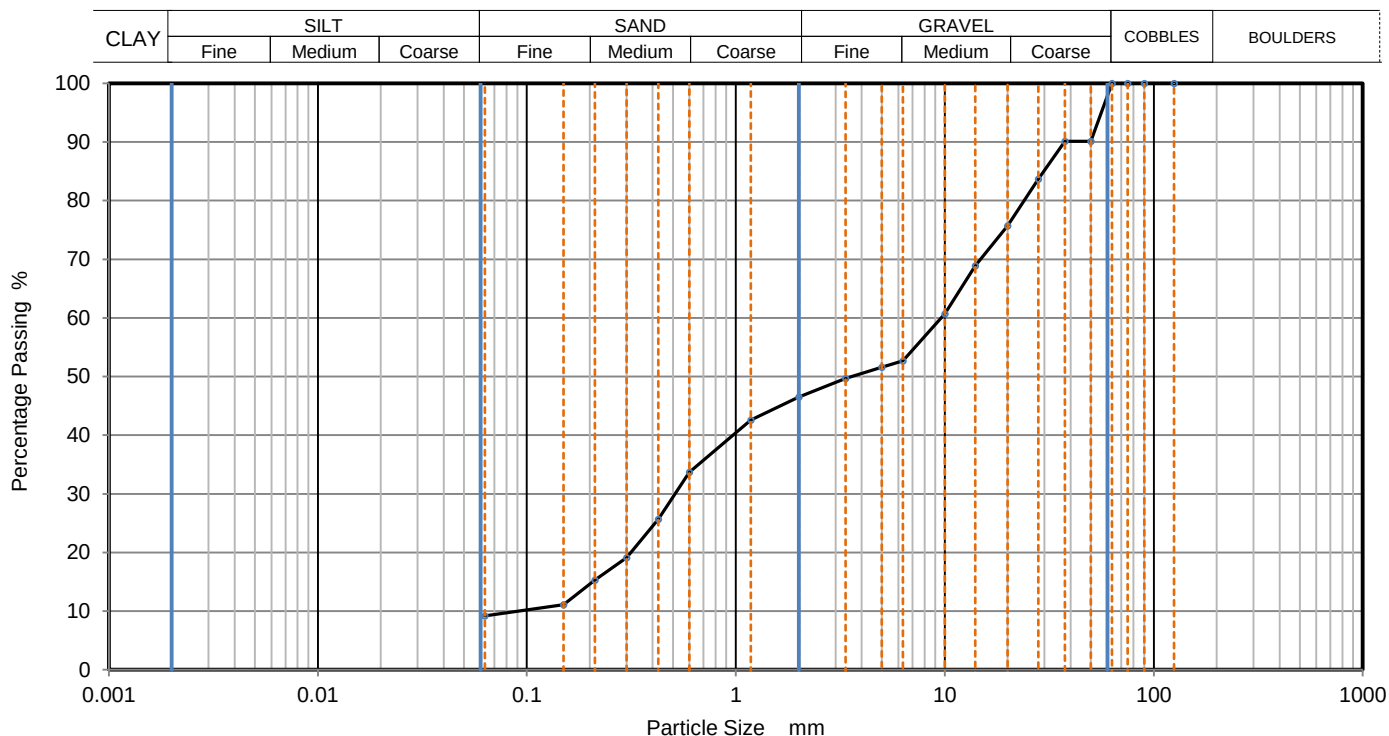
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation    |           |
|------------------|-----------|------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm | % Passing |
| 125              | 100       |                  |           |
| 90               | 100       |                  |           |
| 75               | 100       |                  |           |
| 63               | 100       |                  |           |
| 50               | 90        |                  |           |
| 37.5             | 90        |                  |           |
| 28               | 84        |                  |           |
| 20               | 76        |                  |           |
| 14               | 69        |                  |           |
| 10               | 61        |                  |           |
| 6.3              | 53        |                  |           |
| 5                | 52        |                  |           |
| 3.35             | 50        |                  |           |
| 2                | 47        |                  |           |
| 1.18             | 43        |                  |           |
| 0.6              | 34        |                  |           |
| 0.425            | 26        |                  |           |
| 0.3              | 19        |                  |           |
| 0.212            | 15        |                  |           |
| 0.15             | 11        |                  |           |
| 0.063            | 9         |                  |           |

Dry Mass of sample, g 4446

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 53.5       |
| Sand               | 37.3       |
| Fines <0.063mm     | 9.2        |

| Grading Analysis       |      |
|------------------------|------|
| D100                   | mm   |
| D60                    | mm   |
| D30                    | mm   |
| D10                    | mm   |
| Uniformity Coefficient | 100  |
| Curvature Coefficient  | 0.29 |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Checked and Approved

Initials: J.P

Date: 20/09/2016

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH3

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 3

Project No. 52527 Client Ian Farmer Associates

Depth 2.00 m

Soil Description Brown slightly clayey very sandy GRAVEL (gravel is fmc and angular to sub-rounded)

Sample Type B

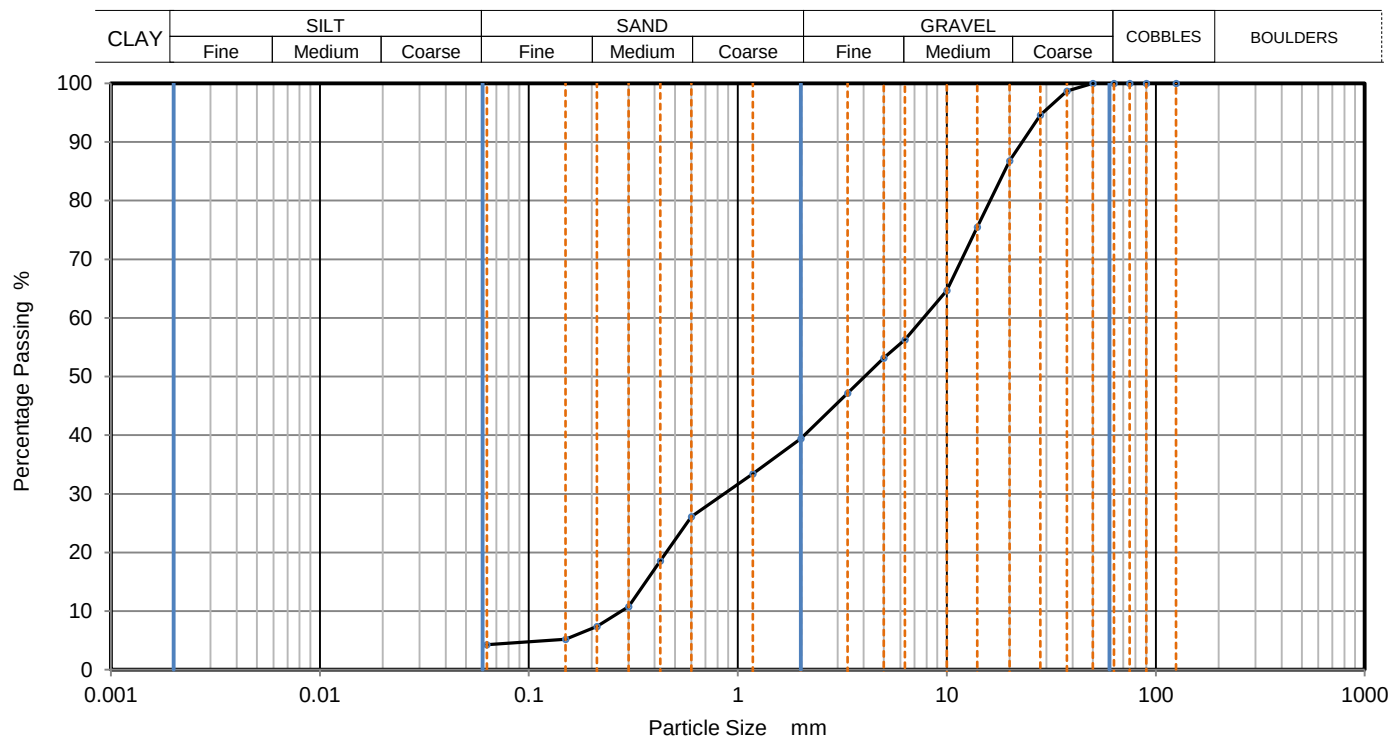
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation    |           |
|------------------|-----------|------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm | % Passing |
| 125              | 100       |                  |           |
| 90               | 100       |                  |           |
| 75               | 100       |                  |           |
| 63               | 100       |                  |           |
| 50               | 100       |                  |           |
| 37.5             | 99        |                  |           |
| 28               | 95        |                  |           |
| 20               | 87        |                  |           |
| 14               | 76        |                  |           |
| 10               | 65        |                  |           |
| 6.3              | 56        |                  |           |
| 5                | 53        |                  |           |
| 3.35             | 47        |                  |           |
| 2                | 39        |                  |           |
| 1.18             | 33        |                  |           |
| 0.6              | 26        |                  |           |
| 0.425            | 19        |                  |           |
| 0.3              | 11        |                  |           |
| 0.212            | 7         |                  |           |
| 0.15             | 5         |                  |           |
| 0.063            | 4         |                  |           |

Dry Mass of sample, g 4905

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 60.6       |
| Sand               | 35.1       |
| Fines <0.063mm     | 4.3        |

| Grading Analysis       |          |
|------------------------|----------|
| D100                   | mm       |
| D60                    | mm 7.74  |
| D30                    | mm 0.864 |
| D10                    | mm 0.277 |
| Uniformity Coefficient | 28       |
| Curvature Coefficient  | 0.35     |

### Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Date: 20/09/2016

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MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH4

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 3

Project No. 52527 Client Ian Farmer Associates

Depth 2.00 m

Soil Description Brown clayey silty very gravelly SAND (gravel is fmc and sub-angular to sub-rounded)

Sample Type B

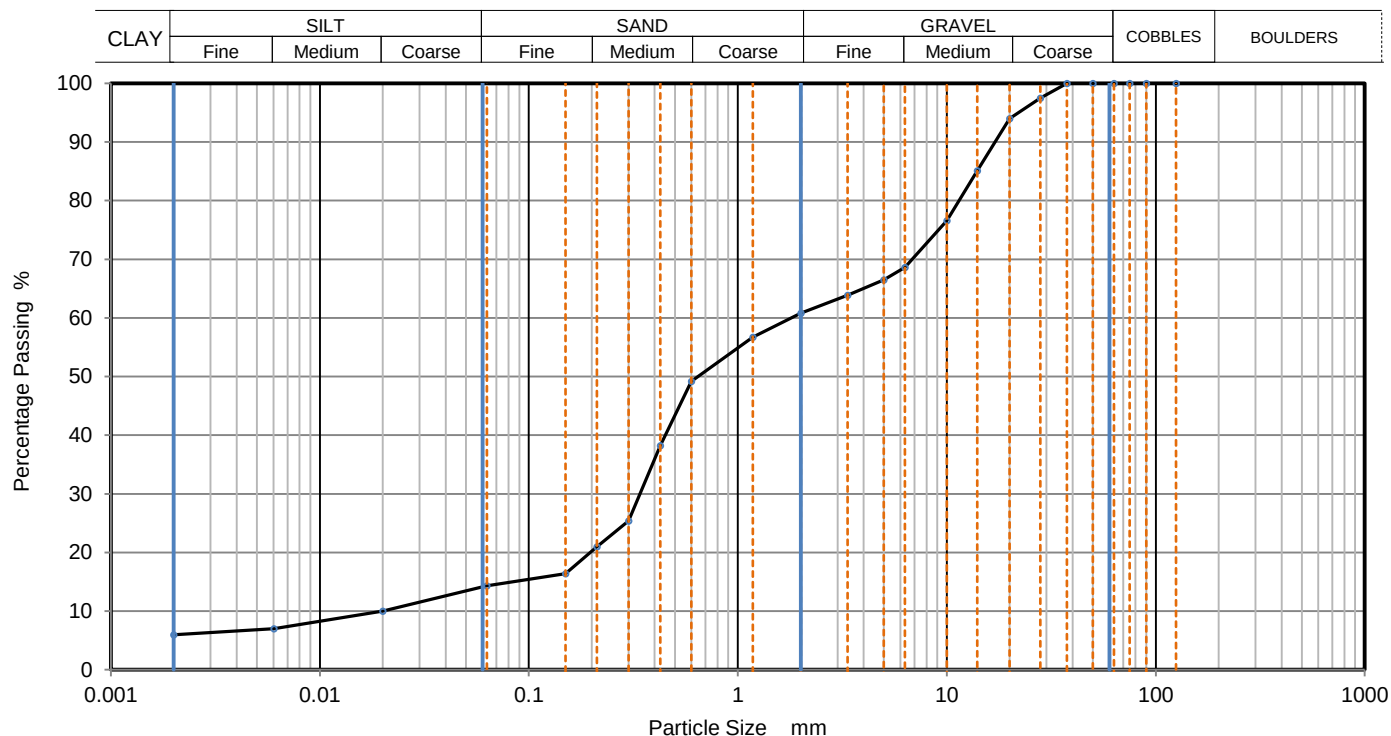
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation                                        |           |
|------------------|-----------|------------------------------------------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm                                     | % Passing |
| 125              | 100       | 0.0200                                               | 10        |
| 90               | 100       | 0.0060                                               | 7         |
| 75               | 100       | 0.0020                                               | 6         |
| 63               | 100       |                                                      |           |
| 50               | 100       |                                                      |           |
| 37.5             | 100       |                                                      |           |
| 28               | 98        |                                                      |           |
| 20               | 94        |                                                      |           |
| 14               | 85        |                                                      |           |
| 10               | 77        |                                                      |           |
| 6.3              | 69        |                                                      |           |
| 5                | 67        |                                                      |           |
| 3.35             | 64        |                                                      |           |
| 2                | 61        |                                                      |           |
| 1.18             | 57        |                                                      |           |
| 0.6              | 49        | Particle density (assumed)<br>2.70 Mg/m <sup>3</sup> |           |
| 0.425            | 38        |                                                      |           |
| 0.3              | 25        |                                                      |           |
| 0.212            | 21        |                                                      |           |
| 0.15             | 16        |                                                      |           |
| 0.063            | 14        |                                                      |           |

Dry Mass of sample, g 2890

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 39.2       |
| Sand               | 46.5       |
| Silt               | 8.5        |
| Clay               | 5.8        |

| Grading Analysis       |     |
|------------------------|-----|
| D100                   | mm  |
| D60                    | mm  |
| D30                    | mm  |
| D10                    | mm  |
| Uniformity Coefficient | 86  |
| Curvature Coefficient  | 3.1 |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Date: 20/09/2016

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Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH4

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 5

Project No. 52527 Client Ian Farmer Associates

Depth 4.00 m

Soil Description Brown slightly clayey very sandy GRAVEL (gravel is fmc and angular to sub-rounded)

Sample Type B

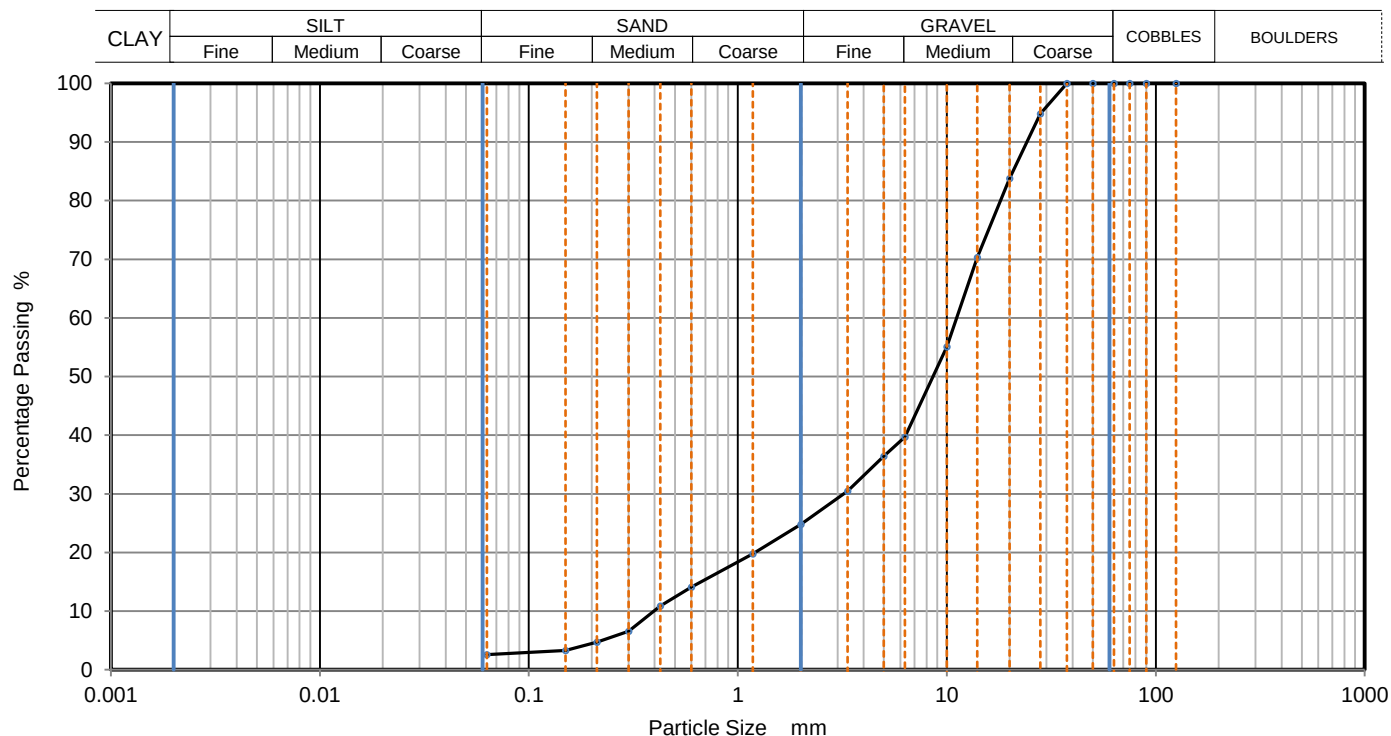
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation    |           |
|------------------|-----------|------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm | % Passing |
| 125              | 100       |                  |           |
| 90               | 100       |                  |           |
| 75               | 100       |                  |           |
| 63               | 100       |                  |           |
| 50               | 100       |                  |           |
| 37.5             | 100       |                  |           |
| 28               | 95        |                  |           |
| 20               | 84        |                  |           |
| 14               | 70        |                  |           |
| 10               | 55        |                  |           |
| 6.3              | 40        |                  |           |
| 5                | 36        |                  |           |
| 3.35             | 31        |                  |           |
| 2                | 25        |                  |           |
| 1.18             | 20        |                  |           |
| 0.6              | 14        |                  |           |
| 0.425            | 11        |                  |           |
| 0.3              | 7         |                  |           |
| 0.212            | 5         |                  |           |
| 0.15             | 3         |                  |           |
| 0.063            | 3         |                  |           |

Dry Mass of sample, g 4771

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 75.2       |
| Sand               | 22.2       |
| Fines <0.063mm     | 2.6        |

| Grading Analysis       |     |
|------------------------|-----|
| D100                   | mm  |
| D60                    | mm  |
| D30                    | mm  |
| D10                    | mm  |
| Uniformity Coefficient | 28  |
| Curvature Coefficient  | 2.3 |

### Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Date: 20/09/2016

2519

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MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH5

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 1

Project No. 52527 Client Ian Farmer Associates

Depth 0.15 m

Soil Description Brown slightly clayey silty very gravelly SAND (gravel is fmc and sub-angular to sub-rounded)

Sample Type B

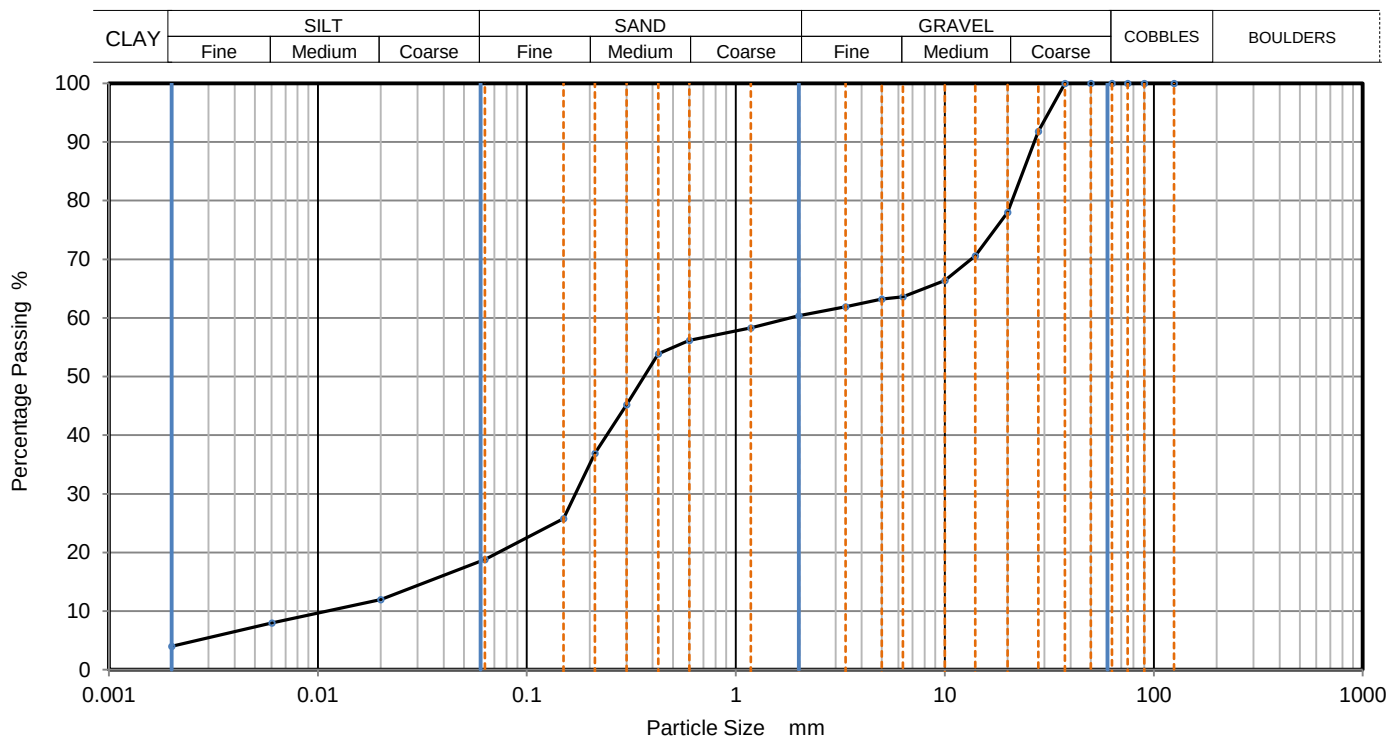
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation                                        |           |
|------------------|-----------|------------------------------------------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm                                     | % Passing |
| 125              | 100       | 0.0200                                               | 12        |
| 90               | 100       | 0.0060                                               | 8         |
| 75               | 100       | 0.0020                                               | 4         |
| 63               | 100       |                                                      |           |
| 50               | 100       |                                                      |           |
| 37.5             | 100       |                                                      |           |
| 28               | 92        |                                                      |           |
| 20               | 78        |                                                      |           |
| 14               | 71        |                                                      |           |
| 10               | 66        |                                                      |           |
| 6.3              | 64        |                                                      |           |
| 5                | 63        |                                                      |           |
| 3.35             | 62        |                                                      |           |
| 2                | 60        |                                                      |           |
| 1.18             | 58        |                                                      |           |
| 0.6              | 56        | Particle density (assumed)<br>2.70 Mg/m <sup>3</sup> |           |
| 0.425            | 54        |                                                      |           |
| 0.3              | 45        |                                                      |           |
| 0.212            | 37        |                                                      |           |
| 0.15             | 26        |                                                      |           |
| 0.063            | 19        |                                                      |           |

Dry Mass of sample, g 2854

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 39.6       |
| Sand               | 41.5       |
| Silt               | 14.8       |
| Clay               | 4.1        |

| Grading Analysis       |           |
|------------------------|-----------|
| D100                   | mm        |
| D60                    | mm 1.82   |
| D30                    | mm 0.171  |
| D10                    | mm 0.0107 |
| Uniformity Coefficient | 170       |
| Curvature Coefficient  | 1.5       |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Date: 20/09/2016

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH5

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 3

Project No. 52527 Client Ian Farmer Associates

Depth 1.50 m

Soil Description Brown silty clayey gravelly SAND (gravel is fmc and sub-angular)

Sample Type B

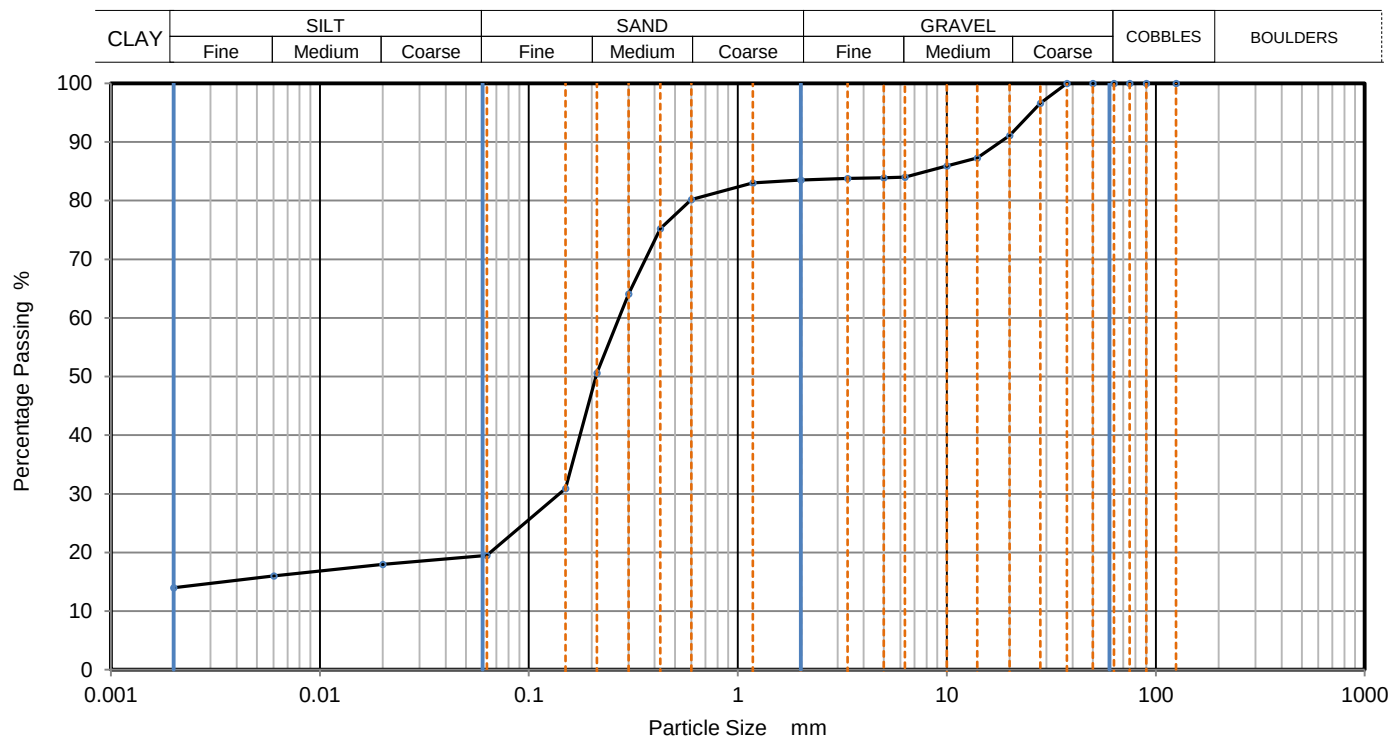
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation                                        |           |
|------------------|-----------|------------------------------------------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm                                     | % Passing |
| 125              | 100       | 0.0200                                               | 18        |
| 90               | 100       | 0.0060                                               | 16        |
| 75               | 100       | 0.0020                                               | 14        |
| 63               | 100       |                                                      |           |
| 50               | 100       |                                                      |           |
| 37.5             | 100       |                                                      |           |
| 28               | 97        |                                                      |           |
| 20               | 91        |                                                      |           |
| 14               | 87        |                                                      |           |
| 10               | 86        |                                                      |           |
| 6.3              | 84        |                                                      |           |
| 5                | 84        |                                                      |           |
| 3.35             | 84        |                                                      |           |
| 2                | 84        |                                                      |           |
| 1.18             | 83        |                                                      |           |
| 0.6              | 80        | Particle density (assumed)<br>2.70 Mg/m <sup>3</sup> |           |
| 0.425            | 75        |                                                      |           |
| 0.3              | 64        |                                                      |           |
| 0.212            | 51        |                                                      |           |
| 0.15             | 31        |                                                      |           |
| 0.063            | 20        |                                                      |           |

Dry Mass of sample, g 1472

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 16.5       |
| Sand               | 64.0       |
| Silt               | 5.9        |
| Clay               | 13.6       |

| Grading Analysis       |         |
|------------------------|---------|
| D100                   | mm      |
| D60                    | mm 0.27 |
| D30                    | mm 0.14 |
| D10                    | mm      |
| Uniformity Coefficient |         |
| Curvature Coefficient  |         |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



**K4 Soils Laboratory**  
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Initials: J.P

Date: 20/09/2016

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH6

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 3

Project No. 52527 Client Ian Farmer Associates

Depth 2.00 m

Soil Description Brown silty clayey gravelly SAND (gravel is fmc and sub-angular to sub-rounded)

Sample Type B

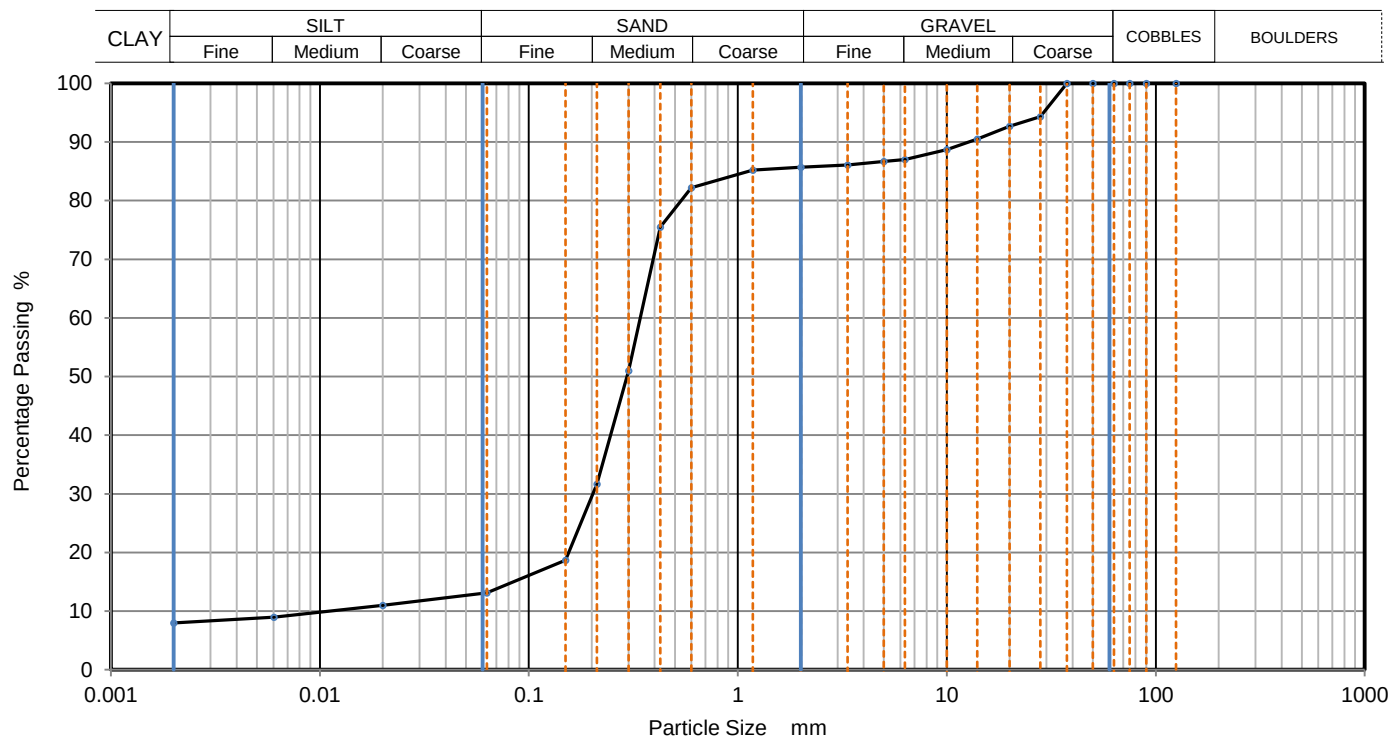
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation                                        |           |
|------------------|-----------|------------------------------------------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm                                     | % Passing |
| 125              | 100       | 0.0200                                               | 11        |
| 90               | 100       | 0.0060                                               | 9         |
| 75               | 100       | 0.0020                                               | 8         |
| 63               | 100       |                                                      |           |
| 50               | 100       |                                                      |           |
| 37.5             | 100       |                                                      |           |
| 28               | 94        |                                                      |           |
| 20               | 93        |                                                      |           |
| 14               | 91        |                                                      |           |
| 10               | 89        |                                                      |           |
| 6.3              | 87        |                                                      |           |
| 5                | 87        |                                                      |           |
| 3.35             | 86        |                                                      |           |
| 2                | 86        |                                                      |           |
| 1.18             | 85        |                                                      |           |
| 0.6              | 82        | Particle density (assumed)<br>2.70 Mg/m <sup>3</sup> |           |
| 0.425            | 76        |                                                      |           |
| 0.3              | 51        |                                                      |           |
| 0.212            | 32        |                                                      |           |
| 0.15             | 19        |                                                      |           |
| 0.063            | 13        |                                                      |           |

Dry Mass of sample, g 2304

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 14.3       |
| Sand               | 72.6       |
| Silt               | 5.2        |
| Clay               | 7.9        |

| Grading Analysis       |            |
|------------------------|------------|
| D100                   | mm         |
| D60                    | mm 0.341   |
| D30                    | mm 0.203   |
| D10                    | mm 0.00856 |
| Uniformity Coefficient | 40         |
| Curvature Coefficient  | 14         |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Initials: J.P

Date: 20/09/2016

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH7

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 4

Project No. 52527 Client Ian Farmer Associates

Depth 3.25 m

Soil Description Brown and occasional orange brown silty clayey SAND with rare fine gravel

Sample Type B

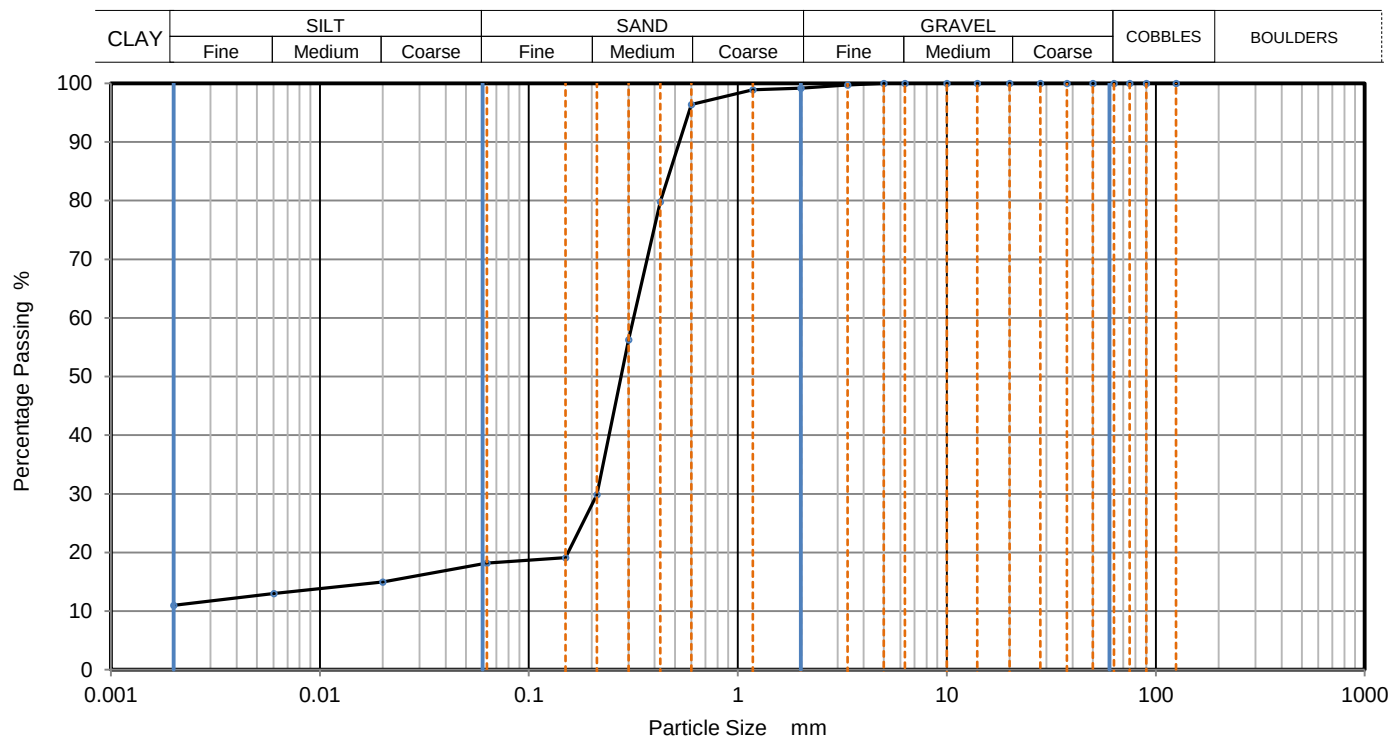
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation                                        |           |
|------------------|-----------|------------------------------------------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm                                     | % Passing |
| 125              | 100       | 0.0200                                               | 15        |
| 90               | 100       | 0.0060                                               | 13        |
| 75               | 100       | 0.0020                                               | 11        |
| 63               | 100       |                                                      |           |
| 50               | 100       |                                                      |           |
| 37.5             | 100       |                                                      |           |
| 28               | 100       |                                                      |           |
| 20               | 100       |                                                      |           |
| 14               | 100       |                                                      |           |
| 10               | 100       |                                                      |           |
| 6.3              | 100       |                                                      |           |
| 5                | 100       |                                                      |           |
| 3.35             | 100       |                                                      |           |
| 2                | 99        |                                                      |           |
| 1.18             | 99        |                                                      |           |
| 0.6              | 96        | Particle density (assumed)<br>2.70 Mg/m <sup>3</sup> |           |
| 0.425            | 80        |                                                      |           |
| 0.3              | 56        |                                                      |           |
| 0.212            | 30        |                                                      |           |
| 0.15             | 19        |                                                      |           |
| 0.063            | 18        |                                                      |           |

Dry Mass of sample, g 1092

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 0.8        |
| Sand               | 81.0       |
| Silt               | 7.0        |
| Clay               | 11.2       |

| Grading Analysis       |          |
|------------------------|----------|
| D100                   | mm       |
| D60                    | mm 0.317 |
| D30                    | mm 0.212 |
| D10                    | mm       |
| Uniformity Coefficient |          |
| Curvature Coefficient  |          |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Checked and Approved

Initials: J.P

Date: 20/09/2016

MSF-5-R3

Figure A3.1



## PARTICLE SIZE DISTRIBUTION

Job Ref 21488

Borehole/Pit No. BH7

Site Name University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB

Sample No. 5

Project No. 52527 Client Ian Farmer Associates

Depth 4.50 m

Soil Description Brown clayey very gravelly SAND (gravel is fmc and sub-rounded to angular)

Sample Type B

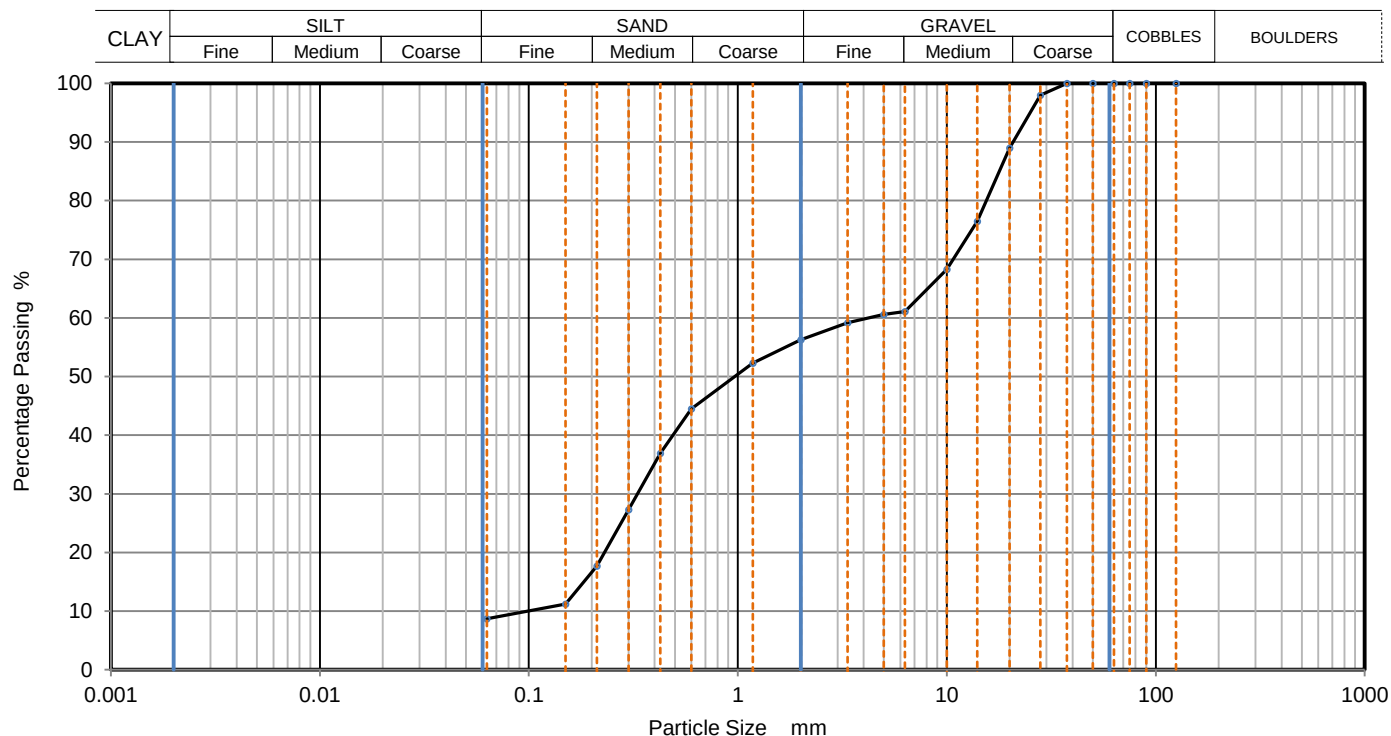
Samples received 26/08/2016

Schedules received 26/08/2016

Test Method BS1377:Part 2: 1990, clause 9.0

Project started 26/08/2016

Date tested 13/09/2016



| Sieving          |           | Sedimentation    |           |
|------------------|-----------|------------------|-----------|
| Particle Size mm | % Passing | Particle Size mm | % Passing |
| 125              | 100       |                  |           |
| 90               | 100       |                  |           |
| 75               | 100       |                  |           |
| 63               | 100       |                  |           |
| 50               | 100       |                  |           |
| 37.5             | 100       |                  |           |
| 28               | 98        |                  |           |
| 20               | 89        |                  |           |
| 14               | 77        |                  |           |
| 10               | 68        |                  |           |
| 6.3              | 61        |                  |           |
| 5                | 61        |                  |           |
| 3.35             | 59        |                  |           |
| 2                | 56        |                  |           |
| 1.18             | 52        |                  |           |
| 0.6              | 45        |                  |           |
| 0.425            | 37        |                  |           |
| 0.3              | 27        |                  |           |
| 0.212            | 18        |                  |           |
| 0.15             | 11        |                  |           |
| 0.063            | 9         |                  |           |

Dry Mass of sample, g 3023

| Sample Proportions | % dry mass |
|--------------------|------------|
| Very coarse        | 0.0        |
| Gravel             | 43.7       |
| Sand               | 47.6       |
| Fines <0.063mm     | 8.7        |

| Grading Analysis       |      |
|------------------------|------|
| D100                   | mm   |
| D60                    | mm   |
| D30                    | mm   |
| D10                    | mm   |
| Uniformity Coefficient | 43   |
| Curvature Coefficient  | 0.26 |

Remarks

Preparation and testing in accordance with BS1377 unless noted below



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Initials: J.P

Date: 20/09/2016

2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3

Figure A3.1

|                                                                                                                                                                                                                                                                                                                                                                    |                                                              |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         |                   |      |                    |            |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------|------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|------|----|--------|----------|-----|--------------|---------|-------------------|------|--------------------|------------|--|
|                                                                                                                                                                                                                                                                                    |                                                              |       |      |      | <b>Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure</b><br><b>Summary of Results</b><br><br><b>Tests carried out in accordance with BS1377:Part 7 : 1990 clause 8 or 9 as appropriate to test</b> |           |         |      |    |        |          |     |              |         |                   |      |                    |            |  |
| Job No.<br>21488                                                                                                                                                                                                                                                                                                                                                   |                                                              |       |      |      | Project Name<br>University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue,<br>Reading RG2 7HB                                                                                                                           |           |         |      |    |        |          |     |              |         | Programme         |      |                    |            |  |
|                                                                                                                                                                                                                                                                                                                                                                    |                                                              |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         | Samples received  |      |                    | 26/08/2016 |  |
|                                                                                                                                                                                                                                                                                                                                                                    |                                                              |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         | Schedule received |      |                    | 26/08/2016 |  |
| Project No.<br>52527                                                                                                                                                                                                                                                                                                                                               |                                                              |       |      |      | Client<br>Ian Farmer Associates                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         | Project started   |      |                    | 26/08/2016 |  |
|                                                                                                                                                                                                                                                                                                                                                                    |                                                              |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         | Testing Started   |      |                    | 13/09/2016 |  |
| Hole No.                                                                                                                                                                                                                                                                                                                                                           | Sample                                                       |       |      |      | Soil Description                                                                                                                                                                                                                          | Test Type | Density |      | w  | Length | Diameter | σ3  | At failure   |         |                   |      | Remarks            |            |  |
|                                                                                                                                                                                                                                                                                                                                                                    | Ref                                                          | Top   | Base | Type |                                                                                                                                                                                                                                           |           | bulk    | dry  |    |        |          |     | Axial strain | σ1 - σ3 | CU                | Mode |                    |            |  |
|                                                                                                                                                                                                                                                                                                                                                                    |                                                              |       |      |      |                                                                                                                                                                                                                                           |           | Mg/m3   |      | %  | mm     | mm       | kPa | %            | kPa     | kPa               |      |                    |            |  |
| BH1                                                                                                                                                                                                                                                                                                                                                                | 1                                                            | 5.00  | -    | U    | High strength fissured dark grey silty CLAY                                                                                                                                                                                               | UU        | 1.99    | 1.54 | 29 | 198    | 102      | 100 | 7.1          | 159     | 79                | B    |                    |            |  |
| BH1                                                                                                                                                                                                                                                                                                                                                                | 2                                                            | 8.00  | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                            | UU        | 2.06    | 1.63 | 26 | 198    | 102      | 160 | 12           | 245     | 122               | C    | Slightly disturbed |            |  |
| BH1                                                                                                                                                                                                                                                                                                                                                                | 3                                                            | 11.00 | -    | U    | Very high strength fissured dark grey silty CLAY with scattered shell deposits and light grey fine sand partings                                                                                                                          | UU        | 2.07    | 1.68 | 24 | 198    | 102      | 220 | 14           | 391     | 196               | C    | Slightly disturbed |            |  |
| BH1                                                                                                                                                                                                                                                                                                                                                                | 4                                                            | 14.00 | -    | U    | Very high strength fissured dark grey silty CLAY with scattered shell deposits and light grey fine sand partings                                                                                                                          | UU        | 1.86    | 1.52 | 23 | 198    | 102      | 280 | 14           | 371     | 186               | C    | Very disturbed     |            |  |
| BH2                                                                                                                                                                                                                                                                                                                                                                | 1                                                            | 5.00  | -    | U    | High strength fissured dark grey silty CLAY                                                                                                                                                                                               | UU        | 2.03    | 1.59 | 27 | 198    | 102      | 100 | 9.1          | 152     | 76                | C    |                    |            |  |
| BH2                                                                                                                                                                                                                                                                                                                                                                | 2                                                            | 8.00  | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                            | UU        | 2.05    | 1.65 | 24 | 198    | 102      | 160 | 16           | 254     | 127               | C    |                    |            |  |
| BH2                                                                                                                                                                                                                                                                                                                                                                | 3                                                            | 11.00 | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                            | UU        | 2.06    | 1.70 | 21 | 198    | 102      | 220 | 6.6          | 294     | 147               | B    | Disturbed          |            |  |
| BH2                                                                                                                                                                                                                                                                                                                                                                | 4                                                            | 14.00 | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                       | UU        | 1.93    | 1.59 | 22 | 198    | 102      | 280 | 17           | 409     | 204               | C    | Disturbed          |            |  |
| BH3                                                                                                                                                                                                                                                                                                                                                                | 1                                                            | 6.50  | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                            | UU        | 1.97    | 1.62 | 22 | 198    | 102      | 130 | 14           | 197     | 98                | C    |                    |            |  |
| BH3                                                                                                                                                                                                                                                                                                                                                                | 2                                                            | 9.50  | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                            | UU        | 2.09    | 1.68 | 24 | 198    | 102      | 190 | 12           | 289     | 145               | C    |                    |            |  |
| BH3                                                                                                                                                                                                                                                                                                                                                                | 3                                                            | 12.50 | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings                                                                                                                                                       | UU        | 2.08    | 1.70 | 22 | 198    | 102      | 250 | 7.6          | 440     | 220               | B    | Disturbed          |            |  |
| BH3                                                                                                                                                                                                                                                                                                                                                                | 4                                                            | 15.50 | -    | U    | Extremely high strength fissured dark grey silty CLAY with scattered shell deposits light grey fine sand partings                                                                                                                         | UU        | 2.06    | 1.67 | 23 | 198    | 102      | 310 | 8.1          | 625     | 313               | B    |                    |            |  |
| BH3                                                                                                                                                                                                                                                                                                                                                                | 5                                                            | 18.50 | -    | U    | Extremely high strength fissured dark grey slightly sandy silty CLAY                                                                                                                                                                      | UU        | 1.95    | 1.66 | 18 | 198    | 102      | 370 | 9.1          | 684     | 342               | B    |                    |            |  |
| Legend    UU - single stage test (single and multiple specimens)    σ3    Cell pressure    Mode of failure ;    B - Brittle<br>UUM - Multistage test on a single specimen    σ1 - σ3    Maximum corrected deviator stress    P - Plastic<br>suffix R - remoulded or recompacted    cu    Undrained shear strength, ½ (σ1 - σ3)    C - Compound                     |                                                              |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         |                   |      |                    |            |  |
| <div><div></div><div><b>Test Report by K4 SOILS LABORATORY</b><br/>Unit 8 Olds Close Olds Approach<br/>Watford Herts WD18 9RU<br/>Tel: 01923 711 288<br/>Email: james@k4soils.com</div><div><b>Checked and Approved</b><br/><br/>Initials: J.P<br/>Date: 20/09/2016</div></div> |                                                              |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         |                   |      |                    |            |  |
| 2519                                                                                                                                                                                                                                                                                                                                                               | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) |       |      |      |                                                                                                                                                                                                                                           |           |         |      |    |        |          |     |              |         |                   |      | MSF-5-R7b          |            |  |

Figure A3.1

|                                                                                                                                                                                                                                                                                                                                                                        |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     |                   |         |            |      |                    |         |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------|------|------|------------------------------------------------------------------------------------------------------------------|-----------|---------|------|----|--------|----------|-----|-------------------|---------|------------|------|--------------------|---------|--|
|                                                                                                                                                                                                                                                                                        |                                                              |       |      |      | Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure<br>Summary of Results   |           |         |      |    |        |          |     |                   |         |            |      |                    |         |  |
| Job No.<br>21488                                                                                                                                                                                                                                                                                                                                                       |                                                              |       |      |      | Project Name<br>University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue,<br>Reading RG2 7HB  |           |         |      |    |        |          |     | Programme         |         |            |      |                    | Remarks |  |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     | Samples received  |         | 26/08/2016 |      |                    |         |  |
| Project No.<br>52527                                                                                                                                                                                                                                                                                                                                                   |                                                              |       |      |      | Client<br>Ian Farmer Associates                                                                                  |           |         |      |    |        |          |     | Schedule received |         | 26/08/2016 |      |                    |         |  |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     | Project started   |         | 26/08/2016 |      |                    |         |  |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     | Testing Started   |         | 13/09/2016 |      |                    |         |  |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     |                   |         |            |      |                    |         |  |
| Hole No.                                                                                                                                                                                                                                                                                                                                                               | Sample                                                       |       |      |      | Soil Description                                                                                                 | Test Type | Density |      | w  | Length | Diameter | σ3  | At failure        |         |            |      | Remarks            |         |  |
|                                                                                                                                                                                                                                                                                                                                                                        | Ref                                                          | Top   | Base | Type |                                                                                                                  |           | bulk    | dry  |    |        |          |     | Axial strain      | σ1 - σ3 | CU         | Mode |                    |         |  |
|                                                                                                                                                                                                                                                                                                                                                                        |                                                              |       |      |      |                                                                                                                  |           | Mg/m3   |      | %  | mm     | mm       | kPa | %                 | kPa     | kPa        |      |                    |         |  |
| BH4                                                                                                                                                                                                                                                                                                                                                                    | 1                                                            | 6.50  | -    | U    | High strength fissured dark grey silty CLAY                                                                      | UU        | 2.03    | 1.64 | 24 | 198    | 102      | 130 | 12                | 273     | 137        | C    |                    |         |  |
| BH4                                                                                                                                                                                                                                                                                                                                                                    | 2                                                            | 9.50  | -    | U    | High strength fissured dark grey silty CLAY                                                                      | UU        | 2.08    | 1.68 | 24 | 198    | 102      | 190 | 4.0               | 202     | 101        | B    |                    |         |  |
| BH4                                                                                                                                                                                                                                                                                                                                                                    | 3                                                            | 12.50 | -    | U    | Very high strength fissured dark grey silty CLAY with scattered shell fragments light grey fine sand partings    | UU        | 2.03    | 1.65 | 23 | 198    | 102      | 250 | 13                | 330     | 165        | C    |                    |         |  |
| BH4                                                                                                                                                                                                                                                                                                                                                                    | 4                                                            | 15.50 | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings                              | UU        | 1.96    | 1.59 | 23 | 198    | 102      | 310 | 8.6               | 462     | 231        | B    | Very disturbed     |         |  |
| BH4                                                                                                                                                                                                                                                                                                                                                                    | 5                                                            | 18.50 | -    | U    | Very high strength slightly fissured dark grey sandy silty CLAY                                                  | UU        | 1.94    | 1.66 | 17 | 198    | 102      | 370 | 13                | 593     | 297        | C    | Disturbed          |         |  |
| BH5                                                                                                                                                                                                                                                                                                                                                                    | 1                                                            | 7.00  | -    | U    | High strength fissured dark grey silty CLAY                                                                      | UU        | 2.02    | 1.59 | 27 | 198    | 102      | 140 | 13                | 190     | 95         | C    | Disturbed          |         |  |
| BH5                                                                                                                                                                                                                                                                                                                                                                    | 2                                                            | 10.00 | -    | U    | High strength fissured dark grey silty CLAY with light grey fine sand partings                                   | UU        | 2.10    | 1.72 | 22 | 198    | 102      | 200 | 8.1               | 277     | 138        | B    |                    |         |  |
| BH5                                                                                                                                                                                                                                                                                                                                                                    | 3                                                            | 13.00 | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings                              | UU        | 2.10    | 1.72 | 23 | 198    | 102      | 260 | 9.6               | 351     | 175        | B    |                    |         |  |
| BH5                                                                                                                                                                                                                                                                                                                                                                    | 4                                                            | 16.00 | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings                              | UU        | 2.00    | 1.64 | 22 | 198    | 102      | 320 | 13                | 332     | 166        | C    | Slightly disturbed |         |  |
| BH5                                                                                                                                                                                                                                                                                                                                                                    | 5                                                            | 19.00 | -    | U    | Very high strength fissured dark grey silty CLAY with scattered shell fragment and light grey fine sand partings | UU        | 1.97    | 1.61 | 22 | 198    | 102      | 380 | 9.6               | 453     | 227        | B    | Very disturbed     |         |  |
| BH6                                                                                                                                                                                                                                                                                                                                                                    | 1                                                            | 6.50  | -    | U    | High strength fissured dark grey silty CLAY                                                                      | UU        | 1.94    | 1.50 | 29 | 198    | 102      | 130 | 9.1               | 161     | 81         | B    |                    |         |  |
| BH6                                                                                                                                                                                                                                                                                                                                                                    | 2                                                            | 9.50  | -    | U    | Very high strength fissured dark grey silty CLAY with rare shell fragments                                       | UU        | 2.09    | 1.71 | 22 | 198    | 102      | 190 | 11                | 313     | 156        | C    |                    |         |  |
| BH6                                                                                                                                                                                                                                                                                                                                                                    | 3                                                            | 12.50 | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings                              | UU        | 2.03    | 1.63 | 24 | 198    | 102      | 250 | 11                | 339     | 170        | C    | Disturbed          |         |  |
| Legend    UU - single stage test (single and multiple specimens)    σ3    Cell pressure    Mode of failure ;    B - Brittle<br>UUM - Multistage test on a single specimen    σ1 - σ3    Maximum corrected deviator stress    P - Plastic<br>suffix R - remoulded or recompacted    cu    Undrained shear strength, ½ (σ1 - σ3)    C - Compound                         |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     |                   |         |            |      |                    |         |  |
| <div><div><div>UKAS TESTING</div></div><div>Test Report by K4 SOILS LABORATORY<br/>Unit 8 Olds Close Olds Approach<br/>Watford Herts WD18 9RU<br/>Tel: 01923 711 288<br/>Email: james@k4soils.com</div><div>Checked and Approved<br/>Initials: J.P<br/>Date: 20/09/2016</div></div> |                                                              |       |      |      |                                                                                                                  |           |         |      |    |        |          |     |                   |         |            |      |                    |         |  |
| 2519                                                                                                                                                                                                                                                                                                                                                                   | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) |       |      |      |                                                                                                                  |           |         |      |    |        |          |     |                   |         |            |      | MSF-5-R7b          |         |  |

Figure A3.1

|                       |        | <b>Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure</b><br><b>Summary of Results</b> |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |
|-------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------|------|------|---------------------------------------------------------------------------------------------------|-----------------|---------------|------|----|------------|----------|-------------------|----------------|---------------------------|--------|------|-----------|
| <b>Tests carried out in accordance with BS1377:Part 7 : 1990 clause 8 or 9 as appropriate to test</b> |        |                                                                                                                              |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |
| Job No.                                                                                               |        | Project Name                                                                                                                 |      |      |                                                                                                   |                 |               |      |    |            |          | Programme         |                |                           |        |      |           |
| 21488                                                                                                 |        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB                                 |      |      |                                                                                                   |                 |               |      |    |            |          | Samples received  |                | 26/08/2016                |        |      |           |
| Project No.                                                                                           |        | Client                                                                                                                       |      |      |                                                                                                   |                 |               |      |    |            |          | Schedule received |                | 26/08/2016                |        |      |           |
| 52527                                                                                                 |        | Ian Farmer Associates                                                                                                        |      |      |                                                                                                   |                 |               |      |    |            |          | Project started   |                | 26/08/2016                |        |      |           |
|                                                                                                       |        |                                                                                                                              |      |      |                                                                                                   | Testing Started |               |      |    | 13/09/2016 |          |                   |                |                           |        |      |           |
| Hole No.                                                                                              | Sample |                                                                                                                              |      |      | Soil Description                                                                                  | Test Type       | Density       |      | w  | Length     | Diameter | $\sigma_3$        | At failure     |                           |        |      | Remarks   |
|                                                                                                       | Ref    | Top                                                                                                                          | Base | Type |                                                                                                   |                 | bulk<br>Mg/m3 | dry  |    |            |          |                   | Axial strain % | $\sigma_1 - \sigma_3$ kPa | CU kPa | Mode |           |
| BH6                                                                                                   | 4      | 15.50                                                                                                                        | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings               | UU              | 2.01          | 1.62 | 24 | 198        | 102      | 310               | 8.6            | 428                       | 214    | B    | Disturbed |
| BH6                                                                                                   | 5      | 18.50                                                                                                                        | -    | U    | Very high strength fissured dark grey sandy silty CLAY                                            | UU              | 1.92          | 1.63 | 17 | 198        | 102      | 370               | 9.6            | 507                       | 253    | C    | Disturbed |
| BH7                                                                                                   | 1      | 1.20                                                                                                                         | -    | U    | Very high strength slightly fissured orangish brown mottled bluish grey slightly sandy silty CLAY | UU              | 2.04          | 1.73 | 18 | 198        | 102      | 24                | 2.0            | 302                       | 151    | B    |           |
| BH7                                                                                                   | 2      | 6.00                                                                                                                         | -    | U    | High strength fissured dark grey silty CLAY                                                       | UU              | 1.99          | 1.54 | 29 | 198        | 102      | 120               | 9.6            | 246                       | 123    | C    | Disturbed |
| BH7                                                                                                   | 3      | 9.00                                                                                                                         | -    | U    | High strength fissured dark grey silty CLAY                                                       | UU              | 2.02          | 1.60 | 27 | 198        | 102      | 180               | 11             | 186                       | 93     | C    |           |
| BH7                                                                                                   | 4      | 12.00                                                                                                                        | -    | U    | Very high strength fissured dark grey silty CLAY                                                  | UU              | 2.10          | 1.73 | 21 | 198        | 102      | 240               | 9.6            | 342                       | 171    | C    | Disturbed |
| BH7                                                                                                   | 5      | 15.00                                                                                                                        | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings               | UU              | 2.02          | 1.61 | 25 | 198        | 102      | 300               | 13             | 319                       | 160    | C    |           |
| BH7                                                                                                   | 6      | 18.00                                                                                                                        | -    | U    | Very high strength fissured dark grey silty CLAY with light grey fine sand partings               | UU              | 2.06          | 1.69 | 21 | 198        | 102      | 360               | 8.6            | 397                       | 198    | B    |           |
|                                                                                                       |        |                                                                                                                              |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |
|                                                                                                       |        |                                                                                                                              |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |
|                                                                                                       |        |                                                                                                                              |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |
|                                                                                                       |        |                                                                                                                              |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |
|                                                                                                       |        |                                                                                                                              |      |      |                                                                                                   |                 |               |      |    |            |          |                   |                |                           |        |      |           |

Legend
UU - single stage test (single and multiple specimens)
UUM - Multistage test on a single specimen
suffix R - remoulded or recompacted
 $\sigma_3$  Cell pressure
 $\sigma_1 - \sigma_3$  Maximum corrected deviator stress
cu Undrained shear strength,  $\frac{1}{2} (\sigma_1 - \sigma_3)$ 
Mode of failure ;
B - Brittle
P - Plastic
C - Compound

|                                                                                     |                                                                                                                                                          |  |                                                                  |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------|
|  | <b>Test Report by K4 SOILS LABORATORY</b><br>Unit 8 Olds Close Olds Approach<br>Watford Herts WD18 9RU<br>Tel: 01923 711 288<br>Email: james@k4soils.com |  | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 20/09/2016 |
|                                                                                     | 2519                                                                                                                                                     |  | MSF-5-R7b                                                        |
|                                                                                     | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)                                                                                             |  |                                                                  |

Figure A3.1



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |   |
|--------------------|------------|---|
| Job Ref            | 21488      |   |
| Borehole/Pit No.   | BH1        |   |
| Sample No.         | 1          |   |
| Depth              | 5.00       | m |
| Sample Type        | U          |   |
| Samples received   | 26/08/2016 |   |
| Schedules received | 26/08/2016 |   |
| Date of test       | 12/09/2016 |   |

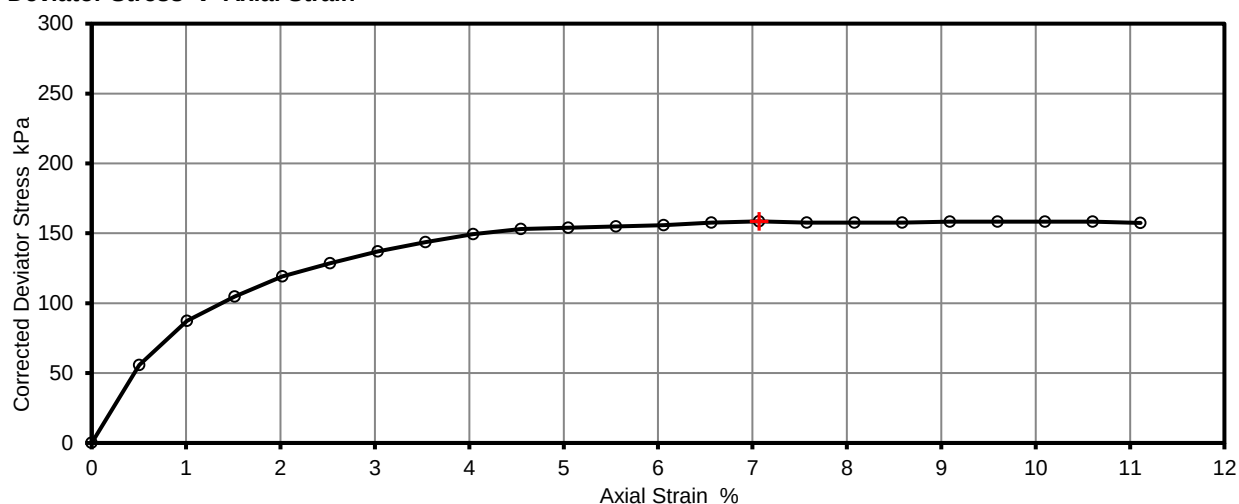
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

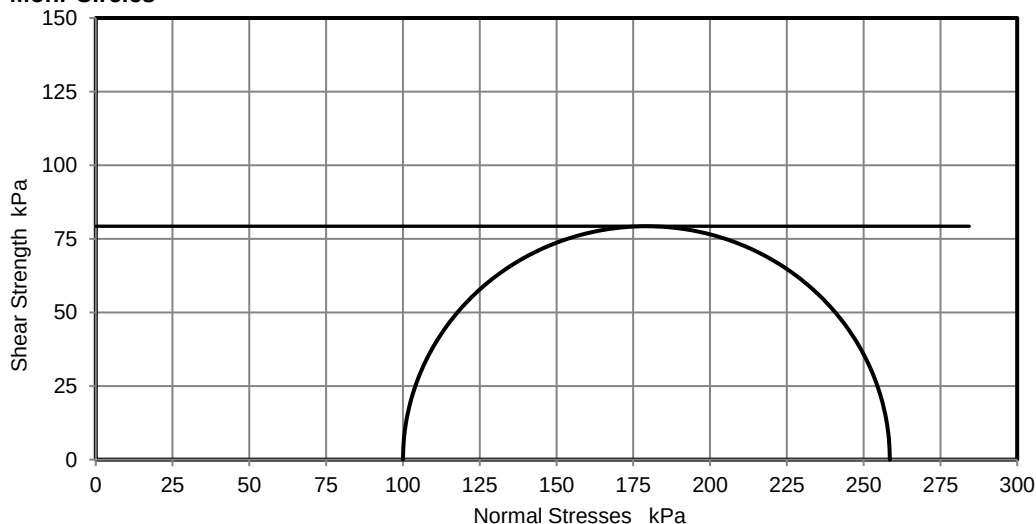
Position within sample

|                                             |         |                                          |
|---------------------------------------------|---------|------------------------------------------|
| Test Number                                 | 1       |                                          |
| Length                                      | 198.0   | mm                                       |
| Diameter                                    | 102.0   | mm                                       |
| Bulk Density                                | 1.99    | Mg/m3                                    |
| Moisture Content                            | 29      | %                                        |
| Dry Density                                 | 1.54    | Mg/m3                                    |
|                                             |         |                                          |
| Rate of Strain                              | 2.0     | %/min                                    |
| Cell Pressure                               | 100     | kPa                                      |
| Axial Strain                                | 7.1     | %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 159     | kPa                                      |
| Undrained Shear Strength, cu                | 79      | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle |                                          |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

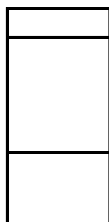
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH1        |
| Sample No.         | 2          |
| Depth              | 8.00 m     |
| Sample Type        | U          |
| Samples received   | 26/08/2016 |
| Schedules received | 26/08/2016 |
| Date of test       | 12/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

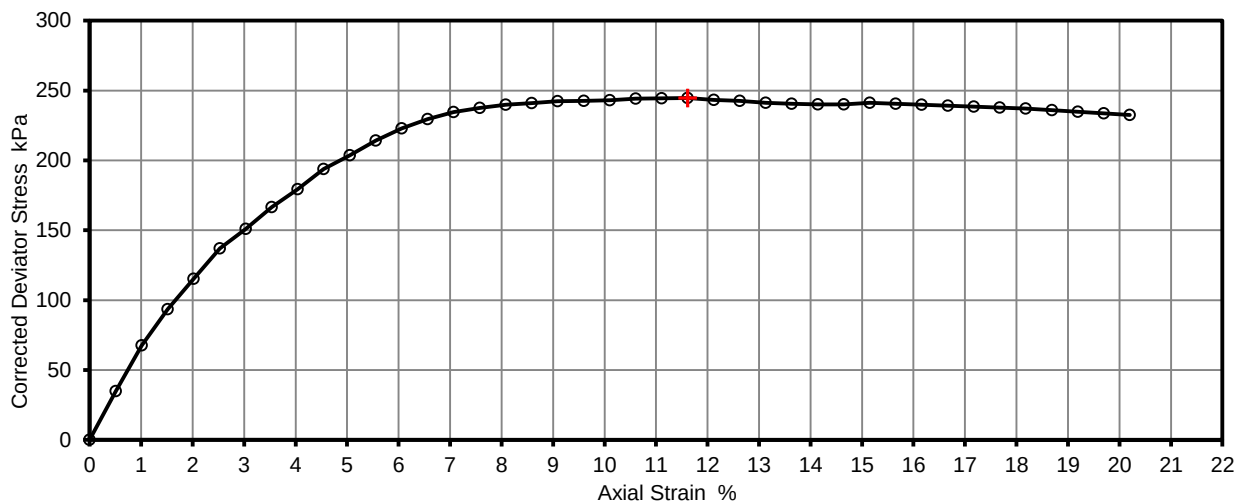
Slightly disturbed

Position within sample

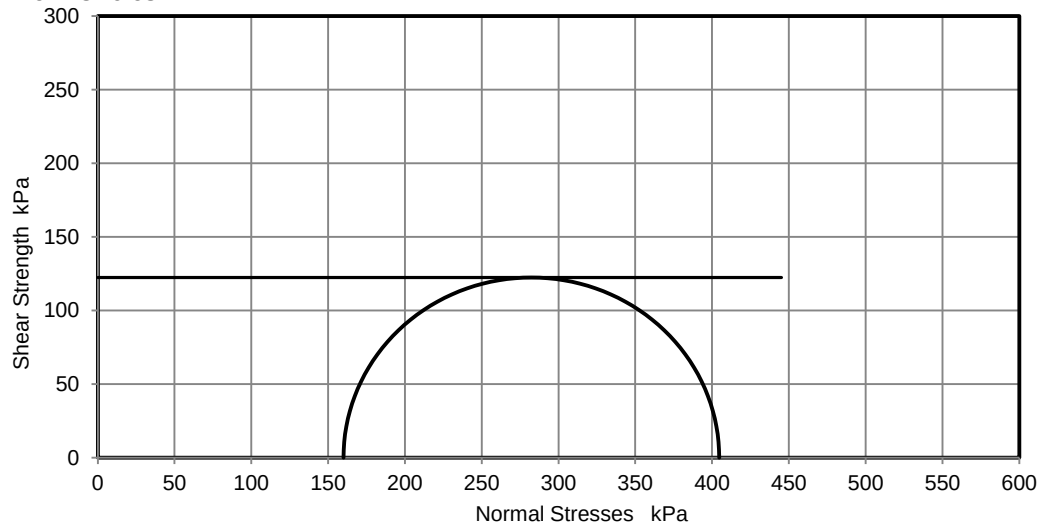


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.06 Mg/m3                                   |
| Moisture Content                             | 26 %                                         |
| Dry Density                                  | 1.63 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 160 kPa                                      |
| Axial Strain                                 | 11.6 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 245 kPa                                      |
| Undrained Shear Strength, cu                 | 122 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

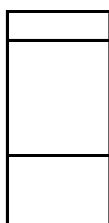
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH1        |
| Sample No.         | 3          |
| Depth              | 11.00 m    |
| Sample Type        | U          |
| Samples received   | 26/09/2016 |
| Schedules received | 26/09/2016 |
| Date of test       | 12/09/2016 |

|                  |                                                                                                                  |        |                       |
|------------------|------------------------------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB                     |        |                       |
| Project No.      | 52527                                                                                                            | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with scattered shell deposits and light grey fine sand partings |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                                                |        |                       |

## **Remarks**

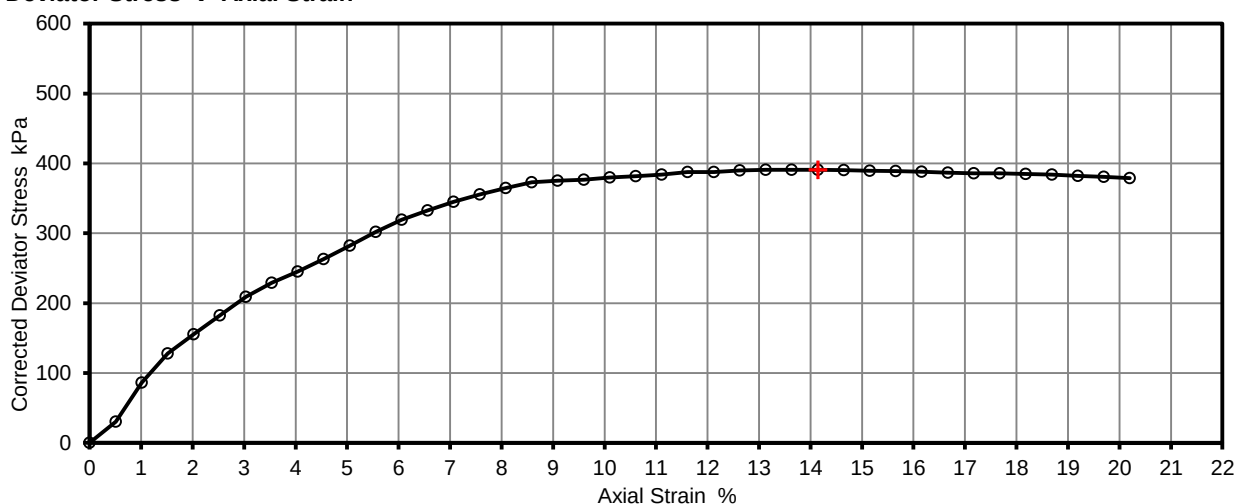
Slightly disturbed

Position within sample

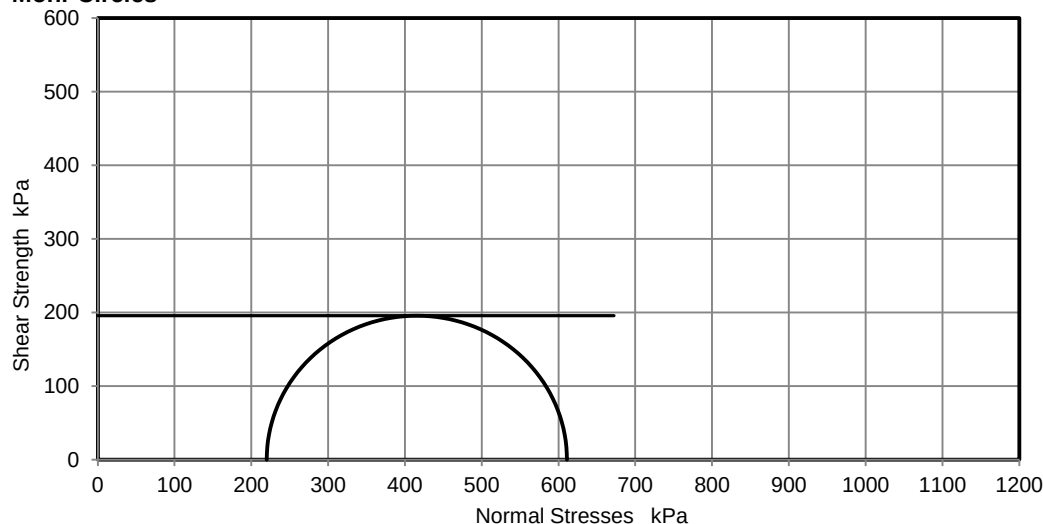


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.07 Mg/m3                                   |
| Moisture Content                             | 24 %                                         |
| Dry Density                                  | 1.68 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 220 kPa                                      |
| Axial Strain                                 | 14.1 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 391 kPa                                      |
| Undrained Shear Strength, cu                 | 196 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

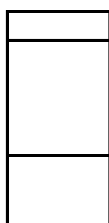
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH1        |
| Sample No.         | 4          |
| Depth              | 14.00 m    |
| Sample Type        | U          |
| Samples received   | 26/08/2016 |
| Schedules received | 26/08/2016 |
| Date of test       | 12/09/2016 |

|                  |                                                                                                                  |        |                       |
|------------------|------------------------------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB                     |        |                       |
| Project No.      | 52527                                                                                                            | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with scattered shell deposits and light grey fine sand partings |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                                                |        |                       |

## **Remarks**

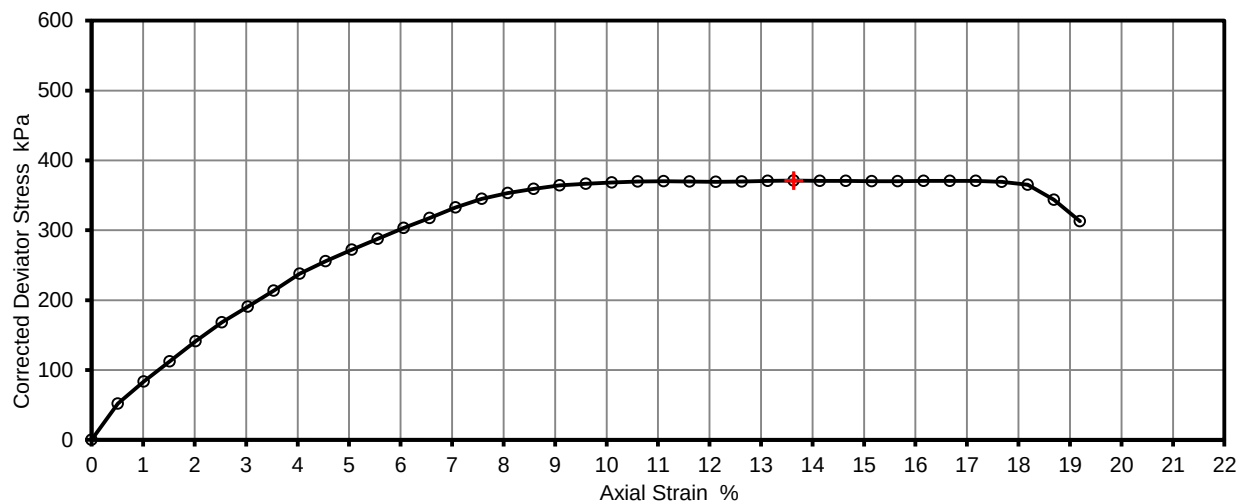
Very disturbed

Position within sample

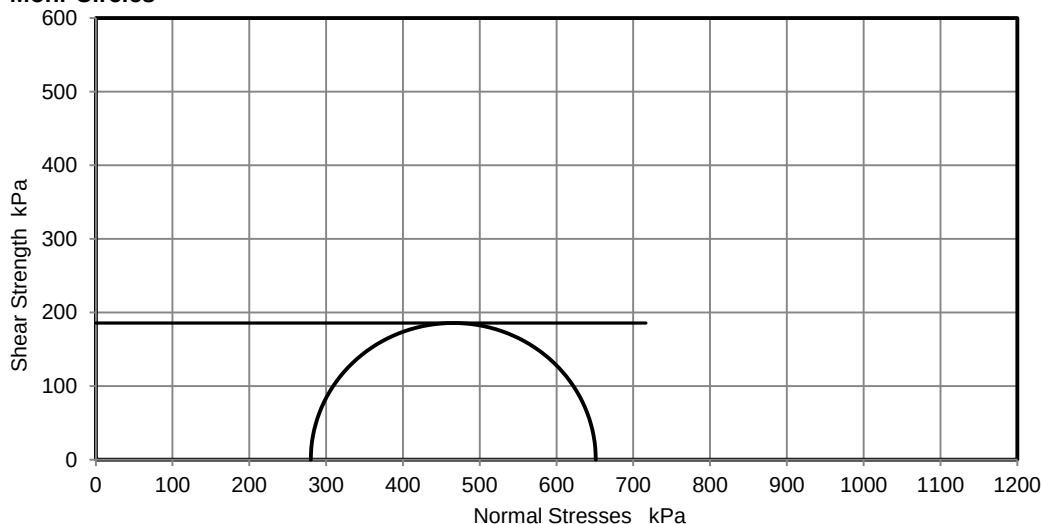


|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 1.86 Mg/m3                                   |
| Moisture Content                            | 23 %                                         |
| Dry Density                                 | 1.52 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 280 kPa                                      |
| Axial Strain                                | 13.6 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 371 kPa                                      |
| Undrained Shear Strength, cu                | 186 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH2        |
| Sample No.         | 1          |
| Depth              | 5.00 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 12/09/2016 |

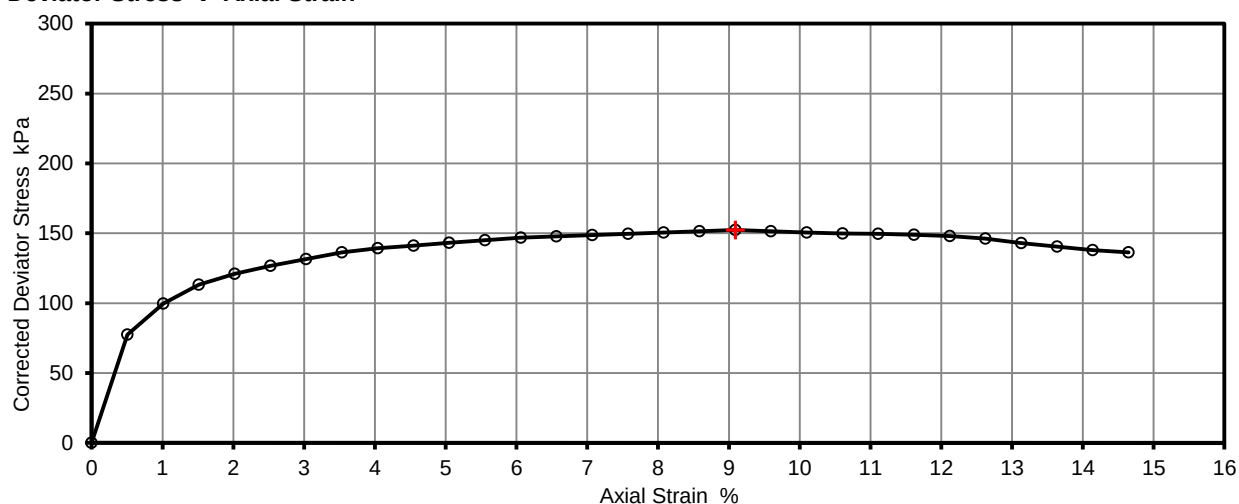
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

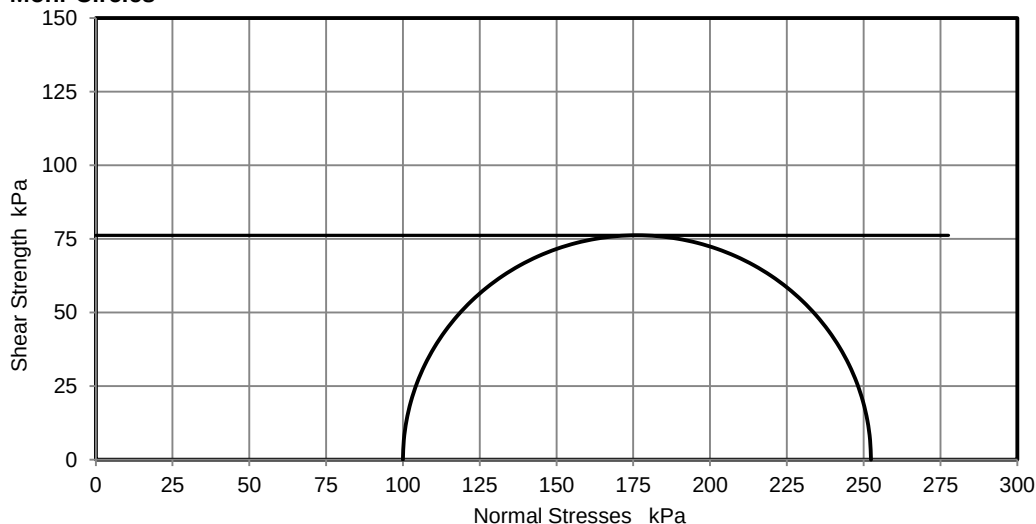
Position within sample

|                                             |                                             |
|---------------------------------------------|---------------------------------------------|
| Test Number                                 | 1                                           |
| Length                                      | 198.0 mm                                    |
| Diameter                                    | 102.0 mm                                    |
| Bulk Density                                | 2.03 Mg/m3                                  |
| Moisture Content                            | 27 %                                        |
| Dry Density                                 | 1.59 Mg/m3                                  |
| Rate of Strain                              | 2.0 %/min                                   |
| Cell Pressure                               | 100 kPa                                     |
| Axial Strain                                | 9.1 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 152 kPa                                     |
| Undrained Shear Strength, cu                | 76 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                    |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH2        |
| Sample No.         | 2          |
| Depth              | 8.00 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

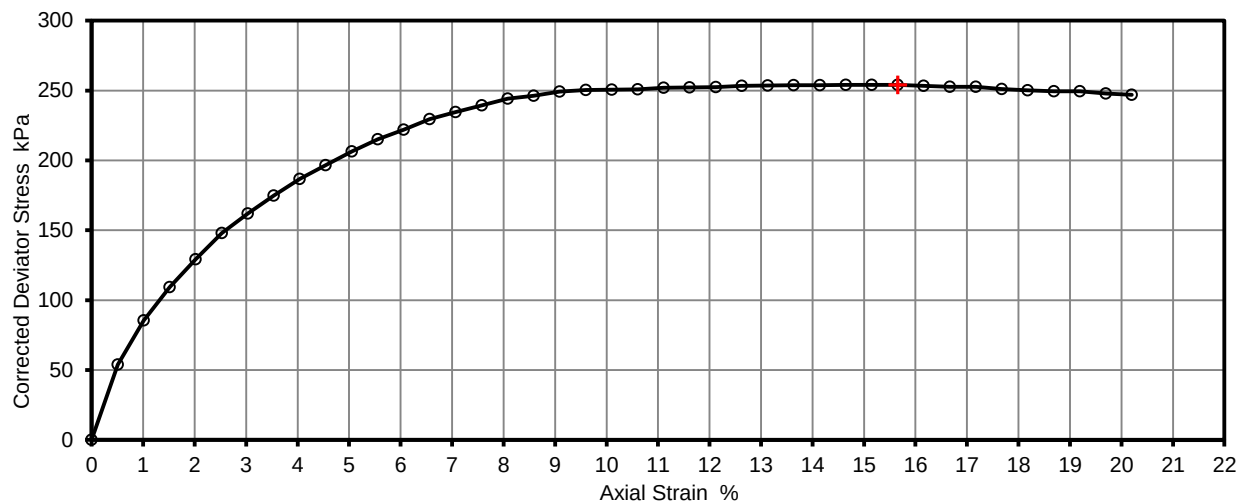
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

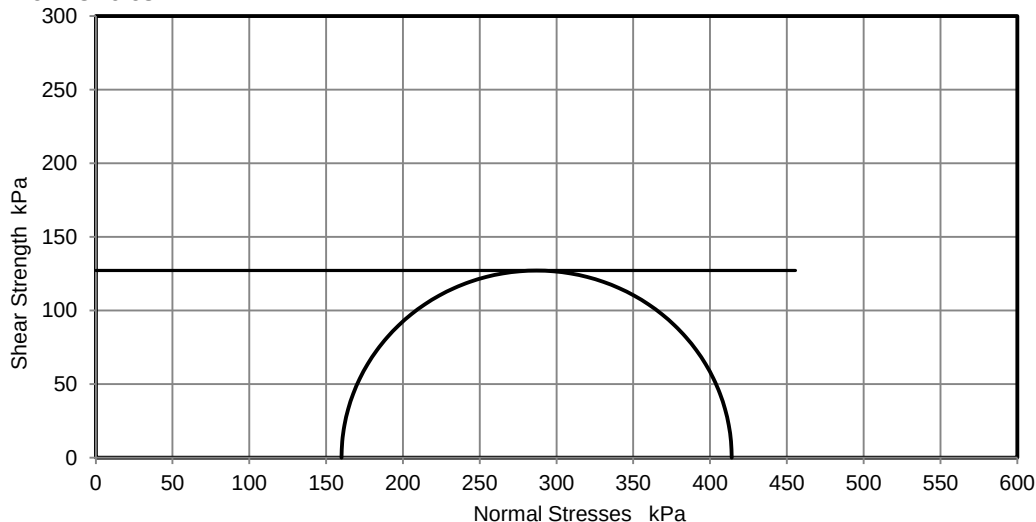
Position within sample

|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.05 Mg/m3                                   |
| Moisture Content                            | 24 %                                         |
| Dry Density                                 | 1.65 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 160 kPa                                      |
| Axial Strain                                | 15.7 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 254 kPa                                      |
| Undrained Shear Strength, cu                | 127 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

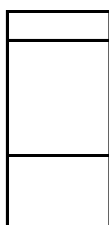
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH2        |
| Sample No.         | 3          |
| Depth              | 11.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

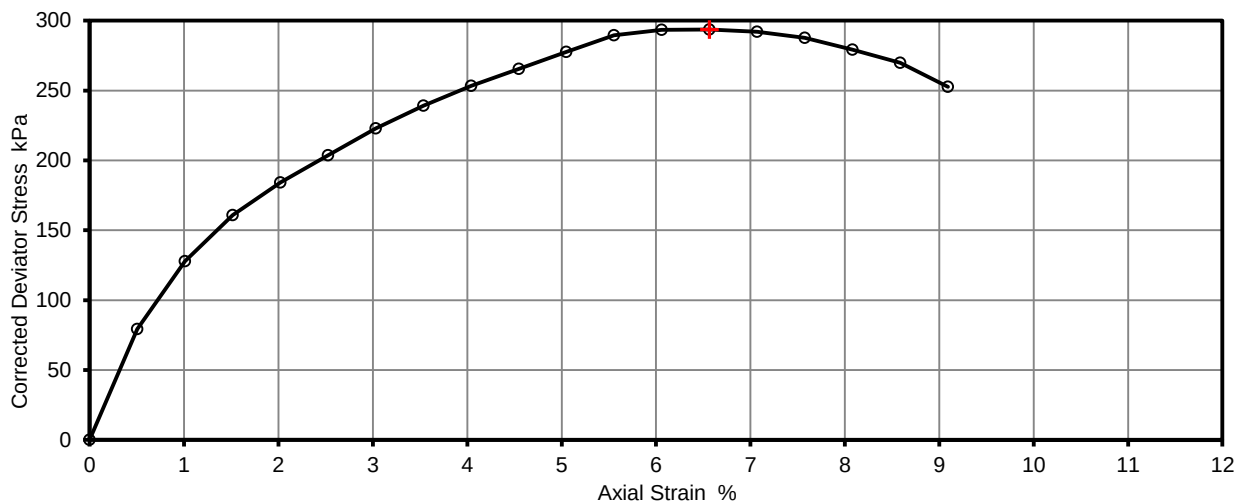
Disturbed

Position within sample

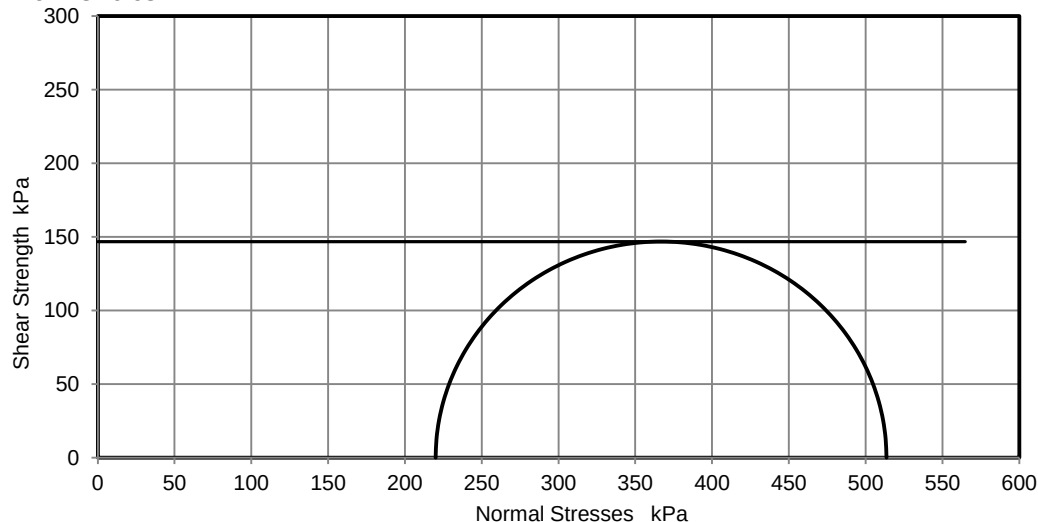


|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.06 Mg/m <sup>3</sup>                       |
| Moisture Content                            | 21 %                                         |
| Dry Density                                 | 1.70 Mg/m <sup>3</sup>                       |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 220 kPa                                      |
| Axial Strain                                | 6.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 294 kPa                                      |
| Undrained Shear Strength, cu                | 147 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

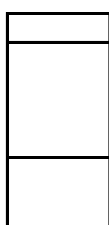
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH2        |
| Sample No.         | 4          |
| Depth              | 14.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

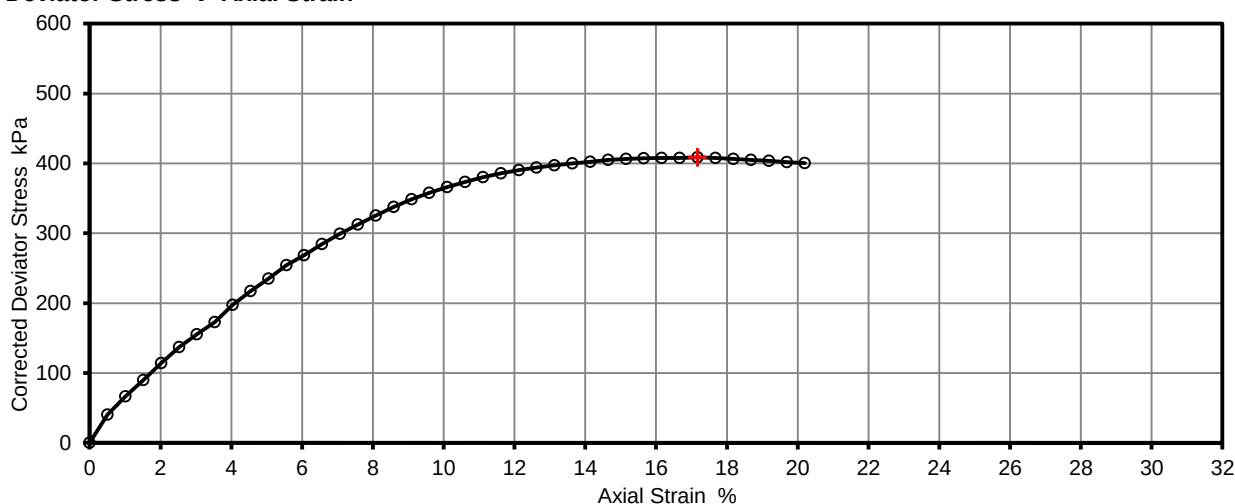
Disturbed

Position within sample

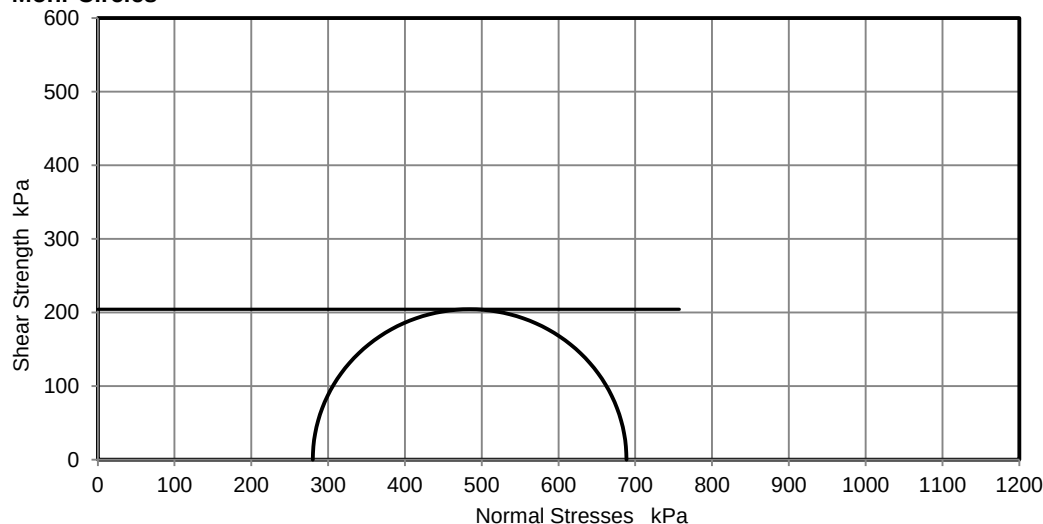


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 1.93 Mg/m3                                   |
| Moisture Content                             | 22 %                                         |
| Dry Density                                  | 1.59 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 280 kPa                                      |
| Axial Strain                                 | 17.2 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 409 kPa                                      |
| Undrained Shear Strength, cu                 | 204 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH3        |
| Sample No.         | 1          |
| Depth              | 6.50 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

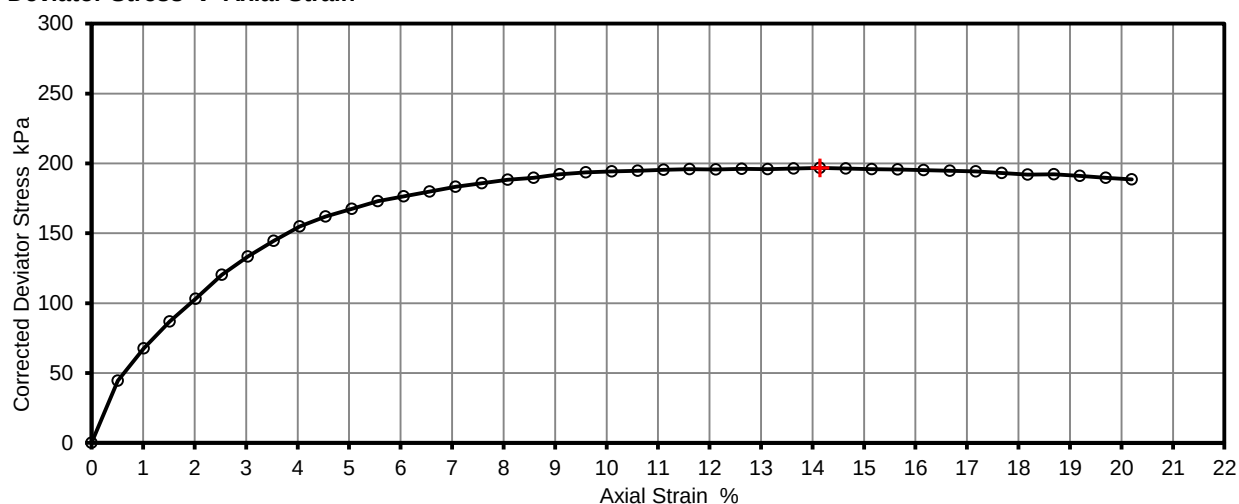
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

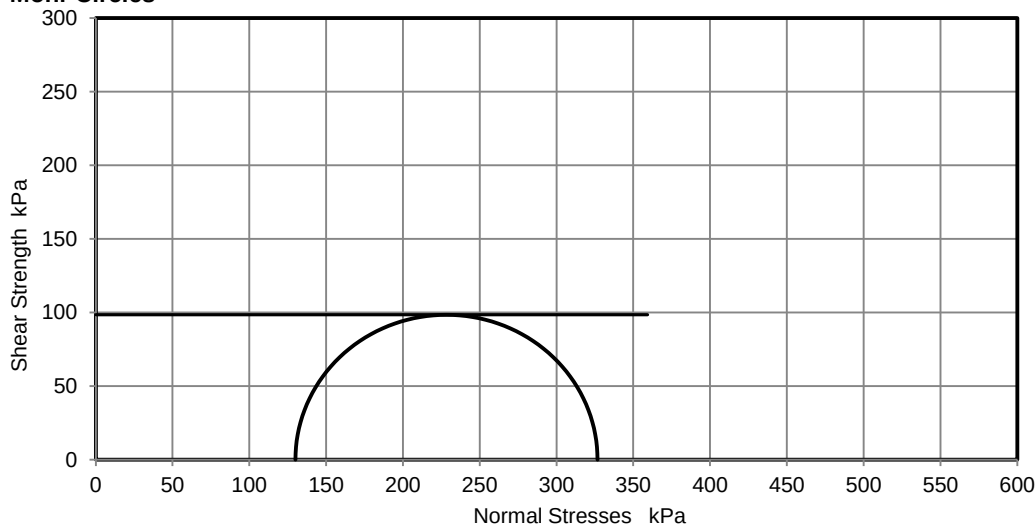
Position within sample

|                                             |                                             |
|---------------------------------------------|---------------------------------------------|
| Test Number                                 | 1                                           |
| Length                                      | 198.0 mm                                    |
| Diameter                                    | 102.0 mm                                    |
| Bulk Density                                | 1.97 Mg/m3                                  |
| Moisture Content                            | 22 %                                        |
| Dry Density                                 | 1.62 Mg/m3                                  |
| Rate of Strain                              | 2.0 %/min                                   |
| Cell Pressure                               | 130 kPa                                     |
| Axial Strain                                | 14.1 %                                      |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 197 kPa                                     |
| Undrained Shear Strength, cu                | 98 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                    |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH3        |
| Sample No.         | 2          |
| Depth              | 9.50 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

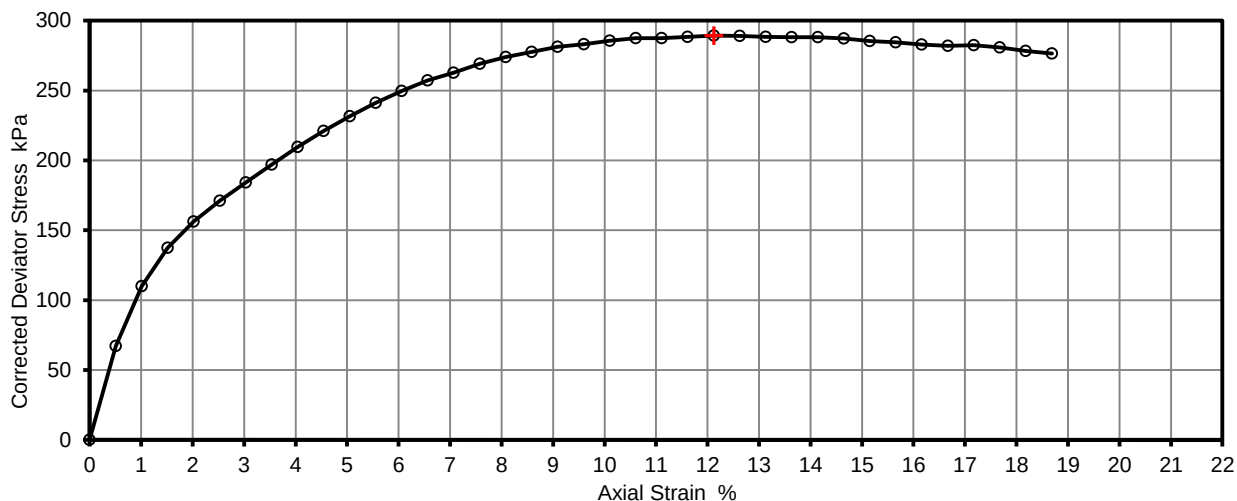
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

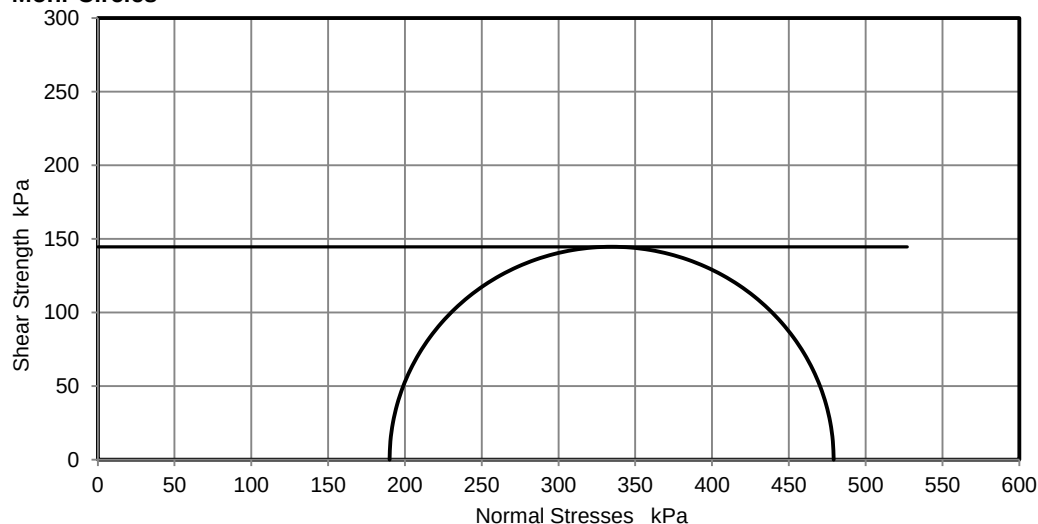
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.09 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 24 %                                         |
| Dry Density                                  | 1.68 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 190 kPa                                      |
| Axial Strain                                 | 12.1 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 289 kPa                                      |
| Undrained Shear Strength, cu                 | 145 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Figure A3.1



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

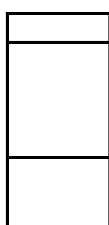
|                    |            |   |
|--------------------|------------|---|
| Job Ref            | 21488      |   |
| Borehole/Pit No.   | BH3        |   |
| Sample No.         | 3          |   |
| Depth              | 12.50      | m |
| Sample Type        | U          |   |
| Samples received   |            |   |
| Schedules received | 00/01/1900 |   |
| Date of test       | 13/09/2016 |   |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

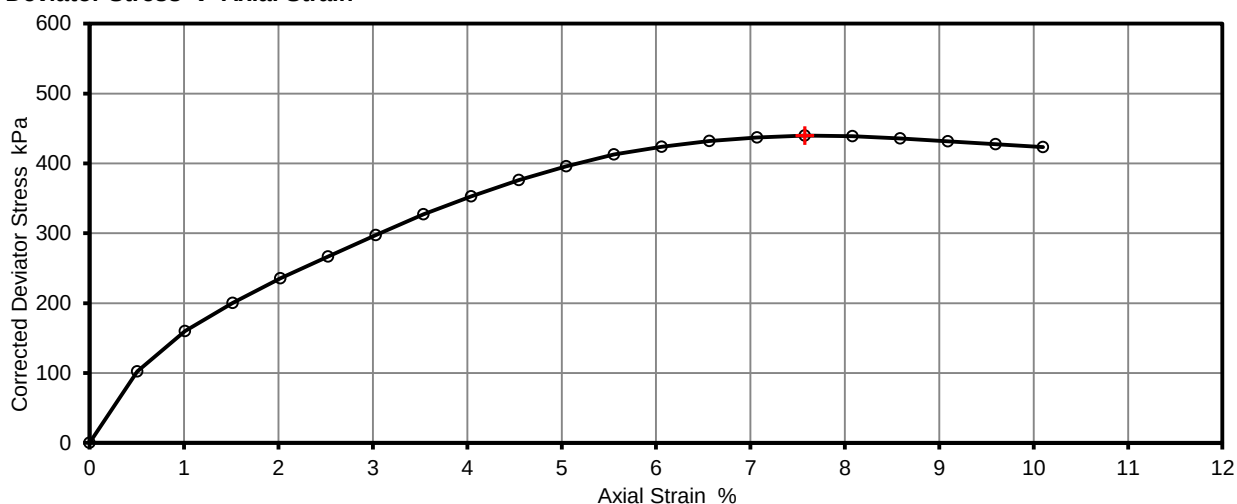
Disturbed

Position within sample

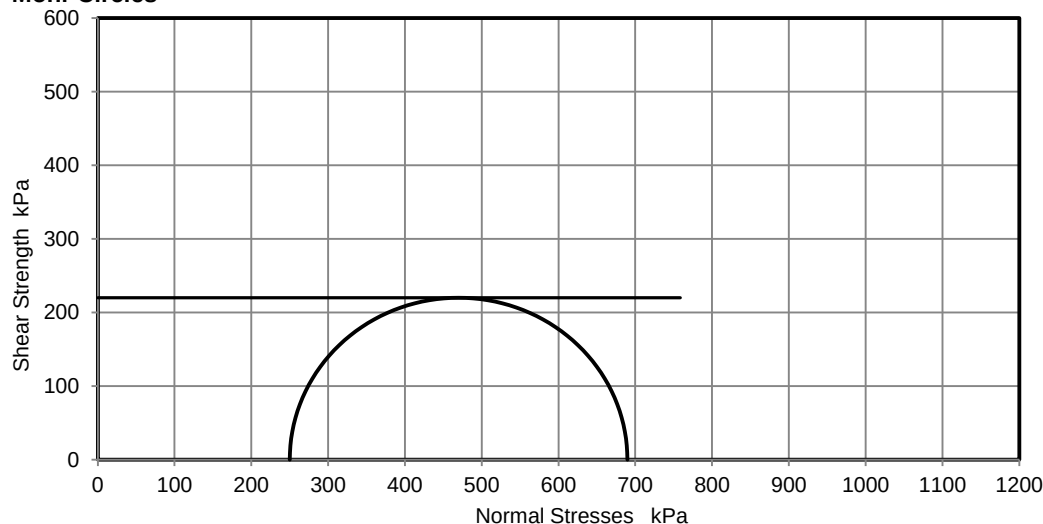


|                                             |         |                                          |
|---------------------------------------------|---------|------------------------------------------|
| Test Number                                 | 1       |                                          |
| Length                                      | 198.0   | mm                                       |
| Diameter                                    | 102.0   | mm                                       |
| Bulk Density                                | 2.08    | Mg/m3                                    |
| Moisture Content                            | 22      | %                                        |
| Dry Density                                 | 1.70    | Mg/m3                                    |
|                                             |         |                                          |
| Rate of Strain                              | 2.0     | %/min                                    |
| Cell Pressure                               | 250     | kPa                                      |
| Axial Strain                                | 7.6     | %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 440     | kPa                                      |
| Undrained Shear Strength, cu                | 220     | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle |                                          |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Initials: J.P

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH3        |
| Sample No.         | 4          |
| Depth              | 15.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

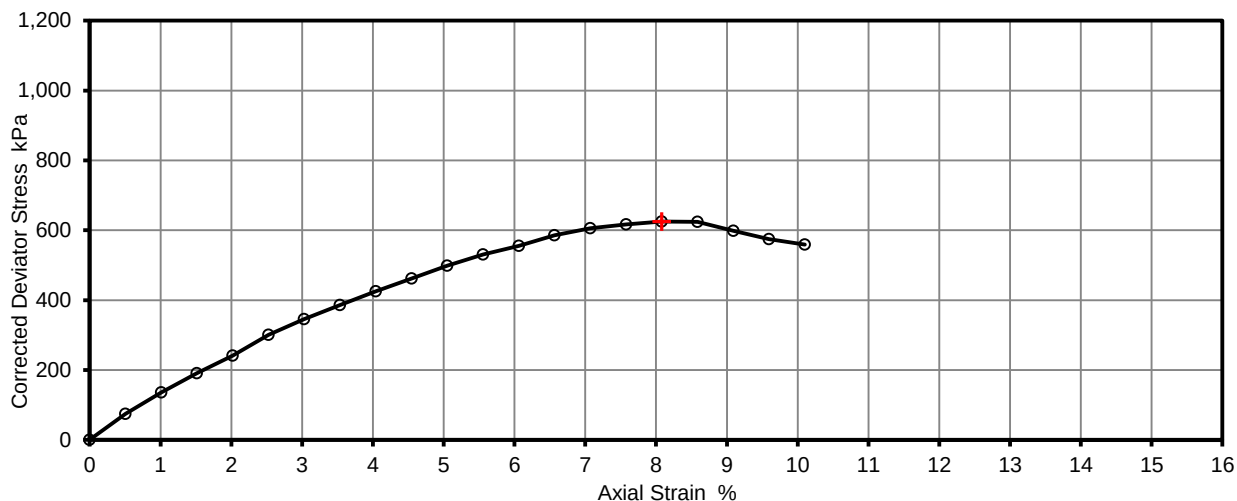
|                  |                                                                                                                   |        |                       |
|------------------|-------------------------------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB                      |        |                       |
| Project No.      | 52527                                                                                                             | Client | Ian Farmer Associates |
| Soil Description | Extremely high strength fissured dark grey silty CLAY with scattered shell deposits light grey fine sand partings |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                                                 |        |                       |

## **Remarks**

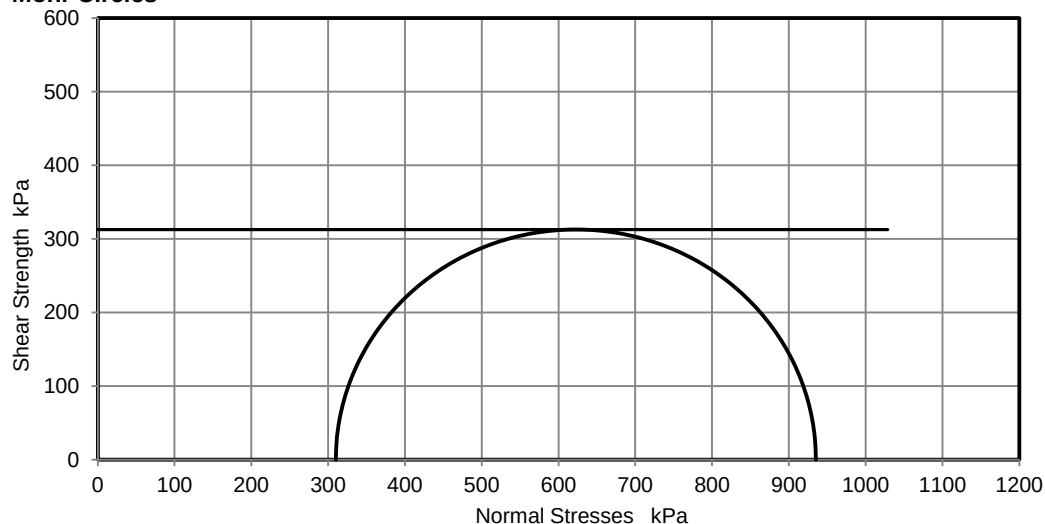
Position within sample

|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.06 Mg/m3                                   |
| Moisture Content                            | 23 %                                         |
| Dry Density                                 | 1.67 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 310 kPa                                      |
| Axial Strain                                | 8.1 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 625 kPa                                      |
| Undrained Shear Strength, cu                | 313 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH3        |
| Sample No.         | 5          |
| Depth              | 18.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

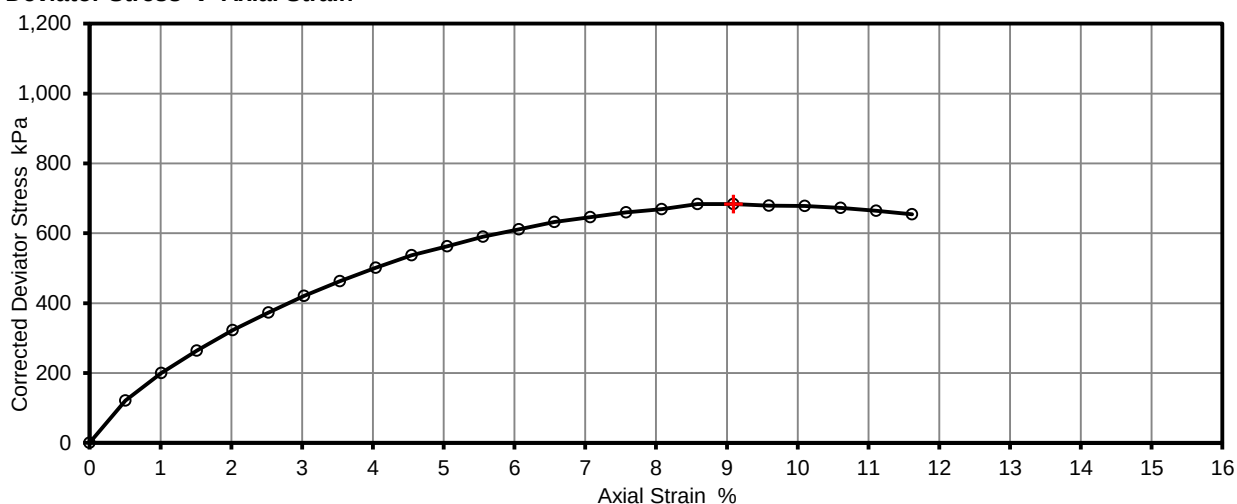
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Extremely high strength fissured dark grey slightly sandy silty CLAY                         |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

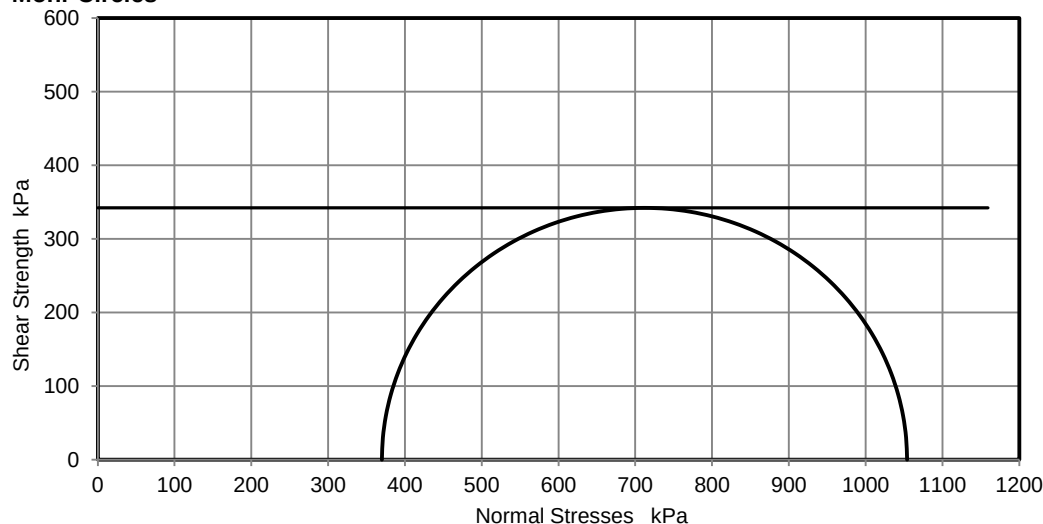
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 1.95 Mg/m3                                   |
| Moisture Content                             | 17 %                                         |
| Dry Density                                  | 1.66 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 370 kPa                                      |
| Axial Strain                                 | 9.1 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 684 kPa                                      |
| Undrained Shear Strength, cu                 | 342 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH4        |
| Sample No.         | 1          |
| Depth              | 6.50 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

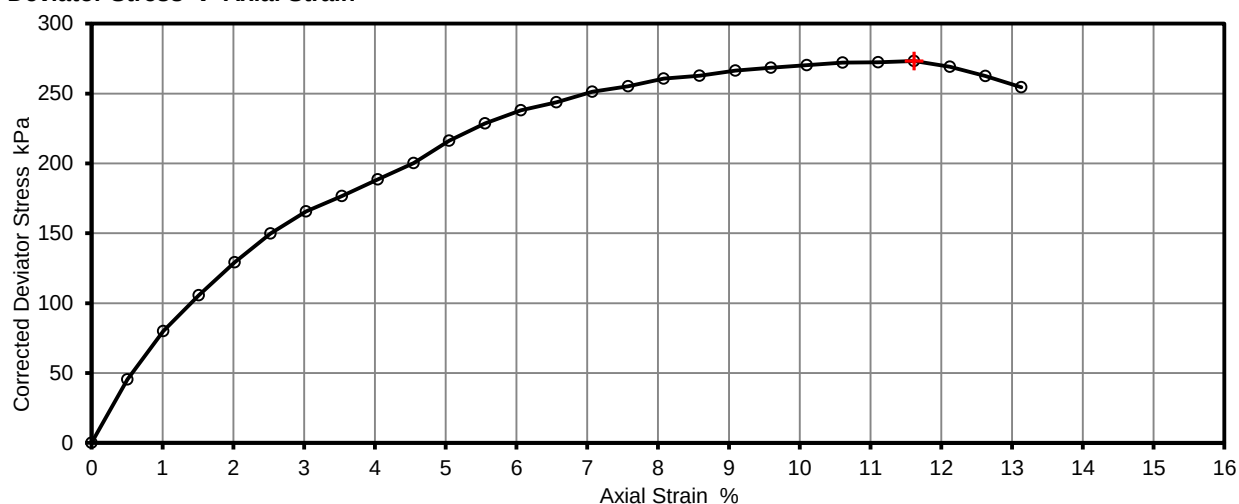
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

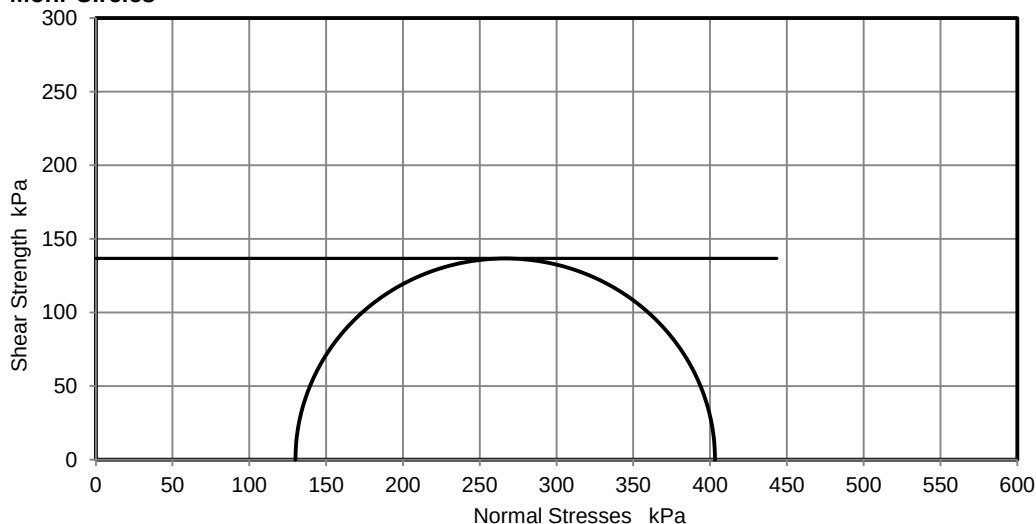
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.03 Mg/m3                                   |
| Moisture Content                             | 24 %                                         |
| Dry Density                                  | 1.64 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 130 kPa                                      |
| Axial Strain                                 | 11.6 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 273 kPa                                      |
| Undrained Shear Strength, cu                 | 137 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH4        |
| Sample No.         | 2          |
| Depth              | 9.50 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

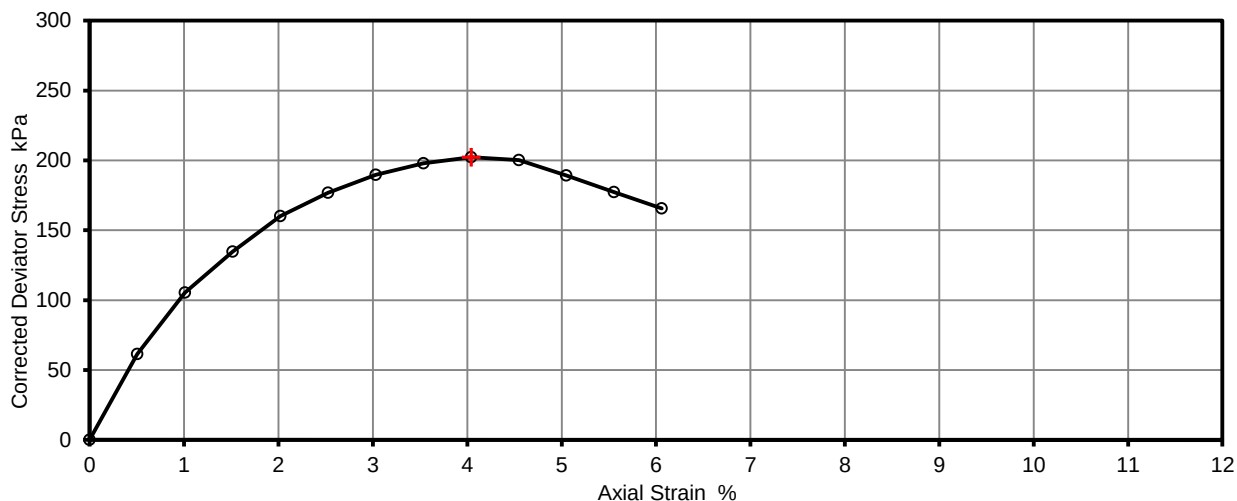
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

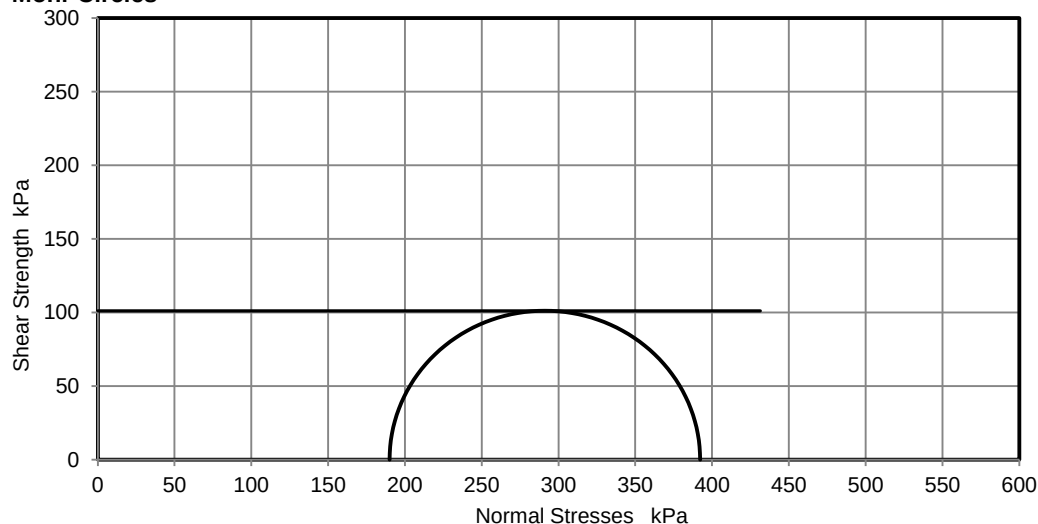
Position within sample

|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.08 Mg/m <sup>3</sup>                       |
| Moisture Content                            | 24 %                                         |
| Dry Density                                 | 1.68 Mg/m <sup>3</sup>                       |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 190 kPa                                      |
| Axial Strain                                | 4.0 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 202 kPa                                      |
| Undrained Shear Strength, cu                | 101 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH4        |
| Sample No.         | 3          |
| Depth              | 12.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

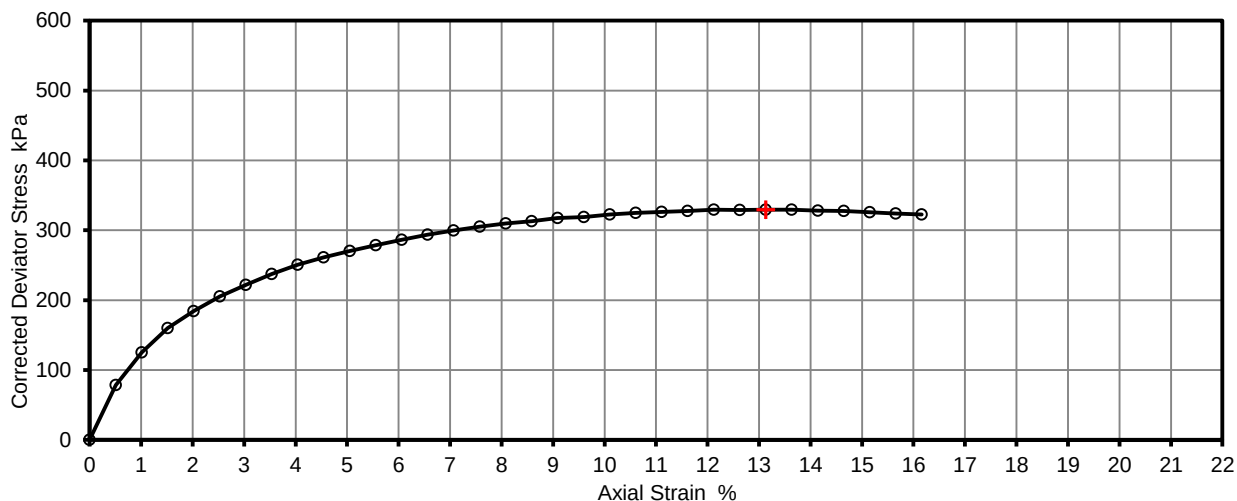
|                  |                                                                                                               |        |                       |
|------------------|---------------------------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB                  |        |                       |
| Project No.      | 52527                                                                                                         | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with scattered shell fragments light grey fine sand partings |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                                             |        |                       |

## **Remarks**

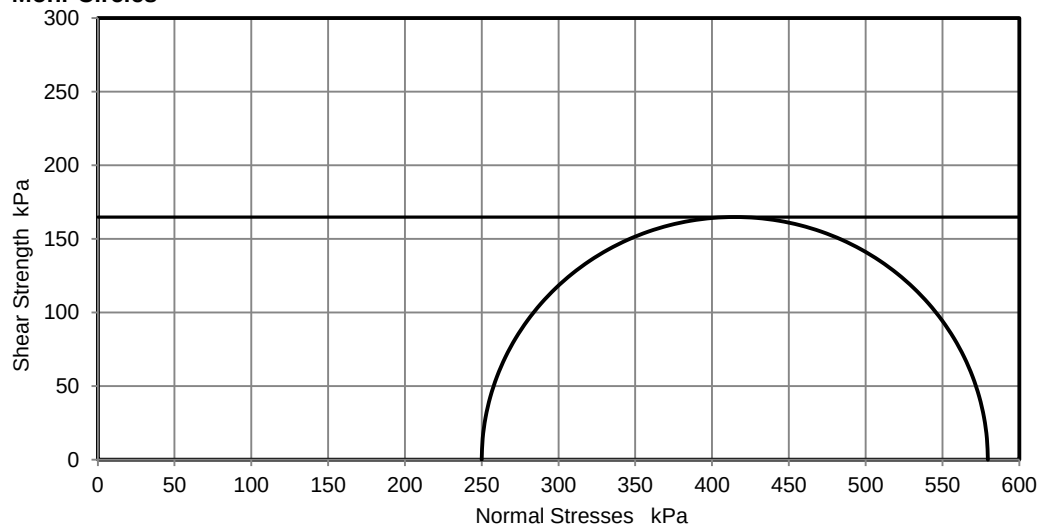
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.03 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 23 %                                         |
| Dry Density                                  | 1.65 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 250 kPa                                      |
| Axial Strain                                 | 13.1 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 330 kPa                                      |
| Undrained Shear Strength, cu                 | 165 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

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Figure A3.1



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

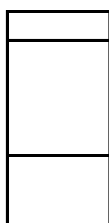
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH4        |
| Sample No.         | 4          |
| Depth              | 15.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

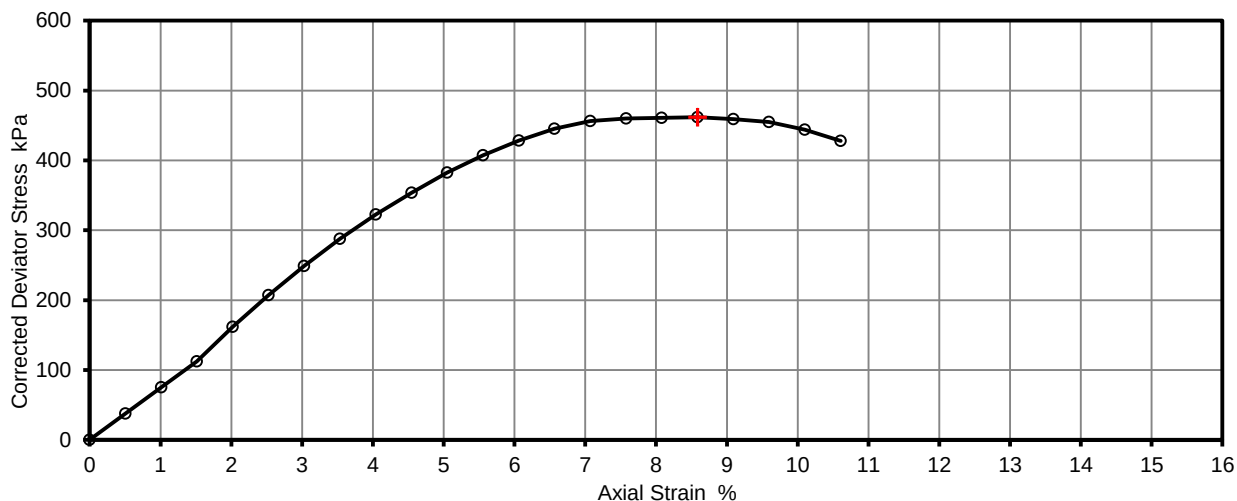
Very disturbed

Position within sample

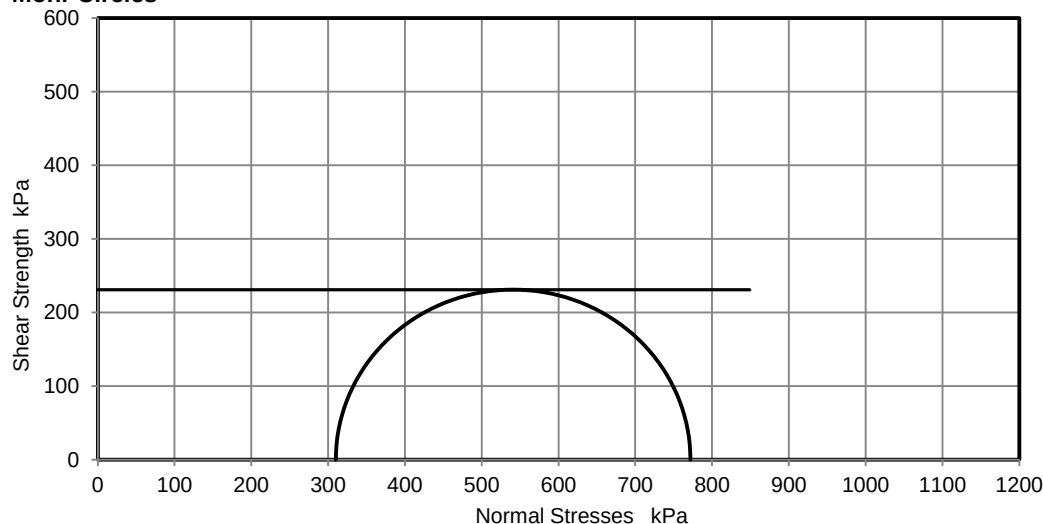


|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 1.96 Mg/m3                                   |
| Moisture Content                            | 23 %                                         |
| Dry Density                                 | 1.59 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 310 kPa                                      |
| Axial Strain                                | 8.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 462 kPa                                      |
| Undrained Shear Strength, cu                | 231 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Initials: J.P

Date 20/09/2016

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

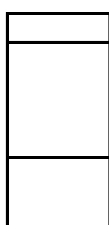
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH4        |
| Sample No.         | 5          |
| Depth              | 18.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength slightly fissured dark grey sandy silty CLAY                              |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

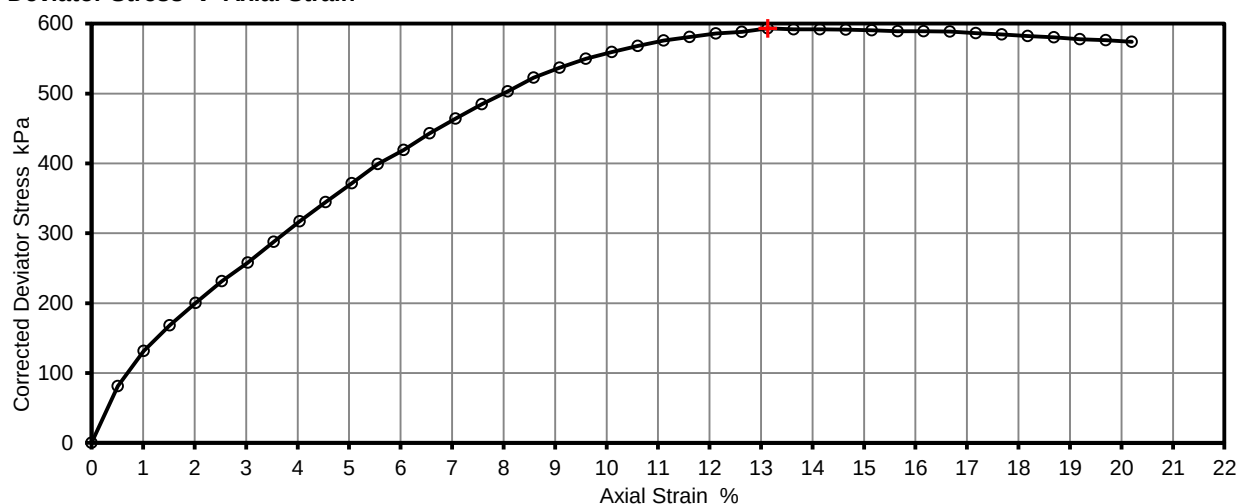
Disturbed

Position within sample

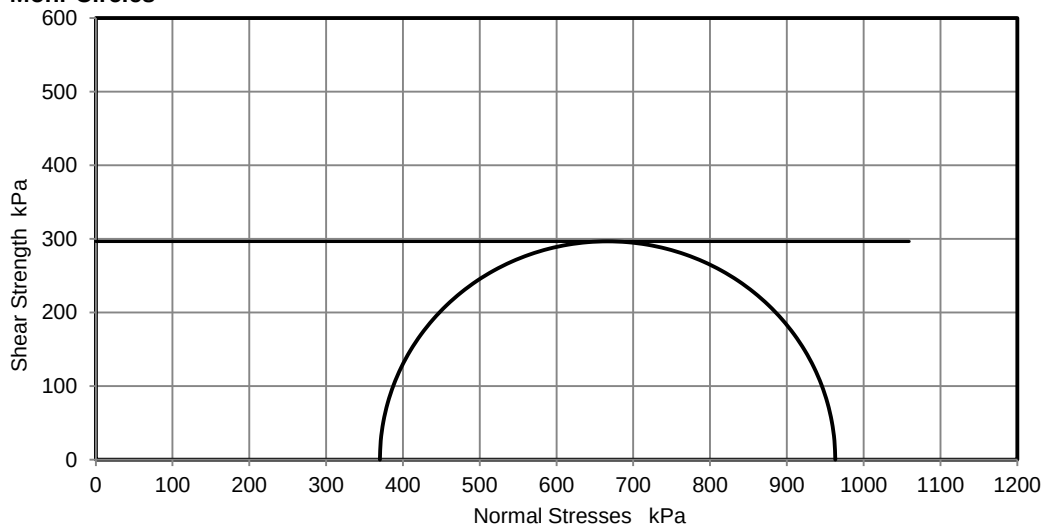


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 1.94 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 17 %                                         |
| Dry Density                                  | 1.66 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 370 kPa                                      |
| Axial Strain                                 | 13.1 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 593 kPa                                      |
| Undrained Shear Strength, cu                 | 297 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Initials: J.P

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Figure A3.1



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

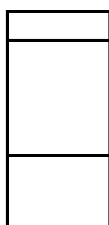
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH5        |
| Sample No.         | 1          |
| Depth              | 7.00 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

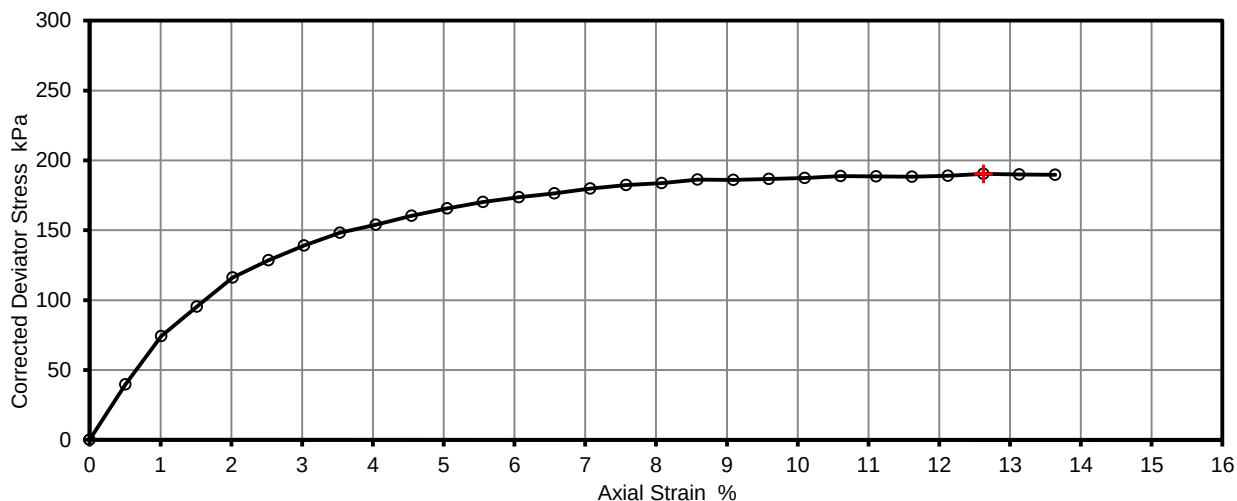
Disturbed

Position within sample

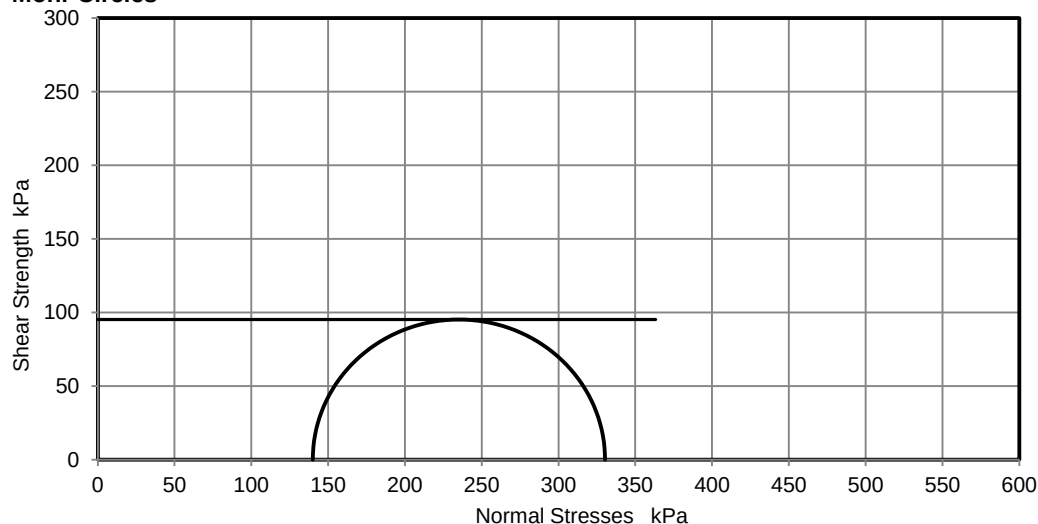


|                                             |                                             |
|---------------------------------------------|---------------------------------------------|
| Test Number                                 | 1                                           |
| Length                                      | 198.0 mm                                    |
| Diameter                                    | 102.0 mm                                    |
| Bulk Density                                | 2.02 Mg/m3                                  |
| Moisture Content                            | 27 %                                        |
| Dry Density                                 | 1.59 Mg/m3                                  |
| Rate of Strain                              | 2.0 %/min                                   |
| Cell Pressure                               | 140 kPa                                     |
| Axial Strain                                | 12.6 %                                      |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 190 kPa                                     |
| Undrained Shear Strength, cu                | 95 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                    |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH5        |
| Sample No.         | 2          |
| Depth              | 10.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

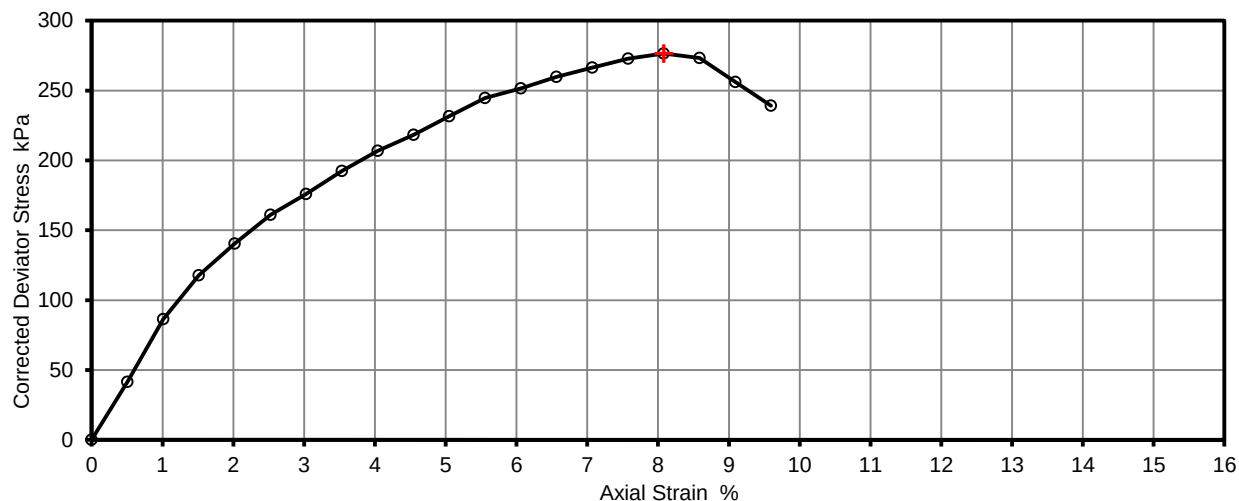
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY with light grey fine sand partings               |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

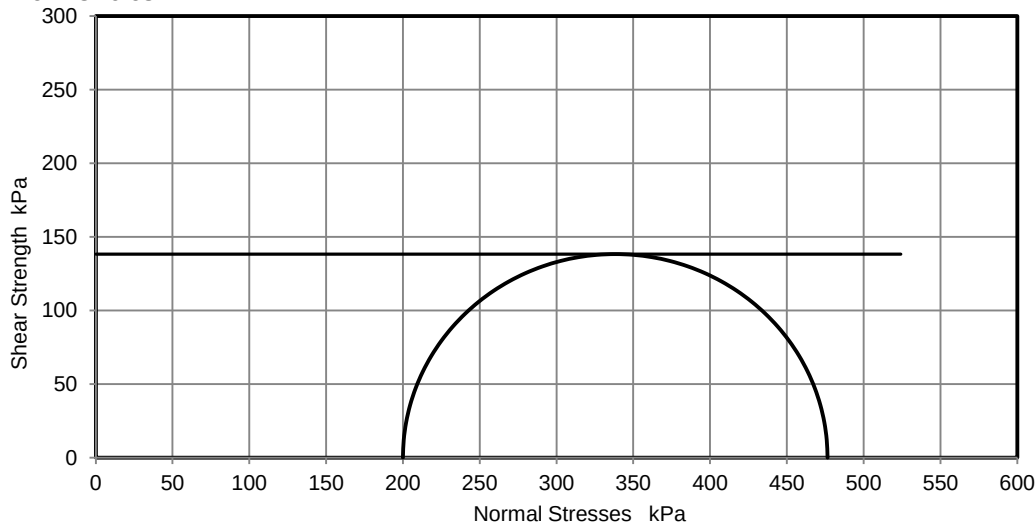
Position within sample

|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.10 Mg/m3                                   |
| Moisture Content                            | 22 %                                         |
| Dry Density                                 | 1.72 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 200 kPa                                      |
| Axial Strain                                | 8.1 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 277 kPa                                      |
| Undrained Shear Strength, cu                | 138 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH5        |
| Sample No.         | 3          |
| Depth              | 13.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

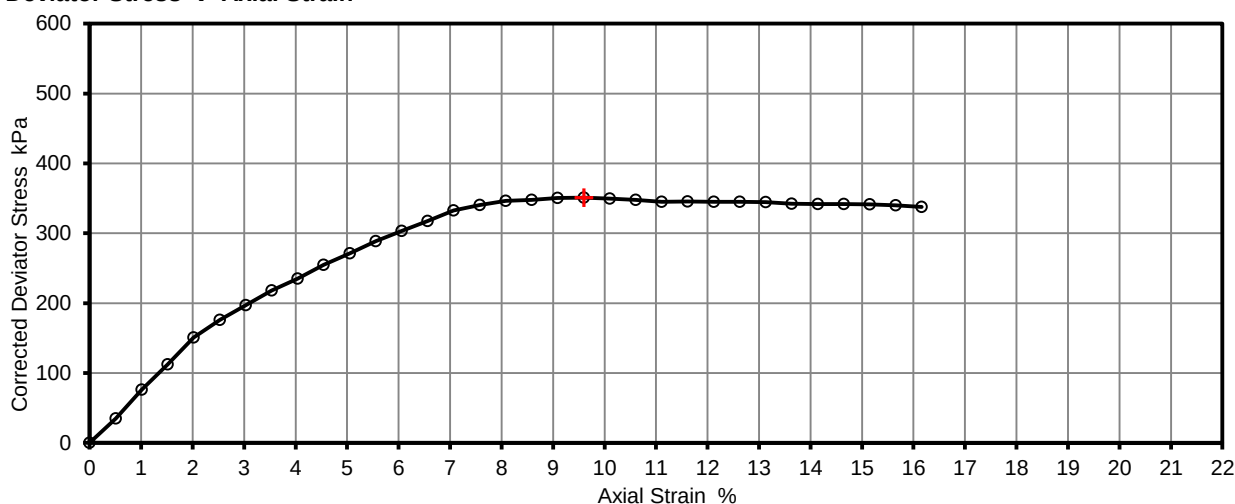
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

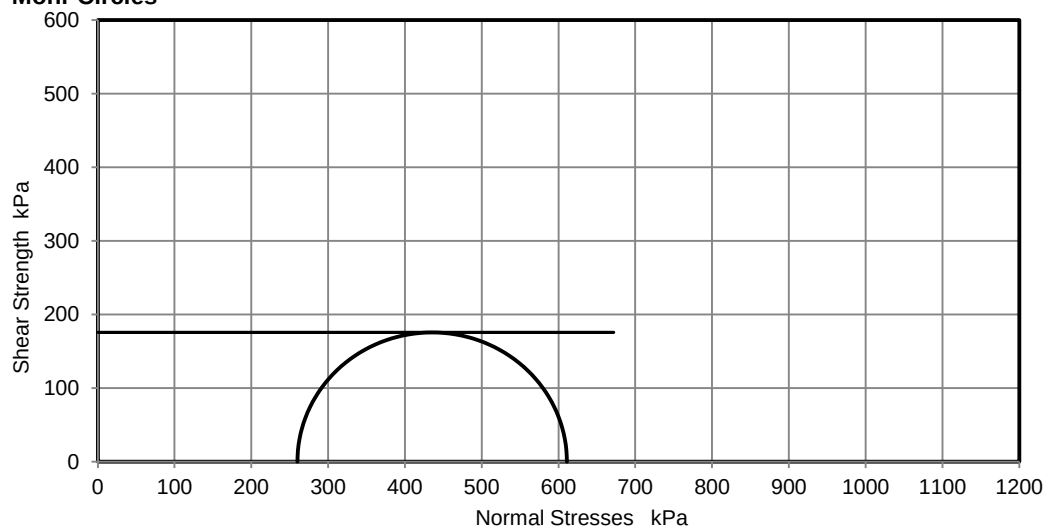
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.10 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 22 %                                         |
| Dry Density                                  | 1.72 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 260 kPa                                      |
| Axial Strain                                 | 9.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 351 kPa                                      |
| Undrained Shear Strength, cu                 | 175 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

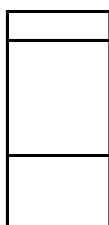
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH5        |
| Sample No.         | 4          |
| Depth              | 16.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

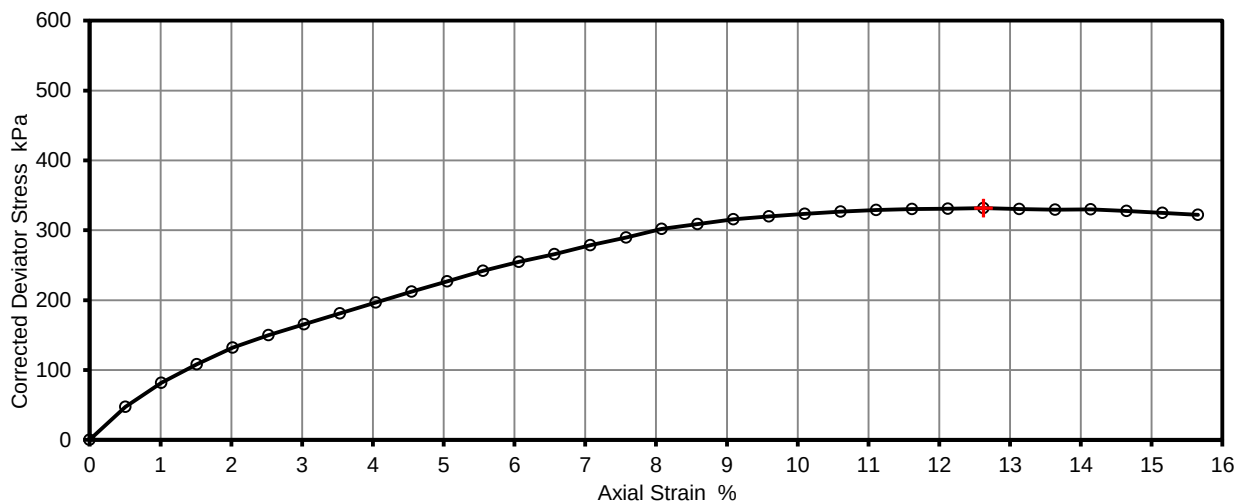
Slightly disturbed

Position within sample

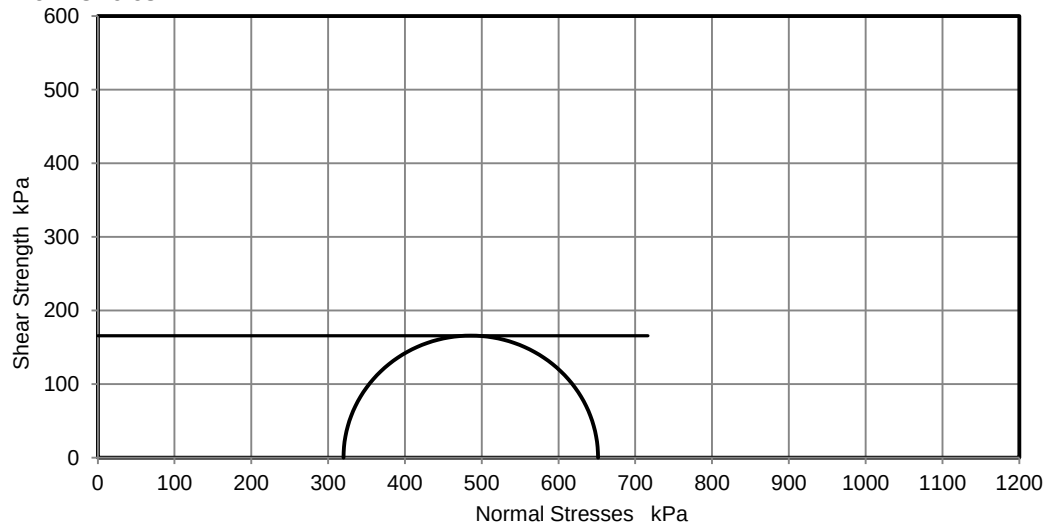


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.00 Mg/m3                                   |
| Moisture Content                             | 22 %                                         |
| Dry Density                                  | 1.64 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 320 kPa                                      |
| Axial Strain                                 | 12.6 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 332 kPa                                      |
| Undrained Shear Strength, cu                 | 166 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

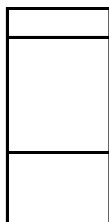
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH5        |
| Sample No.         | 5          |
| Depth              | 19.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                                                  |        |                       |
|------------------|------------------------------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB                     |        |                       |
| Project No.      | 52527                                                                                                            | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with scattered shell fragment and light grey fine sand partings |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                                                |        |                       |

## **Remarks**

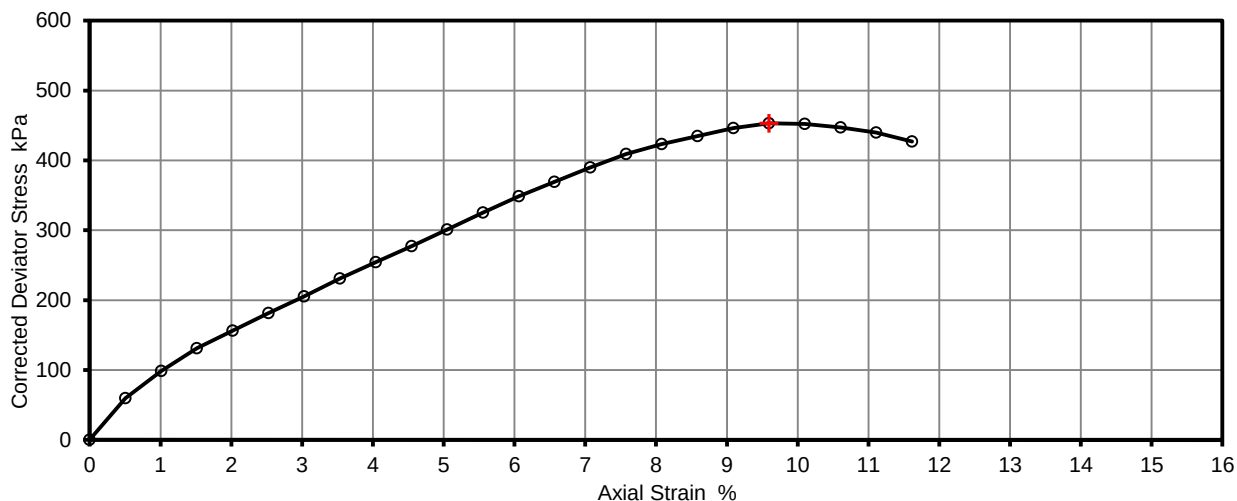
Very disturbed

Position within sample

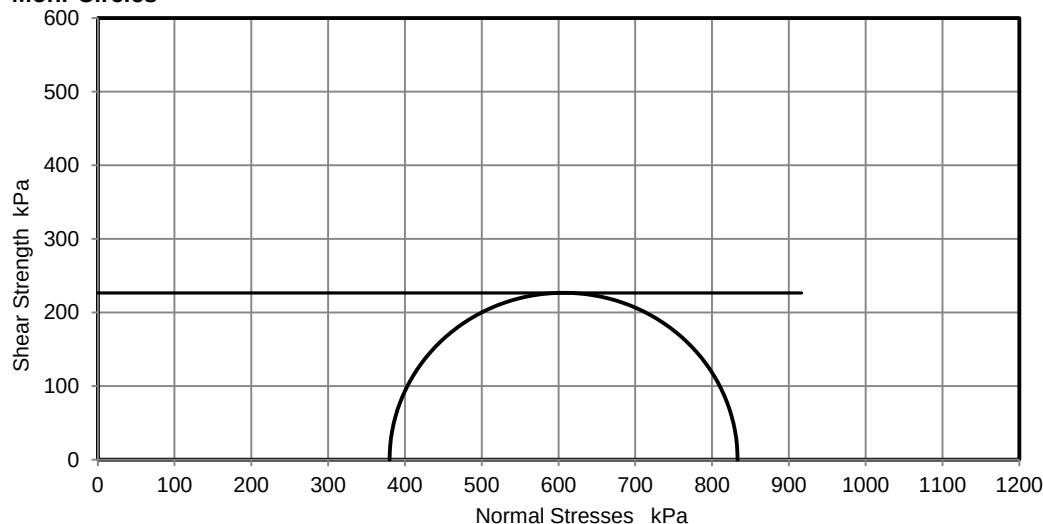


|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 1.97 Mg/m3                                   |
| Moisture Content                            | 22 %                                         |
| Dry Density                                 | 1.61 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 380 kPa                                      |
| Axial Strain                                | 9.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 453 kPa                                      |
| Undrained Shear Strength, cu                | 227 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |   |
|--------------------|------------|---|
| Job Ref            | 21488      |   |
| Borehole/Pit No.   | BH6        |   |
| Sample No.         | 1          |   |
| Depth              | 6.50       | m |
| Sample Type        | U          |   |
| Samples received   |            |   |
| Schedules received | 00/01/1900 |   |
| Date of test       | 13/09/2016 |   |

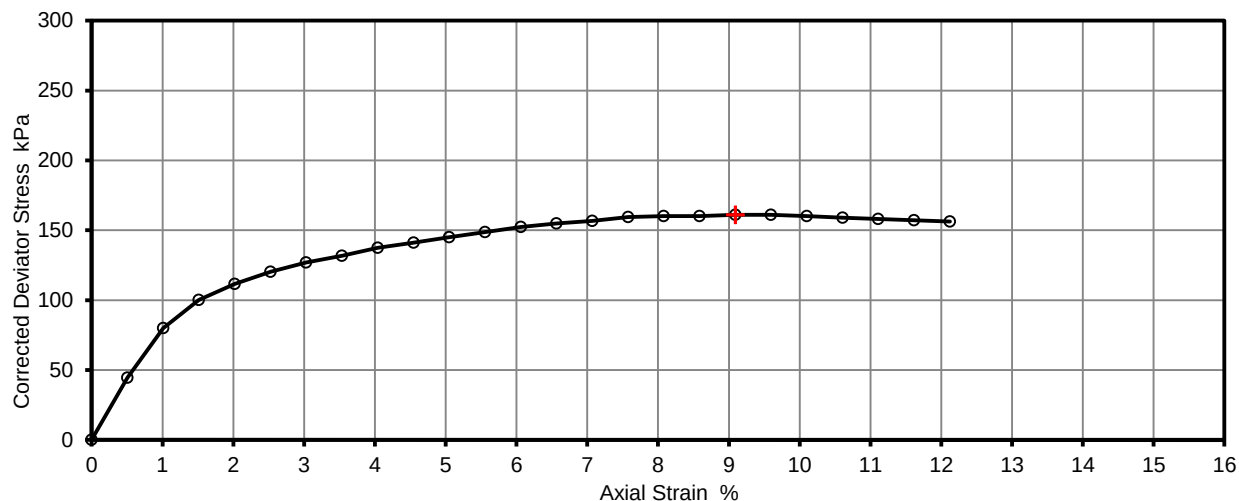
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

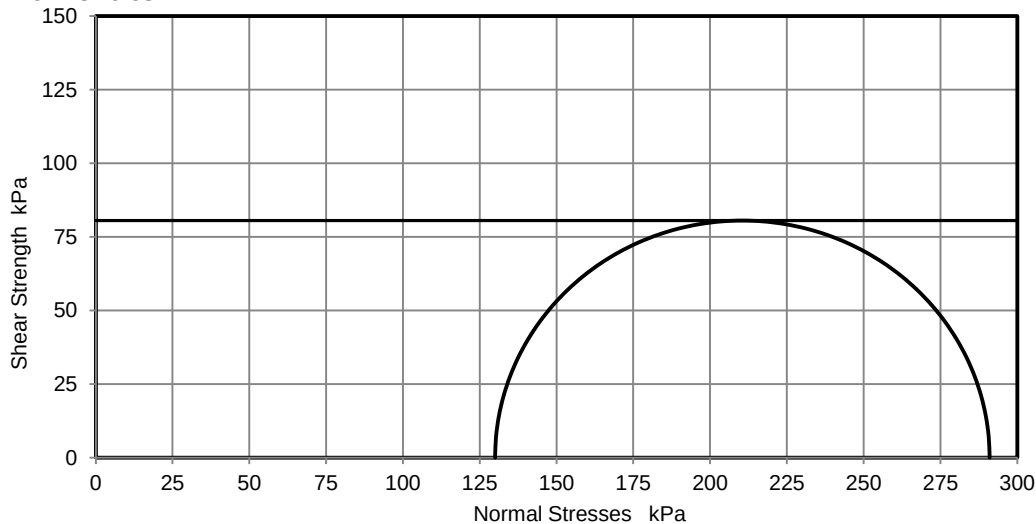
Position within sample

|                                             |         |                                          |
|---------------------------------------------|---------|------------------------------------------|
| Test Number                                 | 1       |                                          |
| Length                                      | 198.0   | mm                                       |
| Diameter                                    | 102.0   | mm                                       |
| Bulk Density                                | 1.94    | Mg/m3                                    |
| Moisture Content                            | 29      | %                                        |
| Dry Density                                 | 1.50    | Mg/m3                                    |
|                                             |         |                                          |
| Rate of Strain                              | 2.0     | %/min                                    |
| Cell Pressure                               | 130     | kPa                                      |
| Axial Strain                                | 9.1     | %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 161     | kPa                                      |
| Undrained Shear Strength, cu                | 81      | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle |                                          |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH6        |
| Sample No.         | 2          |
| Depth              | 9.50 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

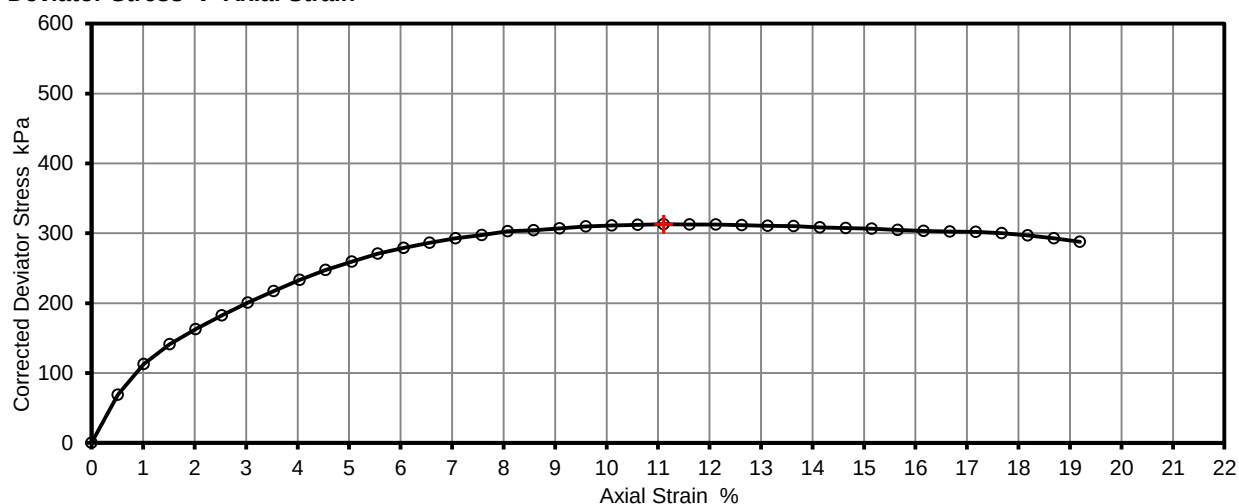
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with rare shell fragments                   |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

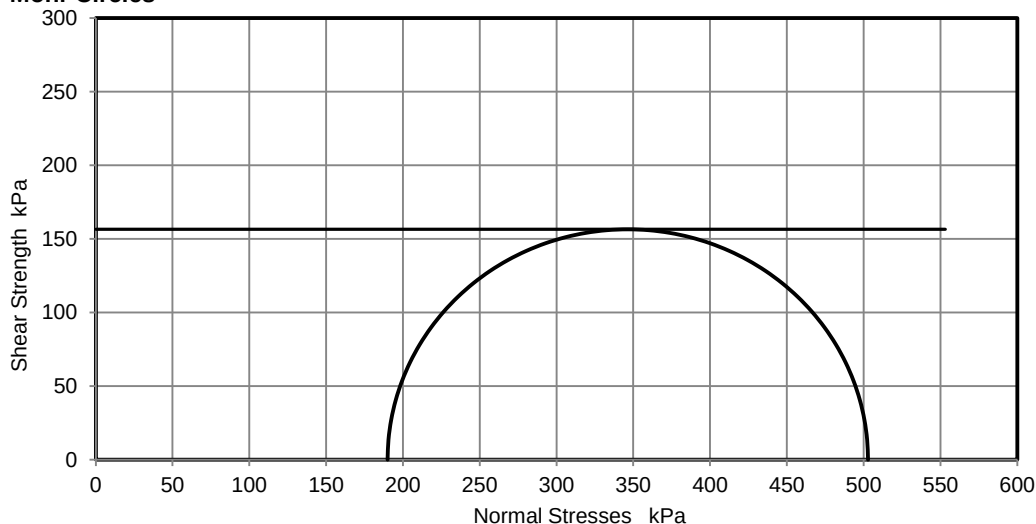
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.09 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 22 %                                         |
| Dry Density                                  | 1.71 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 190 kPa                                      |
| Axial Strain                                 | 11.1 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 313 kPa                                      |
| Undrained Shear Strength, cu                 | 156 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

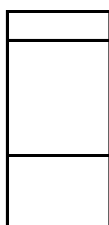
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH6        |
| Sample No.         | 3          |
| Depth              | 12.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 13/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

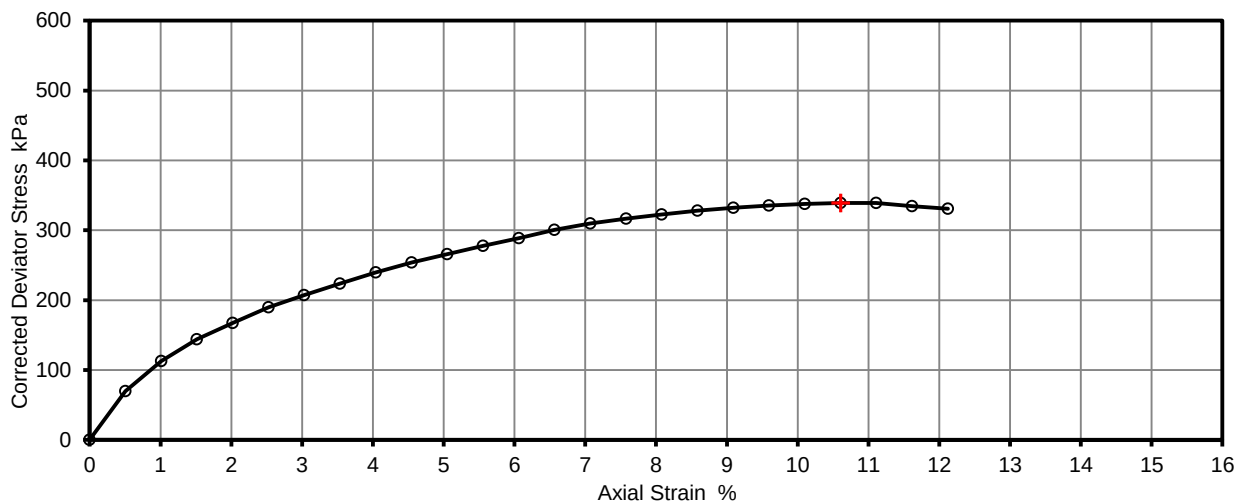
Disturbed

Position within sample

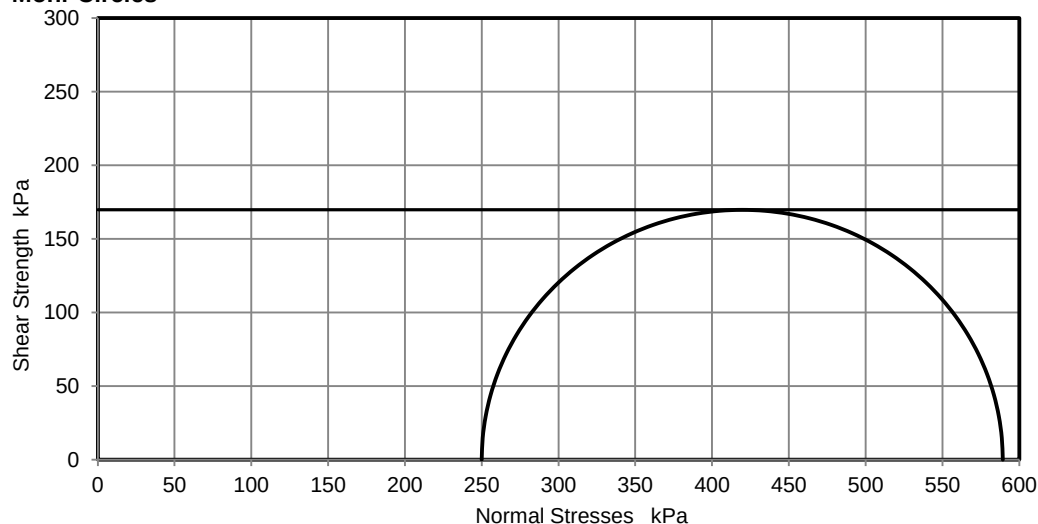


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.03 Mg/m3                                   |
| Moisture Content                             | 24 %                                         |
| Dry Density                                  | 1.63 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 250 kPa                                      |
| Axial Strain                                 | 10.6 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 339 kPa                                      |
| Undrained Shear Strength, cu                 | 170 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Initials: J.P

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

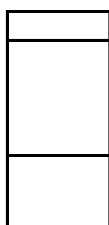
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH6        |
| Sample No.         | 4          |
| Depth              | 15.50 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

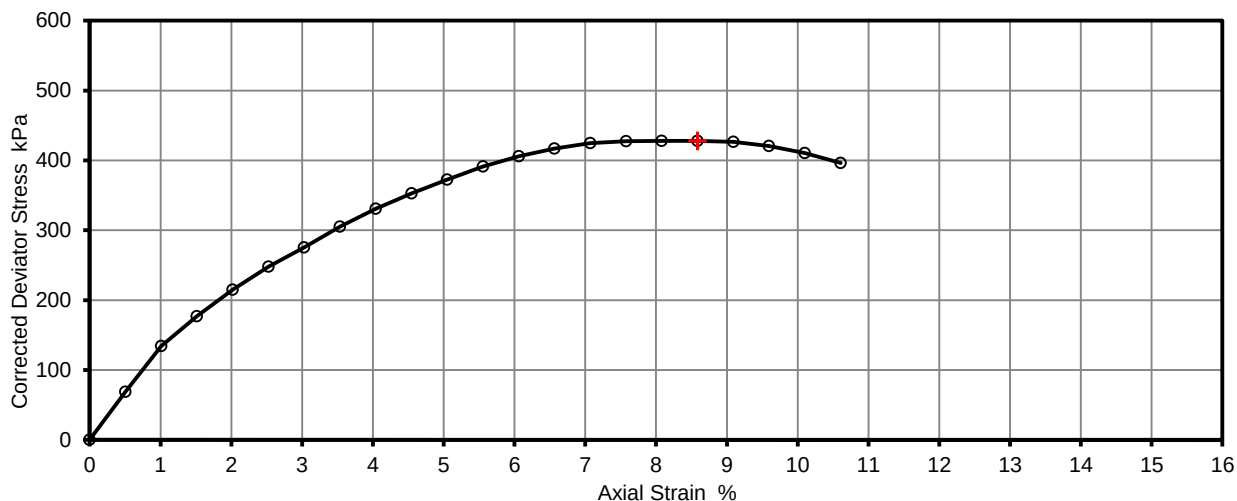
Disturbed

Position within sample

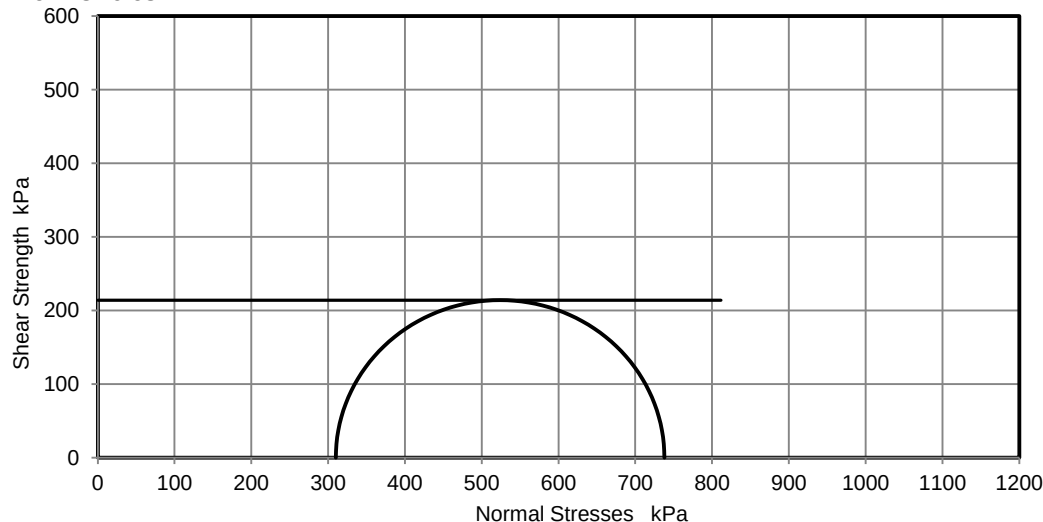


|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.01 Mg/m3                                   |
| Moisture Content                            | 24 %                                         |
| Dry Density                                 | 1.62 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 310 kPa                                      |
| Axial Strain                                | 8.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 428 kPa                                      |
| Undrained Shear Strength, cu                | 214 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

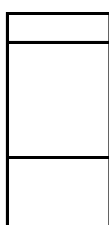
|                    |            |   |
|--------------------|------------|---|
| Job Ref            | 21488      |   |
| Borehole/Pit No.   | BH6        |   |
| Sample No.         | 5          |   |
| Depth              | 18.50      | m |
| Sample Type        | U          |   |
| Samples received   |            |   |
| Schedules received | 00/01/1900 |   |
| Date of test       | 14/09/2016 |   |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey sandy silty CLAY                                       |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

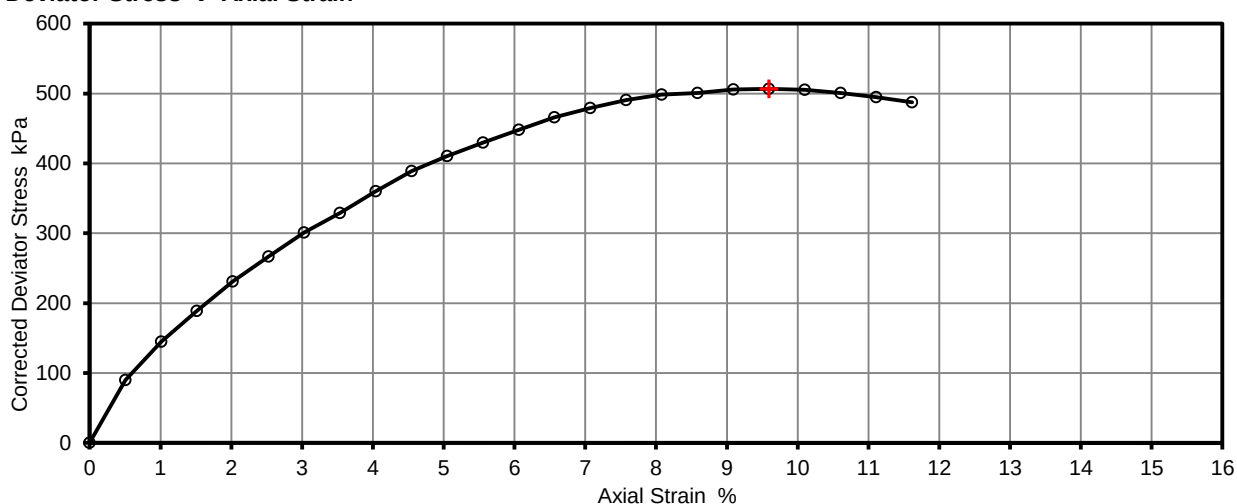
Disturbed

Position within sample

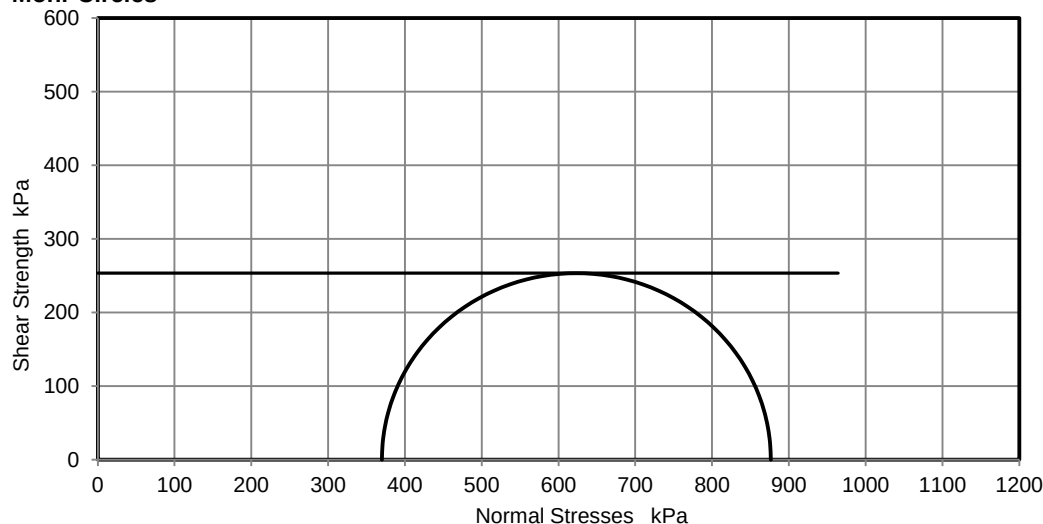


|                                             |          |                                          |
|---------------------------------------------|----------|------------------------------------------|
| Test Number                                 | 1        |                                          |
| Length                                      | 198.0    | mm                                       |
| Diameter                                    | 102.0    | mm                                       |
| Bulk Density                                | 1.92     | Mg/m3                                    |
| Moisture Content                            | 17       | %                                        |
| Dry Density                                 | 1.63     | Mg/m3                                    |
|                                             |          |                                          |
| Rate of Strain                              | 2.0      | %/min                                    |
| Cell Pressure                               | 370      | kPa                                      |
| Axial Strain                                | 9.6      | %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 507      | kPa                                      |
| Undrained Shear Strength, cu                | 253      | kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound |                                          |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Checked and Approved

Initials: J.P

Date 20/09/2016

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH7        |
| Sample No.         | 1          |
| Depth              | 1.20 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

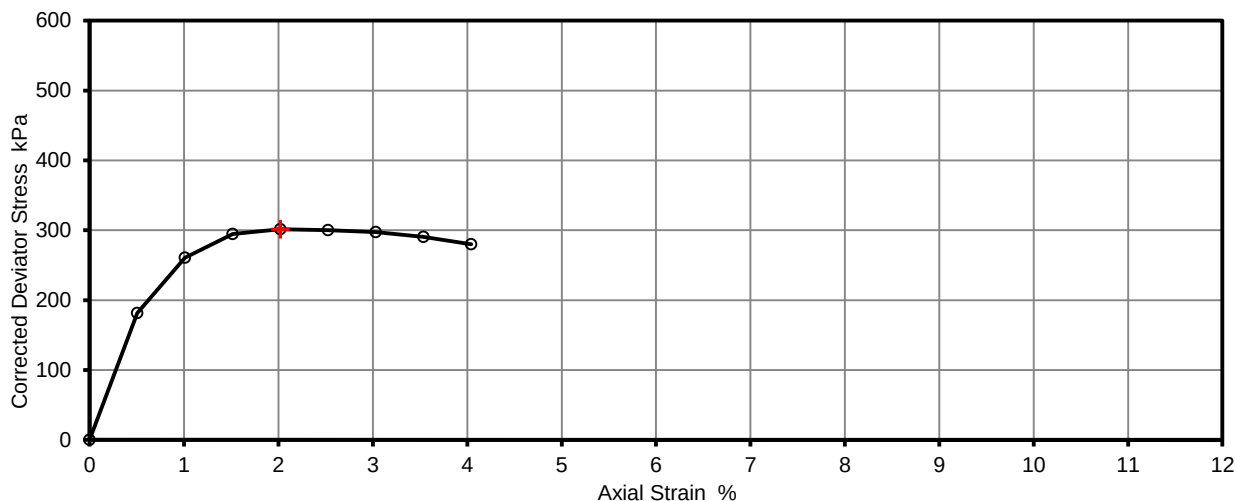
|                  |                                                                                                   |        |                       |
|------------------|---------------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB      |        |                       |
| Project No.      | 52527                                                                                             | Client | Ian Farmer Associates |
| Soil Description | Very high strength slightly fissured orangish brown mottled bluish grey slightly sandy silty CLAY |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                                 |        |                       |

## **Remarks**

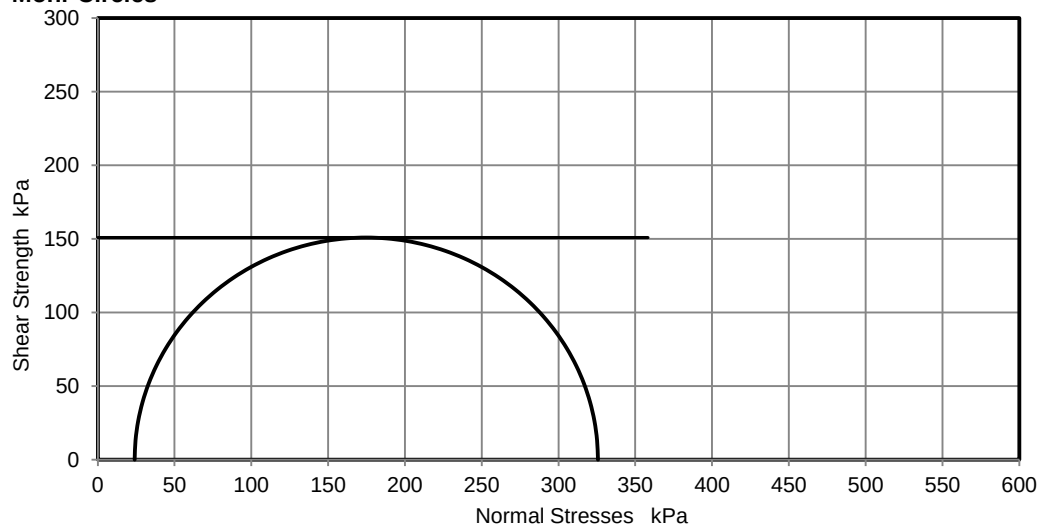
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.04 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 18 %                                         |
| Dry Density                                  | 1.73 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 24 kPa                                       |
| Axial Strain                                 | 2.0 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 302 kPa                                      |
| Undrained Shear Strength, cu                 | 151 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Figure A3.1



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

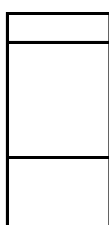
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH7        |
| Sample No.         | 2          |
| Depth              | 6.00 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

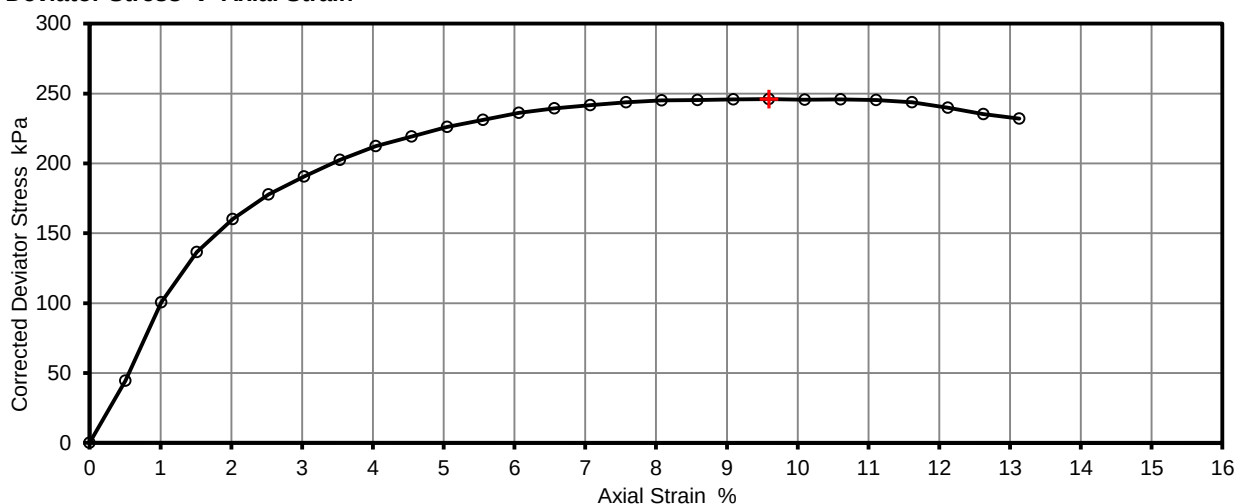
Disturbed

Position within sample

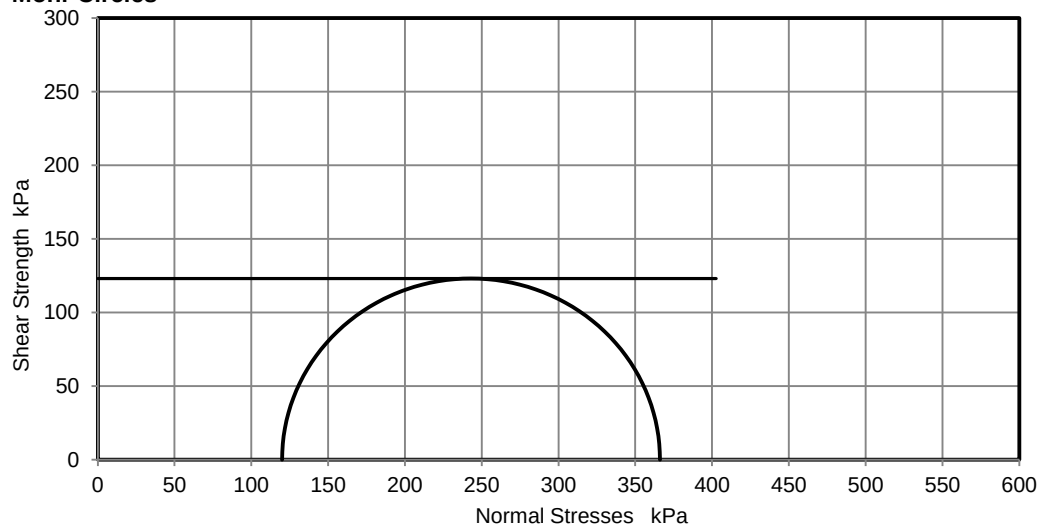


|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 1.99 Mg/m3                                   |
| Moisture Content                            | 29 %                                         |
| Dry Density                                 | 1.54 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 120 kPa                                      |
| Axial Strain                                | 9.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 246 kPa                                      |
| Undrained Shear Strength, cu                | 123 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH7        |
| Sample No.         | 3          |
| Depth              | 9.00 m     |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

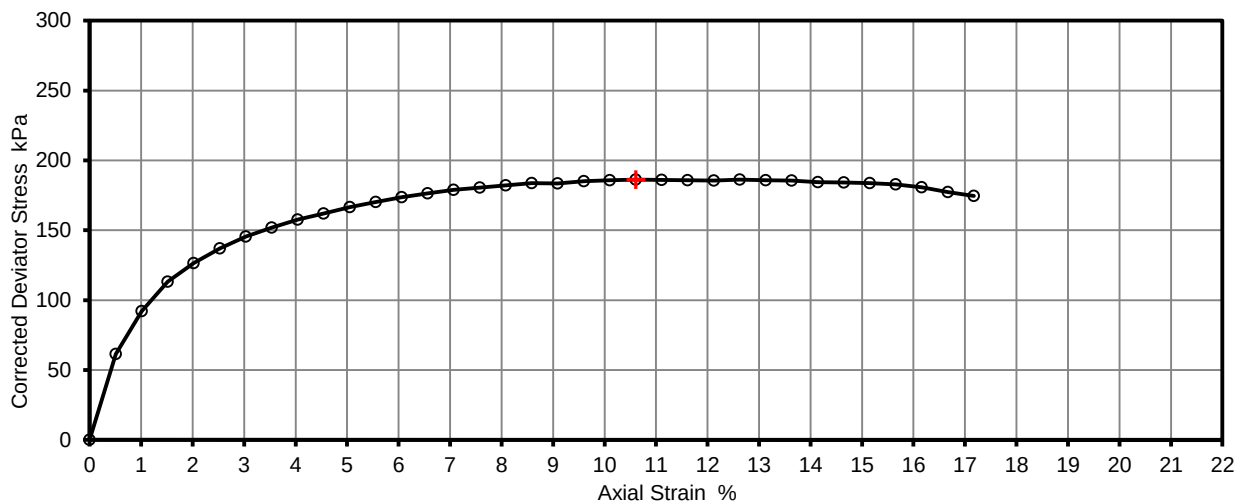
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | High strength fissured dark grey silty CLAY                                                  |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

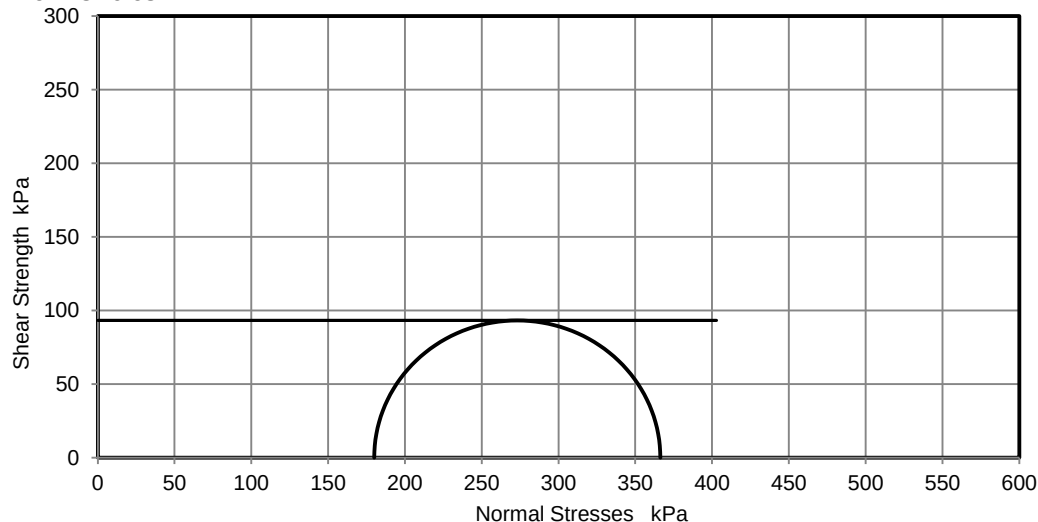
Position within sample

|                                             |                                             |
|---------------------------------------------|---------------------------------------------|
| Test Number                                 | 1                                           |
| Length                                      | 198.0 mm                                    |
| Diameter                                    | 102.0 mm                                    |
| Bulk Density                                | 2.02 Mg/m3                                  |
| Moisture Content                            | 27 %                                        |
| Dry Density                                 | 1.60 Mg/m3                                  |
| Rate of Strain                              | 2.0 %/min                                   |
| Cell Pressure                               | 180 kPa                                     |
| Axial Strain                                | 10.6 %                                      |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 186 kPa                                     |
| Undrained Shear Strength, cu                | 93 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Compound                                    |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

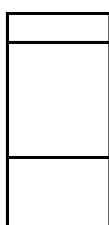
|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH7        |
| Sample No.         | 4          |
| Depth              | 12.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY                                             |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

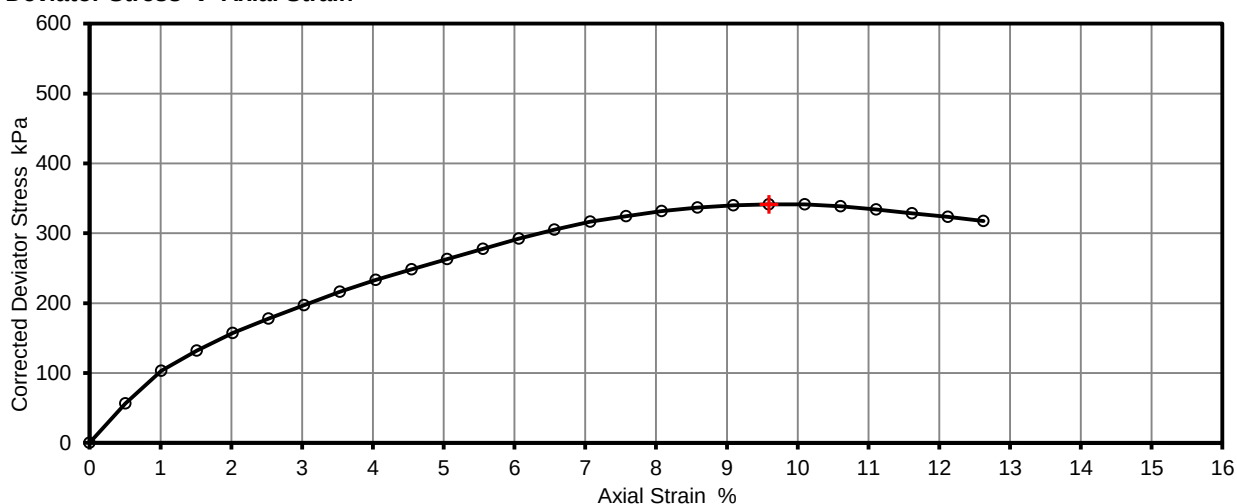
Disturbed

Position within sample

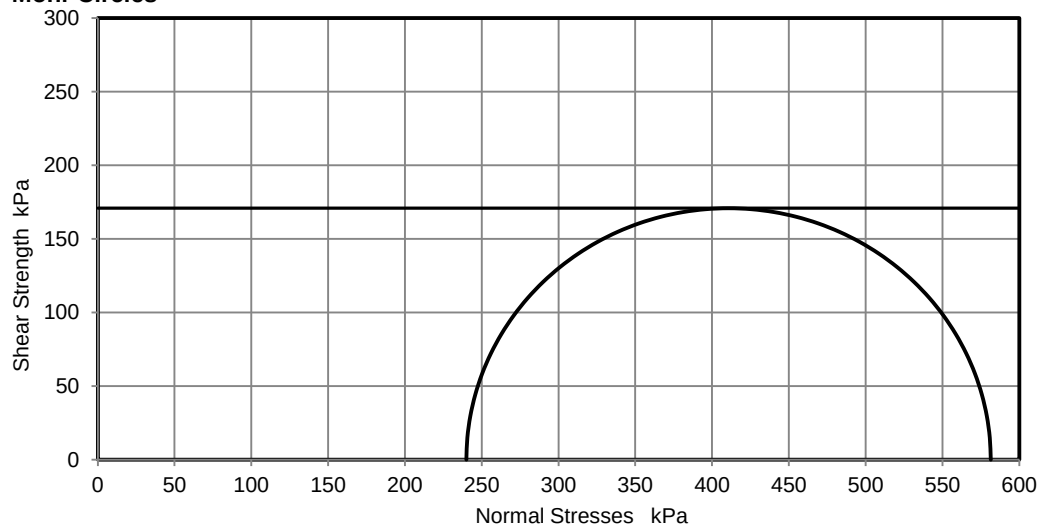


|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.10 Mg/m3                                   |
| Moisture Content                             | 21 %                                         |
| Dry Density                                  | 1.73 Mg/m3                                   |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 240 kPa                                      |
| Axial Strain                                 | 9.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 342 kPa                                      |
| Undrained Shear Strength, cu                 | 171 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Initials: J.P

Date 20/09/2016

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# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH7        |
| Sample No.         | 5          |
| Depth              | 15.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

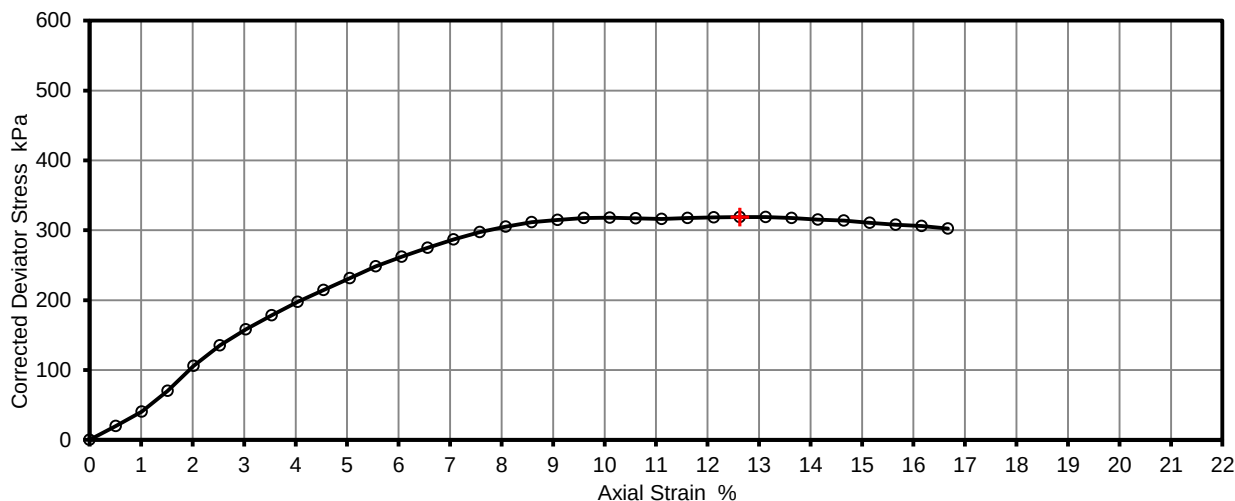
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

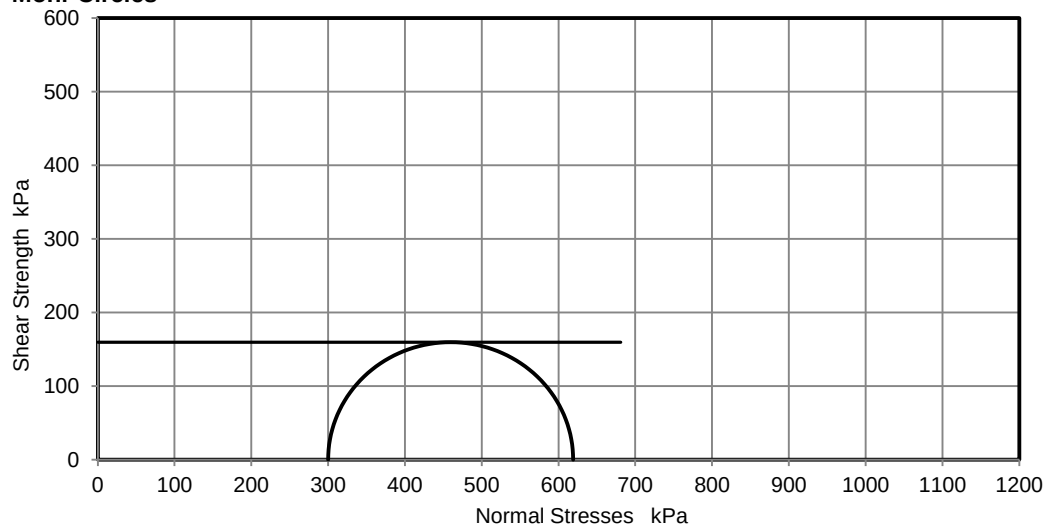
Position within sample

|                                              |                                              |
|----------------------------------------------|----------------------------------------------|
| Test Number                                  | 1                                            |
| Length                                       | 198.0 mm                                     |
| Diameter                                     | 102.0 mm                                     |
| Bulk Density                                 | 2.02 Mg/m <sup>3</sup>                       |
| Moisture Content                             | 25 %                                         |
| Dry Density                                  | 1.61 Mg/m <sup>3</sup>                       |
| Rate of Strain                               | 2.0 %/min                                    |
| Cell Pressure                                | 300 kPa                                      |
| Axial Strain                                 | 12.6 %                                       |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ ) f | 319 kPa                                      |
| Undrained Shear Strength, cu                 | 160 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                              | Compound                                     |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



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Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7



# **Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**

|                    |            |
|--------------------|------------|
| Job Ref            | 21488      |
| Borehole/Pit No.   | BH7        |
| Sample No.         | 6          |
| Depth              | 18.00 m    |
| Sample Type        | U          |
| Samples received   |            |
| Schedules received | 00/01/1900 |
| Date of test       | 14/09/2016 |

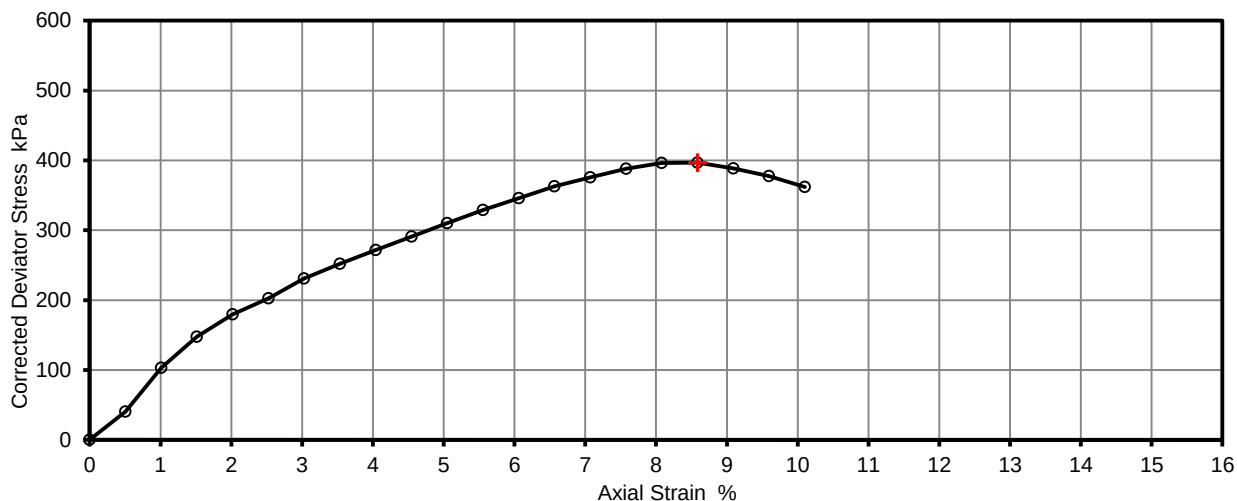
|                  |                                                                                              |        |                       |
|------------------|----------------------------------------------------------------------------------------------|--------|-----------------------|
| Site Name        | University of Reading, St Patricks Hall Redevelopment, 20 Northcourt Avenue, Reading RG2 7HB |        |                       |
| Project No.      | 52527                                                                                        | Client | Ian Farmer Associates |
| Soil Description | Very high strength fissured dark grey silty CLAY with light grey fine sand partings          |        |                       |
| Test Method      | BS1377 : Part 7 : 1990, clause 8, single specimen                                            |        |                       |

## **Remarks**

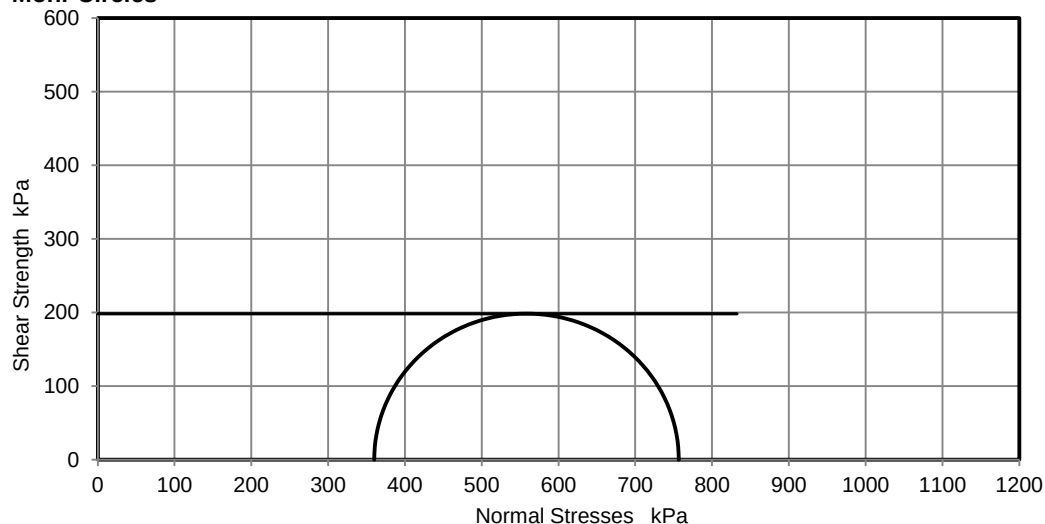
Position within sample

|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| Test Number                                 | 1                                            |
| Length                                      | 198.0 mm                                     |
| Diameter                                    | 102.0 mm                                     |
| Bulk Density                                | 2.06 Mg/m3                                   |
| Moisture Content                            | 21 %                                         |
| Dry Density                                 | 1.69 Mg/m3                                   |
| Rate of Strain                              | 2.0 %/min                                    |
| Cell Pressure                               | 360 kPa                                      |
| Axial Strain                                | 8.6 %                                        |
| Deviator Stress, ( $\sigma_1 - \sigma_3$ )f | 397 kPa                                      |
| Undrained Shear Strength, cu                | 198 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f |
| Mode of Failure                             | Brittle                                      |

## **Deviator Stress v Axial Strain**



## **Mohr Circles**



Deviator stress corrected for area change and membrane effects

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



2519

Test Report by K4 SOILS LABORATORY  
Unit 8 Olds Close Olds Approach  
Watford Herts WD18 9RU  
Tel: 01923 711 288  
Email: James@k4soils.com

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

Checked and Approved

Initials: J.P

Date 20/09/2016

MSF-5 R7

**Victoria Tickner**

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## **Analytical Report Number : 16-26406**

|                             |                                |                               |            |
|-----------------------------|--------------------------------|-------------------------------|------------|
| <b>Project / Site name:</b> | University of Reading, Reading | <b>Samples received on:</b>   | 26/08/2016 |
| <b>Your job number:</b>     | 52527                          | <b>Samples instructed on:</b> | 26/08/2016 |
| <b>Your order number:</b>   | 53896                          | <b>Analysis completed by:</b> | 05/09/2016 |
| <b>Report Issue Number:</b> | 1                              | <b>Report issued on:</b>      | 05/09/2016 |
| <b>Samples Analysed:</b>    | 20 soil samples                |                               |            |

**Signed:**

Rexona Rahman  
Reporting Manager  
**For & on behalf of i2 Analytical Ltd.**

**Signed:**

Dr Irma Doyle  
Senior Account Manager  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

|                                                                                    |           |                           |
|------------------------------------------------------------------------------------|-----------|---------------------------|
| Standard sample disposal times, unless otherwise agreed with the laboratory, are : | soils     | - 4 weeks from reporting  |
|                                                                                    | leachates | - 2 weeks from reporting  |
|                                                                                    | waters    | - 2 weeks from reporting  |
|                                                                                    | asbestos  | - 6 months from reporting |

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Analytical Report Number: 16-26406

Project / Site name: University of Reading, Reading

Your Order No: 53896

| Lab Sample Number                       |       |                       |                         | 621968        | 621969        | 621970        | 621971        | 621972        |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                       |                         | BH1           | BH1           | BH2           | BH2           | BH2           |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                       |                         | 1.20-1.65     | 5.50          | 2.70-3.20     | 4.40          | 12.00         |
| Date Sampled                            |       |                       |                         | 16/08/2016    | 16/08/2016    | 15/08/2016    | 15/08/2016    | 15/08/2016    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |               |
| Stone Content                           | %     | 0.1                   | NONE                    | 37            | < 0.1         | 53            | < 0.1         | < 0.1         |
| Moisture Content                        | %     | N/A                   | NONE                    | 6.2           | 21            | 4.8           | 20            | 16            |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 1.0           | 1.2           | 1.2           | 1.4           | 1.3           |

#### General Inorganics

|                                                                         |          |         |        |       |      |       |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|------|-------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.7   | 7.9  | 8.3   | 6.6   | 8.3   |
| Total Sulphate as SO <sub>4</sub>                                       | mg/kg    | 50      | MCERTS | -     | 770  | -     | 230   | 1300  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.024 | 0.26 | 0.020 | 0.084 | 0.62  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 23.7  | 258  | 19.9  | 83.6  | 625   |
| Total Sulphur                                                           | mg/kg    | 50      | NONE   | -     | 8500 | -     | 1900  | 11000 |

Figure A3.2 Iss No 16-26406-1 University of Reading, Reading 52527

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 16-26406

Project / Site name: University of Reading, Reading

Your Order No: 53896

| Lab Sample Number                       |       |                       |                         | 621973        | 621974        | 621975        | 621976        | 621977        |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                       |                         | BH2           | BH3           | BH3           | BH4           | BH5           |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                       |                         | 15.00         | 0.40-0.80     | 4.50          | 1.20-1.60     | 1.50-2.00     |
| Date Sampled                            |       |                       |                         | 15/08/2016    | 16/08/2016    | 16/08/2016    | 17/08/2016    | 17/08/2016    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |               |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | 18            | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                        | %     | N/A                   | NONE                    | 13            | 11            | 20            | 7.6           | 12            |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 1.1           | 0.97          | 1.8           | 1.3           | 0.85          |

#### General Inorganics

|                                                                         |          |         |        |       |       |       |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 8.3   | 8.3   | 6.9   | 9.3   | 5.4   |
| Total Sulphate as SO <sub>4</sub>                                       | mg/kg    | 50      | MCERTS | 3000  | -     | 390   | -     | -     |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 1.3   | 0.013 | 0.039 | 0.032 | 0.018 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 1340  | 13.4  | 39.4  | 31.8  | 18.3  |
| Total Sulphur                                                           | mg/kg    | 50      | NONE   | 11000 | -     | 5000  | -     | -     |

Figure A3.2 Iss No 16-26406-1 University of Reading, Reading 52527

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Analytical Report Number: 16-26406

Project / Site name: University of Reading, Reading

Your Order No: 53896

| Lab Sample Number                       |       |                       |                         | 621978        | 621979        | 621980        | 621981        | 621982        |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                       |                         | BH5           | BH5           | BH5           | BH6           | BH6           |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                       |                         | 3.00-3.50     | 5.20          | 22.25         | 1.20-1.60     | 2.00-2.40     |
| Date Sampled                            |       |                       |                         | 17/08/2016    | 17/08/2016    | 17/08/2016    | 18/08/2016    | 18/08/2016    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |               |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                        | %     | N/A                   | NONE                    | 8.9           | 18            | 17            | 15            | 11            |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 0.99          | 0.74          | 0.77          | 0.72          | 0.81          |

#### General Inorganics

|                                                                         |          |         |        |       |       |       |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 5.3   | 6.6   | 8.2   | 7.9   | 7.6   |
| Total Sulphate as SO <sub>4</sub>                                       | mg/kg    | 50      | MCERTS | -     | 340   | 280   | -     | -     |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.022 | 0.059 | 1.0   | 0.040 | 0.020 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 21.5  | 58.7  | 1020  | 39.9  | 19.8  |
| Total Sulphur                                                           | mg/kg    | 50      | NONE   | -     | 4100  | 11000 | -     | -     |

Figure A3.2 Iss No 16-26406-1 University of Reading, Reading 52527

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Analytical Report Number: 16-26406

Project / Site name: University of Reading, Reading

Your Order No: 53896

| Lab Sample Number                       |       |                       |                         | 621983        | 621984        | 621985        | 621986        | 621987        |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                       |                         | BH6           | BH7           | BH7           | WS3           | WS9           |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                       |                         | 4.50          | 1.20          | 12.50         | 0.50          | 0.50          |
| Date Sampled                            |       |                       |                         | 18/08/2016    | 18/08/2016    | 18/08/2016    | 18/08/2016    | 18/08/2016    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |               |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         | < 0.1         | 24            | < 0.1         |
| Moisture Content                        | %     | N/A                   | NONE                    | 18            | 12            | 18            | 3.7           | 11            |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 2.0           | 1.7           | 0.75          | 1.2           | 0.67          |

#### General Inorganics

|                                                                         |          |         |        |      |       |      |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|------|-------|------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.3  | 6.0   | 8.5  | 6.9   | 6.1   |
| Total Sulphate as SO <sub>4</sub>                                       | mg/kg    | 50      | MCERTS | 660  | -     | 660  | -     | -     |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.23 | 0.019 | 0.15 | 0.011 | 0.054 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 232  | 18.5  | 147  | 10.6  | 53.8  |
| Total Sulphur                                                           | mg/kg    | 50      | NONE   | 4300 | -     | 9700 | -     | -     |

Figure A3.2 Iss No 16-26406-1 University of Reading, Reading 52527

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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number : 16-26406**

**Project / Site name: University of Reading, Reading**

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                            |
|-------------------|------------------|---------------|-----------|-------------------------------------------------|
| 621968            | BH1              | None Supplied | 1.20-1.65 | Brown gravelly clay with stones.                |
| 621969            | BH1              | None Supplied | 5.50      | Grey clay.                                      |
| 621970            | BH2              | None Supplied | 2.70-3.20 | Brown sandy gravel with stones.**               |
| 621971            | BH2              | None Supplied | 4.40      | Brown clay.                                     |
| 621972            | BH2              | None Supplied | 12.00     | Grey clay.                                      |
| 621973            | BH2              | None Supplied | 15.00     | Grey sandy clay.                                |
| 621974            | BH3              | None Supplied | 0.40-0.80 | Brown loam and clay with stones and vegetation. |
| 621975            | BH3              | None Supplied | 4.50      | Light brown clay.                               |
| 621976            | BH4              | None Supplied | 1.20-1.60 | Brown gravel.**                                 |
| 621977            | BH5              | None Supplied | 1.50-2.00 | Light brown sandy clay.                         |
| 621978            | BH5              | None Supplied | 3.00-3.50 | Light brown sand.                               |
| 621979            | BH5              | None Supplied | 5.20      | Brown clay.                                     |
| 621980            | BH5              | None Supplied | 22.25     | Grey clay.                                      |
| 621981            | BH6              | None Supplied | 1.20-1.60 | Brown clay.                                     |
| 621982            | BH6              | None Supplied | 2.00-2.40 | Light brown sand.                               |
| 621983            | BH6              | None Supplied | 4.50      | Grey clay.                                      |
| 621984            | BH7              | None Supplied | 1.20      | Brown clay.                                     |
| 621985            | BH7              | None Supplied | 12.50     | Grey clay.                                      |
| 621986            | WS3              | None Supplied | 0.50      | Brown sandy loam with stones and vegetation.    |
| 621987            | WS9              | None Supplied | 0.50      | Brown clay.                                     |

\*\*Non Mcerts Matrix

**Analytical Report Number : 16-26406**

**Project / Site name: University of Reading, Reading**

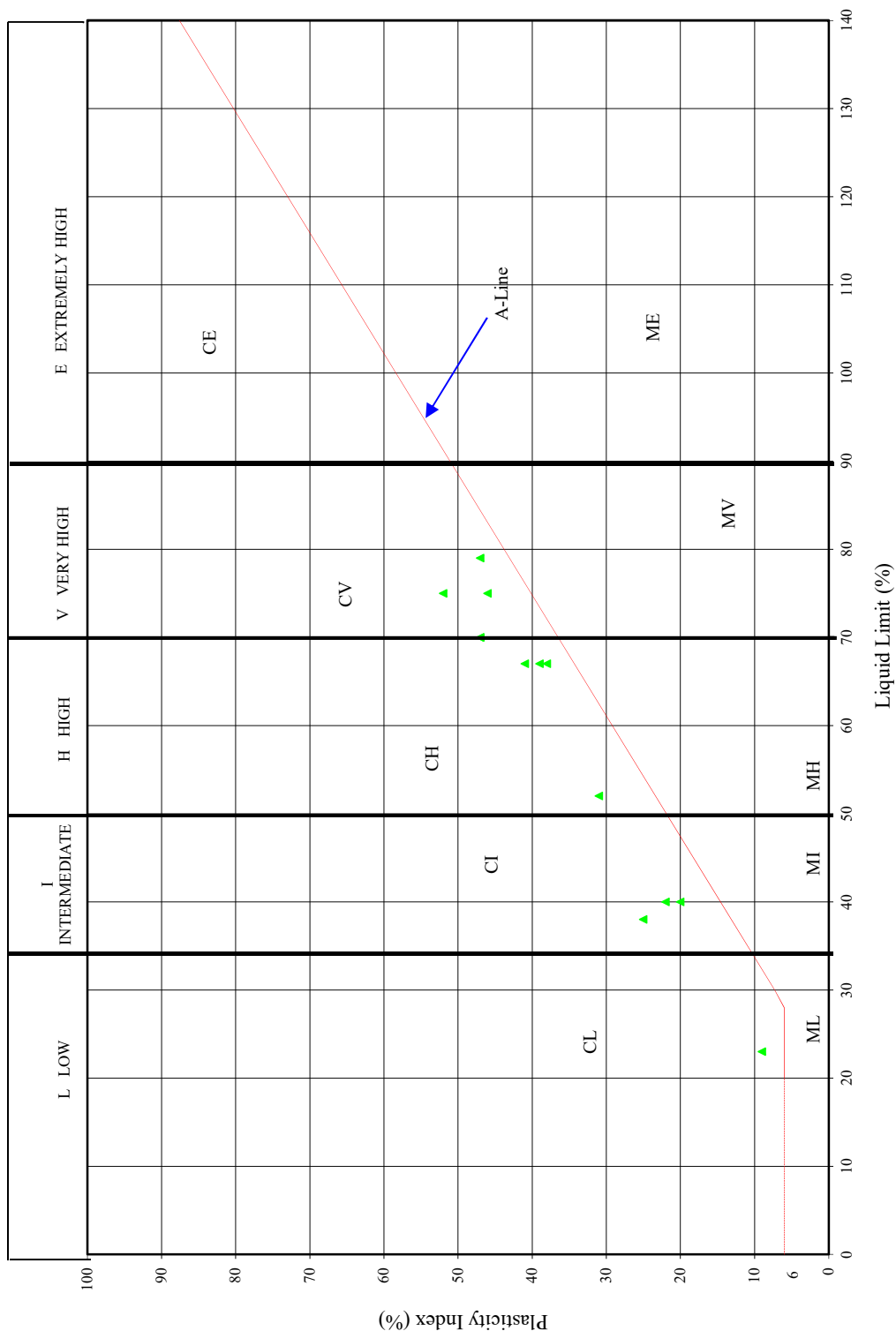
**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                                       | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Moisture Content                                   | Moisture content, determined gravimetrically.                                                                                                             | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L019-UK/PL    | W                  | NONE                 |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L099-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                                        | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES. | L038-PL       | D                  | MCERTS               |
| Total sulphate (as SO <sub>4</sub> in soil)        | Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.                                                                   | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L038-PL       | D                  | MCERTS               |
| Total Sulphur in soil                              | Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.                                      | In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil                      | L038-PL       | D                  | NONE                 |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**

**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.**



SILTS generally plot below A Line  
CLAYS generally plot above A Line

**APPENDIX 4**  
**DESIGN CONSIDERATIONS**

**GUIDELINES FOR THE DESIGN OF PILES**  
**FIRST APPROXIMATION OF WORKING LOAD**

**A4.1 GENERAL**

The ultimate carrying capacity,  $Q_u$ , of a particular pile is taken as the sum of the ultimate shaft friction resistance,  $Q_s$ , and the ultimate end bearing resistance,  $Q_b$ . This may be expressed as follows:-

$$\begin{aligned} Q_u &= Q_s + Q_b \\ &= f.A_s + q.A_b \end{aligned}$$

|       |       |   |                                             |
|-------|-------|---|---------------------------------------------|
| where | $f$   | = | unit shaft resistance                       |
|       | $A_s$ | = | embedded surface area of pile               |
|       | $q$   | = | unit end bearing resistance                 |
|       | $A_b$ | = | effective cross-sectional area of pile base |

**A4.2 COHESIVE SOILS**

**A4.2.1 Shaft Resistance**

The ultimate shaft resistance,  $f$ , for piles in both compression or tension in cohesive soils is determined by applying a factor to the undrained shear strength,  $C_s$ , which exists in the soils along the embedded length of the pile, and is given by:-

$$f = \alpha.C_s$$

Where  $\alpha$  is an adhesion factor, which for straight-shafted bored piles may be taken as 0.45 to 0.60.

Ultimate unit shaft friction should not exceed 100kPa.

**A4.2.2 End Bearing**

For piles terminating in cohesive soils, the ultimate unit end bearing resistance  $q$ , is given by:-

$$q = N_c.C_b$$

|       |                                                               |
|-------|---------------------------------------------------------------|
| where | $C_b$ is the undrained shear strength at the base of the pile |
| and   | $N_c$ is a bearing capacity factor                            |

The value of  $N_c$  for a cohesive material is variable, depending on the depth of the penetration of the pile into the bearing stratum. Generally,  $N_c$  could be taken to have a value of 9, except in the case of large diameter short piles where a lesser value should be used.

**A4.3 COHESIONLESS SOILS**

**A4.3.1 Shaft Resistance**

For piles driven in cohesionless soils the ultimate unit shaft resistance,  $f$ , may be calculated using the following method, which gives:-

$$f = 0.5\gamma' (D+d) K_s \tan \delta$$

where

|           |   |                                                                                      |
|-----------|---|--------------------------------------------------------------------------------------|
| $\gamma'$ | = | average effective unit weight of soil surrounding the pile                           |
| D         | = | depth to the pile toe or to the base of the granular stratum whichever is the lesser |
| d         | = | depth to the top of the granular stratum                                             |
| $\delta$  | = | angle of friction between pile and soil (see below)                                  |
| $K_s$     | = | a coefficient (see below)                                                            |

#### VALUES OF $K_s$ AND $\delta$

| Pile Type | $\delta$    | $K_s$            |      |               |
|-----------|-------------|------------------|------|---------------|
|           |             | Relative Density |      | Tension Piles |
|           |             | Low              | High |               |
| Steel     | 20°         | 0.5              | 1.5  | 0.5           |
| Concrete  | 0.75 $\phi$ | 1.0              | 2.0  | 0.5           |

The value of  $\phi$  may be interpreted from standard penetration tests.

For bored and cast-in-place piles,  $\delta = 22^\circ$  and  $K_s = 1$  should be used to allow for loosening of the soil during boring.

It has been found that the ultimate unit shaft resistance does not exceed 100kPa and therefore this value should not be exceeded in design.

#### A4.3.2 End Bearing

The unit ultimate end bearing resistance ( $q$ ) of piles in cohesionless soils may be calculated as follows:-

$$q = \gamma' D N_q$$

where  $\gamma'$  = average effective unit weight of soil surrounding the pile

D = depth to pile toe

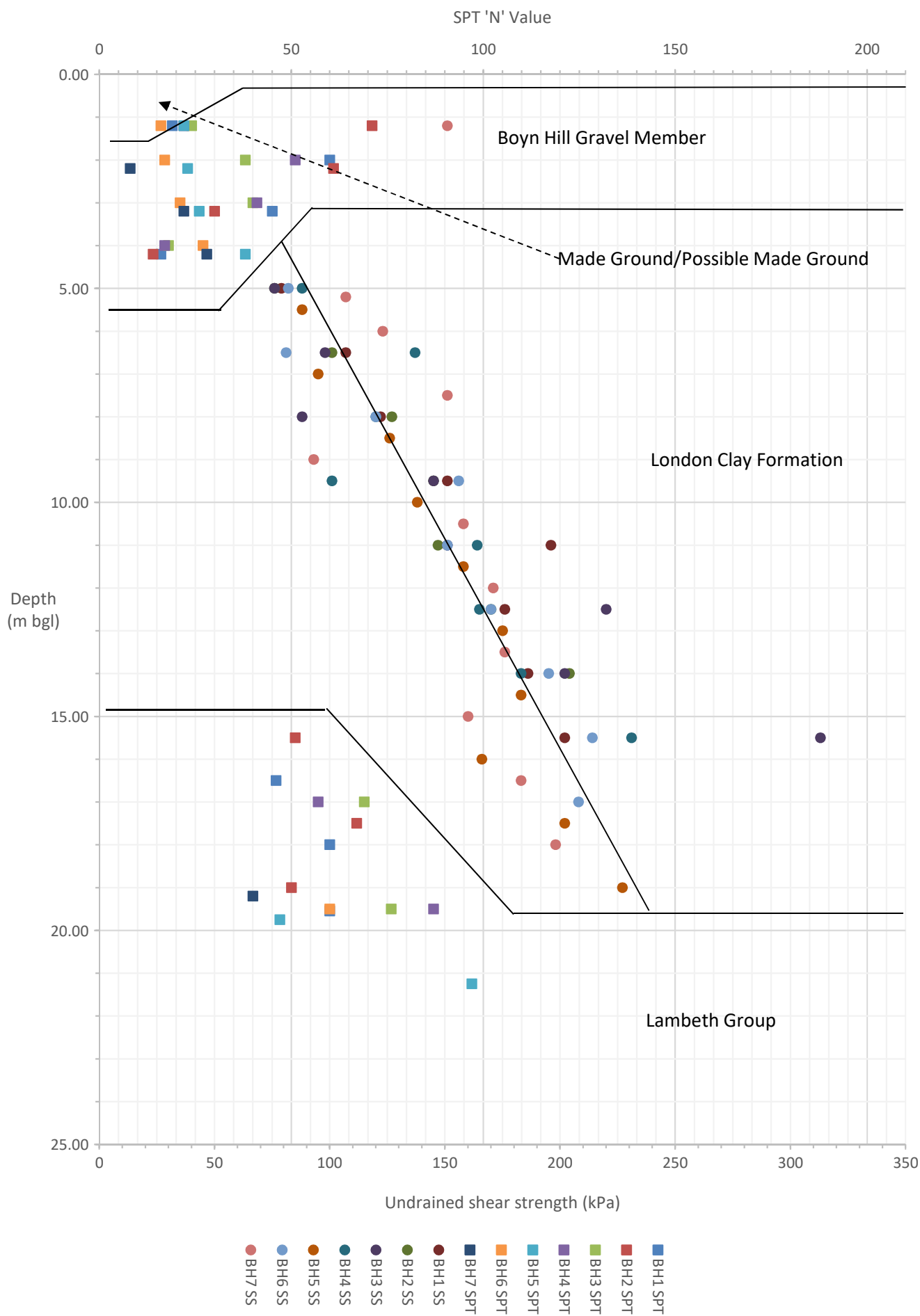
$N_q$  = bearing capacity factor

In addition, the ultimate unit base resistance should not exceed a value of 11,000kPa. For bored and cast-in-place piles the value of  $N_q$  used should correspond to loose soil conditions.

### A4.4 FACTORS OF SAFETY

#### A4.4.1 Cohesive and Non-cohesive Soils

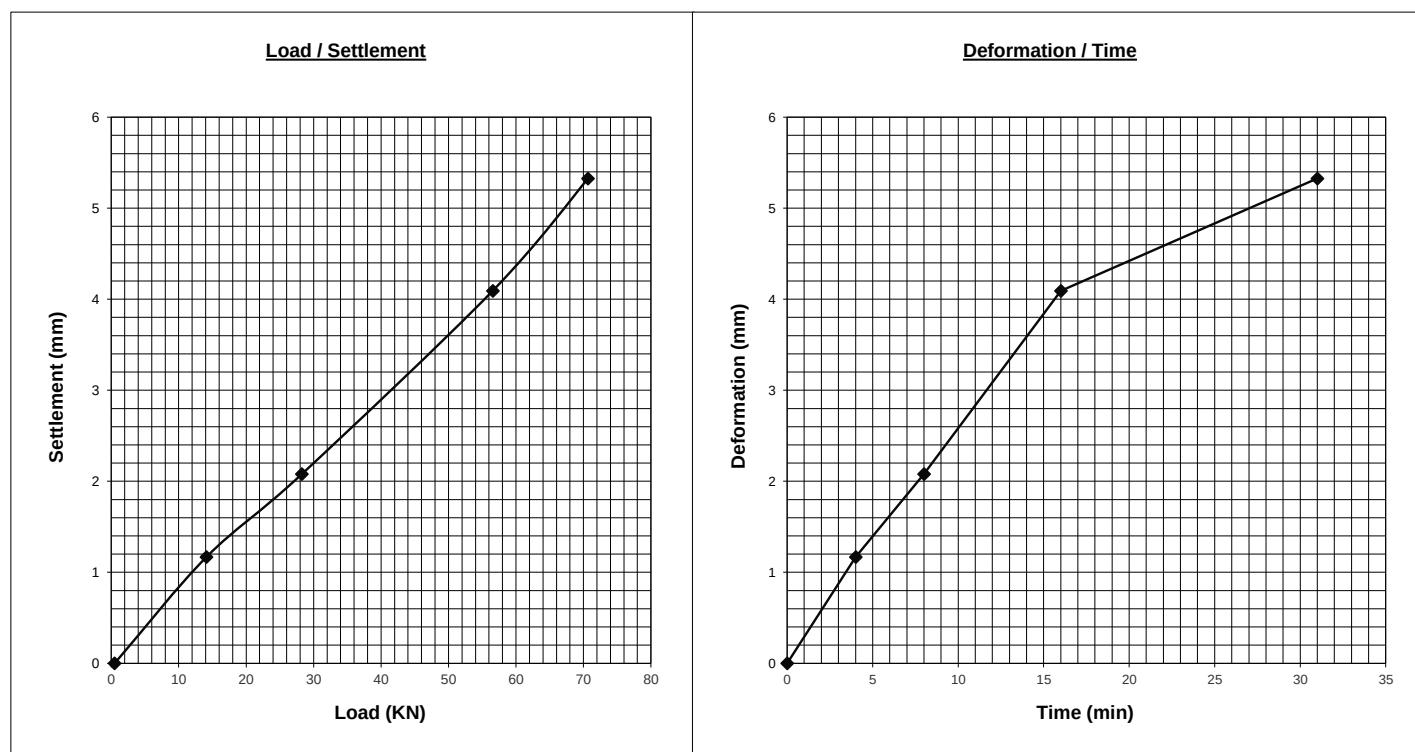
For cohesive and non-cohesive soils a factor of safety of 3 may be used to obtain the allowable or safe carrying capacity of piles from the ultimate carrying capacity.



|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>23/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB1                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                    |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 29 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 5.4 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 1.17                     |
| 2                  | 28.3    | 2.08                     |
| 3                  | 56.6    | 4.09                     |
| 4                  | 70.7    | 5.33                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



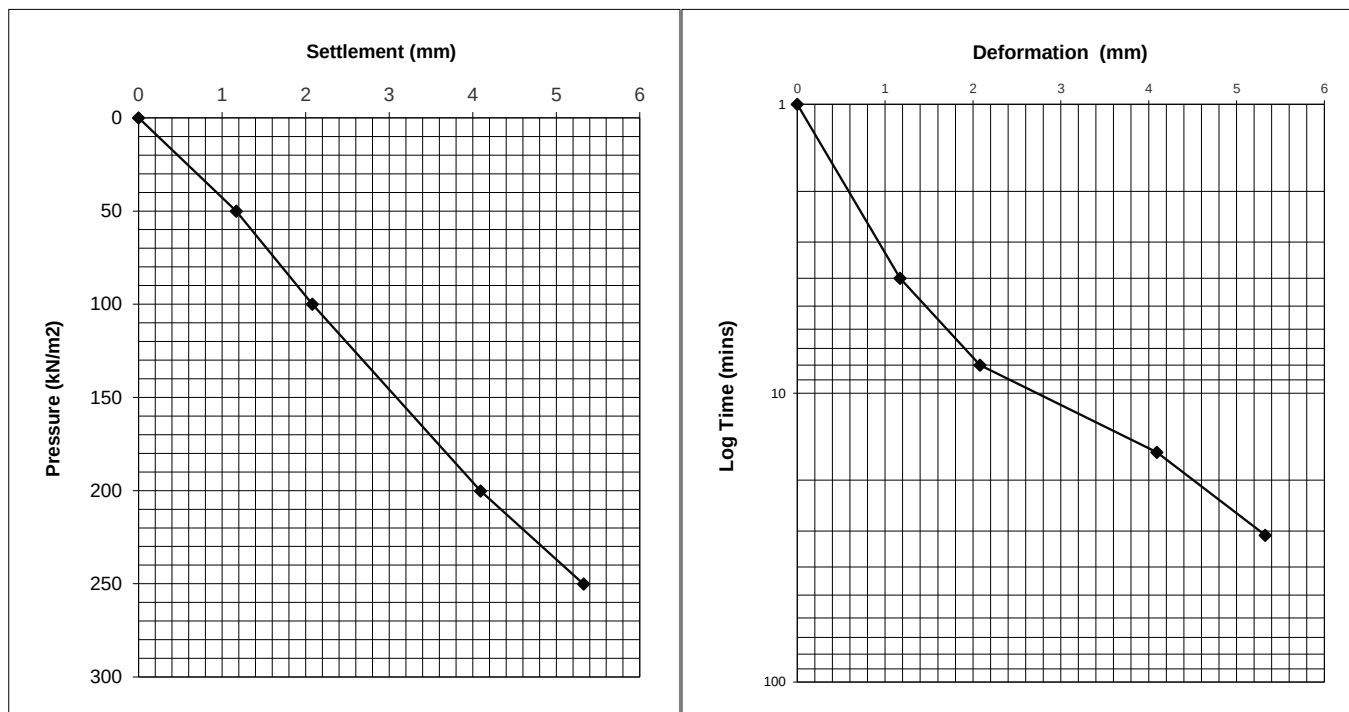
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>23/08/2016 |                                                                                                        |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                        |
| <b>Position no:</b><br>PB1                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                        |

|                                                                                                            |                                          |
|------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                  | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                            | Loading procedure: Incremental           |
| Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded) | Description of Reaction load: Site Plant |
| Temperature (OC): 29                                                                                       | Insitu moisture content(%): 5.4          |

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 1.17          | 50             |
| 2                  | 28.3    | 2.08          | 100            |
| 3                  | 56.6    | 4.09          | 200            |
| 4                  | 70.7    | 5.33          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request.

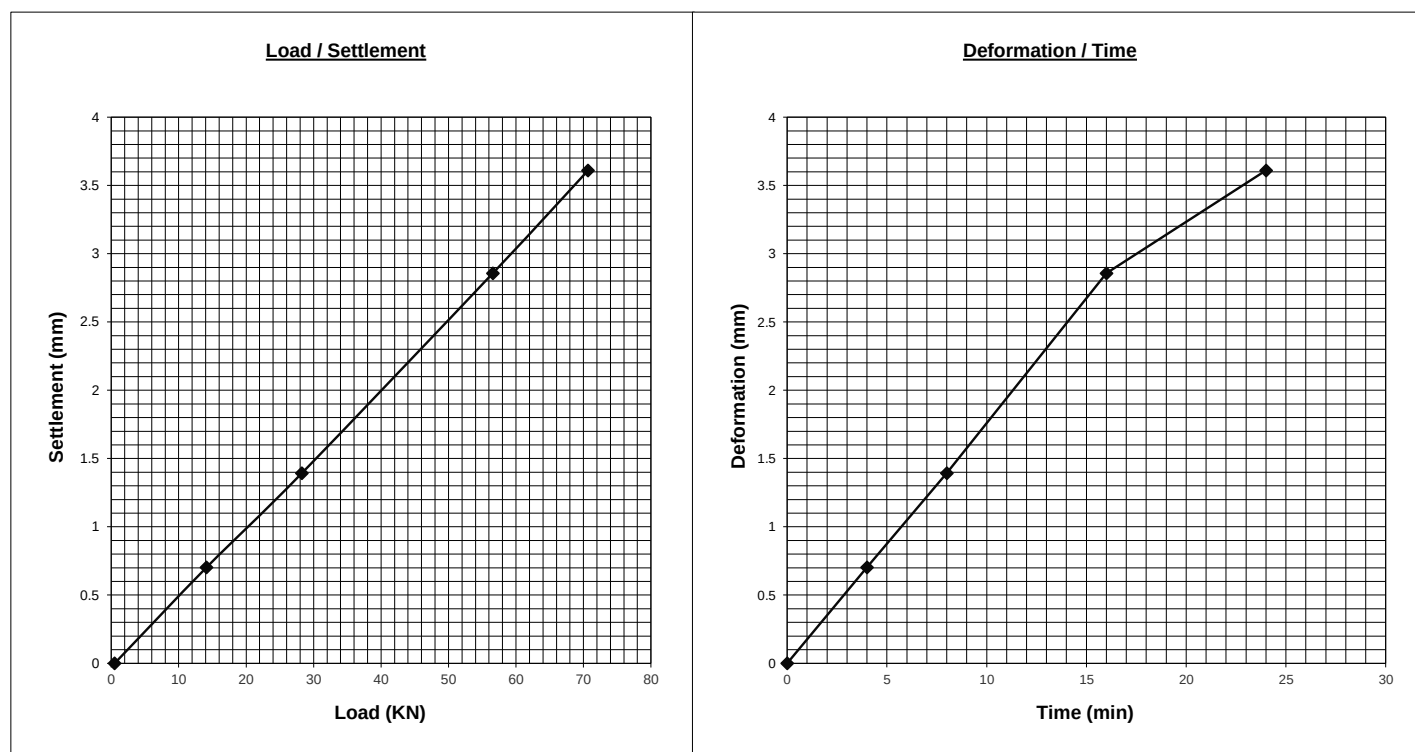
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>23/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB2                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                    |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 29 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 6.5 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 0.70                     |
| 2                  | 28.3    | 1.39                     |
| 3                  | 56.6    | 2.86                     |
| 4                  | 70.7    | 3.61                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



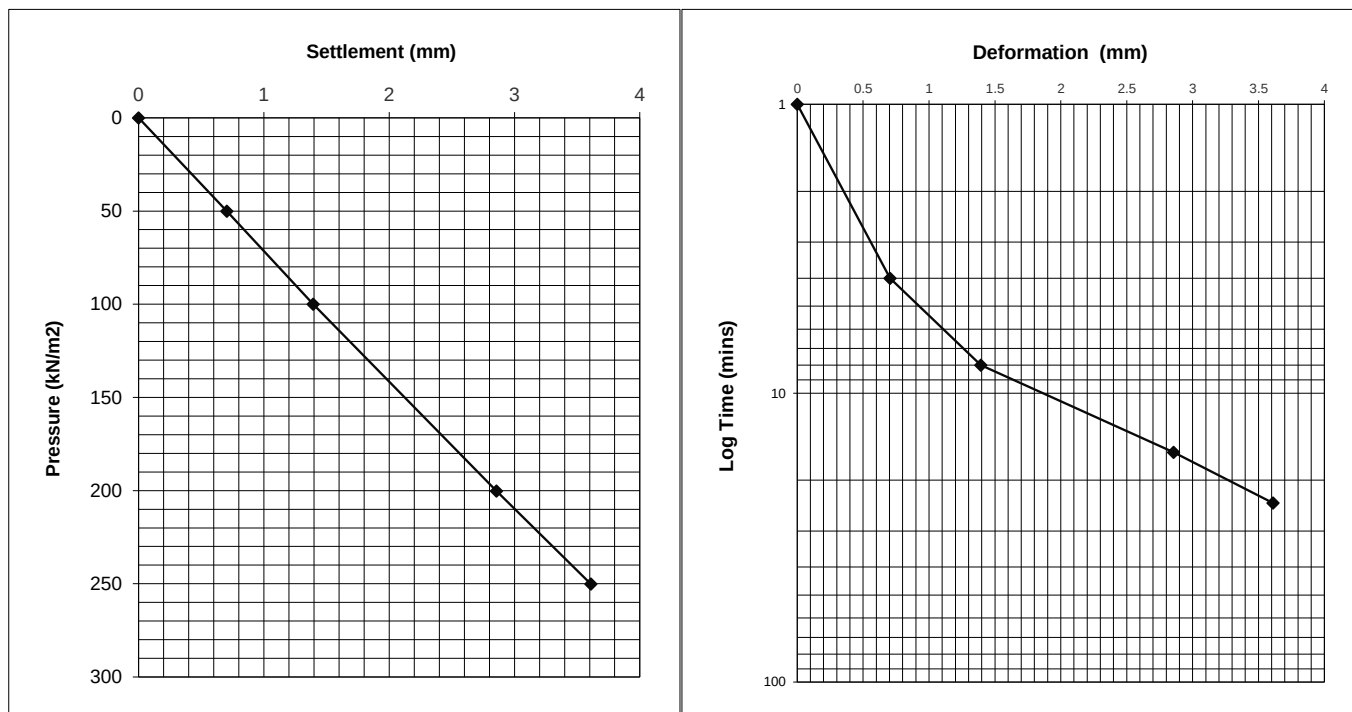
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                       |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>23/08/2016 |                                                                                                       |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                       |
| <b>Position no:</b><br>PB2                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                       |

|                                                                                                            |                                          |
|------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                  | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                            | Loading procedure: Incremental           |
| Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded) | Description of Reaction load: Site Plant |
| Temperature (OC): 29                                                                                       | Insitu moisture content(%): 6.5          |

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 0.70          | 50             |
| 2                  | 28.3    | 1.39          | 100            |
| 3                  | 56.6    | 2.86          | 200            |
| 4                  | 70.7    | 3.61          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request.

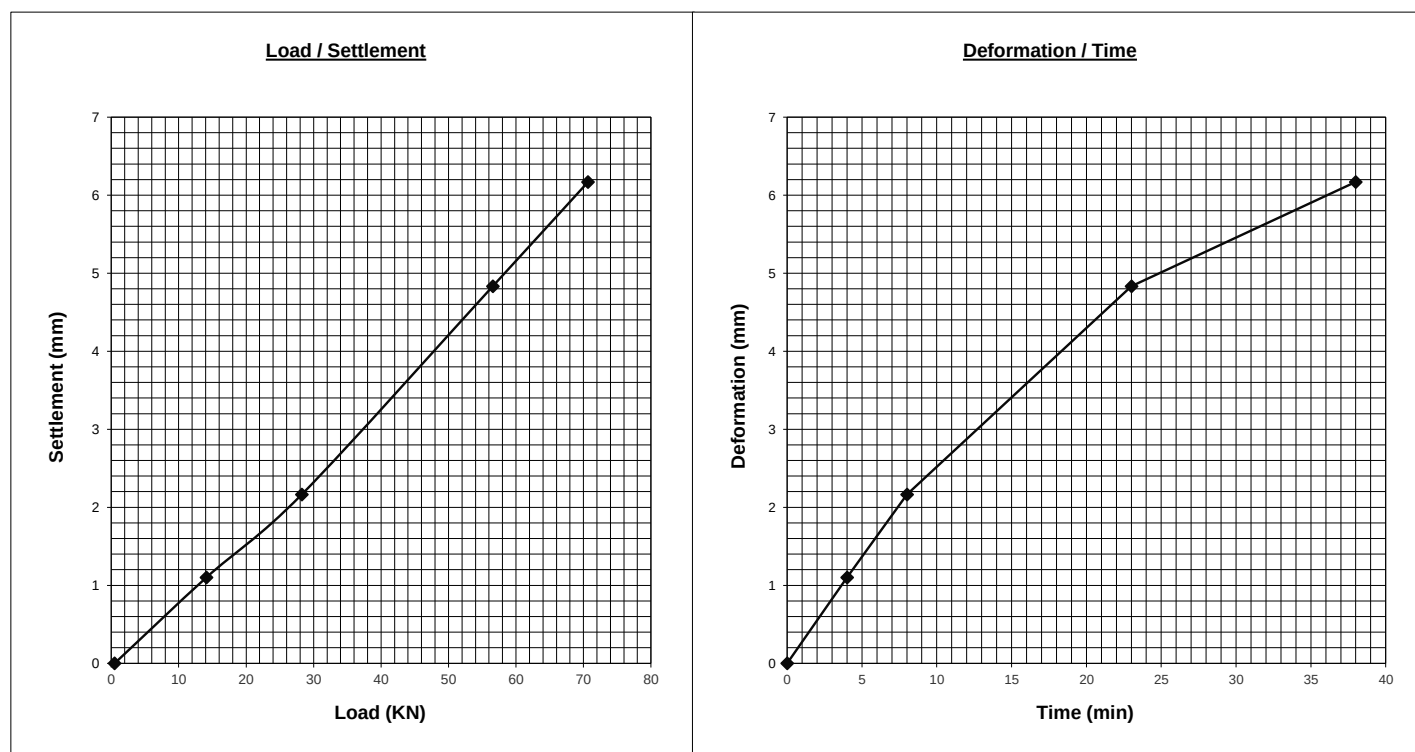
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>23/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB3                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                    |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 29 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 9.8 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 1.10                     |
| 2                  | 28.3    | 2.17                     |
| 3                  | 56.6    | 4.83                     |
| 4                  | 70.7    | 6.17                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



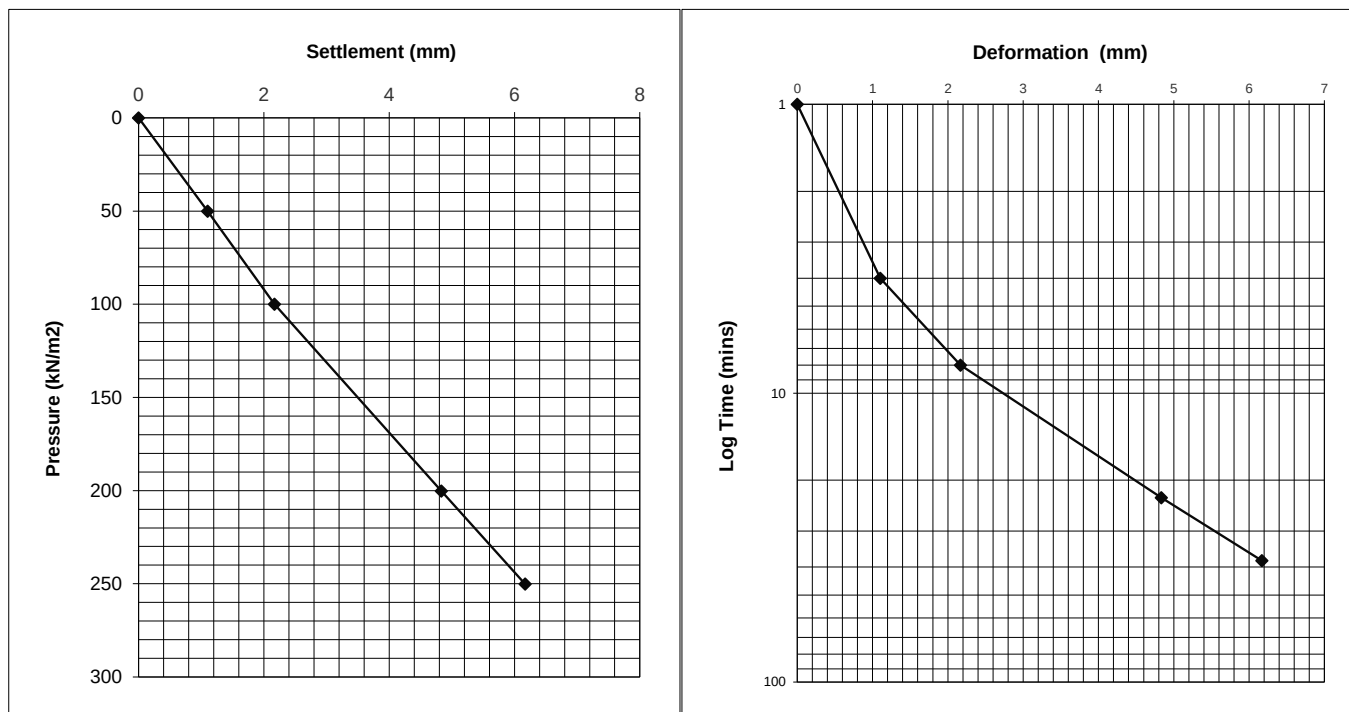
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                       |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>23/08/2016 |                                                                                                       |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                       |
| <b>Position no:</b><br>PB3                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                       |

|                                                                                                                                                                                                    |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 29 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: Site Plant<br>Insitu moisture content(%): 9.8 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 1.10          | 50             |
| 2                  | 28.3    | 2.17          | 100            |
| 3                  | 56.6    | 4.83          | 200            |
| 4                  | 70.7    | 6.17          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request.

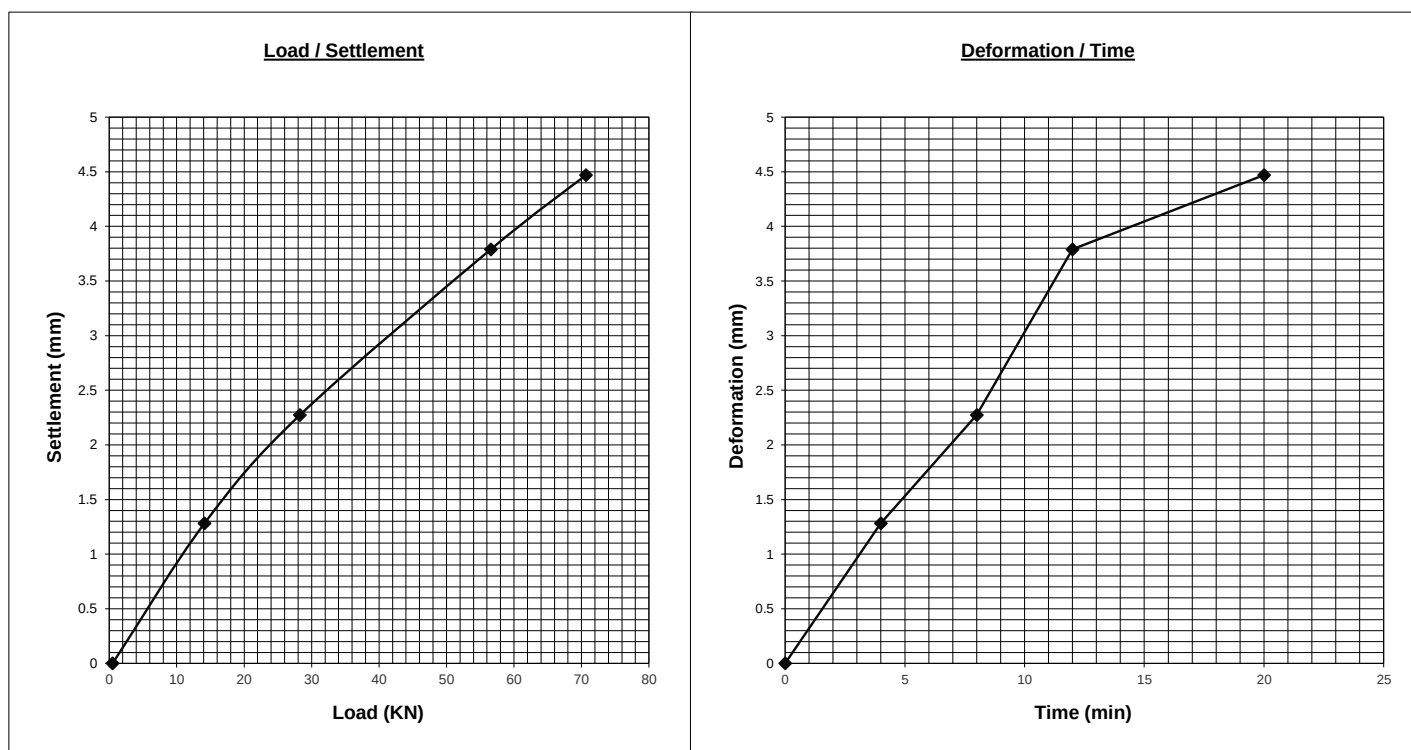
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>24/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB4                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                                   |                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 30 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 4.8 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 1.28                     |
| 2                  | 28.3    | 2.27                     |
| 3                  | 56.6    | 3.79                     |
| 4                  | 70.7    | 4.47                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



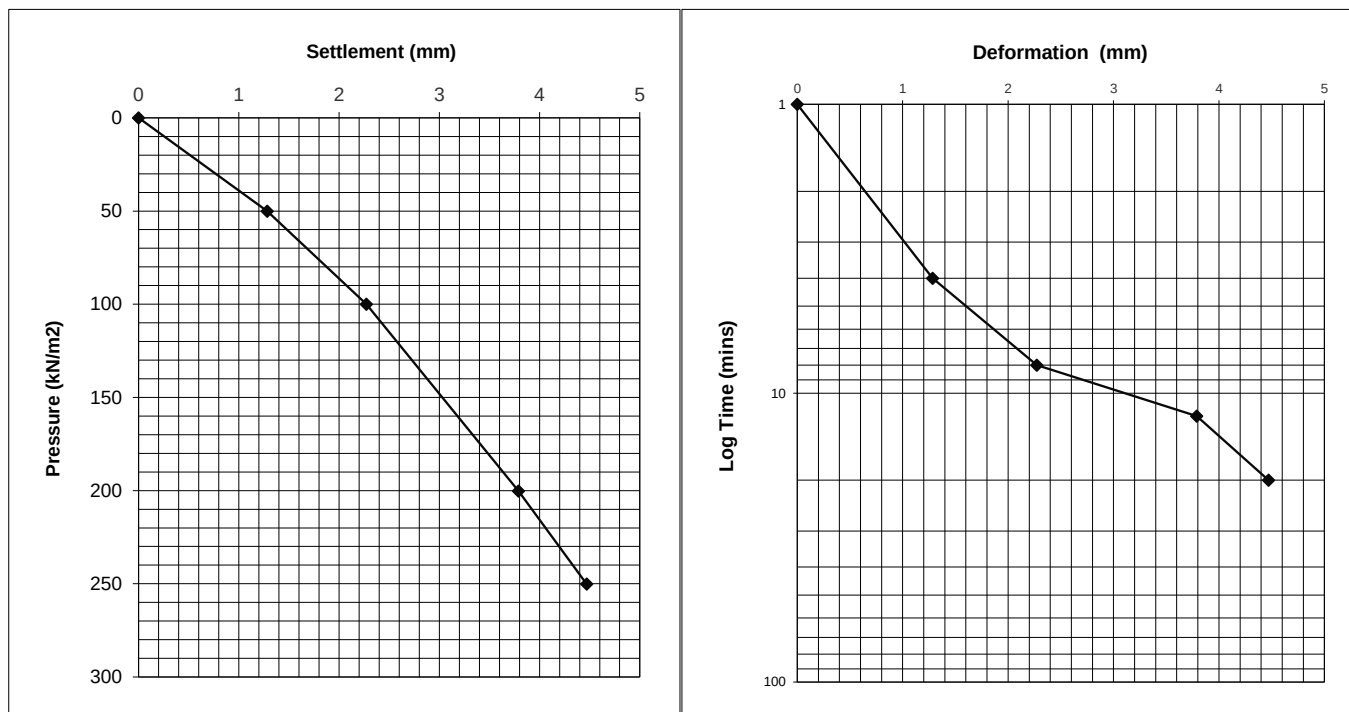
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>24/08/2016 |                                                                                                        |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                        |
| <b>Position no:</b><br>PB4                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                        |

|                                                                                                                                                                                                                    |                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fine and sub-angular to rounded)<br>Temperature (OC): 30 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: Site Plant<br>Insitu moisture content(%): 4.8 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 1.28          | 50             |
| 2                  | 28.3    | 2.27          | 100            |
| 3                  | 56.6    | 3.79          | 200            |
| 4                  | 70.7    | 4.47          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request.

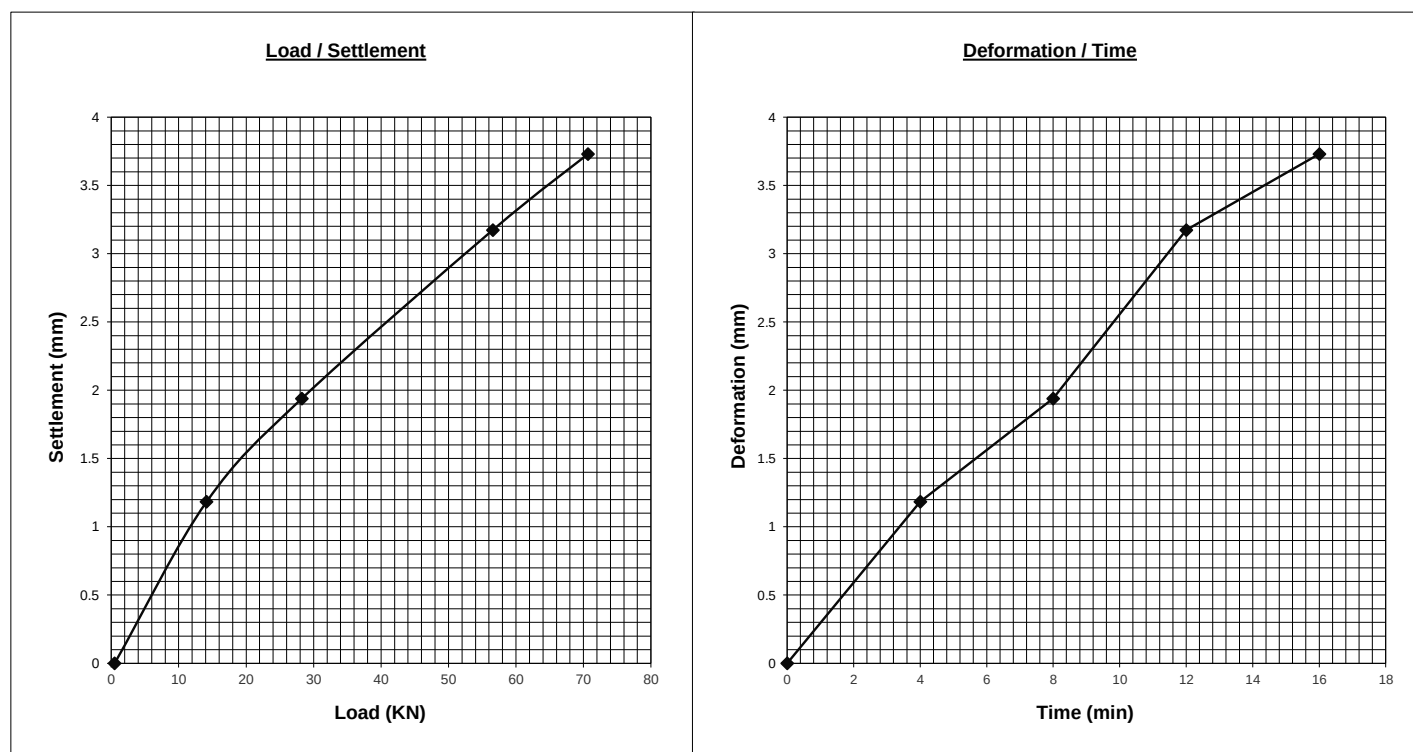
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>23/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB5                                                                      | <b>Depth:</b><br>0.25              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                    |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 29 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 5.1 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 1.18                     |
| 2                  | 28.3    | 1.94                     |
| 3                  | 56.6    | 3.17                     |
| 4                  | 70.7    | 3.73                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



|                                                                                    |                               |                                                                  |
|------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                    | BS1377:Part 9:1990:Clause 4.0 |                                                                  |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

All samples connected with this report .incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request.

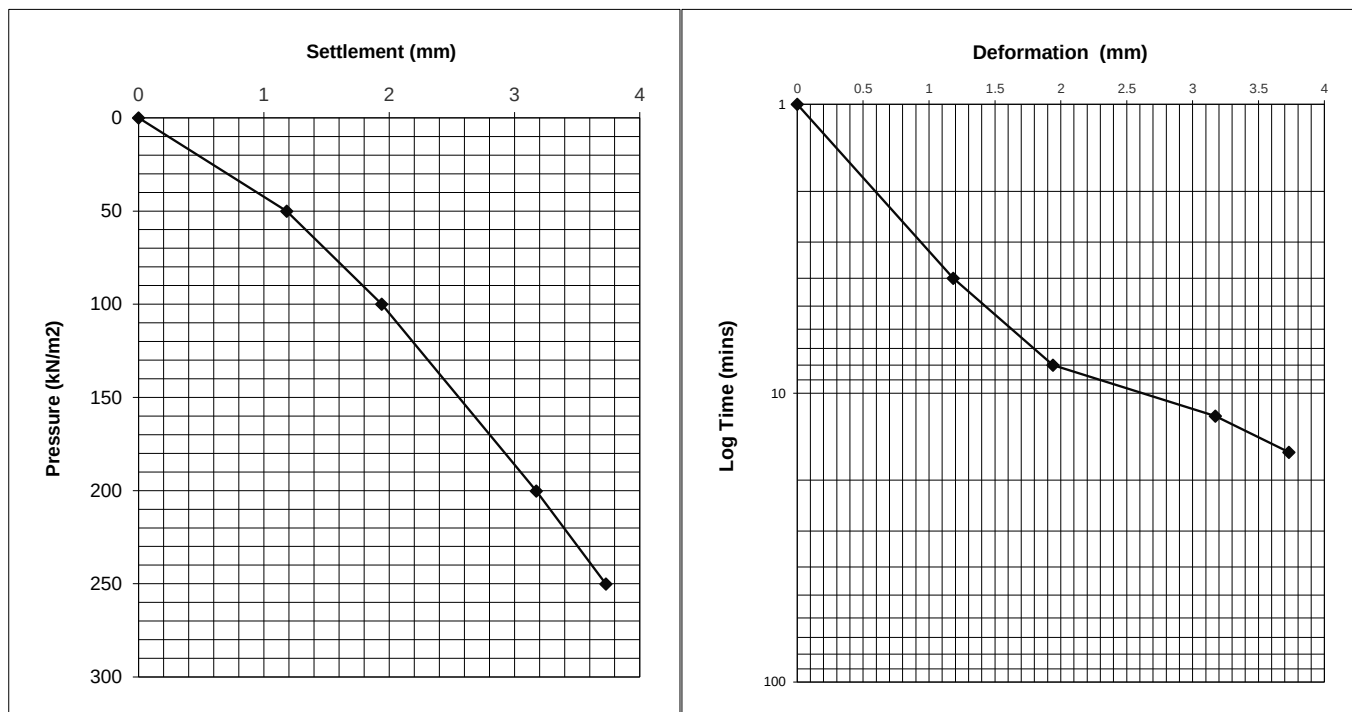
MSF-11/R9/Rev2

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                       |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>23/08/2016 |                                                                                                       |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                       |
| <b>Position no:</b><br>PB5                                                                      | <b>Depth:</b><br>0.25              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                       |

|                                                                                                                                                                                                    |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 29 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: Site Plant<br>Insitu moisture content(%): 5.1 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 1.18          | 50             |
| 2                  | 28.3    | 1.94          | 100            |
| 3                  | 56.6    | 3.17          | 200            |
| 4                  | 70.7    | 3.73          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request.

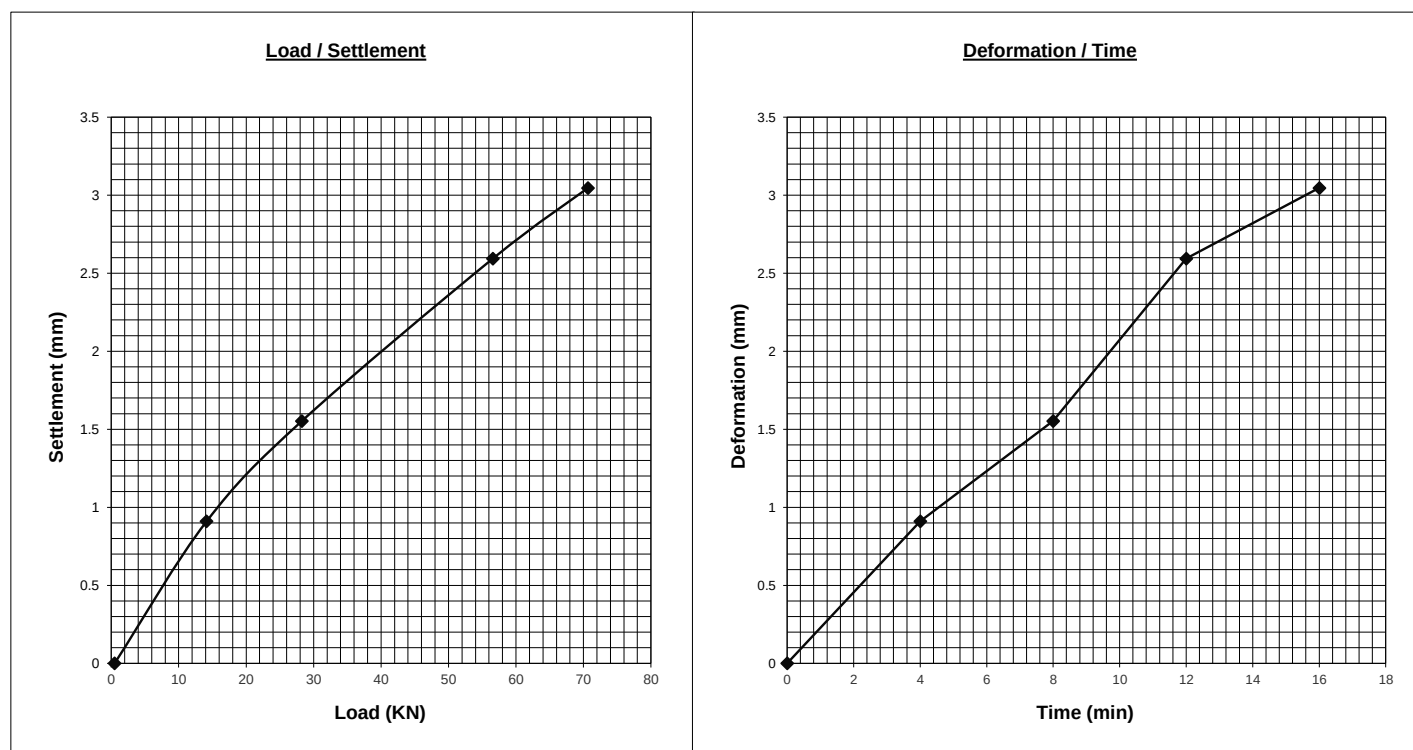
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>24/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB6                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                                   |                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 30 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 6.1 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 0.91                     |
| 2                  | 28.3    | 1.55                     |
| 3                  | 56.6    | 2.59                     |
| 4                  | 70.7    | 3.05                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



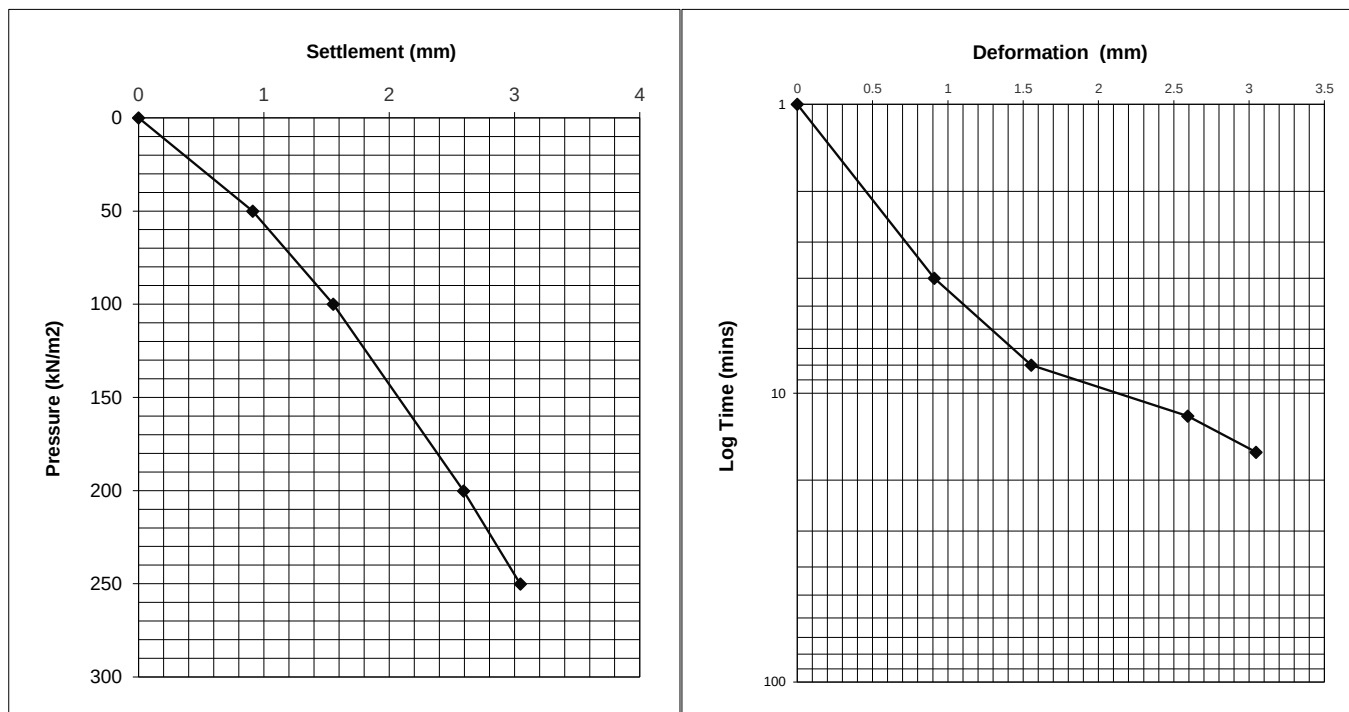
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                       |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>24/08/2016 |                                                                                                       |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                       |
| <b>Position no:</b><br>PB6                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                       |

|                                                                                                                            |                                          |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                                  | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                                            | Loading procedure: Incremental           |
| Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fine and sub-angular to rounded) | Description of Reaction load: Site Plant |
| Temperature (OC): 30                                                                                                       | Insitu moisture content(%): 6.1          |

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 0.91          | 50             |
| 2                  | 28.3    | 1.55          | 100            |
| 3                  | 56.6    | 2.59          | 200            |
| 4                  | 70.7    | 3.05          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

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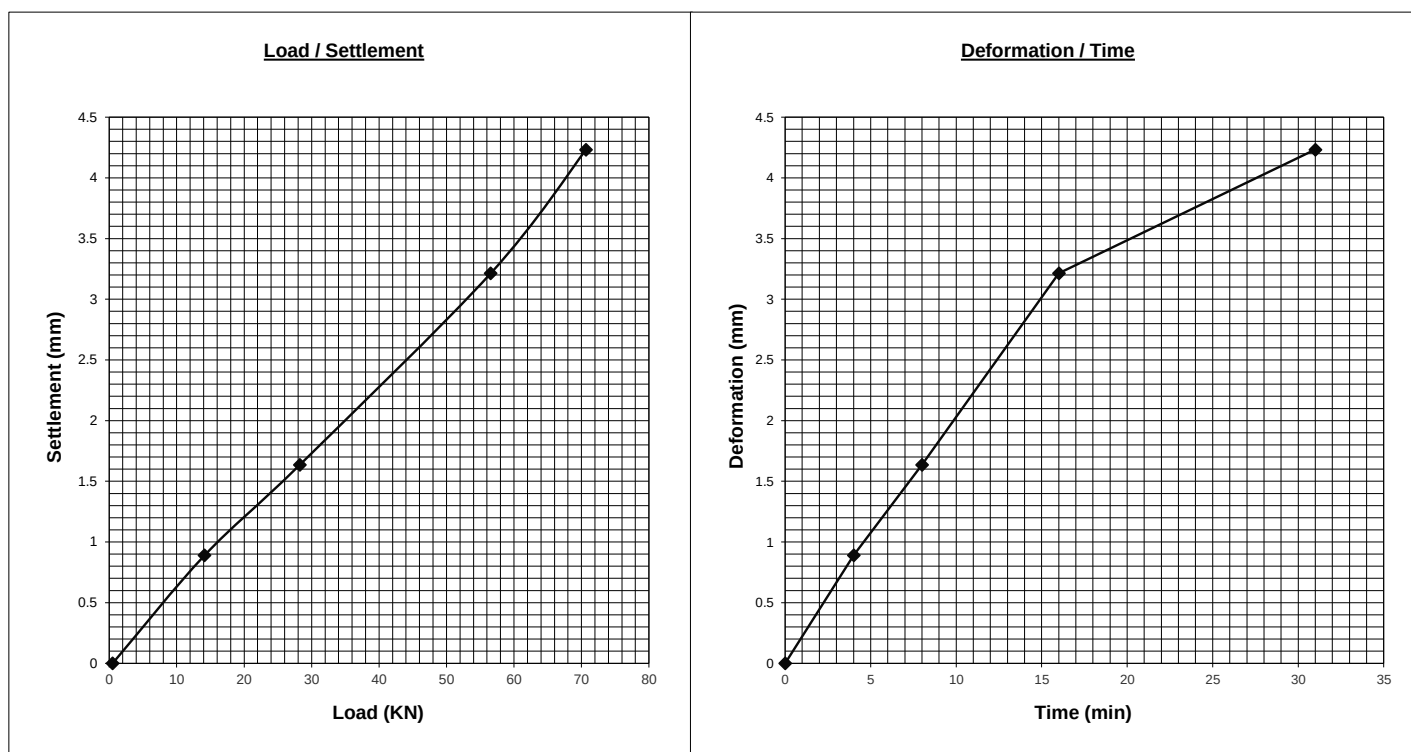
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>24/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB7                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                           |                                          |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                                 | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                                           | Loading procedure: Incremental           |
| Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fmc and sub-angular to rounded) | Description of Reaction load: site plant |
| Temperature (OC): 30                                                                                                      | Insitu moisture content(%): 7.5          |

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 0.89                     |
| 2                  | 28.3    | 1.64                     |
| 3                  | 56.6    | 3.21                     |
| 4                  | 70.7    | 4.23                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



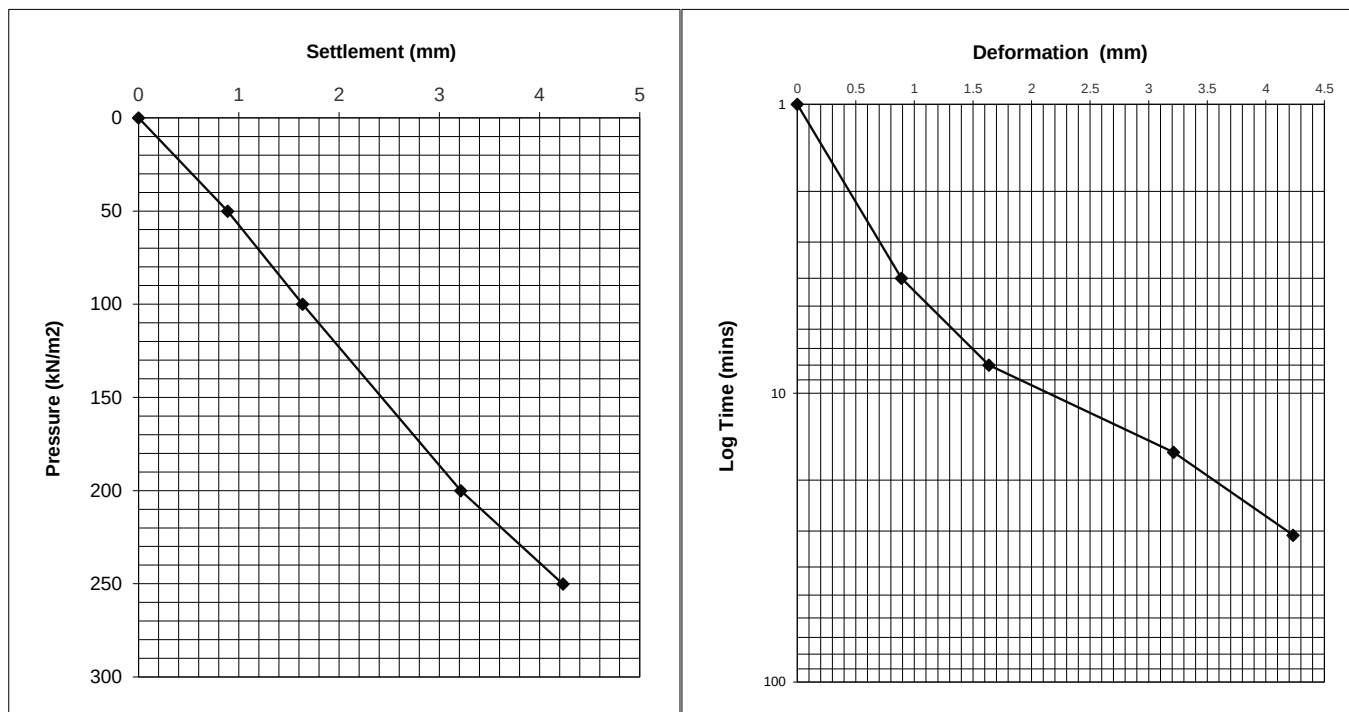
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                      |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                      |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>24/08/2016 |                                                                                                        |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                        |
| <b>Position no:</b><br>PB7                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                        |

|                                                                                                                            |                                          |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                                  | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                                            | Loading procedure: Incremental           |
| Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fine and sub-angular to rounded) | Description of Reaction load: Site Plant |
| Temperature (OC): 30                                                                                                       | Insitu moisture content(%): 7.5          |

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 0.89          | 50             |
| 2                  | 28.3    | 1.64          | 100            |
| 3                  | 56.6    | 3.21          | 200            |
| 4                  | 70.7    | 4.23          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

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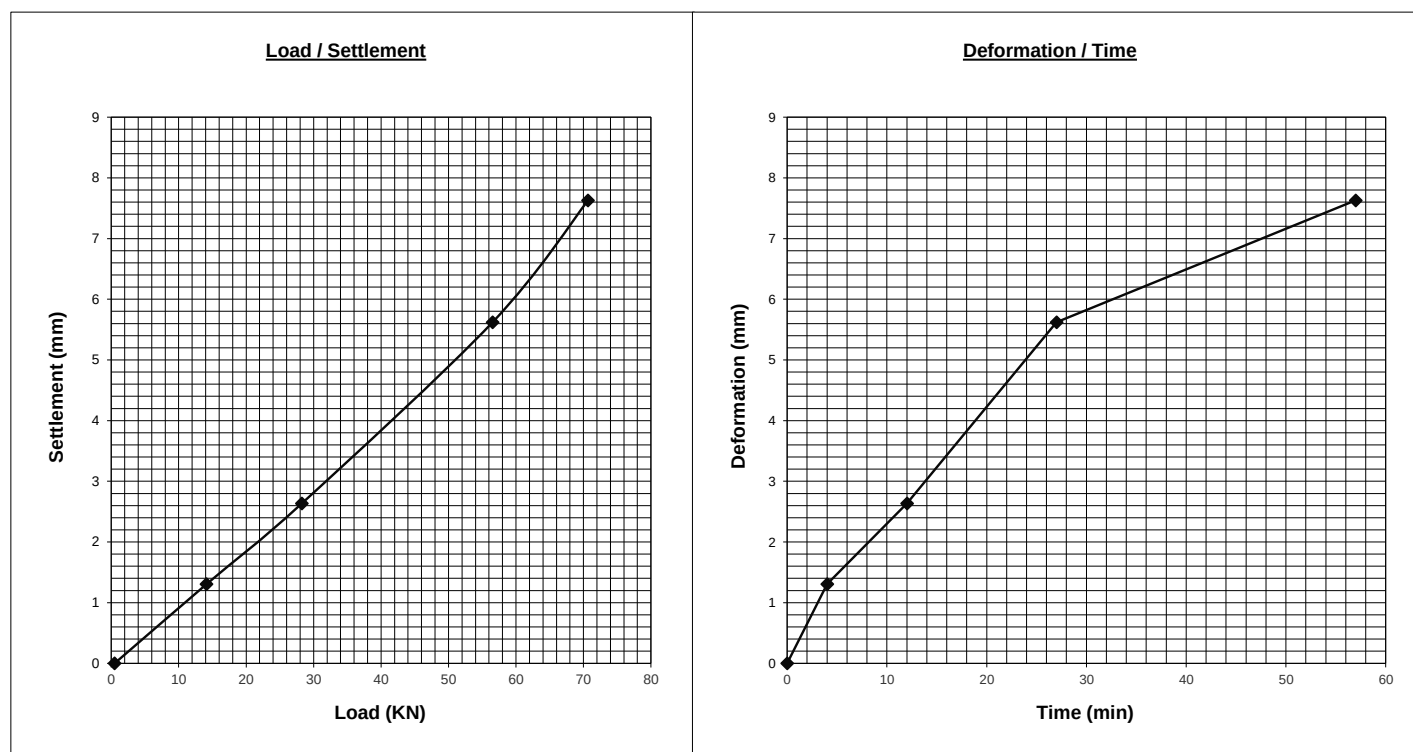
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>24/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB8                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                    |                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 30 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 11 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 1.31                     |
| 2                  | 28.3    | 2.64                     |
| 3                  | 56.6    | 5.62                     |
| 4                  | 70.7    | 7.63                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



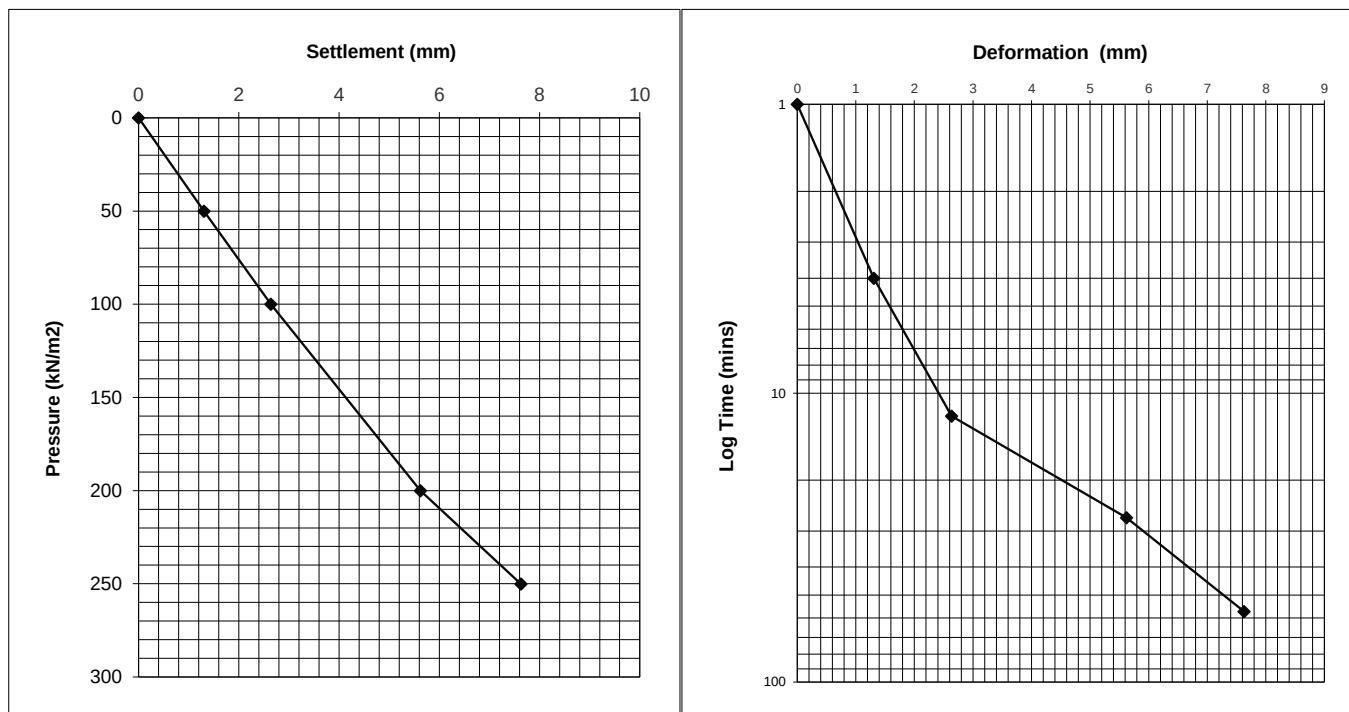
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                       |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>24/08/2016 |                                                                                                       |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                       |
| <b>Position no:</b><br>PB8                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                       |

|                                                                                                             |                                          |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                   | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                             | Loading procedure: Incremental           |
| Material Type: Brown sandy gravelly CLAY with numerous rootlets (gravel is fine and sub-angular to rounded) | Description of Reaction load: Site Plant |
| Temperature (OC): 30                                                                                        | Insitu moisture content(%): 11           |

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 1.31          | 50             |
| 2                  | 28.3    | 2.64          | 100            |
| 3                  | 56.6    | 5.62          | 200            |
| 4                  | 70.7    | 7.63          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

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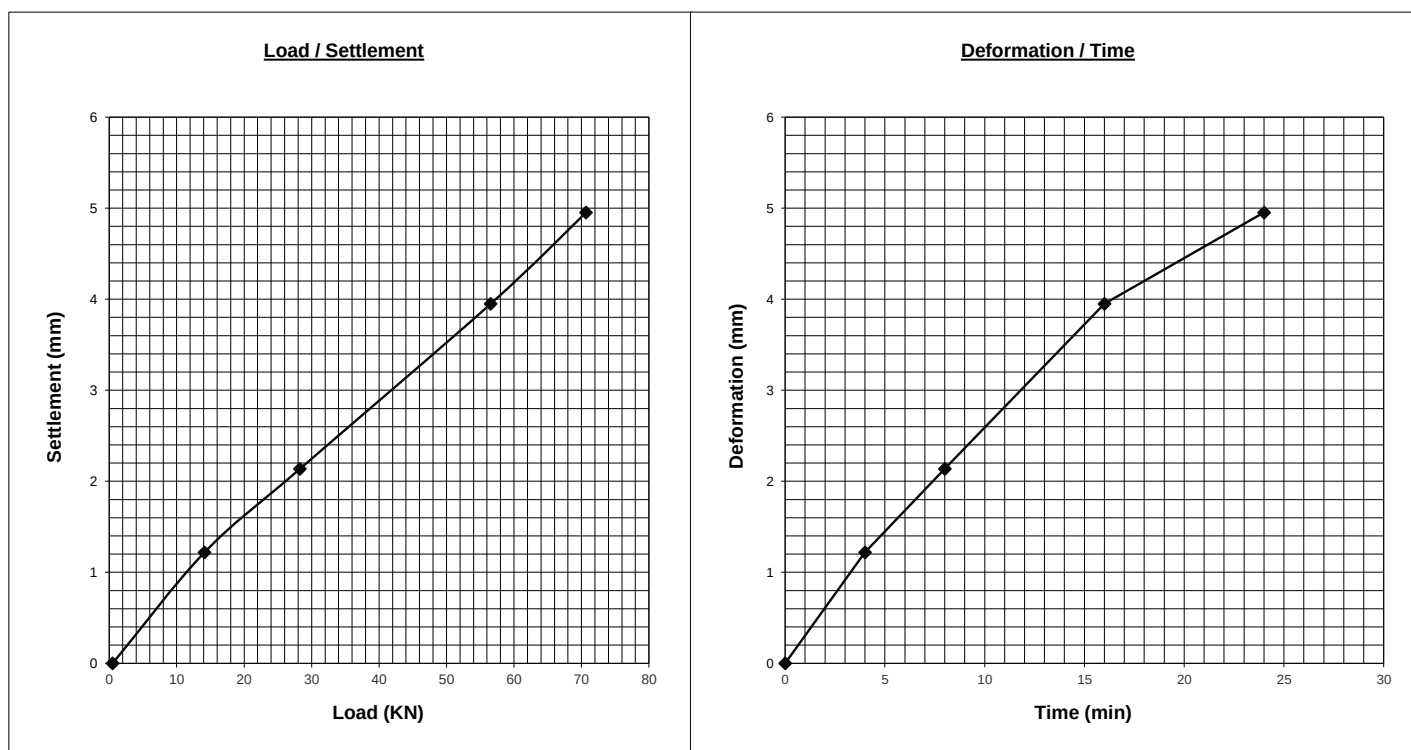
MSF-11/R9

Figure A2.24

|                                                                                                 |                                    |                                                                              |                                                                                                        |
|-------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-                                                | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project Started:</b><br>-                                                 |                                                                                                        |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing Started:</b><br>24/08/2016<br><b>Date Reported:</b><br>31/08/2016 |                                                                                                        |
| <b>Position no:</b><br>PB9                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m                                             |                                                                                                        |

|                                                                                                                                                                                                                   |                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Information</b><br>Environmental conditions: Clear<br>Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fmc and sub-angular to rounded)<br>Temperature (OC): 30 | <b>Test Data</b><br>Loading procedure: Incremental<br>Description of Reaction load: site plant<br>Insitu moisture content(%): 6.0 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|

| Load Increment no: | Load kN | Cumulative settlement mm |
|--------------------|---------|--------------------------|
| Seating load       | 0.5     | 0                        |
| 1                  | 14.1    | 1.22                     |
| 2                  | 28.3    | 2.14                     |
| 3                  | 56.6    | 3.95                     |
| 4                  | 70.7    | 4.95                     |
| 5                  |         |                          |
| 6                  |         |                          |
| 7                  |         |                          |
| 8                  |         |                          |
| 9                  |         |                          |



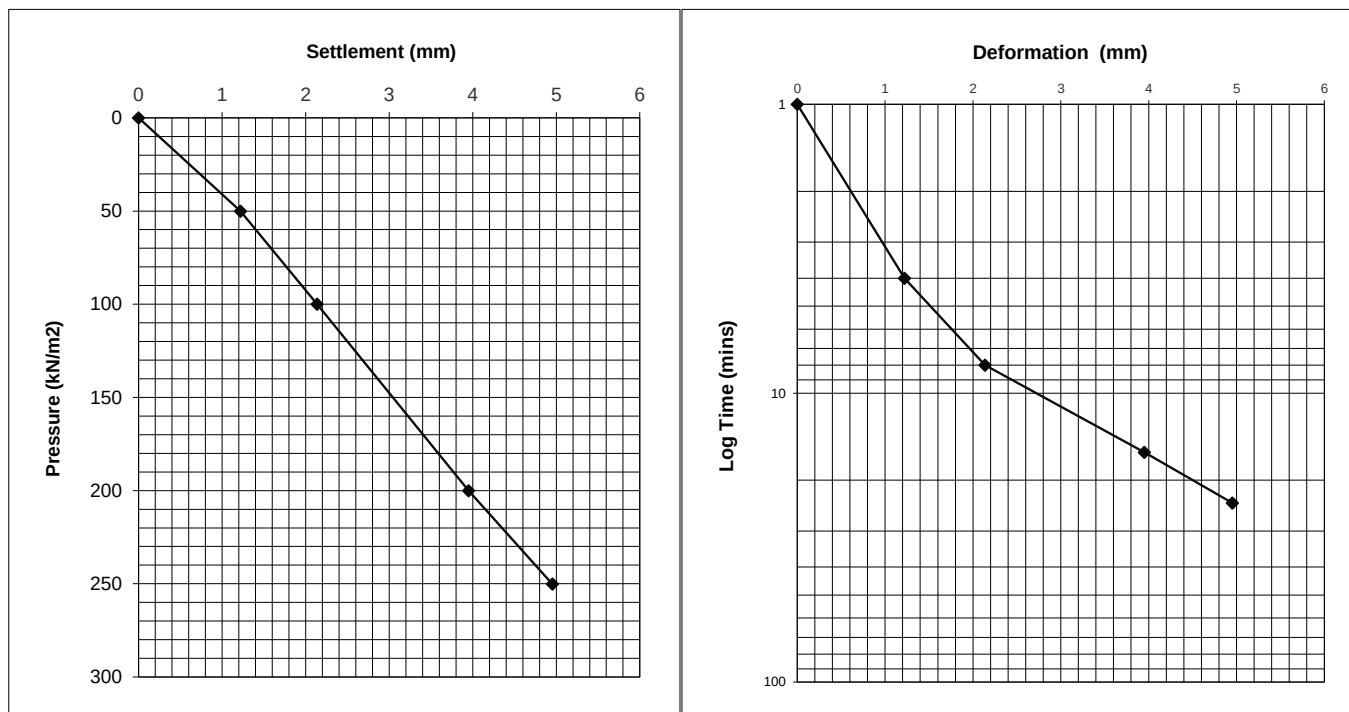
|                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                               | <b>Plate bearing Test</b>     | <b>Checked and Approved</b><br>Initials: J.P<br>Date: 31/08/2016 |
|                                                                                                                                                                                                                                                                                                                                                                                                 | BS1377:Part 9:1990:Clause 4.0 |                                                                  |
| Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU<br>Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)<br>All samples connected with this report ,incl any on 'hold' will be stored and disposed off according to Company policy. A copy of this policy is available on request. |                               |                                                                  |

Figure A2.24

|                                                                                                 |                                    |                                       |                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Project Name:</b><br>St Patricks, University Of Reading, Northcourt Avenue, Reading, RG2 7HB |                                    | <b>Samples Received:</b><br>-         | <b>K4 SOILS</b><br> |
| <b>Client Name:</b><br>Ian Farmer Associates                                                    |                                    | <b>Project started:</b><br>-          |                                                                                                       |
| <b>Project No:</b><br>52527                                                                     | <b>Our job/report no:</b><br>21442 | <b>Testing started:</b><br>24/08/2016 |                                                                                                       |
|                                                                                                 |                                    | <b>Date Reported:</b><br>31/08/2016   |                                                                                                       |
| <b>Position no:</b><br>PB9                                                                      | <b>Depth:</b><br>0.20              | <b>Plate diameter:</b><br>0.60 m      |                                                                                                       |

|                                                                                                                            |                                          |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Sample Information</b>                                                                                                  | <b>Test Data</b>                         |
| Environmental conditions: Clear                                                                                            | Loading procedure: Incremental           |
| Material Type: Pale brown slightly gravelly clayey SAND with numerous rootlets (gravel is fine and sub-angular to rounded) | Description of Reaction load: Site Plant |
| Temperature (OC): 30                                                                                                       | Insitu moisture content(%): 6.0          |

| Load Increment no: | Load kN | Settlement mm | Pressure kN/m2 |
|--------------------|---------|---------------|----------------|
| Seating load       | 0.5     | 0             | 0              |
| 1                  | 14.1    | 1.22          | 50             |
| 2                  | 28.3    | 2.14          | 100            |
| 3                  | 56.6    | 3.95          | 200            |
| 4                  | 70.7    | 4.95          | 250            |
| 5                  |         |               |                |
| 6                  |         |               |                |
| 7                  |         |               |                |
| 8                  |         |               |                |
| 9                  |         |               |                |



|                                                                                     |                               |                                   |
|-------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|
|  | <b>Plate bearing Test</b>     | <b>Checked and Approved</b>       |
|                                                                                     | BS1377:Part 9:1990:Clause 4.0 | Initials: J.P<br>Date: 31/08/2016 |

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU

Test Results relate only to the sample numbers shown above. Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

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MSF-11/R9

Figure A2.24