



Arc Environmental Ltd  
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## BOREHOLE LOG

|                                                         |                  |                  |                  |                           |
|---------------------------------------------------------|------------------|------------------|------------------|---------------------------|
| Project<br>Land off Estuary Boulevard, Speke, Liverpool |                  |                  |                  | BOREHOLE No<br><b>BHE</b> |
| Job No<br>16-433                                        | Date<br>20-07-14 | Ground Level (m) | Co-Ordinates ( ) |                           |
| Contractor<br>Arc Environmental Ltd                     |                  |                  |                  | Sheet<br>1 of 1           |

| SAMPLES & TESTS |         |                      | Water | STRATA        |        |                    |                                                                                                  | Geology | Instrument/<br>Backfill |
|-----------------|---------|----------------------|-------|---------------|--------|--------------------|--------------------------------------------------------------------------------------------------|---------|-------------------------|
| Depth           | Type No | Test Result          |       | Reduced Level | Legend | Depth (Thick-ness) | DESCRIPTION                                                                                      |         |                         |
| 0.50            | D       |                      |       |               |        | 0.30               | Grass overlying sandy clayey soil with brick fragments (MADE GROUND).                            |         |                         |
| 1.00            | D       |                      |       |               |        | (2.40)             | Medium dense grey and brown very gravelly clayey silty fine to medium SAND (SHIRDLEY HILL SAND). |         |                         |
| 1.50-1.95       | SPT     | N=11                 |       |               |        |                    |                                                                                                  |         |                         |
| 2.00            | D       |                      |       |               |        |                    |                                                                                                  |         |                         |
| 2.50-2.95       | SPT     | N=12                 |       |               |        | 2.70               |                                                                                                  |         |                         |
| 3.00            | D       |                      |       |               |        |                    | Stiff (extremely high strength) brown slightly sandy gravelly CLAY (BOULDER CLAY).               |         |                         |
| 3.50-3.95       | U       | 483kN/m <sup>2</sup> |       |               |        |                    |                                                                                                  |         |                         |
| 4.50-4.95       | SPT     | N=14                 |       |               |        |                    |                                                                                                  |         |                         |
| 5.00            | D       |                      |       |               |        | (5.30)             |                                                                                                  |         |                         |
| 6.00-6.45       | U       | 826kN/m <sup>2</sup> |       |               |        |                    |                                                                                                  |         |                         |
| 7.50-7.95       | SPT     | N=19                 |       |               |        | 8.00               |                                                                                                  |         |                         |
|                 |         |                      |       |               |        |                    | Borehole complete at 8.00m.                                                                      |         |                         |

| Boring Progress and Water Observations    |       |       |              |                |           | Chiselling                                |    |       | Water Added     |    | GENERAL REMARKS                                                               |
|-------------------------------------------|-------|-------|--------------|----------------|-----------|-------------------------------------------|----|-------|-----------------|----|-------------------------------------------------------------------------------|
| Date                                      | Time  | Depth | Casing Depth | Casing Dia. mm | Water Dpt | From                                      | To | Hours | From            | To |                                                                               |
| 20-07-14                                  | 00.00 | 8.00  | 4.40         | 150            | Dry       |                                           |    |       |                 |    | WATER: Borehole remained DRY throughout.<br>REMARKS: Inspection pit - 1 Hour. |
| All dimensions in metres<br>Scale 1:56.25 |       |       | Client CDP   |                |           | Method/<br>Plant Used<br>Cable Percussion |    |       | Logged By<br>RD |    |                                                                               |

AGS3 UK BH 14-156 PHASE 3 BH LOGS GPJ AGS3 ALL GDT 11/21/14

# **APPENDIX III**

## **Ground Gas and Groundwater Monitoring Certificate**

Arc Environmental Ground Gas & Groundwater Monitoring Certificate



|       |                                              |
|-------|----------------------------------------------|
| Site: | Land off Estuary Boulevard, Speke, Liverpool |
| Ref:  | 16-433                                       |

| Visit | Date       | Time        | Equipment | Weather              | Initials | Comments | Borehole | Gas Flow (l/hr) | Atmospheric Pressure (mb) | Trend | Methane (% v/v) |        | Methane (% LEL) |        | Carbon Dioxide (% v/v) |        | Oxygen (% v/v) |        | Hydrocarbons (GFM 435 only) |        | PID (Isobutylene) ppm | Depth to Water (m bgl) |
|-------|------------|-------------|-----------|----------------------|----------|----------|----------|-----------------|---------------------------|-------|-----------------|--------|-----------------|--------|------------------------|--------|----------------|--------|-----------------------------|--------|-----------------------|------------------------|
|       |            |             |           |                      |          |          |          |                 |                           |       | Initial         | Steady | Initial         | Steady | Initial                | Steady | Initial        | Steady | Hex %                       | PID Cf |                       |                        |
| 1     | 09/04/2014 | 14.30-14.50 | GFM430    | Sunny/Dry            | JPD      |          | 2        | <0.1            | 1010                      | F     |                 | 0.0    |                 | 0.0    |                        |        |                |        |                             |        | 0.92                  |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 1014                      | F     |                 | 0.0    |                 | 0.0    |                        | 0.0    |                | 20.0   |                             |        | 0.23                  |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 1015                      | F     |                 | 0.0    |                 | 0.0    |                        | 0.7    |                | 19.2   |                             |        | 0.64                  |                        |
| 2     | 01/05/2014 | 11.35       | GFM430    | Dry, overcast        | MRB      |          | 2        | <0.1            | 1005                      | F     |                 | 0.0    |                 | 0.0    |                        |        |                |        |                             | 1.40   |                       |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 1006                      | F     |                 | 0.0    |                 | 0.0    |                        | 0.9    |                | 19.7   |                             |        | 1.50                  |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 1006                      | F     |                 | 0.0    |                 | 0.0    |                        | 0.5    |                | 19.9   |                             |        | 1.72                  |                        |
| 3     | 19/05/2014 | 01:12       | GFM430    | Sunny                | MPB      |          | 2        | <0.1            | 997                       | S     |                 | 0.0    |                 | 0.0    |                        | 2.1    |                | 19.7   |                             | 1.25   |                       |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 997                       | S     |                 | 0.0    |                 | 0.0    |                        | 4.3    |                | 16.3   |                             |        | 1.30                  |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 997                       | S     |                 | 0.0    |                 | 0.0    |                        | 2.5    |                | 18.1   |                             |        | 1.20                  |                        |
| 4     | 26/06/2014 | 12:05pm     | GFM435    | Cloudy               | IH       |          | 2        | <0.1            | 1008                      | S     |                 | 0.0    |                 | 0.0    |                        | 1.7    |                | 13.6   |                             | 1.13   |                       |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 1008                      | S     |                 | 0.0    |                 | 0.0    |                        | 0.1    |                | 18.8   |                             |        | 1.33                  |                        |
|       |            |             |           |                      |          |          |          | <0.1            | 1008                      | S     |                 | 0.0    |                 | 0.0    |                        | 0.9    |                | 16.7   |                             |        | 0.86                  |                        |
| 5     | 22/07/2014 | 9:25am      | GFM435    | Sunny                | IH       |          | 10       | <0.1            | 1020                      | R     |                 | 0.0    |                 | 0.0    |                        | 3.9    |                | 16.7   |                             | 1.24   |                       |                        |
| 6     | 25/07/2014 | 11:00am     | GFM435    | Sunny                | AL       |          | 10       | <0.1            | 1019                      | S     |                 | 0.0    |                 | 0.0    |                        | 0.0    |                | 20.7   |                             | 1.24   |                       |                        |
| 7     | 19/08/2014 | 1:00pm      | LMSxi     | Sunny, strong breeze | RS       |          | 10       | <0.1            | 1008                      | S     |                 | 0.0    |                 | 0.0    |                        | 4.2    |                | 16.1   |                             | 1.03   |                       |                        |
| 8     | 28/08/2014 | 1:30pm      | GFM435    | Cloudy               | IH       |          | 10       | 0.0             | 1002                      | F     |                 | 0.0    |                 | 0.0    |                        | 3.1    |                | 17.8   |                             | 1.01   |                       |                        |

Notes:  
Detection limits - Methane = 0.0%, Carbon Dioxide = 0.0%, LEL = 0.0%, Oxygen = 0.0%, Flow = 0.1l/hr  
Monitoring order is from **Left to Right** across table  
Monitoring should be for **Not Less** than 3 minutes However, if high concentrations of gases initially recorded, monitoring should be for up to 10 minutes  
N/A = Not applicable  
>>> = Off the scale  
  
Cf = PID compensation Factor (1-10) - Must be used to multiply the PID reading to give an accurate measure of the total hydrocarbons in the borehole when methane is present  
Hex = Hexane (Valid and in range up to 2.000%) - Recorded when anomalously high methane is present.  
PID = Photo Ionisation Detector (Calibrated to Isobutylene)

(F) = Falling  
(R) = Rising  
(S) = Steady

# Arc Environmental Ground Gas & Groundwater Monitoring Certificate



|              |                                              |
|--------------|----------------------------------------------|
| <b>Site:</b> | Land off Estuary Boulevard, Speke, Liverpool |
| <b>Ref:</b>  | 16-433                                       |

| Visit | Date       | Time    | Equipment | Weather                    | Initials | Comments               | Borehole            | Gas Flow<br>(l/hr) | Atmospheric<br>Pressure<br>(mb) | Trend       | Methane (% v/v) |        | Carbon Dioxide<br>(% v/v) |                   | Oxygen (% v/v) |                      | Hydrocarbons<br>(GFM 435 only) |        | PID<br>(Isobutylene)<br>ppm | Depth to<br>Water (m<br>bgl)         |
|-------|------------|---------|-----------|----------------------------|----------|------------------------|---------------------|--------------------|---------------------------------|-------------|-----------------|--------|---------------------------|-------------------|----------------|----------------------|--------------------------------|--------|-----------------------------|--------------------------------------|
|       |            |         |           |                            |          |                        |                     |                    |                                 |             | Initial         | Steady | Initial                   | Steady            | Initial        | Steady               | Hex %                          | PID Cf |                             |                                      |
| 1     | 22/07/2014 | 9:25am  | GFM435    | Sunny                      | IH       | Bailed out<br>all BH's | BH A<br>BH B<br>BHE | 0.0<br>0.0<br>0.0  | 1018<br>1019<br>1016            | R<br>R<br>R |                 | 0.0    |                           | 2.9               |                | 18.3                 |                                |        |                             | 0.69                                 |
| 2     | 25/07/2014 | 11:00am | GFM435    | Sunny                      | AL       | Bailed out<br>all BH's | BH A<br>BH B<br>BHE | 0.0<br>0.0<br>0.0  | 1020<br>1020<br>1019            | F<br>F<br>F |                 | 0.0    |                           | 0.2<br>4.6<br>0.0 |                | 20.7<br>15.0<br>20.9 |                                |        |                             | 0.83<br>1.22<br>1.10                 |
| 3     | 19/08/2014 | 1:00pm  | GFM435    | Sunny,<br>strong<br>breeze | RS       | Bailed out<br>all BH's | BH A<br>BH B<br>BHE | 0.0<br>0.0<br>0.0  | 1008<br>1008<br>1008            | S<br>S<br>S |                 | 0.0    |                           |                   |                | 18.8                 |                                |        |                             | 0.70                                 |
| 4     | 28/08/2014 | 1:05pm  | GFM435    | Cloudy                     | IH       |                        | BHA<br>BHB<br>BHE   | 0.0<br>0.0<br>0.0  | 992<br>992<br>991               | F<br>F<br>F |                 | 0.0    |                           |                   |                | 17.7                 |                                |        |                             | 1.26<br>1.05<br>0.52<br>1.03<br>0.95 |

Notes:

Detection limits - Methane = 0.0%, Carbon Dioxide = 0.0%, LEL = 0.0%, Oxygen = 0.0%, Flow = 0.1l/hr

Monitoring order is from **Left to Right** across table

Monitoring should be for **Not Less** than 3 minutes. However, if high concentrations of gasses initially recorded, monitoring should be for up to 10

N/A = Not applicable

>>> = Off the scale

(F) = Falling

(R) = Rising

(S) = Steady

Cf = PID compensation Factor (1-10) - Must be used to multiply the PID reading to give an accurate measure of the total hydrocarbons in the borehole when methane is present

Hex = Hexane (Valid and in range up to 2.000%) - Recorded when abnormally high methane is present.

PID = Photo Ionisation Detector (Calibrated to Isobutylene)

**TEST DATE AND CONDITIONS**

|                       |            |
|-----------------------|------------|
| Date                  | 14/05/2014 |
| Atmospheric Pressure  | 1014 mB    |
| Ambient Temp          | 24.3 °C    |
| EnviroNics Serial No. | n/a        |

**GAS DATA LTD**

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**LMS FINAL INSPECTION & CALIBRATION CERTIFICATE****INSTRUMENT DETAILS**

|             |              |                       |
|-------------|--------------|-----------------------|
| Serial No   | 5124         | CUSTOMER              |
| S/W Version | G3.19c-LTBXV | ARC Environmental Ltd |

**INSTRUMENT CHECKS**

|                  |   |                     |            |
|------------------|---|---------------------|------------|
| Keyboard         | ✓ | Clock Set / Running | ✓          |
| Pump In/Out      | ✓ | Labels Fitted       | ✓          |
| Display Contrast | ✓ | Recalibration Due   | 14/05/2015 |

**GASES**

| CH4                    |           | CO2                    |           | O2                     |         |
|------------------------|-----------|------------------------|-----------|------------------------|---------|
| Test %                 | Reading % | Test %                 | Reading % | Test %                 | Reading |
| 0<br>accept <= 0.1     | 0         | 0<br>accept <= 0.1     | 0         | 0<br>accept <= 0.1     | 0.1     |
| 7.6<br>accept 7.4-7.8  | 7.4       | 6.3<br>accept 6.1-6.5  | 6.1       | 21<br>accept 20.5-21.2 | 20.7    |
| 51<br>accept 49.0-53.0 | 50.8      | 53<br>accept 50.0-58.0 | 52.5      |                        |         |

**PRESSURES**

| Absolute/Relative                             |      | Differential                       |   |
|-----------------------------------------------|------|------------------------------------|---|
| Atmos<br>accept current +/-1                  | 1014 | 0.0                                | x |
| Atmos + 50 mbar<br>accept current +48-<br>+52 | 1064 | +30 mbar<br>accept 29.5-<br>30.5   | x |
| Atmos - 50 mbar<br>accept current -48--<br>52 | 963  | -30 mbar<br>accept -29.5--<br>30.5 | x |

**TEMPERATURE**

| Applied °C             | Reading °C |
|------------------------|------------|
| 0<br>accept -0.1-+0.1  | 0          |
| 25<br>accept 24.5-25.5 | 24.6       |
| 40<br>accept 37.5-40.5 | 40.3       |

**OPTIONS**

|                                   |   |     |   |                                  |   |
|-----------------------------------|---|-----|---|----------------------------------|---|
| Borehole Flow<br>(see other Side) | ✓ | LEL | ✓ | Temp Probe<br>(see above)        | x |
| Extraction Flow                   | x |     |   | Toxic Gasses<br>(see other Side) | x |

**PACKING**

| Charger     | UK | US | Euro | Sample Pipe     | Standard | Flow |
|-------------|----|----|------|-----------------|----------|------|
| Manual      |    |    |      | Serial Cable    |          | ✓    |
| Leather Bag |    | ✓  |      | Software        |          | x    |
| Strap       |    | ✓  |      | Cal Certificate |          | ✓    |



| TEST DATE AND CONDITIONS |            |
|--------------------------|------------|
| Date                     | 14/05/2014 |
| Atmospheric Pressure     | 1008mB     |
| Ambient Temp             | 22.5°C     |
| Envionics Serial No.     | 2518       |

# GAS DATA LTD

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## GFM435-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

| INSTRUMENT DETAILS |                       |
|--------------------|-----------------------|
| Serial No          | Customer              |
| 11025              | Arc Environmental Ltd |

| INSTRUMENT CHECKS   |   |                    |                |
|---------------------|---|--------------------|----------------|
| Keyboard            | ✓ | Pump Flow          | >500cc/min     |
| Display Contrast    | ✓ | Pump Flow @ -200mB | 300cc/min      |
| Clock Set / Running | ✓ | S/W Version        | G435.0024/0004 |
| Labels Fitted       | ✓ | Recalibration Date | 14/05/2015     |

| GAS CHECKS                 |               |                              |               |         |               |        |               |
|----------------------------|---------------|------------------------------|---------------|---------|---------------|--------|---------------|
| Calibration Gas            |               | Instrument Gas Channels Read |               |         |               |        |               |
| Gas Type                   | Applied Conc. | CH4 (%)                      | tol. (% vol.) | CO2 (%) | tol. (% vol.) | O2 (%) | tol. (% vol.) |
| N2                         | 100%          | 0.0                          | 0.0           | 0.0     | 0.0           | 0.0    | +/-0.1        |
| CH4                        | 5 %           | 5.2                          | +/-0.3        | 0.0     | 0.0           | -0.1   | +/-0.1        |
|                            | 60%           | 61.8                         | +/-3.0        | 0.0     | 0.0           | -0.1   | +/-0.1        |
| CO2                        | 5%            | 0.0                          | 0.0           | 5.0     | +/-0.3        | 0.0    | +/-0.1        |
|                            | 40%           | 0.0                          | 0.0           | 38.8    | +/-3.0        | 0.0    | +/-0.1        |
| AIR (20.9% O2, 400ppm CO2) | 100%          | 0.0                          | 0.0           | 0.1     | +0.1          | 20.8   | +/-0.5        |
|                            |               |                              |               |         |               |        |               |
|                            |               |                              |               |         |               |        |               |

| PRESSURE CHECKS      |                     |                                   |             |  |  |  |  |
|----------------------|---------------------|-----------------------------------|-------------|--|--|--|--|
| Calibration Pressure |                     | Instrument Pressure Channels Read |             |  |  |  |  |
| Pressure @           | Applied Pressure    | Atmospheric [Ap] ( mB )           | tol. ( mB ) |  |  |  |  |
| All ports            | current atmospheric | 1008                              | +/-2.0      |  |  |  |  |
| Ap port (internal)   | +800mB(a)           | 798                               | +/-5.0      |  |  |  |  |
|                      | +1200mB(a)          | 1201                              | +/-5.0      |  |  |  |  |
|                      |                     |                                   |             |  |  |  |  |
|                      |                     |                                   |             |  |  |  |  |

| TEST DATE AND CONDITIONS |            |
|--------------------------|------------|
| Date                     | 14/05/2014 |
| Atmospheric Pressure     | 1008mB     |
| Ambient Temp             | 22.5°C     |
| Envionics Serial No.     | 2518       |

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## GFM435-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

| FLOW CHECKS      |                  |                               |                 |                                   |             |
|------------------|------------------|-------------------------------|-----------------|-----------------------------------|-------------|
| Calibration Flow |                  | Instrument Flow Channels Read |                 |                                   |             |
| Applied Flow     | Applied Pressure | Flow [Flow] ( l/hour )        | tol. ( l/hour ) | Differential Pressure [Dp] ( Pa ) | tol. ( Pa ) |
| -30.0 l/hour     | -257 Pa          | -29.1                         | +/-3.0          | -256                              | +/-50       |
| -3.0 l/hour      | -10 Pa           | -2.6                          | +/-1.0          | -9                                | +/-6        |
| 0.0 l/hour       | 0 Pa             | 0.0                           | 0.0             | 0                                 | +/-0.5      |
| +3.0 l/hour      | 10 Pa            | 2.8                           | +/-0.5          | 9                                 | +/-3        |
| +30.0 l/hour     | 271 Pa           | 29.2                          | +/-3.0          | 270                               | +/-50       |
| +60.0 l/hour     | 839 Pa           | 59.5                          | +/-6.0          | 829                               | +/-130      |
| +90.0 l/hour     | 1676 Pa          | 89.0                          | +/-9.0          | 1681                              | +/-250      |

| OPTIONAL GAS CHECKS |               |                              |  |  |  |  |           |               |
|---------------------|---------------|------------------------------|--|--|--|--|-----------|---------------|
| Calibration Gas     |               | Instrument Gas Channels Read |  |  |  |  |           |               |
| Gas Type            | Applied Conc. | Label Range                  |  |  |  |  | Hexane 2% | tol. (% vol.) |
| N2                  | 100%          |                              |  |  |  |  | 0         | +/- 5.0       |
|                     |               |                              |  |  |  |  |           | +/- 5.0       |
|                     |               |                              |  |  |  |  |           | +/- 5.0       |
|                     |               |                              |  |  |  |  |           | +/- 5.0       |
|                     |               |                              |  |  |  |  |           | +/- 5.0       |
|                     |               |                              |  |  |  |  |           | +/- 5.0       |
| Hexane              | 20000ppm      |                              |  |  |  |  | 1.937     | +/- 10.0      |

| TEMPERATURE CHECK              |                                     |             |
|--------------------------------|-------------------------------------|-------------|
| Calibration Temperature        | Instrument Temperature Channel Read |             |
| Applied Equivalent Temperature | Temperature [Temp] ( °C )           | tol. ( °C ) |
| -10.0 °C                       | -10.5                               | +/- 2.0     |
| 0.0 °C                         | 0.0                                 | +/- 1.0     |
| 30.0 °C                        | 30.0                                | +/- 1.0     |
| 60.0 °C                        | 60.0                                | +/- 1.0     |
| 100.0 °C                       | 100.0                               | +/- 1.0     |

| TEST DATE AND CONDITIONS |         |
|--------------------------|---------|
| Date                     | 15.5.14 |
| Atmospheric Pressure     | 1024 mB |
| Ambient Temp             | 23 °C   |
| EnviroNics Serial No.    | 5089    |

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**GFM435 (MCERTS) OUTWARD INSPECTION & QUALITY CHECK SHEET**

| INSTRUMENT DETAILS |                   |                                       |               |
|--------------------|-------------------|---------------------------------------|---------------|
| SO Number          | Instrument Banner | Instrument Serial Number + SW Version | Job Number(s) |
| 308363             | GFM435            | 11025:24:04 16919                     | —             |

Calibration Technician ASD

DATE 14-5-2014

Inspection Technician [Signature]

DATE 15.5.14

| INSTRUMENT CHECKS |                                   | Pass (P), Fail (F) or not applicable(NA) | INSTRUMENT PACKING LIST   |     | Tick if included |
|-------------------|-----------------------------------|------------------------------------------|---------------------------|-----|------------------|
| Function Tests    | Dust Caps Fitted                  | P                                        | Instrument                |     | ✓                |
|                   | Keyboard Test (All keys)          | P                                        | Leather Case              |     | ✓                |
|                   | Backlight Test                    | P                                        | Instrument Strap          |     | ✓                |
|                   | Clock Set / Running               | P                                        | AC Battery Charger (UK)   |     | ✓                |
|                   | Comms Test                        | P                                        | AC Battery Charger (EURO) |     | X                |
|                   | Pump Flow Test (In & Out)         | P                                        | AC Battery Charger (US)   |     | X                |
|                   | Overall Leak Test (30mb)          | P                                        | Gas Sample Pipe           |     | ✓                |
|                   | Battery Charge Test               | P                                        | Hard Carry Case           |     | ✓                |
|                   | Service Date set to?              | 14.5.15                                  | Spares Pot                |     | ✓                |
| Channel Tests     | Data Logging Enabled?             | NA                                       | Allen Key                 |     | X                |
|                   | Verify CH4/LEL/Hexane/PID         | P                                        | Flow Sample Pipe          |     | X                |
|                   | Verify CO2                        | P                                        | Pressure Sample Pipe      |     | X                |
|                   | Verify O2                         | P                                        | Temperature Probe         |     | X                |
|                   | Verify H2S                        | NA                                       | Vane Anemometer           |     | X                |
|                   | Verify CO                         | NA                                       | USB Cable                 |     | X                |
|                   | Verify 1st Option gas             | NA                                       | USB Memory Stick          |     | ✓                |
|                   | Verify 2nd Option gas             | NA                                       | SiteMan Software          | Ver | 4.12             |
|                   | Verify atmospheric pressure       | P                                        | Internal Filter Pack      | Qty | X                |
|                   | Verify differential pressure      | P                                        | External Filter Pack      | Qty | 4                |
|                   | Verify flow                       | P                                        | Field Guide               |     | X                |
|                   | Verify temperature probe input    | P                                        | Extra Items:              |     |                  |
|                   | Verify vane anemometer input      | P                                        |                           |     |                  |
| DataBase Checks   | Jobcard(s) completed and signed   | P                                        |                           |     |                  |
|                   | Jobcard(s) booked off database    | P                                        |                           |     |                  |
|                   | Calibration certificate completed | P                                        |                           |     |                  |
|                   | Complete & print QI record        | NA                                       |                           |     |                  |
| Label Checks      | No. of Calibration label fitted   | 4221                                     | Comments                  |     |                  |
|                   | MCERTS label displayed            | P                                        |                           |     |                  |
|                   | Warranty label fitted             | P                                        |                           |     |                  |
| H2S Range         | H2S Range from SO                 | NA                                       |                           |     |                  |
| H2S Range         | H2S Range from cal cert           | NA                                       |                           |     |                  |
| Over-range        | Over-range value correct?         | NA                                       |                           |     |                  |

| TEST DATE AND CONDITIONS |            |
|--------------------------|------------|
| Date                     | 17/10/2013 |
| Atmospheric Pressure     | 999mB      |
| Ambient Temp             | 22.6°C     |
| EnviroNics Serial No.    | 2518       |

# GAS DATA LTD

Pegasus House  
Seven Stars Estate  
Wheler Rd  
Coventry  
CV3 4LB

Tel 02476303311 Fax 02476307711



## GFM430-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

| INSTRUMENT DETAILS |                       |
|--------------------|-----------------------|
| Serial No          | Customer              |
| 10044              | Arc Environmental Ltd |

| INSTRUMENT CHECKS   |   |                    |                |
|---------------------|---|--------------------|----------------|
| Keyboard            | ✓ | Pump Flow          | 500cc/min      |
| Display Contrast    | ✓ | Pump Flow @ -200mB | 250cc/min      |
| Clock Set / Running | ✓ | S/W Version        | G430.0024/0013 |
| Labels Fitted       | ✓ | Recalibration Date | 17/10/2014     |

| GAS CHECKS                 |               |                              |               |         |               |        |               |
|----------------------------|---------------|------------------------------|---------------|---------|---------------|--------|---------------|
| Calibration Gas            |               | Instrument Gas Channels Read |               |         |               |        |               |
| Gas Type                   | Applied Conc. | CH4 (%)                      | tol. (% vol.) | CO2 (%) | tol. (% vol.) | O2 (%) | tol. (% vol.) |
| N2                         | 100%          | 0.0                          | 0.0           | 0.0     | 0.0           | 0.0    | +0.1          |
| CH4                        | 5 %           | 4.9                          | +/-0.3        | 0.0     | 0.0           | 0.0    | +0.1          |
|                            | 60%           | 59.7                         | +/-3.0        | 0.0     | 0.0           | 0.0    | +0.1          |
| CO2                        | 5%            | 0.0                          | 0.0           | 5.0     | +/-0.3        | 0.0    | +0.1          |
|                            | 40%           | 0.0                          | 0.0           | 38.8    | +/-3.0        | 0.0    | +0.1          |
| AIR (20.9% O2, 400ppm CO2) | 100%          | 0.0                          | 0.0           | 0.1     | +0.1          | 20.8   | +/-0.5        |

| PRESSURE CHECKS      |                     |                                   |             |
|----------------------|---------------------|-----------------------------------|-------------|
| Calibration Pressure |                     | Instrument Pressure Channels Read |             |
| Pressure @           | Applied Pressure    | Atmospheric [Ap] ( mB )           | tol. ( mB ) |
| All ports            | current atmospheric | 999                               | +/-2.0      |
| Ap port (internal)   | +800mB(a)           | 802                               | +/-5.0      |
|                      | +1200mB(a)          | 1203                              | +/-5.0      |

| TEST DATE AND CONDITIONS |            |
|--------------------------|------------|
| Date                     | 17/10/2013 |
| Atmospheric Pressure     | 999mB      |
| Ambient Temp             | 22.6°C     |
| Environics Serial No.    | 2518       |

# GAS DATA LTD

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Coventry  
CV3 4LB

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## GFM430-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

| FLOW CHECKS      |                  |                               |                    |                                      |                |
|------------------|------------------|-------------------------------|--------------------|--------------------------------------|----------------|
| Calibration Flow |                  | Instrument Flow Channels Read |                    |                                      |                |
| Applied Flow     | Applied Pressure | Flow<br>[Flow] ( l/hour )     | tol.<br>( l/hour ) | Differential Pressure<br>[Dp] ( Pa ) | tol.<br>( Pa ) |
| -30.0 l/hour     | -271 Pa          | -28.0                         | +/-3.0             | -248                                 | +/-50          |
| -3.0 l/hour      | -12 Pa           | -2.7                          | +/-1.0             | -11                                  | +/-6           |
| 0.0 l/hour       | 0 Pa             | 0.0                           | 0.0                | 0                                    | 0.0            |
| +3.0 l/hour      | 12 Pa            | 3.0                           | +/-0.5             | 11                                   | +/-3           |
| +30.0 l/hour     | 295 Pa           | 28.5                          | +/-3.0             | 292                                  | +/-50          |
| +60.0 l/hour     | 924 Pa           | 57.8                          | +/-6.0             | 884                                  | +/-130         |
| +90.0 l/hour     | 1852 Pa          | 86.5                          | +/-9.0             | 1802                                 | +/-250         |

| OPTIONAL GAS CHECKS |               |                              |  |  |  |  |                  |
|---------------------|---------------|------------------------------|--|--|--|--|------------------|
| Calibration Gas     |               | Instrument Gas Channels Read |  |  |  |  |                  |
| Gas Type            | Applied Conc. | Label Range                  |  |  |  |  | tol.<br>(% vol.) |
| N2                  | 100%          |                              |  |  |  |  | 0.0              |
|                     |               |                              |  |  |  |  | +/- 5.0          |
|                     |               |                              |  |  |  |  | +/- 5.0          |
|                     |               |                              |  |  |  |  | +/- 5.0          |
|                     |               |                              |  |  |  |  | +/- 5.0          |
|                     |               |                              |  |  |  |  | +/- 5.0          |

| TEMPERATURE CHECK              |                                     |                |
|--------------------------------|-------------------------------------|----------------|
| Calibration Temperature        | Instrument Temperature Channel Read |                |
| Applied Equivalent Temperature | Temperature<br>[Temp] ( °C )        | tol.<br>( °C ) |
| -10.0 °C                       | -10.0                               | +/- 2.0        |
| 0.0 °C                         | 0.0                                 | +/- 1.0        |
| 30.0 °C                        | 30.0                                | +/- 1.0        |
| 60.0 °C                        | 60.0                                | +/- 1.0        |
| 100.0 °C                       | 100.0                               | +/- 1.0        |

| TEST DATE AND CONDITIONS |          |
|--------------------------|----------|
| Date                     | 18.10.13 |
| Atmospheric Pressure     | 1003 mB  |
| Ambient Temp             | 22 °C    |
| EnviroNics Serial No.    | 2633     |

**GAS DATA LTD**

Pegasus House  
Seven Stars Estate  
Wheler Rd.  
Coventry  
CV3 4LB

Tel: 024 76 303311

Fax: 024 76 307711


**GFM400 SERIES OUTWARD INSPECTION & QUALITY CHECK SHEET**

| INSTRUMENT DETAILS |                 |                          |               |   |   |
|--------------------|-----------------|--------------------------|---------------|---|---|
| SO Number          | Instrument Type | Instrument Serial Number | Job Number(s) |   |   |
| 307136             | GFM430          | 10044                    | 14447         | — | — |

Calibration Technician *JSD*

DATE 17-10-2013

Inspection Technician *[Signature]*

DATE 18.10.13

| INSTRUMENT CHECKS |                                        | Pass (P), Fail (F) or not applicable (NA) | INSTRUMENT PACKING LIST     |     | Tick if included |
|-------------------|----------------------------------------|-------------------------------------------|-----------------------------|-----|------------------|
| Function Tests    | Dust Caps Fitted                       | P                                         | Instrument                  |     | ✓                |
|                   | Keyboard Test (All Keys)               | P                                         | Leather Case                |     | ✓                |
|                   | Backlight Test                         | P                                         | Instrument Strap            |     | ✓                |
|                   | Clock Set / Running                    | P                                         | AC Battery Charger (UK)     |     | ✓                |
|                   | Comms Test                             | P                                         | AC Battery Charger (EURO)   |     | X                |
|                   | Pump Flow Test (In & Out)              | P                                         | AC Battery Charger (US)     |     | X                |
|                   | Overall Leak Test (30mB)               | P                                         | Gas Sample Pipe             |     | ✓                |
|                   | Battery Charge Test                    | P                                         | Operation Manual (hardcopy) |     | X                |
|                   | Service Date set to?                   | 17.10.14                                  | Carry Case                  |     | ✓                |
| Channel Test      | Data Logging Enabled?                  | NA                                        | Spares Pot                  |     | ✓                |
|                   | Verify CH4/LEL                         | P                                         | Allen Key                   |     | X                |
|                   | Verify CO2                             | P                                         | Flow Sample Pipe            |     | X                |
|                   | Verify O2                              | P                                         | Pressure Sample Pipe        |     | X                |
|                   | Verify first optional gas              | NA                                        | Temperature Probe           |     | X                |
|                   | Verify second optional gas             | NA                                        | Vane Anemometer             |     | X                |
|                   | Verify third optional gas              | NA                                        | USB Cable                   |     | X                |
|                   | Verify fourth optional gas             | NA                                        | USB Memory stick            |     | X                |
|                   | Verify atmospheric pressure            | P                                         | SiteMan Software            | Ver | X                |
|                   | Verify static pressure                 | NA                                        | Internal Filter Pack        | Qty | X                |
|                   | Verify differential pressure           | P                                         | External Filter Pack        | Qty | 6                |
|                   | Verify flow                            | P                                         | Field Guide                 |     | X                |
|                   | Verify temperature probe input         | P                                         | Extra Items:                |     |                  |
|                   | Verify vane anemometer input           | P                                         |                             |     |                  |
| DataBase Checks   | Jobcard(s) completed and signed        | P                                         |                             |     |                  |
|                   | Jobcard(s) booked off database         | P                                         |                             |     |                  |
|                   | Calibration certificate completed      | P                                         |                             |     |                  |
|                   | Complete & print QI record             | NA                                        |                             |     |                  |
| Label Checks      | No. of Calibration label fitted        | 3331                                      | Comments                    |     |                  |
|                   | Warranty label fitted                  | P                                         |                             |     |                  |
| H2S Range         | H2S Range from Sales Order             | NA                                        |                             |     |                  |
| H2S Range         | H2S Range from Calibration Certificate | NA                                        |                             |     |                  |
| Over-range        | Over-range value correct?              | NA                                        |                             |     |                  |

# **APPENDIX IV**

## **Laboratory Results (Geotechnical & Ground Contamination)**



## ANALYTICAL TEST REPORT

**Contract no:** 51114(1)  
**Contract name:** Phase 2, Liverpool Business Park, Speke  
**Client reference:** 14-156  
**Clients name:** ARC Environmental  
**Clients address:** Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
DH7 8PN  
**Samples received:** 16 April 2014  
**Analysis started:** 22 April 2014  
**Analysis completed:** 28 May 2014  
**Report issued:** 28 May 2014

This is a supplementary report to report number 51114 issued 29 April 2014.

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope.  
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.  
Methods, procedures and performance data are available on request.  
Results reported herein relate only to the material supplied to the laboratory.  
This report shall not be reproduced except in full, without prior written approval.  
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**

Karan Campbell  
Director

John Campbell  
Director

Dave Bowerbank  
Customer Services Co-ordinator

# Chemtech Environmental Limited

## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

| Lab ref | Sample id | Depth (m) | Sample description                     | Material removed | % Removed | % Moisture |
|---------|-----------|-----------|----------------------------------------|------------------|-----------|------------|
| 51114-1 | BH 7      | 0.20      | Sandy Clay with Stones, Gravel & Roots | -                | -         | 16.8       |
| 51114-2 | BH 8      | 0.50      | Sandy Clay with Stones & Gravel        | -                | -         | 14.2       |

# Chemtech Environmental Limited

## SOILS

|                               |                    |                      |            |            |
|-------------------------------|--------------------|----------------------|------------|------------|
| <b>Lab number</b>             |                    |                      | 51114-1    | 51114-2    |
| <b>Sample id</b>              |                    |                      | BH 7       | BH 8       |
| <b>Depth (m)</b>              |                    |                      | 0.20       | 0.50       |
| <b>Date sampled</b>           |                    |                      | 03/04/2014 | 03/04/2014 |
| <b>Test</b>                   | <b>Method</b>      | <b>Units</b>         |            |            |
| Arsenic (total)               | CE054 <sup>M</sup> | mg/kg As             | 5.5        | 5.7        |
| Cadmium (total)               | CE054 <sup>M</sup> | mg/kg Cd             | 0.3        | <0.2       |
| Chromium (total)              | CE054 <sup>M</sup> | mg/kg Cr             | 60         | 86         |
| Chromium (III)                | -                  | mg/kg CrIII          | 60         | 86         |
| Chromium (VI)                 | CE050              | mg/kg CrVI           | <1         | <1         |
| Copper (total)                | CE054 <sup>M</sup> | mg/kg Cu             | 23         | 17         |
| Lead (total)                  | CE054 <sup>M</sup> | mg/kg Pb             | 61         | 20         |
| Mercury (total)               | CE054              | mg/kg Hg             | <0.5       | <0.5       |
| Nickel (total)                | CE054 <sup>M</sup> | mg/kg Ni             | 16         | 29         |
| Selenium (total)              | CE054 <sup>M</sup> | mg/kg Se             | 1.4        | 0.7        |
| Zinc (total)                  | CE054 <sup>M</sup> | mg/kg Zn             | 80         | 52         |
| pH                            | CE004 <sup>M</sup> | units                | 5.6        | 7.9        |
| Sulphate (2:1 water soluble)  | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | 183        | 72         |
| Cyanide (free)                | CE077              | mg/kg CN             | <2         | <2         |
| Total Organic Carbon (TOC)    | CE072 <sup>M</sup> | % w/w C              | 3.37       | 0.77       |
| <b>PAH</b>                    |                    |                      |            |            |
| Acenaphthene                  | CE087              | mg/kg                | 2.67       | <0.01      |
| Acenaphthylene                | CE087              | mg/kg                | 0.16       | <0.01      |
| Anthracene                    | CE087              | mg/kg                | 20.59      | 0.06       |
| Benzo(a)anthracene            | CE087              | mg/kg                | 50.27      | 0.15       |
| Benzo(a)pyrene                | CE087              | mg/kg                | 29.33      | 0.07       |
| Benzo(b)fluoranthene          | CE087              | mg/kg                | 45.26      | 0.11       |
| Benzo(ghi)perylene            | CE087              | mg/kg                | 14.60      | 0.03       |
| Benzo(k)fluoranthene          | CE087              | mg/kg                | 17.02      | 0.03       |
| Chrysene                      | CE087              | mg/kg                | 69.79      | 0.14       |
| Dibenz(ah)anthracene          | CE087              | mg/kg                | 4.78       | 0.01       |
| Fluoranthene                  | CE087              | mg/kg                | 111.21     | 0.27       |
| Fluorene                      | CE087              | mg/kg                | 3.08       | <0.01      |
| Indeno(123cd)pyrene           | CE087              | mg/kg                | 16.31      | 0.03       |
| Naphthalene                   | CE087              | mg/kg                | 0.24       | <0.01      |
| Phenanthrene                  | CE087              | mg/kg                | 49.26      | 0.13       |
| Pyrene                        | CE087              | mg/kg                | 81.10      | 0.19       |
| PAH (total of USEPA 16)       | CE087              | mg/kg                | 516        | 1.22       |
| Benzo(j)fluoranthene          | CE087              | mg/kg                | 14.22      | <0.01      |
| PAH (total of OIL 8)          | CE087              | mg/kg                | 247        | 0.54       |
| <b>Subcontracted analysis</b> |                    |                      |            |            |
| Asbestos                      | \$                 | -                    | NAD        | NAD        |

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## LEACHATES

|                                                           |                    |                      |                          |
|-----------------------------------------------------------|--------------------|----------------------|--------------------------|
| <b>Lab number</b><br><b>Sample id</b><br><b>Depth (m)</b> |                    |                      | 51114-1L<br>BH 7<br>0.20 |
| <b>Test</b>                                               | <b>Method</b>      | <b>Units</b>         |                          |
| Arsenic (dissolved)                                       | CE128 <sup>U</sup> | µg/l As              | 8.87                     |
| Boron (dissolved)                                         | CE128 <sup>U</sup> | µg/l B               | 25                       |
| Cadmium (dissolved)                                       | CE128 <sup>U</sup> | µg/l Cd              | <0.07                    |
| Chromium (dissolved)                                      | CE128 <sup>U</sup> | µg/l Cr              | 10.9                     |
| Copper (dissolved)                                        | CE128 <sup>U</sup> | µg/l Cu              | 7.1                      |
| Lead (dissolved)                                          | CE128 <sup>U</sup> | µg/l Pb              | 2.5                      |
| Mercury (dissolved)                                       | CE128 <sup>U</sup> | µg/l Hg              | <0.008                   |
| Nickel (dissolved)                                        | CE128 <sup>U</sup> | µg/l Ni              | 5.9                      |
| Selenium (dissolved)                                      | CE128 <sup>U</sup> | µg/l Se              | 0.75                     |
| Zinc (dissolved)                                          | CE128 <sup>U</sup> | µg/l Zn              | 2                        |
| pH                                                        | CE004 <sup>U</sup> | units                | 8.2                      |
| Sulphate                                                  | CE049 <sup>U</sup> | mg/l SO <sub>4</sub> | 15                       |
| Cyanide (free)                                            | CE077              | µg/l CN              | <20                      |
| <b>PAHs</b>                                               |                    |                      |                          |
| Acenaphthene                                              | CE087              | µg/l                 | <0.1                     |
| Acenaphthylene                                            | CE087              | µg/l                 | <0.1                     |
| Anthracene                                                | CE087              | µg/l                 | <0.1                     |
| Benzo(a)anthracene                                        | CE087              | µg/l                 | <0.1                     |
| Benzo(a)pyrene                                            | CE087              | µg/l                 | <0.1                     |
| Benzo(b)fluoranthene                                      | CE087              | µg/l                 | <0.1                     |
| Benzo(ghi)perylene                                        | CE087              | µg/l                 | <0.1                     |
| Benzo(k)fluoranthene                                      | CE087              | µg/l                 | <0.1                     |
| Chrysene                                                  | CE087              | µg/l                 | <0.1                     |
| Dibenz(ah)anthracene                                      | CE087              | µg/l                 | <0.1                     |
| Fluoranthene                                              | CE087              | µg/l                 | <0.1                     |
| Fluorene                                                  | CE087              | µg/l                 | <0.1                     |
| Indeno(123cd)pyrene                                       | CE087              | µg/l                 | <0.1                     |
| Naphthalene                                               | CE087              | µg/l                 | <0.1                     |
| Phenanthrene                                              | CE087              | µg/l                 | <0.1                     |
| Pyrene                                                    | CE087              | µg/l                 | <0.1                     |
| PAH (total of USEPA 16)                                   | CE087              | µg/l                 | <1.6                     |
| Benzo(j)fluoranthene                                      | CE087              | µg/l                 | <0.1                     |
| PAH (total of OIL 8)                                      | CE087              | µg/l                 | <0.8                     |

# Chemtech Environmental Limited

## METHOD DETAILS

| METHOD | SOILS                        | METHOD SUMMARY                                  | SAMPLE | STATUS | LOD  | UNITS                |
|--------|------------------------------|-------------------------------------------------|--------|--------|------|----------------------|
| CE054  | Arsenic (total)              | Aqua regia digest, ICP-OES                      | Dry    | M      | 1    | mg/kg As             |
| CE054  | Cadmium (total)              | Aqua regia digest, ICP-OES                      | Dry    | M      | 0.2  | mg/kg Cd             |
| CE054  | Chromium (total)             | Aqua regia digest, ICP-OES                      | Dry    | M      | 1    | mg/kg Cr             |
| -      | Chromium (III)               | Calculation: Cr (total) - Cr (VI)               | Dry    |        | 1    | mg/kg CrIII          |
| CE050  | Chromium (VI)                | Acid extraction, Colorimetry                    | Dry    |        | 1    | mg/kg CrVI           |
| CE054  | Copper (total)               | Aqua regia digest, ICP-OES                      | Dry    | M      | 1    | mg/kg Cu             |
| CE054  | Lead (total)                 | Aqua regia digest, ICP-OES                      | Dry    | M      | 1    | mg/kg Pb             |
| CE054  | Mercury (total)              | Aqua regia digest, ICP-OES                      | Dry    |        | 0.5  | mg/kg Hg             |
| CE054  | Nickel (total)               | Aqua regia digest, ICP-OES                      | Dry    | M      | 1    | mg/kg Ni             |
| CE054  | Selenium (total)             | Aqua regia digest, ICP-OES                      | Dry    | M      | 0.3  | mg/kg Se             |
| CE054  | Zinc (total)                 | Aqua regia digest, ICP-OES                      | Dry    | M      | 3    | mg/kg Zn             |
| CE004  | pH                           | Based on BS 1377, pH Meter                      | Wet    | M      | -    | units                |
| CE061  | Sulphate (2:1 water soluble) | Aqueous extraction, ICP-OES                     | Dry    | M      | 10   | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)               | Extraction, Continuous Flow Colorimetry         | Wet    |        | 2    | mg/kg CN             |
| CE072  | Total Organic Carbon (TOC)   | Removal of IC by acidification, Carbon Analyser | Dry    | M      | 0.1  | % w/w C              |
| CE087  | PAH (speciated)              | Solvent extraction, GC-MS                       | Wet    |        | 0.01 | mg/kg                |
| \$     | Asbestos (qualitative)       | HSG 248, Microscopy                             | Dry    | U      | -    | -                    |

# Chemtech Environmental Limited

## METHOD DETAILS

| METHOD | LEACHATES            | METHOD SUMMARY             | STATUS | LOD   | UNITS                |
|--------|----------------------|----------------------------|--------|-------|----------------------|
| CE128  | Arsenic (dissolved)  | ICP-MS                     | U      | 0.06  | µg/l As              |
| CE128  | Boron (dissolved)    | ICP-MS                     | U      | 6     | µg/l B               |
| CE128  | Cadmium (dissolved)  | ICP-MS                     | U      | 0.07  | µg/l Cd              |
| CE128  | Chromium (dissolved) | ICP-MS                     | U      | 0.2   | µg/l Cr              |
| CE128  | Copper (dissolved)   | ICP-MS                     | U      | 0.4   | µg/l Cu              |
| CE128  | Lead (dissolved)     | ICP-MS                     | U      | 0.2   | µg/l Pb              |
| CE128  | Mercury (dissolved)  | ICP-MS                     | U      | 0.008 | µg/l Hg              |
| CE128  | Nickel (dissolved)   | ICP-MS                     | U      | 0.5   | µg/l Ni              |
| CE128  | Selenium (dissolved) | ICP-MS                     | U      | 0.07  | µg/l Se              |
| CE128  | Zinc (dissolved)     | ICP-MS                     | U      | 1     | µg/l Zn              |
| CE004  | pH                   | Based on BS 1377, pH Meter | U      | -     | units                |
| CE049  | Sulphate             | Ion Chromatography         | U      | 10    | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)       | Distillation, Colorimetry  |        | 20    | µg/l CN              |
| CE087  | PAH (speciated)      | Solvent extraction, GC-MS  |        | 0.1   | µg/l                 |



## ANALYTICAL TEST REPORT

**Contract no:** 51293(1)  
**Contract name:** Phase 2, Liverpool Business Park, Speke  
**Client reference:** 14-156  
**Clients name:** ARC Environmental  
**Clients address:** Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
DH7 8PN  
**Samples received:** 08 May 2014  
**Analysis started:** 08 May 2014  
**Analysis completed** 23 May 2014  
**Report issued:** 27 May 2014

This is a supplementary report to report number 51293 issued 15 May 2014.

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope.  
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.  
Methods, procedures and performance data are available on request.  
Results reported herein relate only to the material supplied to the laboratory.  
BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.  
This report shall not be reproduced except in full, without prior written approval.  
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**

Karan Campbell  
Director

John Campbell  
Director

Dave Bowerbank  
Customer Services Co-ordinator

# Chemtech Environmental Limited

## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

| Lab ref  | Sample id | Depth (m) | Sample description                   | Material removed | % Removed | % Moisture |
|----------|-----------|-----------|--------------------------------------|------------------|-----------|------------|
| 51293-1  | TP 01     | 0.20-0.40 | Sandy Loam with Gravel & Roots       | -                | -         | 14.2       |
| 51293-2  | TP 01     | 1.60-1.80 | Sandy Loamy Clay with Roots          | -                | -         | 31.6       |
| 51293-3  | TP 02     | 0.10-0.40 | Loamy Clay with Roots                | -                | -         | 12.6       |
| 51293-4  | TP 03     | 0.10-0.40 | Sandy Clay with Roots                | -                | -         | 11.8       |
| 51293-5  | TP 04     | 0.20-0.60 | Sandy Clay with Stones & Gravel      | -                | -         | 13.3       |
| 51293-6  | TP 06     | 0.10-0.40 | Sand with Stones & Gravel            | -                | -         | 11.4       |
| 51293-7  | TP 06     | 1.20-1.40 | Sand with Stones & Gravel            | -                | -         | 15.2       |
| 51293-8  | TP 07     | 0.20-0.40 | Sandy Loam with Roots                | -                | -         | 14.5       |
| 51293-9  | TP 08     | 0.20-0.60 | Sandy Loamy Clay with Gravel & Roots | -                | -         | 13.0       |
| 51293-10 | TP 09     | 0.20-0.50 | Sand with Stones & Gravel            | -                | -         | 11.7       |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |                      | 51293-1<br>TP 01<br>0.20-0.40<br>24/04/2014 | 51293-2<br>TP 01<br>1.60-1.80<br>24/04/2014 | 51293-3<br>TP 02<br>0.10-0.40<br>24/04/2014 | 51293-4<br>TP 03<br>0.10-0.40<br>24/04/2014 | 51293-5<br>TP 04<br>0.20-0.60<br>24/04/2014 | 51293-6<br>TP 06<br>0.10-0.40<br>24/04/2014 |
|------------------------------------------------------|--------------------|----------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| Test                                                 | Method             | Units                |                                             |                                             |                                             |                                             |                                             |                                             |
| Arsenic (total)                                      | CE127 <sup>M</sup> | mg/kg As             | 8.1                                         | -                                           | 1.4                                         | 14                                          | 5.6                                         | 12                                          |
| Cadmium (total)                                      | CE127 <sup>M</sup> | mg/kg Cd             | 0.7                                         | -                                           | <0.1                                        | <0.2                                        | <0.2                                        | 0.4                                         |
| Chromium (total)                                     | CE127 <sup>M</sup> | mg/kg Cr             | 83                                          | -                                           | 74                                          | 78                                          | 66                                          | 75                                          |
| Chromium (III)                                       | -                  | mg/kg CrIII          | 83                                          | -                                           | 74                                          | 78                                          | 66                                          | 75                                          |
| Chromium (VI)                                        | CE050              | mg/kg CrVI           | <1                                          | -                                           | <1                                          | <1                                          | <1                                          | <1                                          |
| Copper (total)                                       | CE127 <sup>M</sup> | mg/kg Cu             | 29                                          | -                                           | 3.8                                         | 31                                          | 15                                          | 29                                          |
| Lead (total)                                         | CE127 <sup>M</sup> | mg/kg Pb             | 61                                          | -                                           | 8.2                                         | 56                                          | 21                                          | 65                                          |
| Mercury (total)                                      | CE127 <sup>M</sup> | mg/kg Hg             | <0.5                                        | -                                           | <0.5                                        | <0.5                                        | <0.5                                        | <0.5                                        |
| Nickel (total)                                       | CE127 <sup>M</sup> | mg/kg Ni             | 15                                          | -                                           | 5.3                                         | 20                                          | 17                                          | 22                                          |
| Selenium (total)                                     | CE127 <sup>M</sup> | mg/kg Se             | 0.7                                         | -                                           | 0.3                                         | 0.9                                         | 0.6                                         | 0.9                                         |
| Zinc (total)                                         | CE127 <sup>M</sup> | mg/kg Zn             | 55                                          | -                                           | <5                                          | 36                                          | 32                                          | 97                                          |
| pH                                                   | CE004 <sup>M</sup> | units                | 6.0                                         | -                                           | 6.5                                         | 6.8                                         | 7.1                                         | 8.1                                         |
| Sulphate (2:1 water soluble)                         | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | 27                                          | -                                           | 13                                          | 29                                          | 150                                         | 131                                         |
| Cyanide (free)                                       | CE077              | mg/kg CN             | <2                                          | -                                           | <2                                          | <2                                          | <2                                          | <2                                          |
| Total Organic Carbon (TOC)                           | CE072 <sup>M</sup> | % w/w C              | 2.04                                        | 2.18                                        | 0.57                                        | 1.91                                        | 0.74                                        | 1.91                                        |
| Estimate of OMC (calculated from TOC)                | CE072              | % w/w                | -                                           | 3.75                                        | -                                           | -                                           | -                                           | -                                           |
| <b>PAH</b>                                           |                    |                      |                                             |                                             |                                             |                                             |                                             |                                             |
| Acenaphthene                                         | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 1.45                                        | 0.12                                        |
| Acenaphthylene                                       | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 0.10                                        | 0.01                                        |
| Anthracene                                           | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 3.44                                        | 0.32                                        |
| Benzo(a)anthracene                                   | CE087              | mg/kg                | 0.02                                        | -                                           | <0.01                                       | 0.03                                        | 4.45                                        | 0.82                                        |
| Benzo(a)pyrene                                       | CE087              | mg/kg                | 0.02                                        | -                                           | <0.01                                       | 0.02                                        | 3.42                                        | 1.12                                        |
| Benzo(b)fluoranthene                                 | CE087              | mg/kg                | 0.03                                        | -                                           | <0.01                                       | 0.04                                        | 4.70                                        | 1.30                                        |
| Benzo(ghi)perylene                                   | CE087              | mg/kg                | 0.01                                        | -                                           | <0.01                                       | 0.02                                        | 1.95                                        | 0.82                                        |
| Benzo(k)fluoranthene                                 | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | 0.01                                        | 1.98                                        | 0.52                                        |
| Chrysene                                             | CE087              | mg/kg                | 0.02                                        | -                                           | <0.01                                       | 0.04                                        | 4.14                                        | 0.92                                        |
| Dibenz(ah)anthracene                                 | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 0.63                                        | 0.19                                        |
| Fluoranthene                                         | CE087              | mg/kg                | 0.06                                        | -                                           | <0.01                                       | 0.09                                        | 13.61                                       | 1.58                                        |
| Fluorene                                             | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 1.84                                        | 0.09                                        |
| Indeno(123cd)pyrene                                  | CE087              | mg/kg                | 0.02                                        | -                                           | <0.01                                       | 0.02                                        | 1.96                                        | 0.67                                        |
| Naphthalene                                          | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 0.16                                        | 0.02                                        |
| Phenanthrene                                         | CE087              | mg/kg                | 0.03                                        | -                                           | <0.01                                       | 0.04                                        | 10.34                                       | 1.00                                        |
| Pyrene                                               | CE087              | mg/kg                | 0.06                                        | -                                           | <0.01                                       | 0.08                                        | 9.49                                        | 1.33                                        |
| PAH (total of USEPA 16)                              | CE087              | mg/kg                | 0.27                                        | -                                           | <0.16                                       | 0.39                                        | 63.66                                       | 10.83                                       |
| Benzo(j)fluoranthene                                 | CE087              | mg/kg                | <0.01                                       | -                                           | <0.01                                       | <0.01                                       | 0.67                                        | 0.14                                        |
| PAH (total of OIL 8)                                 | CE087              | mg/kg                | 0.11                                        | -                                           | <0.08                                       | 0.16                                        | 21.95                                       | 5.68                                        |
| <b>BTEX &amp; TPH</b>                                |                    |                      |                                             |                                             |                                             |                                             |                                             |                                             |
| Benzene                                              | CE057 <sup>U</sup> | mg/kg                | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| Toluene                                              | CE057 <sup>U</sup> | mg/kg                | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| Ethylbenzene                                         | CE057 <sup>U</sup> | mg/kg                | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |       | 51293-1<br>TP 01<br>0.20-0.40<br>24/04/2014 | 51293-2<br>TP 01<br>1.60-1.80<br>24/04/2014 | 51293-3<br>TP 02<br>0.10-0.40<br>24/04/2014 | 51293-4<br>TP 03<br>0.10-0.40<br>24/04/2014 | 51293-5<br>TP 04<br>0.20-0.60<br>24/04/2014 | 51293-6<br>TP 06<br>0.10-0.40<br>24/04/2014 |
|------------------------------------------------------|--------------------|-------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| Test                                                 | Method             | Units |                                             |                                             |                                             |                                             |                                             |                                             |
| m & p-Xylene                                         | CE057 <sup>U</sup> | mg/kg | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| o-Xylene                                             | CE057 <sup>U</sup> | mg/kg | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| TPH Aliphatic EC5-EC6                                | CE068              | mg/kg | -                                           | -                                           | <0.1                                        | <0.1                                        | -                                           | <0.1                                        |
| TPH Aliphatic EC6-EC8                                | CE068              | mg/kg | -                                           | -                                           | <0.1                                        | <0.1                                        | -                                           | 0.1                                         |
| TPH Aliphatic EC8-EC10                               | CE068              | mg/kg | -                                           | -                                           | <0.1                                        | 0.1                                         | -                                           | <0.1                                        |
| TPH Aliphatic EC10-EC12                              | CE068              | mg/kg | -                                           | -                                           | <1                                          | 7                                           | -                                           | <1                                          |
| TPH Aliphatic EC12-EC16                              | CE068              | mg/kg | -                                           | -                                           | 5                                           | 1                                           | -                                           | 3                                           |
| TPH Aliphatic EC16-EC35                              | CE068              | mg/kg | -                                           | -                                           | 23                                          | 53                                          | -                                           | 346                                         |
| TPH Aliphatic EC35-EC44                              | CE068              | mg/kg | -                                           | -                                           | 52                                          | 70                                          | -                                           | 305                                         |
| TPH Aromatic EC5-EC7                                 | CE068              | mg/kg | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| TPH Aromatic EC7-EC8                                 | CE068              | mg/kg | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| TPH Aromatic EC8-EC10                                | CE068              | mg/kg | -                                           | -                                           | <0.01                                       | <0.01                                       | -                                           | <0.01                                       |
| TPH Aromatic EC10-EC12                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | <1                                          | -                                           | <1                                          |
| TPH Aromatic EC12-EC16                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | <1                                          | -                                           | <1                                          |
| TPH Aromatic EC16-EC21                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | <1                                          | -                                           | 4                                           |
| TPH Aromatic EC21-EC35                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | <1                                          | -                                           | 6                                           |
| TPH Aromatic EC35-EC44                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | <1                                          | -                                           | <1                                          |
| Subcontracted analysis                               |                    |       |                                             |                                             |                                             |                                             |                                             |                                             |
| Asbestos                                             | \$                 | -     | NAD                                         | -                                           | NAD                                         | NAD                                         | NAD                                         | NAD                                         |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |                      | 51293-7<br>TP 06<br>1.20-1.40<br>24/04/2014 | 51293-8<br>TP 07<br>0.20-0.40<br>24/04/2014 | 51293-9<br>TP 08<br>0.20-0.60<br>24/04/2014 | 51293-10<br>TP 09<br>0.20-0.50<br>24/04/2014 |
|------------------------------------------------------|--------------------|----------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------------|
| Test                                                 | Method             | Units                |                                             |                                             |                                             |                                              |
| Arsenic (total)                                      | CE127 <sup>M</sup> | mg/kg As             | -                                           | 8.7                                         | 9.0                                         | 7.6                                          |
| Cadmium (total)                                      | CE127 <sup>M</sup> | mg/kg Cd             | -                                           | 0.2                                         | 0.2                                         | 0.2                                          |
| Chromium (total)                                     | CE127 <sup>M</sup> | mg/kg Cr             | -                                           | 71                                          | 79                                          | 66                                           |
| Chromium (III)                                       | -                  | mg/kg CrIII          | -                                           | 71                                          | 79                                          | 66                                           |
| Chromium (VI)                                        | CE050              | mg/kg CrVI           | -                                           | <1                                          | <1                                          | <1                                           |
| Copper (total)                                       | CE127 <sup>M</sup> | mg/kg Cu             | -                                           | 27                                          | 26                                          | 24                                           |
| Lead (total)                                         | CE127 <sup>M</sup> | mg/kg Pb             | -                                           | 59                                          | 43                                          | 106                                          |
| Mercury (total)                                      | CE127 <sup>M</sup> | mg/kg Hg             | -                                           | <0.5                                        | <0.5                                        | <0.5                                         |
| Nickel (total)                                       | CE127 <sup>M</sup> | mg/kg Ni             | -                                           | 14                                          | 26                                          | 13                                           |
| Selenium (total)                                     | CE127 <sup>M</sup> | mg/kg Se             | -                                           | 0.6                                         | 0.8                                         | 0.5                                          |
| Zinc (total)                                         | CE127 <sup>M</sup> | mg/kg Zn             | -                                           | 40                                          | 81                                          | 62                                           |
| pH                                                   | CE004 <sup>M</sup> | units                | -                                           | 6.0                                         | 8.0                                         | 7.5                                          |
| Sulphate (2:1 water soluble)                         | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | -                                           | 26                                          | 27                                          | 17                                           |
| Cyanide (free)                                       | CE077              | mg/kg CN             | -                                           | <2                                          | <2                                          | <2                                           |
| Total Organic Carbon (TOC)                           | CE072 <sup>M</sup> | % w/w C              | 0.31                                        | 1.56                                        | 1.45                                        | 1.43                                         |
| Estimate of OMC (calculated from TOC)                | CE072              | % w/w                | 0.53                                        | 2.69                                        | -                                           | 2.47                                         |
| <b>PAH</b>                                           |                    |                      |                                             |                                             |                                             |                                              |
| Acenaphthene                                         | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Acenaphthylene                                       | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Anthracene                                           | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Benzo(a)anthracene                                   | CE087              | mg/kg                | -                                           | -                                           | 0.05                                        | -                                            |
| Benzo(a)pyrene                                       | CE087              | mg/kg                | -                                           | -                                           | 0.05                                        | -                                            |
| Benzo(b)fluoranthene                                 | CE087              | mg/kg                | -                                           | -                                           | 0.08                                        | -                                            |
| Benzo(ghi)perylene                                   | CE087              | mg/kg                | -                                           | -                                           | 0.05                                        | -                                            |
| Benzo(k)fluoranthene                                 | CE087              | mg/kg                | -                                           | -                                           | 0.03                                        | -                                            |
| Chrysene                                             | CE087              | mg/kg                | -                                           | -                                           | 0.07                                        | -                                            |
| Dibenz(ah)anthracene                                 | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Fluoranthene                                         | CE087              | mg/kg                | -                                           | -                                           | 0.10                                        | -                                            |
| Fluorene                                             | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Indeno(123cd)pyrene                                  | CE087              | mg/kg                | -                                           | -                                           | 0.04                                        | -                                            |
| Naphthalene                                          | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Phenanthrene                                         | CE087              | mg/kg                | -                                           | -                                           | 0.04                                        | -                                            |
| Pyrene                                               | CE087              | mg/kg                | -                                           | -                                           | 0.11                                        | -                                            |
| PAH (total of USEPA 16)                              | CE087              | mg/kg                | -                                           | -                                           | 0.61                                        | -                                            |
| Benzo(j)fluoranthene                                 | CE087              | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| PAH (total of OIL 8)                                 | CE087              | mg/kg                | -                                           | -                                           | 0.32                                        | -                                            |
| <b>BTEX &amp; TPH</b>                                |                    |                      |                                             |                                             |                                             |                                              |
| Benzene                                              | CE057 <sup>U</sup> | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Toluene                                              | CE057 <sup>U</sup> | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |
| Ethylbenzene                                         | CE057 <sup>U</sup> | mg/kg                | -                                           | -                                           | <0.01                                       | -                                            |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |       | 51293-7<br>TP 06<br>1.20-1.40<br>24/04/2014 | 51293-8<br>TP 07<br>0.20-0.40<br>24/04/2014 | 51293-9<br>TP 08<br>0.20-0.60<br>24/04/2014 | 51293-10<br>TP 09<br>0.20-0.50<br>24/04/2014 |
|------------------------------------------------------|--------------------|-------|---------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------------|
| Test                                                 | Method             | Units |                                             |                                             |                                             |                                              |
| m & p-Xylene                                         | CE057 <sup>U</sup> | mg/kg | -                                           | -                                           | <0.01                                       | -                                            |
| o-Xylene                                             | CE057 <sup>U</sup> | mg/kg | -                                           | -                                           | <0.01                                       | -                                            |
| TPH Aliphatic EC5-EC6                                | CE068              | mg/kg | -                                           | -                                           | <0.1                                        | -                                            |
| TPH Aliphatic EC6-EC8                                | CE068              | mg/kg | -                                           | -                                           | <0.1                                        | -                                            |
| TPH Aliphatic EC8-EC10                               | CE068              | mg/kg | -                                           | -                                           | <0.1                                        | -                                            |
| TPH Aliphatic EC10-EC12                              | CE068              | mg/kg | -                                           | -                                           | 2                                           | -                                            |
| TPH Aliphatic EC12-EC16                              | CE068              | mg/kg | -                                           | -                                           | 2                                           | -                                            |
| TPH Aliphatic EC16-EC35                              | CE068              | mg/kg | -                                           | -                                           | 102                                         | -                                            |
| TPH Aliphatic EC35-EC44                              | CE068              | mg/kg | -                                           | -                                           | 123                                         | -                                            |
| TPH Aromatic EC5-EC7                                 | CE068              | mg/kg | -                                           | -                                           | <0.01                                       | -                                            |
| TPH Aromatic EC7-EC8                                 | CE068              | mg/kg | -                                           | -                                           | <0.01                                       | -                                            |
| TPH Aromatic EC8-EC10                                | CE068              | mg/kg | -                                           | -                                           | <0.01                                       | -                                            |
| TPH Aromatic EC10-EC12                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | -                                            |
| TPH Aromatic EC12-EC16                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | -                                            |
| TPH Aromatic EC16-EC21                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | -                                            |
| TPH Aromatic EC21-EC35                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | -                                            |
| TPH Aromatic EC35-EC44                               | CE068              | mg/kg | -                                           | -                                           | <1                                          | -                                            |
| Subcontracted analysis                               |                    |       |                                             |                                             |                                             |                                              |
| Asbestos                                             | \$                 | -     | -                                           | -                                           | NAD                                         | -                                            |

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## LEACHATES

|                                                           |                    |                      |                                |
|-----------------------------------------------------------|--------------------|----------------------|--------------------------------|
| <b>Lab number</b><br><b>Sample id</b><br><b>Depth (m)</b> |                    |                      | 51293-5L<br>TP 04<br>0.20-0.60 |
| <b>Test</b>                                               | <b>Method</b>      | <b>Units</b>         |                                |
| Arsenic (dissolved)                                       | CE128 <sup>U</sup> | µg/l As              | 14.27                          |
| Boron (dissolved)                                         | CE128 <sup>U</sup> | µg/l B               | 14                             |
| Cadmium (dissolved)                                       | CE128 <sup>U</sup> | µg/l Cd              | <0.07                          |
| Chromium (dissolved)                                      | CE128 <sup>U</sup> | µg/l Cr              | 27.0                           |
| Copper (dissolved)                                        | CE128 <sup>U</sup> | µg/l Cu              | 13.0                           |
| Lead (dissolved)                                          | CE128 <sup>U</sup> | µg/l Pb              | 1.1                            |
| Mercury (dissolved)                                       | CE128 <sup>U</sup> | µg/l Hg              | <0.008                         |
| Nickel (dissolved)                                        | CE128 <sup>U</sup> | µg/l Ni              | 14.5                           |
| Selenium (dissolved)                                      | CE128 <sup>U</sup> | µg/l Se              | 0.93                           |
| Zinc (dissolved)                                          | CE128 <sup>U</sup> | µg/l Zn              | 4                              |
| pH                                                        | CE004 <sup>U</sup> | units                | 9.6                            |
| Sulphate                                                  | CE049 <sup>U</sup> | mg/l SO <sub>4</sub> | 12                             |
| Cyanide (free)                                            | CE077              | µg/l CN              | <20                            |
| <b>PAHs</b>                                               |                    |                      |                                |
| Acenaphthene                                              | CE087              | µg/l                 | <0.1                           |
| Acenaphthylene                                            | CE087              | µg/l                 | <0.1                           |
| Anthracene                                                | CE087              | µg/l                 | <0.1                           |
| Benzo(a)anthracene                                        | CE087              | µg/l                 | <0.1                           |
| Benzo(a)pyrene                                            | CE087              | µg/l                 | <0.1                           |
| Benzo(b)fluoranthene                                      | CE087              | µg/l                 | <0.1                           |
| Benzo(ghi)perylene                                        | CE087              | µg/l                 | <0.1                           |
| Benzo(k)fluoranthene                                      | CE087              | µg/l                 | <0.1                           |
| Chrysene                                                  | CE087              | µg/l                 | <0.1                           |
| Dibenz(ah)anthracene                                      | CE087              | µg/l                 | <0.1                           |
| Fluoranthene                                              | CE087              | µg/l                 | <0.1                           |
| Fluorene                                                  | CE087              | µg/l                 | <0.1                           |
| Indeno(123cd)pyrene                                       | CE087              | µg/l                 | <0.1                           |
| Naphthalene                                               | CE087              | µg/l                 | <0.1                           |
| Phenanthrene                                              | CE087              | µg/l                 | <0.1                           |
| Pyrene                                                    | CE087              | µg/l                 | <0.1                           |
| PAH (total of USEPA 16)                                   | CE087              | µg/l                 | <1.6                           |
| Benzo(j)fluoranthene                                      | CE087              | µg/l                 | <0.1                           |
| PAH (total of OIL 8)                                      | CE087              | µg/l                 | <0.8                           |
| <b>BTEX &amp; TPH</b>                                     |                    |                      |                                |
| Benzene                                                   | CE057 <sup>U</sup> | µg/l                 | <1                             |
| Toluene                                                   | CE057 <sup>U</sup> | µg/l                 | <1                             |
| Ethylbenzene                                              | CE057 <sup>U</sup> | µg/l                 | <1                             |
| m & p-Xylene                                              | CE057 <sup>U</sup> | µg/l                 | <1                             |
| o-Xylene                                                  | CE057 <sup>U</sup> | µg/l                 | <1                             |
| TPH Aliphatic EC5-EC6                                     | CE068              | µg/l                 | <1                             |
| TPH Aliphatic EC6-EC8                                     | CE068              | µg/l                 | <1                             |

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## LEACHATES

|                                                           |               |              |                                |
|-----------------------------------------------------------|---------------|--------------|--------------------------------|
| <b>Lab number</b><br><b>Sample id</b><br><b>Depth (m)</b> |               |              | 51293-5L<br>TP 04<br>0.20-0.60 |
| <b>Test</b>                                               | <b>Method</b> | <b>Units</b> |                                |
| TPH Aliphatic EC8-EC10                                    | CE068         | µg/l         | <1                             |
| TPH Aliphatic EC10-EC12                                   | CE068         | µg/l         | <1                             |
| TPH Aliphatic EC12-EC16                                   | CE068         | µg/l         | <1                             |
| TPH Aliphatic EC16-EC35                                   | CE068         | µg/l         | <1                             |
| TPH Aliphatic EC35-EC44                                   | CE068         | µg/l         | <1                             |
| TPH Aromatic EC5-EC7                                      | CE068         | µg/l         | <1                             |
| TPH Aromatic EC7-EC8                                      | CE068         | µg/l         | <1                             |
| TPH Aromatic EC8-EC10                                     | CE068         | µg/l         | <1                             |
| TPH Aromatic EC10-EC12                                    | CE068         | µg/l         | <1                             |
| TPH Aromatic EC12-EC16                                    | CE068         | µg/l         | 2                              |
| TPH Aromatic EC16-EC21                                    | CE068         | µg/l         | 10                             |
| TPH Aromatic EC21-EC35                                    | CE068         | µg/l         | 10                             |
| TPH Aromatic EC35-EC44                                    | CE068         | µg/l         | 2                              |

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## METHOD DETAILS

| METHOD | SOILS                                      | METHOD SUMMARY                                  | SAMPLE | STATUS | LOD      | UNITS                |
|--------|--------------------------------------------|-------------------------------------------------|--------|--------|----------|----------------------|
| CE127  | Arsenic (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg As             |
| CE127  | Cadmium (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.2      | mg/kg Cd             |
| CE127  | Chromium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cr             |
| -      | Chromium (III)                             | Calculation: Cr (total) - Cr (VI)               | Dry    |        | 1        | mg/kg CrIII          |
| CE050  | Chromium (VI)                              | Acid extraction, Colorimetry                    | Dry    |        | 1        | mg/kg CrVI           |
| CE127  | Copper (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cu             |
| CE127  | Lead (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Pb             |
| CE127  | Mercury (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.5      | mg/kg Hg             |
| CE127  | Nickel (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Ni             |
| CE127  | Selenium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.3      | mg/kg Se             |
| CE127  | Zinc (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 5        | mg/kg Zn             |
| CE004  | pH                                         | Based on BS 1377, pH Meter                      | Wet    | M      | -        | units                |
| CE061  | Sulphate (2:1 water soluble)               | Aqueous extraction, ICP-OES                     | Dry    | M      | 10       | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Extraction, Continuous Flow Colorimetry         | Wet    |        | 2        | mg/kg CN             |
| CE072  | Total Organic Carbon (TOC)                 | Removal of IC by acidification, Carbon Analyser | Dry    | M      | 0.1      | % w/w C              |
| CE072  | Estimate of OMC (calculated from TOC)      | Calculation from Total Organic Carbon           | Dry    |        | 0.1      | % w/w                |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS                       | Wet    |        | 0.01     | mg/kg                |
| CE057  | BTEX                                       | Headspace GC-FID                                | Wet    | U      | 0.01     | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID                                | Wet    |        | 0.01-0.1 | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID                      | Wet    |        | 1        | mg/kg                |
| \$     | Asbestos (qualitative)                     | HSG 248, Microscopy                             | Dry    | U      | -        | -                    |

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## METHOD DETAILS

| METHOD | LEACHATES                                  | METHOD SUMMARY             | STATUS | LOD   | UNITS                |
|--------|--------------------------------------------|----------------------------|--------|-------|----------------------|
| CE128  | Arsenic (dissolved)                        | ICP-MS                     | U      | 0.06  | µg/l As              |
| CE128  | Boron (dissolved)                          | ICP-MS                     | U      | 6     | µg/l B               |
| CE128  | Cadmium (dissolved)                        | ICP-MS                     | U      | 0.07  | µg/l Cd              |
| CE128  | Chromium (dissolved)                       | ICP-MS                     | U      | 0.2   | µg/l Cr              |
| CE128  | Copper (dissolved)                         | ICP-MS                     | U      | 0.4   | µg/l Cu              |
| CE128  | Lead (dissolved)                           | ICP-MS                     | U      | 0.2   | µg/l Pb              |
| CE128  | Mercury (dissolved)                        | ICP-MS                     | U      | 0.008 | µg/l Hg              |
| CE128  | Nickel (dissolved)                         | ICP-MS                     | U      | 0.5   | µg/l Ni              |
| CE128  | Selenium (dissolved)                       | ICP-MS                     | U      | 0.07  | µg/l Se              |
| CE128  | Zinc (dissolved)                           | ICP-MS                     | U      | 1     | µg/l Zn              |
| CE004  | pH                                         | Based on BS 1377, pH Meter | U      | -     | units                |
| CE049  | Sulphate                                   | Ion Chromatography         | U      | 10    | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Distillation, Colorimetry  |        | 20    | µg/l CN              |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS  |        | 0.1   | µg/l                 |
| CE057  | BTEX                                       | Headspace GC-FID           | U      | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID           |        | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID |        | 1     | µg/l                 |

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## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

- N No (not deviating sample)
- Y Yes (deviating sample)
- A Sampling date not provided
- B Sampling time not provided (waters only)
- C Sample exceeded holding time(s)
- D Sample not received in appropriate containers
- E Headspace present in sample container
- F Sample not chemically fixed (where appropriate)
- G Sample not cooled
- H Other (specify)

| Lab ref  | Sample id | Depth (m) | Deviating | Tests (Reason for deviation) |
|----------|-----------|-----------|-----------|------------------------------|
| 51293-1  | TP 01     | 0.20-0.40 | N         |                              |
| 51293-2  | TP 01     | 1.60-1.80 | N         |                              |
| 51293-3  | TP 02     | 0.10-0.40 | N         |                              |
| 51293-4  | TP 03     | 0.10-0.40 | N         |                              |
| 51293-5  | TP 04     | 0.20-0.60 | N         |                              |
| 51293-6  | TP 06     | 0.10-0.40 | N         |                              |
| 51293-7  | TP 06     | 1.20-1.40 | N         |                              |
| 51293-8  | TP 07     | 0.20-0.40 | N         |                              |
| 51293-9  | TP 08     | 0.20-0.60 | N         |                              |
| 51293-10 | TP 09     | 0.20-0.50 | N         |                              |



## ANALYTICAL TEST REPORT

**Contract no:** 52171

**Contract name:** Phase 2, Liverpool Business Park, Speke

**Client reference:** 14-156

**Clients name:** ARC Environmental

**Clients address:** Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
DH7 8PN

**Samples received:** 23 July 2014

**Analysis started:** 23 July 2014

**Analysis completed** 30 July 2014

**Report issued:** 30 July 2014

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope.  
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.  
Methods, procedures and performance data are available on request.  
Results reported herein relate only to the material supplied to the laboratory.  
This report shall not be reproduced except in full, without prior written approval.  
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**

Karan Campbell  
Director

John Campbell  
Director

Dave Bowerbank  
Customer Services Co-ordinator

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## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

| Lab ref | Sample id | Depth (m) | Sample description              | Material removed | % Removed | % Moisture |
|---------|-----------|-----------|---------------------------------|------------------|-----------|------------|
| 52171-1 | TP 10     | 0.30      | Sandy Clay with Stones & Gravel | -                | -         | 8.2        |
| 52171-2 | TP 10     | 1.00      | Sandy Clay with Stones & Gravel | -                | -         | 10.3       |
| 52171-3 | TP 12     | 0.40      | Sandy Clay with Stones & Gravel | -                | -         | 16.0       |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |                      | 52171-1<br>TP 10<br>0.30<br>17/07/2014 | 52171-2<br>TP 10<br>1.00<br>17/07/2014 | 52171-3<br>TP 12<br>0.40<br>17/07/2014 |
|------------------------------------------------------|--------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Test                                                 | Method             | Units                |                                        |                                        |                                        |
| Arsenic (total)                                      | CE127 <sup>M</sup> | mg/kg As             | 7.6                                    | -                                      | 1.4                                    |
| Cadmium (total)                                      | CE127 <sup>M</sup> | mg/kg Cd             | <0.2                                   | -                                      | <0.2                                   |
| Chromium (total)                                     | CE127 <sup>M</sup> | mg/kg Cr             | 73                                     | -                                      | 94                                     |
| Chromium (III)                                       | -                  | mg/kg CrIII          | 73                                     | -                                      | 94                                     |
| Chromium (VI)                                        | CE050              | mg/kg CrVI           | <1                                     | -                                      | <1                                     |
| Copper (total)                                       | CE127 <sup>M</sup> | mg/kg Cu             | 29                                     | -                                      | 2.5                                    |
| Lead (total)                                         | CE127 <sup>M</sup> | mg/kg Pb             | 72                                     | -                                      | 5.2                                    |
| Mercury (total)                                      | CE127 <sup>M</sup> | mg/kg Hg             | <0.5                                   | -                                      | <0.5                                   |
| Nickel (total)                                       | CE127 <sup>M</sup> | mg/kg Ni             | 14                                     | -                                      | 4.2                                    |
| Selenium (total)                                     | CE127 <sup>M</sup> | mg/kg Se             | 0.6                                    | -                                      | 0.4                                    |
| Zinc (total)                                         | CE127 <sup>M</sup> | mg/kg Zn             | 35                                     | -                                      | <5                                     |
| pH                                                   | CE004 <sup>M</sup> | units                | 6.2                                    | 6.6                                    | 7.8                                    |
| Sulphate (2:1 water soluble)                         | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | 19                                     | 67                                     | 10                                     |
| Cyanide (free)                                       | CE077              | mg/kg CN             | <2                                     | -                                      | <2                                     |
| Total Organic Carbon (TOC)                           | CE072 <sup>M</sup> | % w/w C              | 1.78                                   | -                                      | 0.55                                   |
| <b>PAH</b>                                           |                    |                      |                                        |                                        |                                        |
| Acenaphthene                                         | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| Acenaphthylene                                       | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| Anthracene                                           | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| Benzo(a)anthracene                                   | CE087              | mg/kg                | 0.03                                   | -                                      | -                                      |
| Benzo(a)pyrene                                       | CE087              | mg/kg                | 0.03                                   | -                                      | -                                      |
| Benzo(b)fluoranthene                                 | CE087              | mg/kg                | 0.04                                   | -                                      | -                                      |
| Benzo(ghi)perylene                                   | CE087              | mg/kg                | 0.02                                   | -                                      | -                                      |
| Benzo(k)fluoranthene                                 | CE087              | mg/kg                | 0.01                                   | -                                      | -                                      |
| Chrysene                                             | CE087              | mg/kg                | 0.04                                   | -                                      | -                                      |
| Dibenz(ah)anthracene                                 | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| Fluoranthene                                         | CE087              | mg/kg                | 0.05                                   | -                                      | -                                      |
| Fluorene                                             | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| Indeno(123cd)pyrene                                  | CE087              | mg/kg                | 0.02                                   | -                                      | -                                      |
| Naphthalene                                          | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| Phenanthrene                                         | CE087              | mg/kg                | 0.02                                   | -                                      | -                                      |
| Pyrene                                               | CE087              | mg/kg                | 0.05                                   | -                                      | -                                      |
| PAH (total of USEPA 16)                              | CE087              | mg/kg                | 0.30                                   | -                                      | -                                      |
| Benzo(j)fluoranthene                                 | CE087              | mg/kg                | <0.01                                  | -                                      | -                                      |
| PAH (total of OIL 8)                                 | CE087              | mg/kg                | <0.08                                  | -                                      | -                                      |
| <b>TPH</b>                                           |                    |                      |                                        |                                        |                                        |
| TPH Aliphatic EC5-EC6                                | CE068              | mg/kg                | <0.1                                   | -                                      | -                                      |
| TPH Aliphatic EC6-EC8                                | CE068              | mg/kg                | 0.2                                    | -                                      | -                                      |
| TPH Aliphatic EC8-EC10                               | CE068              | mg/kg                | 0.1                                    | -                                      | -                                      |
| TPH Aliphatic EC10-EC12                              | CE068              | mg/kg                | <1                                     | -                                      | -                                      |

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## SOILS

|                               |               |              |            |            |            |
|-------------------------------|---------------|--------------|------------|------------|------------|
| <b>Lab number</b>             |               |              | 52171-1    | 52171-2    | 52171-3    |
| <b>Sample id</b>              |               |              | TP 10      | TP 10      | TP 12      |
| <b>Depth (m)</b>              |               |              | 0.30       | 1.00       | 0.40       |
| <b>Date sampled</b>           |               |              | 17/07/2014 | 17/07/2014 | 17/07/2014 |
| <b>Test</b>                   | <b>Method</b> | <b>Units</b> |            |            |            |
| TPH Aliphatic EC12-EC16       | CE068         | mg/kg        | 1          | -          | -          |
| TPH Aliphatic EC16-EC35       | CE068         | mg/kg        | 23         | -          | -          |
| TPH Aliphatic EC35-EC44       | CE068         | mg/kg        | 30         | -          | -          |
| TPH Aromatic EC5-EC7          | CE068         | mg/kg        | <0.01      | -          | -          |
| TPH Aromatic EC7-EC8          | CE068         | mg/kg        | <0.01      | -          | -          |
| TPH Aromatic EC8-EC10         | CE068         | mg/kg        | <0.01      | -          | -          |
| TPH Aromatic EC10-EC12        | CE068         | mg/kg        | <1         | -          | -          |
| TPH Aromatic EC12-EC16        | CE068         | mg/kg        | <1         | -          | -          |
| TPH Aromatic EC16-EC21        | CE068         | mg/kg        | <1         | -          | -          |
| TPH Aromatic EC21-EC35        | CE068         | mg/kg        | <1         | -          | -          |
| TPH Aromatic EC35-EC44        | CE068         | mg/kg        | <1         | -          | -          |
| <b>Subcontracted analysis</b> |               |              |            |            |            |
| Asbestos                      | \$            | -            | NAD        | -          | NAD        |

# Chemtech Environmental Limited

## LEACHATES

|                         |                    |                      |          |
|-------------------------|--------------------|----------------------|----------|
| <b>Lab number</b>       |                    |                      | 52171-1L |
| <b>Sample id</b>        |                    |                      | TP 10    |
| <b>Depth (m)</b>        |                    |                      | 0.30     |
| <b>Test</b>             | <b>Method</b>      | <b>Units</b>         |          |
| Arsenic (dissolved)     | CE128 <sup>U</sup> | µg/l As              | 3.50     |
| Boron (dissolved)       | CE128 <sup>U</sup> | µg/l B               | <6       |
| Cadmium (dissolved)     | CE128 <sup>U</sup> | µg/l Cd              | <0.07    |
| Chromium (dissolved)    | CE128 <sup>U</sup> | µg/l Cr              | <0.2     |
| Copper (dissolved)      | CE128 <sup>U</sup> | µg/l Cu              | 11.3     |
| Lead (dissolved)        | CE128 <sup>U</sup> | µg/l Pb              | 0.6      |
| Mercury (dissolved)     | CE128 <sup>U</sup> | µg/l Hg              | <0.008   |
| Nickel (dissolved)      | CE128 <sup>U</sup> | µg/l Ni              | 0.6      |
| Selenium (dissolved)    | CE128 <sup>U</sup> | µg/l Se              | <0.07    |
| Zinc (dissolved)        | CE128 <sup>U</sup> | µg/l Zn              | <1       |
| pH                      | CE004 <sup>U</sup> | units                | 7.6      |
| Sulphate                | CE049 <sup>U</sup> | mg/l SO <sub>4</sub> | <10      |
| Cyanide (free)          | CE077              | µg/l CN              | <20      |
| <b>PAHs</b>             |                    |                      |          |
| Acenaphthene            | CE087              | µg/l                 | <0.1     |
| Acenaphthylene          | CE087              | µg/l                 | <0.1     |
| Anthracene              | CE087              | µg/l                 | <0.1     |
| Benzo(a)anthracene      | CE087              | µg/l                 | <0.1     |
| Benzo(a)pyrene          | CE087              | µg/l                 | <0.1     |
| Benzo(b)fluoranthene    | CE087              | µg/l                 | <0.1     |
| Benzo(ghi)perylene      | CE087              | µg/l                 | <0.1     |
| Benzo(k)fluoranthene    | CE087              | µg/l                 | <0.1     |
| Chrysene                | CE087              | µg/l                 | <0.1     |
| Dibenz(ah)anthracene    | CE087              | µg/l                 | <0.1     |
| Fluoranthene            | CE087              | µg/l                 | <0.1     |
| Fluorene                | CE087              | µg/l                 | <0.1     |
| Indeno(123cd)pyrene     | CE087              | µg/l                 | <0.1     |
| Naphthalene             | CE087              | µg/l                 | <0.1     |
| Phenanthrene            | CE087              | µg/l                 | <0.1     |
| Pyrene                  | CE087              | µg/l                 | <0.1     |
| PAH (total of USEPA 16) | CE087              | µg/l                 | <1.6     |
| Benzo(j)fluoranthene    | CE087              | µg/l                 | <0.1     |
| PAH (total of OIL 8)    | CE087              | µg/l                 | <0.8     |
| <b>TPH</b>              |                    |                      |          |
| TPH Aliphatic EC5-EC6   | CE068              | µg/l                 | <1       |
| TPH Aliphatic EC6-EC8   | CE068              | µg/l                 | <1       |
| TPH Aliphatic EC8-EC10  | CE068              | µg/l                 | <1       |
| TPH Aliphatic EC10-EC12 | CE068              | µg/l                 | <1       |
| TPH Aliphatic EC12-EC16 | CE068              | µg/l                 | <1       |
| TPH Aliphatic EC16-EC35 | CE068              | µg/l                 | <1       |
| TPH Aliphatic EC35-EC44 | CE068              | µg/l                 | <1       |

# Chemtech Environmental Limited

## LEACHATES

|                        |               |              |          |
|------------------------|---------------|--------------|----------|
| <b>Lab number</b>      |               |              | 52171-1L |
| <b>Sample id</b>       |               |              | TP 10    |
| <b>Depth (m)</b>       |               |              | 0.30     |
| <b>Test</b>            | <b>Method</b> | <b>Units</b> |          |
| TPH Aromatic EC5-EC7   | CE068         | µg/l         | <1       |
| TPH Aromatic EC7-EC8   | CE068         | µg/l         | <1       |
| TPH Aromatic EC8-EC10  | CE068         | µg/l         | <1       |
| TPH Aromatic EC10-EC12 | CE068         | µg/l         | <1       |
| TPH Aromatic EC12-EC16 | CE068         | µg/l         | <1       |
| TPH Aromatic EC16-EC21 | CE068         | µg/l         | <1       |
| TPH Aromatic EC21-EC35 | CE068         | µg/l         | <1       |
| TPH Aromatic EC35-EC44 | CE068         | µg/l         | <1       |

# Chemtech Environmental Limited

## METHOD DETAILS

| METHOD | SOILS                                      | METHOD SUMMARY                                  | SAMPLE | STATUS | LOD      | UNITS                |
|--------|--------------------------------------------|-------------------------------------------------|--------|--------|----------|----------------------|
| CE127  | Arsenic (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg As             |
| CE127  | Cadmium (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.2      | mg/kg Cd             |
| CE127  | Chromium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cr             |
| -      | Chromium (III)                             | Calculation: Cr (total) - Cr (VI)               | Dry    |        | 1        | mg/kg CrIII          |
| CE050  | Chromium (VI)                              | Acid extraction, Colorimetry                    | Dry    |        | 1        | mg/kg CrVI           |
| CE127  | Copper (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cu             |
| CE127  | Lead (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Pb             |
| CE127  | Mercury (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.5      | mg/kg Hg             |
| CE127  | Nickel (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Ni             |
| CE127  | Selenium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.3      | mg/kg Se             |
| CE127  | Zinc (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 5        | mg/kg Zn             |
| CE004  | pH                                         | Based on BS 1377, pH Meter                      | Wet    | M      | -        | units                |
| CE061  | Sulphate (2:1 water soluble)               | Aqueous extraction, ICP-OES                     | Dry    | M      | 10       | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Extraction, Continuous Flow Colorimetry         | Wet    |        | 2        | mg/kg CN             |
| CE072  | Total Organic Carbon (TOC)                 | Removal of IC by acidification, Carbon Analyser | Dry    | M      | 0.1      | % w/w C              |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS                       | Wet    |        | 0.01     | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID                                | Wet    |        | 0.01-0.1 | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID                      | Wet    |        | 1        | mg/kg                |
| \$     | Asbestos (qualitative)                     | HSG 248, Microscopy                             | Dry    | U      | -        | -                    |

# Chemtech Environmental Limited

## METHOD DETAILS

| METHOD | LEACHATES                                  | METHOD SUMMARY             | STATUS | LOD   | UNITS                |
|--------|--------------------------------------------|----------------------------|--------|-------|----------------------|
| CE128  | Arsenic (dissolved)                        | ICP-MS                     | U      | 0.06  | µg/l As              |
| CE128  | Boron (dissolved)                          | ICP-MS                     | U      | 6     | µg/l B               |
| CE128  | Cadmium (dissolved)                        | ICP-MS                     | U      | 0.07  | µg/l Cd              |
| CE128  | Chromium (dissolved)                       | ICP-MS                     | U      | 0.2   | µg/l Cr              |
| CE128  | Copper (dissolved)                         | ICP-MS                     | U      | 0.4   | µg/l Cu              |
| CE128  | Lead (dissolved)                           | ICP-MS                     | U      | 0.2   | µg/l Pb              |
| CE128  | Mercury (dissolved)                        | ICP-MS                     | U      | 0.008 | µg/l Hg              |
| CE128  | Nickel (dissolved)                         | ICP-MS                     | U      | 0.5   | µg/l Ni              |
| CE128  | Selenium (dissolved)                       | ICP-MS                     | U      | 0.07  | µg/l Se              |
| CE128  | Zinc (dissolved)                           | ICP-MS                     | U      | 1     | µg/l Zn              |
| CE004  | pH                                         | Based on BS 1377, pH Meter | U      | -     | units                |
| CE049  | Sulphate                                   | Ion Chromatography         | U      | 10    | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Distillation, Colorimetry  |        | 20    | µg/l CN              |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS  |        | 0.1   | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID           |        | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID |        | 1     | µg/l                 |

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## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

- N No (not deviating sample)
- Y Yes (deviating sample)
- A Sampling date not provided
- B Sampling time not provided (waters only)
- C Sample exceeded holding time(s)
- D Sample not received in appropriate containers
- E Headspace present in sample container
- F Sample not chemically fixed (where appropriate)
- G Sample not cooled
- H Other (specify)

| Lab ref | Sample id | Depth (m) | Deviating | Tests (Reason for deviation) |
|---------|-----------|-----------|-----------|------------------------------|
| 52171-1 | TP 10     | 0.30      | N         |                              |
| 52171-2 | TP 10     | 1.00      | N         |                              |
| 52171-3 | TP 12     | 0.40      | N         |                              |



## ANALYTICAL TEST REPORT

**Contract no:** 52172

**Contract name:** Phase 3, Liverpool Business Park, Speke

**Client reference:** 14-156

**Clients name:** ARC Environmental

**Clients address:** Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
DH7 8PN

**Samples received:** 23 July 2014

**Analysis started:** 23 July 2014

**Analysis completed** 30 July 2014

**Report issued:** 30 July 2014

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope.  
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.  
Methods, procedures and performance data are available on request.  
Results reported herein relate only to the material supplied to the laboratory.  
This report shall not be reproduced except in full, without prior written approval.  
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**

Karan Campbell  
Director

John Campbell  
Director

Dave Bowerbank  
Customer Services Co-ordinator

# Chemtech Environmental Limited

## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

| Lab ref  | Sample id | Depth (m) | Sample description                      | Material removed | % Removed | % Moisture |
|----------|-----------|-----------|-----------------------------------------|------------------|-----------|------------|
| 52172-1  | TP A      | 0.25      | Sandy Clay with Gravel & Roots          | -                | -         | 16.4       |
| 52172-2  | TP A      | 1.00      | Clayey Sand                             | -                | -         | 15.3       |
| 52172-3  | TP B      | 0.20      | Sandy Clay with Gravel and Roots        | -                | -         | 10.5       |
| 52172-4  | TP C      | 0.30      | Clayey Sand                             | -                | -         | 19.0       |
| 52172-5  | TP C      | 1.00      | Sandy Clay                              | -                | -         | 14.3       |
| 52172-6  | TP D      | 0.40      | Sandy Clay with Gravel and Roots        | -                | -         | 8.8        |
| 52172-7  | TP D      | 1.00      | Sandy Clay with Stones and Gravel       | -                | -         | 12.1       |
| 52172-8  | TP E      | 0.30      | Loam with Gravel and Roots              | -                | -         | 13.0       |
| 52172-9  | TP E      | 1.00      | Clayey Sand with Gravel                 | -                | -         | 12.8       |
| 52172-10 | TP F      | 0.50      | Sandy Loamy Clay with Stones and Gravel | -                | -         | 10.3       |
| 52172-11 | TP G      | 0.40      | Sandy Clay with Stones and Gravel       | -                | -         | 6.6        |
| 52172-12 | TP H      | 0.40      | Sandy Clay with Gravel and Roots        | -                | -         | 7.3        |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |                      | 52172-1<br>TP A<br>0.25<br>17/07/2014 | 52172-2<br>TP A<br>1.00<br>17/07/2014 | 52172-3<br>TP B<br>0.20<br>17/07/2014 | 52172-4<br>TP C<br>0.30<br>17/07/2014 | 52172-5<br>TP C<br>1.00<br>17/07/2014 | 52172-6<br>TP D<br>0.40<br>17/07/2014 |
|------------------------------------------------------|--------------------|----------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Test                                                 | Method             | Units                |                                       |                                       |                                       |                                       |                                       |                                       |
| Arsenic (total)                                      | CE127 <sup>M</sup> | mg/kg As             | 9.4                                   | -                                     | 8.6                                   | 5.3                                   | -                                     | 8.0                                   |
| Cadmium (total)                                      | CE127 <sup>M</sup> | mg/kg Cd             | 0.3                                   | -                                     | <0.2                                  | <0.2                                  | -                                     | <0.2                                  |
| Chromium (total)                                     | CE127 <sup>M</sup> | mg/kg Cr             | 69                                    | -                                     | 98                                    | 45                                    | -                                     | 79                                    |
| Chromium (III)                                       | -                  | mg/kg CrIII          | 69                                    | -                                     | 98                                    | 45                                    | -                                     | 79                                    |
| Chromium (VI)                                        | CE050              | mg/kg CrVI           | <1                                    | -                                     | <1                                    | <1                                    | -                                     | <1                                    |
| Copper (total)                                       | CE127 <sup>M</sup> | mg/kg Cu             | 46                                    | -                                     | 16                                    | 1.7                                   | -                                     | 18                                    |
| Lead (total)                                         | CE127 <sup>M</sup> | mg/kg Pb             | 64                                    | -                                     | 26                                    | 3.5                                   | -                                     | 24                                    |
| Mercury (total)                                      | CE127 <sup>M</sup> | mg/kg Hg             | <0.5                                  | -                                     | <0.5                                  | <0.5                                  | -                                     | <0.5                                  |
| Nickel (total)                                       | CE127 <sup>M</sup> | mg/kg Ni             | 17                                    | -                                     | 30                                    | 2.3                                   | -                                     | 29                                    |
| Selenium (total)                                     | CE127 <sup>M</sup> | mg/kg Se             | 0.7                                   | -                                     | 0.9                                   | <0.3                                  | -                                     | 0.9                                   |
| Zinc (total)                                         | CE127 <sup>M</sup> | mg/kg Zn             | 74                                    | -                                     | 46                                    | <5                                    | -                                     | 42                                    |
| pH                                                   | CE004 <sup>M</sup> | units                | 7.9                                   | 7.0                                   | 8.3                                   | 7.2                                   | 7.8                                   | 8.4                                   |
| Sulphate (2:1 water soluble)                         | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | 30                                    | 43                                    | 23                                    | 14                                    | 24                                    | 25                                    |
| Cyanide (free)                                       | CE077              | mg/kg CN             | <2                                    | -                                     | <2                                    | <2                                    | -                                     | <2                                    |
| Total Organic Carbon (TOC)                           | CE072 <sup>M</sup> | % w/w C              | 5.28                                  | -                                     | 0.30                                  | 0.32                                  | -                                     | 0.65                                  |
| <b>PAH</b>                                           |                    |                      |                                       |                                       |                                       |                                       |                                       |                                       |
| Acenaphthene                                         | CE087              | mg/kg                | <0.01                                 | -                                     | <0.01                                 | <0.01                                 | -                                     | 1.05                                  |
| Acenaphthylene                                       | CE087              | mg/kg                | <0.01                                 | -                                     | <0.01                                 | <0.01                                 | -                                     | 0.02                                  |
| Anthracene                                           | CE087              | mg/kg                | 0.01                                  | -                                     | <0.01                                 | <0.01                                 | -                                     | 1.21                                  |
| Benzo(a)anthracene                                   | CE087              | mg/kg                | 0.08                                  | -                                     | 0.03                                  | <0.01                                 | -                                     | 2.88                                  |
| Benzo(a)pyrene                                       | CE087              | mg/kg                | 0.06                                  | -                                     | 0.02                                  | <0.01                                 | -                                     | 3.25                                  |
| Benzo(b)fluoranthene                                 | CE087              | mg/kg                | 0.11                                  | -                                     | 0.04                                  | <0.01                                 | -                                     | 3.57                                  |
| Benzo(ghi)perylene                                   | CE087              | mg/kg                | 0.04                                  | -                                     | 0.01                                  | <0.01                                 | -                                     | 1.88                                  |
| Benzo(k)fluoranthene                                 | CE087              | mg/kg                | 0.04                                  | -                                     | 0.02                                  | <0.01                                 | -                                     | 1.61                                  |
| Chrysene                                             | CE087              | mg/kg                | 0.09                                  | -                                     | 0.03                                  | <0.01                                 | -                                     | 3.06                                  |
| Dibenz(ah)anthracene                                 | CE087              | mg/kg                | <0.01                                 | -                                     | <0.01                                 | <0.01                                 | -                                     | 0.36                                  |
| Fluoranthene                                         | CE087              | mg/kg                | 0.14                                  | -                                     | 0.06                                  | <0.01                                 | -                                     | 6.75                                  |
| Fluorene                                             | CE087              | mg/kg                | <0.01                                 | -                                     | <0.01                                 | <0.01                                 | -                                     | 0.54                                  |
| Indeno(123cd)pyrene                                  | CE087              | mg/kg                | 0.05                                  | -                                     | 0.01                                  | <0.01                                 | -                                     | 1.84                                  |
| Naphthalene                                          | CE087              | mg/kg                | <0.01                                 | -                                     | <0.01                                 | <0.01                                 | -                                     | 0.08                                  |
| Phenanthrene                                         | CE087              | mg/kg                | 0.06                                  | -                                     | 0.03                                  | <0.01                                 | -                                     | 5.09                                  |
| Pyrene                                               | CE087              | mg/kg                | 0.12                                  | -                                     | 0.06                                  | <0.01                                 | -                                     | 6.21                                  |
| PAH (total of USEPA 16)                              | CE087              | mg/kg                | 0.79                                  | -                                     | 0.32                                  | <0.16                                 | -                                     | 39.4                                  |
| Benzo(j)fluoranthene                                 | CE087              | mg/kg                | <0.01                                 | -                                     | <0.01                                 | <0.01                                 | -                                     | 0.32                                  |
| PAH (total of OIL 8)                                 | CE087              | mg/kg                | 0.43                                  | -                                     | 0.15                                  | <0.08                                 | -                                     | 16.9                                  |
| <b>BTEX &amp; TPH</b>                                |                    |                      |                                       |                                       |                                       |                                       |                                       |                                       |
| Benzene                                              | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | <0.01                                 | -                                     | -                                     | <0.01                                 |
| Toluene                                              | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | <0.01                                 | -                                     | -                                     | <0.01                                 |
| Ethylbenzene                                         | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | <0.01                                 | -                                     | -                                     | <0.01                                 |
| m & p-Xylene                                         | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | <0.01                                 | -                                     | -                                     | <0.01                                 |

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## SOILS

| Lab number              |                    |       | 52172-1    | 52172-2    | 52172-3    | 52172-4    | 52172-5    | 52172-6    |
|-------------------------|--------------------|-------|------------|------------|------------|------------|------------|------------|
| Sample id               |                    |       | TP A       | TP A       | TP B       | TP C       | TP C       | TP D       |
| Depth (m)               |                    |       | 0.25       | 1.00       | 0.20       | 0.30       | 1.00       | 0.40       |
| Date sampled            |                    |       | 17/07/2014 | 17/07/2014 | 17/07/2014 | 17/07/2014 | 17/07/2014 | 17/07/2014 |
| Test                    | Method             | Units |            |            |            |            |            |            |
| o-Xylene                | CE057 <sup>U</sup> | mg/kg | -          | -          | <0.01      | -          | -          | <0.01      |
| TPH Aliphatic EC5-EC6   | CE068              | mg/kg | -          | -          | <0.1       | -          | -          | <0.1       |
| TPH Aliphatic EC6-EC8   | CE068              | mg/kg | -          | -          | <0.1       | -          | -          | 0.2        |
| TPH Aliphatic EC8-EC10  | CE068              | mg/kg | -          | -          | <0.1       | -          | -          | <0.1       |
| TPH Aliphatic EC10-EC12 | CE068              | mg/kg | -          | -          | <1         | -          | -          | <1         |
| TPH Aliphatic EC12-EC16 | CE068              | mg/kg | -          | -          | 2          | -          | -          | <1         |
| TPH Aliphatic EC16-EC35 | CE068              | mg/kg | -          | -          | 40         | -          | -          | 124        |
| TPH Aliphatic EC35-EC44 | CE068              | mg/kg | -          | -          | 38         | -          | -          | 71         |
| TPH Aromatic EC5-EC7    | CE068              | mg/kg | -          | -          | <0.01      | -          | -          | <0.01      |
| TPH Aromatic EC7-EC8    | CE068              | mg/kg | -          | -          | <0.01      | -          | -          | <0.01      |
| TPH Aromatic EC8-EC10   | CE068              | mg/kg | -          | -          | <0.01      | -          | -          | <0.01      |
| TPH Aromatic EC10-EC12  | CE068              | mg/kg | -          | -          | <1         | -          | -          | <1         |
| TPH Aromatic EC12-EC16  | CE068              | mg/kg | -          | -          | <1         | -          | -          | 1          |
| TPH Aromatic EC16-EC21  | CE068              | mg/kg | -          | -          | <1         | -          | -          | 20         |
| TPH Aromatic EC21-EC35  | CE068              | mg/kg | -          | -          | <1         | -          | -          | 17         |
| TPH Aromatic EC35-EC44  | CE068              | mg/kg | -          | -          | <1         | -          | -          | 2          |
| Subcontracted analysis  |                    |       |            |            |            |            |            |            |
| Asbestos                | \$                 | -     | NAD        | -          | NAD        | NAD        | -          | NAD        |

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## SOILS

| Lab number<br>Sample id<br>Depth (m)<br>Date sampled |                    |                      | 52172-7<br>TP D<br>1.00<br>17/07/2014 | 52172-8<br>TP E<br>0.30<br>17/07/2014 | 52172-9<br>TP E<br>1.00<br>17/07/2014 | 52172-10<br>TP F<br>0.50<br>17/07/2014 | 52172-11<br>TP G<br>0.40<br>17/07/2014 | 52172-12<br>TP H<br>0.40<br>17/07/2014 |
|------------------------------------------------------|--------------------|----------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Test                                                 | Method             | Units                |                                       |                                       |                                       |                                        |                                        |                                        |
| Arsenic (total)                                      | CE127 <sup>M</sup> | mg/kg As             | -                                     | 7.7                                   | -                                     | 12                                     | 5.9                                    | 6.7                                    |
| Cadmium (total)                                      | CE127 <sup>M</sup> | mg/kg Cd             | -                                     | 0.3                                   | -                                     | 0.2                                    | <0.2                                   | <0.2                                   |
| Chromium (total)                                     | CE127 <sup>M</sup> | mg/kg Cr             | -                                     | 78                                    | -                                     | 94                                     | 73                                     | 69                                     |
| Chromium (III)                                       | -                  | mg/kg CrIII          | -                                     | 78                                    | -                                     | 94                                     | 73                                     | 69                                     |
| Chromium (VI)                                        | CE050              | mg/kg CrVI           | -                                     | <1                                    | -                                     | <1                                     | <1                                     | <1                                     |
| Copper (total)                                       | CE127 <sup>M</sup> | mg/kg Cu             | -                                     | 25                                    | -                                     | 39                                     | 24                                     | 26                                     |
| Lead (total)                                         | CE127 <sup>M</sup> | mg/kg Pb             | -                                     | 73                                    | -                                     | 89                                     | 39                                     | 42                                     |
| Mercury (total)                                      | CE127 <sup>M</sup> | mg/kg Hg             | -                                     | <0.5                                  | -                                     | <0.5                                   | <0.5                                   | <0.5                                   |
| Nickel (total)                                       | CE127 <sup>M</sup> | mg/kg Ni             | -                                     | 13                                    | -                                     | 27                                     | 22                                     | 19                                     |
| Selenium (total)                                     | CE127 <sup>M</sup> | mg/kg Se             | -                                     | 0.7                                   | -                                     | 0.9                                    | 0.7                                    | 0.7                                    |
| Zinc (total)                                         | CE127 <sup>M</sup> | mg/kg Zn             | -                                     | 48                                    | -                                     | 89                                     | 58                                     | 71                                     |
| pH                                                   | CE004 <sup>M</sup> | units                | 7.6                                   | 6.9                                   | 7.2                                   | 8.3                                    | 8.4                                    | 8.4                                    |
| Sulphate (2:1 water soluble)                         | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | 16                                    | 80                                    | 18                                    | 48                                     | 44                                     | 72                                     |
| Cyanide (free)                                       | CE077              | mg/kg CN             | -                                     | <2                                    | -                                     | <2                                     | <2                                     | <2                                     |
| Total Organic Carbon (TOC)                           | CE072 <sup>M</sup> | % w/w C              | -                                     | 2.48                                  | -                                     | 1.40                                   | 0.93                                   | 1.07                                   |
| <b>PAH</b>                                           |                    |                      |                                       |                                       |                                       |                                        |                                        |                                        |
| Acenaphthene                                         | CE087              | mg/kg                | -                                     | <0.01                                 | -                                     | 0.20                                   | <0.01                                  | 0.04                                   |
| Acenaphthylene                                       | CE087              | mg/kg                | -                                     | <0.01                                 | -                                     | 0.01                                   | <0.01                                  | 0.01                                   |
| Anthracene                                           | CE087              | mg/kg                | -                                     | 0.02                                  | -                                     | 0.31                                   | 0.02                                   | 0.16                                   |
| Benzo(a)anthracene                                   | CE087              | mg/kg                | -                                     | 0.09                                  | -                                     | 1.11                                   | 0.10                                   | 1.15                                   |
| Benzo(a)pyrene                                       | CE087              | mg/kg                | -                                     | 0.10                                  | -                                     | 1.40                                   | 0.12                                   | 1.29                                   |
| Benzo(b)fluoranthene                                 | CE087              | mg/kg                | -                                     | 0.14                                  | -                                     | 1.48                                   | 0.15                                   | 1.43                                   |
| Benzo(ghi)perylene                                   | CE087              | mg/kg                | -                                     | 0.07                                  | -                                     | 0.80                                   | 0.07                                   | 0.69                                   |
| Benzo(k)fluoranthene                                 | CE087              | mg/kg                | -                                     | 0.06                                  | -                                     | 0.66                                   | 0.06                                   | 0.60                                   |
| Chrysene                                             | CE087              | mg/kg                | -                                     | 0.12                                  | -                                     | 1.26                                   | 0.12                                   | 1.18                                   |
| Dibenz(ah)anthracene                                 | CE087              | mg/kg                | -                                     | <0.01                                 | -                                     | 0.16                                   | <0.01                                  | 0.15                                   |
| Fluoranthene                                         | CE087              | mg/kg                | -                                     | 0.20                                  | -                                     | 2.47                                   | 0.24                                   | 1.91                                   |
| Fluorene                                             | CE087              | mg/kg                | -                                     | <0.01                                 | -                                     | 0.12                                   | <0.01                                  | 0.03                                   |
| Indeno(123cd)pyrene                                  | CE087              | mg/kg                | -                                     | 0.06                                  | -                                     | 0.85                                   | 0.08                                   | 0.74                                   |
| Naphthalene                                          | CE087              | mg/kg                | -                                     | 0.01                                  | -                                     | 0.05                                   | <0.01                                  | 0.03                                   |
| Phenanthrene                                         | CE087              | mg/kg                | -                                     | 0.08                                  | -                                     | 1.26                                   | 0.11                                   | 0.43                                   |
| Pyrene                                               | CE087              | mg/kg                | -                                     | 0.19                                  | -                                     | 2.47                                   | 0.22                                   | 1.88                                   |
| PAH (total of USEPA 16)                              | CE087              | mg/kg                | -                                     | 1.14                                  | -                                     | 14.6                                   | 1.30                                   | 11.7                                   |
| Benzo(j)fluoranthene                                 | CE087              | mg/kg                | -                                     | 0.01                                  | -                                     | 0.14                                   | 0.01                                   | 0.13                                   |
| PAH (total of OIL 8)                                 | CE087              | mg/kg                | -                                     | 0.59                                  | -                                     | 7.05                                   | 0.65                                   | 6.67                                   |
| <b>BTEX &amp; TPH</b>                                |                    |                      |                                       |                                       |                                       |                                        |                                        |                                        |
| Benzene                                              | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | -                                     | <0.01                                  | -                                      | <0.01                                  |
| Toluene                                              | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | -                                     | <0.01                                  | -                                      | <0.01                                  |
| Ethylbenzene                                         | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | -                                     | <0.01                                  | -                                      | <0.01                                  |
| m & p-Xylene                                         | CE057 <sup>U</sup> | mg/kg                | -                                     | -                                     | -                                     | <0.01                                  | -                                      | <0.01                                  |

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## SOILS

| Lab number              |                    |       | 52172-7    | 52172-8    | 52172-9    | 52172-10   | 52172-11   | 52172-12   |
|-------------------------|--------------------|-------|------------|------------|------------|------------|------------|------------|
| Sample id               |                    |       | TP D       | TP E       | TP E       | TP F       | TP G       | TP H       |
| Depth (m)               |                    |       | 1.00       | 0.30       | 1.00       | 0.50       | 0.40       | 0.40       |
| Date sampled            |                    |       | 17/07/2014 | 17/07/2014 | 17/07/2014 | 17/07/2014 | 17/07/2014 | 17/07/2014 |
| Test                    | Method             | Units |            |            |            |            |            |            |
| o-Xylene                | CE057 <sup>U</sup> | mg/kg | -          | -          | -          | <0.01      | -          | <0.01      |
| TPH Aliphatic EC5-EC6   | CE068              | mg/kg | -          | -          | -          | <0.1       | -          | <0.1       |
| TPH Aliphatic EC6-EC8   | CE068              | mg/kg | -          | -          | -          | <0.1       | -          | <0.1       |
| TPH Aliphatic EC8-EC10  | CE068              | mg/kg | -          | -          | -          | 0.1        | -          | <0.1       |
| TPH Aliphatic EC10-EC12 | CE068              | mg/kg | -          | -          | -          | <1         | -          | <1         |
| TPH Aliphatic EC12-EC16 | CE068              | mg/kg | -          | -          | -          | <1         | -          | <1         |
| TPH Aliphatic EC16-EC35 | CE068              | mg/kg | -          | -          | -          | 114        | -          | 115        |
| TPH Aliphatic EC35-EC44 | CE068              | mg/kg | -          | -          | -          | 74         | -          | 94         |
| TPH Aromatic EC5-EC7    | CE068              | mg/kg | -          | -          | -          | <0.01      | -          | <0.01      |
| TPH Aromatic EC7-EC8    | CE068              | mg/kg | -          | -          | -          | <0.01      | -          | <0.01      |
| TPH Aromatic EC8-EC10   | CE068              | mg/kg | -          | -          | -          | <0.01      | -          | <0.01      |
| TPH Aromatic EC10-EC12  | CE068              | mg/kg | -          | -          | -          | <1         | -          | <1         |
| TPH Aromatic EC12-EC16  | CE068              | mg/kg | -          | -          | -          | <1         | -          | <1         |
| TPH Aromatic EC16-EC21  | CE068              | mg/kg | -          | -          | -          | 7          | -          | 4          |
| TPH Aromatic EC21-EC35  | CE068              | mg/kg | -          | -          | -          | 7          | -          | 7          |
| TPH Aromatic EC35-EC44  | CE068              | mg/kg | -          | -          | -          | <1         | -          | <1         |
| Subcontracted analysis  |                    |       |            |            |            |            |            |            |
| Asbestos                | \$                 | -     | -          | NAD        | -          | NAD        | NAD        | NAD        |

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## LEACHATES

| Lab number<br>Sample id<br>Depth (m) |                    |                      | 52172-3L<br>TP B<br>0.20 | 52172-8L<br>TP E<br>0.30 |
|--------------------------------------|--------------------|----------------------|--------------------------|--------------------------|
| Test                                 | Method             | Units                |                          |                          |
| Arsenic (dissolved)                  | CE128 <sup>U</sup> | µg/l As              | 3.02                     | 6.55                     |
| Boron (dissolved)                    | CE128 <sup>U</sup> | µg/l B               | <6                       | 14                       |
| Cadmium (dissolved)                  | CE128 <sup>U</sup> | µg/l Cd              | <0.07                    | <0.07                    |
| Chromium (dissolved)                 | CE128 <sup>U</sup> | µg/l Cr              | <0.2                     | <0.2                     |
| Copper (dissolved)                   | CE128 <sup>U</sup> | µg/l Cu              | 4.6                      | 12.6                     |
| Lead (dissolved)                     | CE128 <sup>U</sup> | µg/l Pb              | <0.2                     | 8.6                      |
| Mercury (dissolved)                  | CE128 <sup>U</sup> | µg/l Hg              | <0.008                   | <0.008                   |
| Nickel (dissolved)                   | CE128 <sup>U</sup> | µg/l Ni              | <0.5                     | <0.5                     |
| Selenium (dissolved)                 | CE128 <sup>U</sup> | µg/l Se              | <0.07                    | <0.07                    |
| Zinc (dissolved)                     | CE128 <sup>U</sup> | µg/l Zn              | <1                       | <1                       |
| pH                                   | CE004 <sup>U</sup> | units                | 8.0                      | 7.7                      |
| Sulphate                             | CE049 <sup>U</sup> | mg/l SO <sub>4</sub> | <10                      | 10                       |
| Cyanide (free)                       | CE077              | µg/l CN              | <0.02                    | <0.02                    |
| <b>PAHs</b>                          |                    |                      |                          |                          |
| Acenaphthene                         | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Acenaphthylene                       | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Anthracene                           | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Benzo(a)anthracene                   | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Benzo(a)pyrene                       | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Benzo(b)fluoranthene                 | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Benzo(ghi)perylene                   | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Benzo(k)fluoranthene                 | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Chrysene                             | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Dibenz(ah)anthracene                 | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Fluoranthene                         | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Fluorene                             | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Indeno(123cd)pyrene                  | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Naphthalene                          | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Phenanthrene                         | CE087              | µg/l                 | <0.1                     | <0.1                     |
| Pyrene                               | CE087              | µg/l                 | <0.1                     | <0.1                     |
| PAH (total of USEPA 16)              | CE087              | µg/l                 | <1.6                     | <1.6                     |
| Benzo(j)fluoranthene                 | CE087              | µg/l                 | <0.1                     | <0.1                     |
| PAH (total of OIL 8)                 | CE087              | µg/l                 | <0.8                     | <0.8                     |
| <b>BTEX &amp; TPH</b>                |                    |                      |                          |                          |
| Benzene                              | CE057 <sup>U</sup> | µg/l                 | <1                       | <1                       |
| Toluene                              | CE057 <sup>U</sup> | µg/l                 | <1                       | <1                       |
| Ethylbenzene                         | CE057 <sup>U</sup> | µg/l                 | <1                       | <1                       |
| m & p-Xylene                         | CE057 <sup>U</sup> | µg/l                 | <1                       | <1                       |
| o-Xylene                             | CE057 <sup>U</sup> | µg/l                 | <1                       | <1                       |
| TPH Aliphatic EC5-EC6                | CE068              | µg/l                 | <1                       | 18                       |
| TPH Aliphatic EC6-EC8                | CE068              | µg/l                 | <1                       | 30                       |

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## LEACHATES

| Lab number<br>Sample id<br>Depth (m) |        |       | 52172-3L<br>TP B<br>0.20 | 52172-8L<br>TP E<br>0.30 |
|--------------------------------------|--------|-------|--------------------------|--------------------------|
| Test                                 | Method | Units |                          |                          |
| TPH Aliphatic EC8-EC10               | CE068  | µg/l  | <1                       | 37                       |
| TPH Aliphatic EC10-EC12              | CE068  | µg/l  | <1                       | <1                       |
| TPH Aliphatic EC12-EC16              | CE068  | µg/l  | <1                       | <1                       |
| TPH Aliphatic EC16-EC35              | CE068  | µg/l  | <1                       | <1                       |
| TPH Aliphatic EC35-EC44              | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC5-EC7                 | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC7-EC8                 | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC8-EC10                | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC10-EC12               | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC12-EC16               | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC16-EC21               | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC21-EC35               | CE068  | µg/l  | <1                       | <1                       |
| TPH Aromatic EC35-EC44               | CE068  | µg/l  | <1                       | <1                       |

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## METHOD DETAILS

| METHOD | SOILS                                      | METHOD SUMMARY                                  | SAMPLE | STATUS | LOD      | UNITS                |
|--------|--------------------------------------------|-------------------------------------------------|--------|--------|----------|----------------------|
| CE127  | Arsenic (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg As             |
| CE127  | Cadmium (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.2      | mg/kg Cd             |
| CE127  | Chromium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cr             |
| -      | Chromium (III)                             | Calculation: Cr (total) - Cr (VI)               | Dry    |        | 1        | mg/kg CrIII          |
| CE050  | Chromium (VI)                              | Acid extraction, Colorimetry                    | Dry    |        | 1        | mg/kg CrVI           |
| CE127  | Copper (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cu             |
| CE127  | Lead (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Pb             |
| CE127  | Mercury (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.5      | mg/kg Hg             |
| CE127  | Nickel (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Ni             |
| CE127  | Selenium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.3      | mg/kg Se             |
| CE127  | Zinc (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 5        | mg/kg Zn             |
| CE004  | pH                                         | Based on BS 1377, pH Meter                      | Wet    | M      | -        | units                |
| CE061  | Sulphate (2:1 water soluble)               | Aqueous extraction, ICP-OES                     | Dry    | M      | 10       | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Extraction, Continuous Flow Colorimetry         | Wet    |        | 2        | mg/kg CN             |
| CE072  | Total Organic Carbon (TOC)                 | Removal of IC by acidification, Carbon Analyser | Dry    | M      | 0.1      | % w/w C              |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS                       | Wet    |        | 0.01     | mg/kg                |
| CE057  | BTEX                                       | Headspace GC-FID                                | Wet    | U      | 0.01     | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID                                | Wet    |        | 0.01-0.1 | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID                      | Wet    |        | 1        | mg/kg                |
| \$     | Asbestos (qualitative)                     | HSG 248, Microscopy                             | Dry    | U      | -        | -                    |

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## METHOD DETAILS

| METHOD | LEACHATES                                  | METHOD SUMMARY             | STATUS | LOD   | UNITS                |
|--------|--------------------------------------------|----------------------------|--------|-------|----------------------|
| CE128  | Arsenic (dissolved)                        | ICP-MS                     | U      | 0.06  | µg/l As              |
| CE128  | Boron (dissolved)                          | ICP-MS                     | U      | 6     | µg/l B               |
| CE128  | Cadmium (dissolved)                        | ICP-MS                     | U      | 0.07  | µg/l Cd              |
| CE128  | Chromium (dissolved)                       | ICP-MS                     | U      | 0.2   | µg/l Cr              |
| CE128  | Copper (dissolved)                         | ICP-MS                     | U      | 0.4   | µg/l Cu              |
| CE128  | Lead (dissolved)                           | ICP-MS                     | U      | 0.2   | µg/l Pb              |
| CE128  | Mercury (dissolved)                        | ICP-MS                     | U      | 0.008 | µg/l Hg              |
| CE128  | Nickel (dissolved)                         | ICP-MS                     | U      | 0.5   | µg/l Ni              |
| CE128  | Selenium (dissolved)                       | ICP-MS                     | U      | 0.07  | µg/l Se              |
| CE128  | Zinc (dissolved)                           | ICP-MS                     | U      | 1     | µg/l Zn              |
| CE004  | pH                                         | Based on BS 1377, pH Meter | U      | -     | units                |
| CE049  | Sulphate                                   | Ion Chromatography         | U      | 10    | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Distillation, Colorimetry  |        | 20    | µg/l CN              |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS  |        | 0.1   | µg/l                 |
| CE057  | BTEX                                       | Headspace GC-FID           | U      | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID           |        | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID |        | 1     | µg/l                 |

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## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

- N No (not deviating sample)
- Y Yes (deviating sample)
- A Sampling date not provided
- B Sampling time not provided (waters only)
- C Sample exceeded holding time(s)
- D Sample not received in appropriate containers
- E Headspace present in sample container
- F Sample not chemically fixed (where appropriate)
- G Sample not cooled
- H Other (specify)

| Lab ref  | Sample id | Depth (m) | Deviating | Tests (Reason for deviation) |
|----------|-----------|-----------|-----------|------------------------------|
| 52172-1  | TP A      | 0.25      | N         |                              |
| 52172-2  | TP A      | 1.00      | N         |                              |
| 52172-3  | TP B      | 0.20      | N         |                              |
| 52172-4  | TP C      | 0.30      | N         |                              |
| 52172-5  | TP C      | 1.00      | N         |                              |
| 52172-6  | TP D      | 0.40      | N         |                              |
| 52172-7  | TP D      | 1.00      | N         |                              |
| 52172-8  | TP E      | 0.30      | N         |                              |
| 52172-9  | TP E      | 1.00      | N         |                              |
| 52172-10 | TP F      | 0.50      | N         |                              |
| 52172-11 | TP G      | 0.40      | N         |                              |
| 52172-12 | TP H      | 0.40      | N         |                              |



## ANALYTICAL TEST REPORT

**Contract no:** 52205  
**Contract name:** Phase 3, Liverpool Business Park, Speke  
**Client reference:** 14-156  
**Clients name:** ARC Environmental  
**Clients address:** Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
DH7 8PN

**Samples received:** 28 July 2014

**Analysis started:** 28 July 2014

**Analysis completed** 04 August 2014

**Report issued:** 04 August 2014

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope.  
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.  
Methods, procedures and performance data are available on request.  
Results reported herein relate only to the material supplied to the laboratory.  
BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.  
This report shall not be reproduced except in full, without prior written approval.  
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**

Karan Campbell  
Director

John Campbell  
Director

Dave Bowerbank  
Customer Services Co-ordinator

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## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

| Lab ref | Sample id | Depth (m) | Sample description                  | Material removed | % Removed | % Moisture |
|---------|-----------|-----------|-------------------------------------|------------------|-----------|------------|
| 52205-1 | TP K      | 1.50      | Sandy Loamy Clay with Stones & Slag | -                | -         | 21.4       |
| 52205-2 | TP K      | 2.50      | Sandy Loamy Clay with Stones & Slag | -                | -         | 45.4       |
| 52205-3 | TP K      | 3.60      | Peaty Clay with Roots               | -                | -         | 50.9       |
| 52205-4 | TP L      | 2.80      | Peaty Clay with Roots               | -                | -         | 22.0       |

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## SOILS

| Lab number                            |                    |                      | 52205-1    | 52205-2    | 52205-3    | 52205-4    |
|---------------------------------------|--------------------|----------------------|------------|------------|------------|------------|
| Sample id                             |                    |                      | TP K       | TP K       | TP K       | TP L       |
| Depth (m)                             |                    |                      | 1.50       | 2.50       | 3.60       | 2.80       |
| Date sampled                          |                    |                      | 25/07/2014 | 25/07/2014 | 25/07/2014 | 25/07/2014 |
| Test                                  | Method             | Units                |            |            |            |            |
| Arsenic (total)                       | CE127 <sup>M</sup> | mg/kg As             | 18         | 54         | -          | -          |
| Cadmium (total)                       | CE127 <sup>M</sup> | mg/kg Cd             | 2.5        | 2.0        | -          | -          |
| Chromium (total)                      | CE127 <sup>M</sup> | mg/kg Cr             | 41         | 49         | -          | -          |
| Chromium (III)                        | -                  | mg/kg CrIII          | 41         | 49         | -          | -          |
| Chromium (VI)                         | CE050              | mg/kg CrVI           | <1         | <1         | -          | -          |
| Copper (total)                        | CE127 <sup>M</sup> | mg/kg Cu             | 201        | 120        | -          | -          |
| Lead (total)                          | CE127 <sup>M</sup> | mg/kg Pb             | 137        | 855        | -          | -          |
| Mercury (total)                       | CE127 <sup>M</sup> | mg/kg Hg             | <0.5       | <0.5       | -          | -          |
| Nickel (total)                        | CE127 <sup>M</sup> | mg/kg Ni             | 24         | 47         | -          | -          |
| Selenium (total)                      | CE127 <sup>M</sup> | mg/kg Se             | <0.3       | <0.3       | -          | -          |
| Zinc (total)                          | CE127 <sup>M</sup> | mg/kg Zn             | 294        | 598        | -          | -          |
| pH                                    | CE004 <sup>M</sup> | units                | 10.0       | 7.6        | -          | -          |
| Sulphate (2:1 water soluble)          | CE061 <sup>M</sup> | mg/l SO <sub>4</sub> | 316        | 583        | -          | -          |
| Cyanide (free)                        | CE077              | mg/kg CN             | <2         | <2         | -          | -          |
| Total Organic Carbon (TOC)            | CE072 <sup>M</sup> | % w/w C              | 5.02       | 30.61      | 8.46       | 3.12       |
| Estimate of OMC (calculated from TOC) | CE072              | % w/w                | -          | -          | 14.59      | 5.38       |
| <b>PAH</b>                            |                    |                      |            |            |            |            |
| Acenaphthene                          | CE087              | mg/kg                | 0.03       | <0.01      | -          | -          |
| Acenaphthylene                        | CE087              | mg/kg                | <0.01      | 0.01       | -          | -          |
| Anthracene                            | CE087              | mg/kg                | 0.07       | 0.03       | -          | -          |
| Benzo(a)anthracene                    | CE087              | mg/kg                | 0.27       | 0.28       | -          | -          |
| Benzo(a)pyrene                        | CE087              | mg/kg                | 0.30       | 0.30       | -          | -          |
| Benzo(b)fluoranthene                  | CE087              | mg/kg                | 0.38       | 0.38       | -          | -          |
| Benzo(ghi)perylene                    | CE087              | mg/kg                | 0.22       | 0.22       | -          | -          |
| Benzo(k)fluoranthene                  | CE087              | mg/kg                | 0.14       | 0.15       | -          | -          |
| Chrysene                              | CE087              | mg/kg                | 0.31       | 0.29       | -          | -          |
| Dibenz(ah)anthracene                  | CE087              | mg/kg                | 0.03       | 0.01       | -          | -          |
| Fluoranthene                          | CE087              | mg/kg                | 0.70       | 0.56       | -          | -          |
| Fluorene                              | CE087              | mg/kg                | 0.03       | <0.01      | -          | -          |
| Indeno(123cd)pyrene                   | CE087              | mg/kg                | 0.18       | 0.19       | -          | -          |
| Naphthalene                           | CE087              | mg/kg                | 0.09       | 0.01       | -          | -          |
| Phenanthrene                          | CE087              | mg/kg                | 0.31       | 0.14       | -          | -          |
| Pyrene                                | CE087              | mg/kg                | 0.61       | 0.51       | -          | -          |
| PAH (total of USEPA 16)               | CE087              | mg/kg                | 3.67       | 3.08       | -          | -          |
| Benzo(j)fluoranthene                  | CE087              | mg/kg                | 0.03       | 0.02       | -          | -          |
| PAH (total of OIL 8)                  | CE087              | mg/kg                | 1.64       | 1.62       | -          | -          |
| <b>BTEX &amp; TPH</b>                 |                    |                      |            |            |            |            |
| Benzene                               | CE057 <sup>U</sup> | mg/kg                | <0.01      | <0.01      | -          | -          |
| Toluene                               | CE057 <sup>U</sup> | mg/kg                | <0.01      | <0.01      | -          | -          |
| Ethylbenzene                          | CE057 <sup>U</sup> | mg/kg                | <0.01      | <0.01      | -          | -          |

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## SOILS

|                               |                    |              |            |            |            |            |
|-------------------------------|--------------------|--------------|------------|------------|------------|------------|
| <b>Lab number</b>             |                    |              | 52205-1    | 52205-2    | 52205-3    | 52205-4    |
| <b>Sample id</b>              |                    |              | TP K       | TP K       | TP K       | TP L       |
| <b>Depth (m)</b>              |                    |              | 1.50       | 2.50       | 3.60       | 2.80       |
| <b>Date sampled</b>           |                    |              | 25/07/2014 | 25/07/2014 | 25/07/2014 | 25/07/2014 |
| <b>Test</b>                   | <b>Method</b>      | <b>Units</b> |            |            |            |            |
| m & p-Xylene                  | CE057 <sup>U</sup> | mg/kg        | <0.01      | <0.01      | -          | -          |
| o-Xylene                      | CE057 <sup>U</sup> | mg/kg        | <0.01      | <0.01      | -          | -          |
| TPH Aliphatic EC5-EC6         | CE068              | mg/kg        | <0.1       | <0.1       | -          | -          |
| TPH Aliphatic EC6-EC8         | CE068              | mg/kg        | <0.1       | 0.3        | -          | -          |
| TPH Aliphatic EC8-EC10        | CE068              | mg/kg        | 0.8        | 0.3        | -          | -          |
| TPH Aliphatic EC10-EC12       | CE068              | mg/kg        | 3          | 2          | -          | -          |
| TPH Aliphatic EC12-EC16       | CE068              | mg/kg        | 14         | 2          | -          | -          |
| TPH Aliphatic EC16-EC35       | CE068              | mg/kg        | 462        | 225        | -          | -          |
| TPH Aliphatic EC35-EC44       | CE068              | mg/kg        | 77         | 36         | -          | -          |
| TPH Aromatic EC5-EC7          | CE068              | mg/kg        | <0.01      | <0.01      | -          | -          |
| TPH Aromatic EC7-EC8          | CE068              | mg/kg        | <0.01      | <0.01      | -          | -          |
| TPH Aromatic EC8-EC10         | CE068              | mg/kg        | <0.01      | <0.01      | -          | -          |
| TPH Aromatic EC10-EC12        | CE068              | mg/kg        | <1         | <1         | -          | -          |
| TPH Aromatic EC12-EC16        | CE068              | mg/kg        | <1         | <1         | -          | -          |
| TPH Aromatic EC16-EC21        | CE068              | mg/kg        | 2          | 1          | -          | -          |
| TPH Aromatic EC21-EC35        | CE068              | mg/kg        | 2          | 2          | -          | -          |
| TPH Aromatic EC35-EC44        | CE068              | mg/kg        | <1         | <1         | -          | -          |
| <b>Subcontracted analysis</b> |                    |              |            |            |            |            |
| Asbestos                      | \$                 | -            | NAD        | NAD        | -          | -          |

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## WATERS

|                                                                                                         |                    |                      |                                            |
|---------------------------------------------------------------------------------------------------------|--------------------|----------------------|--------------------------------------------|
| <b>Lab number</b><br><b>Sample id</b><br><b>Depth (m)</b><br><b>Date sampled</b><br><b>Time sampled</b> |                    |                      | 52205-5<br>TP L<br>2.50<br>25/07/2014<br>- |
| <b>Test</b>                                                                                             | <b>Method</b>      | <b>Units</b>         |                                            |
| Arsenic (dissolved)                                                                                     | CE128 <sup>U</sup> | µg/l As              | 57.43                                      |
| Boron (dissolved)                                                                                       | CE128 <sup>U</sup> | µg/l B               | 567                                        |
| Cadmium (dissolved)                                                                                     | CE128 <sup>U</sup> | µg/l Cd              | 0.15                                       |
| Chromium (dissolved)                                                                                    | CE128 <sup>U</sup> | µg/l Cr              | 0.4                                        |
| Copper (dissolved)                                                                                      | CE128 <sup>U</sup> | µg/l Cu              | 6.5                                        |
| Lead (dissolved)                                                                                        | CE128 <sup>U</sup> | µg/l Pb              | 9.5                                        |
| Mercury (dissolved)                                                                                     | CE128 <sup>U</sup> | µg/l Hg              | <0.008                                     |
| Nickel (dissolved)                                                                                      | CE128 <sup>U</sup> | µg/l Ni              | 0.7                                        |
| Selenium (dissolved)                                                                                    | CE128 <sup>U</sup> | µg/l Se              | 3.41                                       |
| Zinc (dissolved)                                                                                        | CE128 <sup>U</sup> | µg/l Zn              | <1                                         |
| pH                                                                                                      | CE004 <sup>U</sup> | units                | 6.9                                        |
| Sulphate                                                                                                | CE049 <sup>U</sup> | mg/l SO <sub>4</sub> | <10                                        |
| Cyanide (free)                                                                                          | CE077              | µg/l CN              | <20                                        |
| <b>PAHs</b>                                                                                             |                    |                      |                                            |
| Acenaphthene                                                                                            | CE087              | µg/l                 | 1.1                                        |
| Acenaphthylene                                                                                          | CE087              | µg/l                 | 0.3                                        |
| Anthracene                                                                                              | CE087              | µg/l                 | 2.2                                        |
| Benzo(a)anthracene                                                                                      | CE087              | µg/l                 | 7.2                                        |
| Benzo(a)pyrene                                                                                          | CE087              | µg/l                 | 7.6                                        |
| Benzo(b)fluoranthene                                                                                    | CE087              | µg/l                 | 9.5                                        |
| Benzo(ghi)perylene                                                                                      | CE087              | µg/l                 | 4.7                                        |
| Benzo(k)fluoranthene                                                                                    | CE087              | µg/l                 | 4.1                                        |
| Chrysene                                                                                                | CE087              | µg/l                 | 8.7                                        |
| Dibenz(ah)anthracene                                                                                    | CE087              | µg/l                 | 1.1                                        |
| Fluoranthene                                                                                            | CE087              | µg/l                 | 14.3                                       |
| Fluorene                                                                                                | CE087              | µg/l                 | 0.9                                        |
| Indeno(123cd)pyrene                                                                                     | CE087              | µg/l                 | 6.0                                        |
| Naphthalene                                                                                             | CE087              | µg/l                 | 0.8                                        |
| Phenanthrene                                                                                            | CE087              | µg/l                 | 3.8                                        |
| Pyrene                                                                                                  | CE087              | µg/l                 | 12.0                                       |
| PAH (total of USEPA 16)                                                                                 | CE087              | µg/l                 | 84.3                                       |
| Benzo(j)fluoranthene                                                                                    | CE087              | µg/l                 | 0.9                                        |
| PAH (total of OIL 8)                                                                                    | CE087              | µg/l                 | 45.1                                       |
| <b>BTEX &amp; TPH</b>                                                                                   |                    |                      |                                            |
| Benzene                                                                                                 | CE057 <sup>U</sup> | µg/l                 | <1                                         |
| Toluene                                                                                                 | CE057 <sup>U</sup> | µg/l                 | <1                                         |
| Ethylbenzene                                                                                            | CE057 <sup>U</sup> | µg/l                 | <1                                         |
| m & p-Xylene                                                                                            | CE057 <sup>U</sup> | µg/l                 | <1                                         |
| o-Xylene                                                                                                | CE057 <sup>U</sup> | µg/l                 | <1                                         |
| TPH Aliphatic EC5-EC6                                                                                   | CE068              | µg/l                 | <1                                         |

# Chemtech Environmental Limited

## WATERS

|                         |               |              |            |
|-------------------------|---------------|--------------|------------|
| <b>Lab number</b>       |               |              | 52205-5    |
| <b>Sample id</b>        |               |              | TP L       |
| <b>Depth (m)</b>        |               |              | 2.50       |
| <b>Date sampled</b>     |               |              | 25/07/2014 |
| <b>Time sampled</b>     |               |              | -          |
| <b>Test</b>             | <b>Method</b> | <b>Units</b> |            |
| TPH Aliphatic EC6-EC8   | CE068         | µg/l         | <1         |
| TPH Aliphatic EC8-EC10  | CE068         | µg/l         | <1         |
| TPH Aliphatic EC10-EC12 | CE068         | µg/l         | <10        |
| TPH Aliphatic EC12-EC16 | CE068         | µg/l         | 114        |
| TPH Aliphatic EC16-EC35 | CE068         | µg/l         | 2697       |
| TPH Aliphatic EC35-EC44 | CE068         | µg/l         | 543        |
| TPH Aromatic EC5-EC7    | CE068         | µg/l         | 3          |
| TPH Aromatic EC7-EC8    | CE068         | µg/l         | 12         |
| TPH Aromatic EC8-EC10   | CE068         | µg/l         | 67         |
| TPH Aromatic EC10-EC12  | CE068         | µg/l         | <1         |
| TPH Aromatic EC12-EC16  | CE068         | µg/l         | 1          |
| TPH Aromatic EC16-EC21  | CE068         | µg/l         | 33         |
| TPH Aromatic EC21-EC35  | CE068         | µg/l         | 44         |
| TPH Aromatic EC35-EC44  | CE068         | µg/l         | 5          |

# Chemtech Environmental Limited

## METHOD DETAILS

| METHOD | SOILS                                      | METHOD SUMMARY                                  | SAMPLE | STATUS | LOD      | UNITS                |
|--------|--------------------------------------------|-------------------------------------------------|--------|--------|----------|----------------------|
| CE127  | Arsenic (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg As             |
| CE127  | Cadmium (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.2      | mg/kg Cd             |
| CE127  | Chromium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cr             |
| -      | Chromium (III)                             | Calculation: Cr (total) - Cr (VI)               | Dry    |        | 1        | mg/kg CrIII          |
| CE050  | Chromium (VI)                              | Acid extraction, Colorimetry                    | Dry    |        | 1        | mg/kg CrVI           |
| CE127  | Copper (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Cu             |
| CE127  | Lead (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Pb             |
| CE127  | Mercury (total)                            | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.5      | mg/kg Hg             |
| CE127  | Nickel (total)                             | Aqua regia digest, ICP-MS                       | Dry    | M      | 1        | mg/kg Ni             |
| CE127  | Selenium (total)                           | Aqua regia digest, ICP-MS                       | Dry    | M      | 0.3      | mg/kg Se             |
| CE127  | Zinc (total)                               | Aqua regia digest, ICP-MS                       | Dry    | M      | 5        | mg/kg Zn             |
| CE004  | pH                                         | Based on BS 1377, pH Meter                      | Wet    | M      | -        | units                |
| CE061  | Sulphate (2:1 water soluble)               | Aqueous extraction, ICP-OES                     | Dry    | M      | 10       | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Extraction, Continuous Flow Colorimetry         | Wet    |        | 2        | mg/kg CN             |
| CE072  | Total Organic Carbon (TOC)                 | Removal of IC by acidification, Carbon Analyser | Dry    | M      | 0.1      | % w/w C              |
| CE072  | Estimate of OMC (calculated from TOC)      | Calculation from Total Organic Carbon           | Dry    |        | 0.1      | % w/w                |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS                       | Wet    |        | 0.01     | mg/kg                |
| CE057  | BTEX                                       | Headspace GC-FID                                | Wet    | U      | 0.01     | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID                                | Wet    |        | 0.01-0.1 | mg/kg                |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID                      | Wet    |        | 1        | mg/kg                |
| \$     | Asbestos (qualitative)                     | HSG 248, Microscopy                             | Dry    | U      | -        | -                    |

# Chemtech Environmental Limited

## METHOD DETAILS

| METHOD | WATERS                                     | METHOD SUMMARY             | STATUS | LOD   | UNITS                |
|--------|--------------------------------------------|----------------------------|--------|-------|----------------------|
| CE128  | Arsenic (dissolved)                        | ICP-MS                     | U      | 0.06  | µg/l As              |
| CE128  | Boron (dissolved)                          | ICP-MS                     | U      | 6     | µg/l B               |
| CE128  | Cadmium (dissolved)                        | ICP-MS                     | U      | 0.07  | µg/l Cd              |
| CE128  | Chromium (dissolved)                       | ICP-MS                     | U      | 0.2   | µg/l Cr              |
| CE128  | Copper (dissolved)                         | ICP-MS                     | U      | 0.4   | µg/l Cu              |
| CE128  | Lead (dissolved)                           | ICP-MS                     | U      | 0.2   | µg/l Pb              |
| CE128  | Mercury (dissolved)                        | ICP-MS                     | U      | 0.008 | µg/l Hg              |
| CE128  | Nickel (dissolved)                         | ICP-MS                     | U      | 0.5   | µg/l Ni              |
| CE128  | Selenium (dissolved)                       | ICP-MS                     | U      | 0.07  | µg/l Se              |
| CE128  | Zinc (dissolved)                           | ICP-MS                     | U      | 1     | µg/l Zn              |
| CE004  | pH                                         | Based on BS 1377, pH Meter | U      | -     | units                |
| CE049  | Sulphate                                   | Ion Chromatography         | U      | 10    | mg/l SO <sub>4</sub> |
| CE077  | Cyanide (free)                             | Distillation, Colorimetry  |        | 20    | µg/l CN              |
| CE087  | PAH (speciated)                            | Solvent extraction, GC-MS  |        | 0.1   | µg/l                 |
| CE057  | BTEX                                       | Headspace GC-FID           | U      | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C5-C10)  | Headspace GC-FID           |        | 1     | µg/l                 |
| CE068  | TPH Aliphatic/Aromatic fractions (C10-C44) | Solvent extraction, GC-FID |        | 1     | µg/l                 |

# Chemtech Environmental Limited

## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

- N No (not deviating sample)
- Y Yes (deviating sample)
- A Sampling date not provided
- B Sampling time not provided (waters only)
- C Sample exceeded holding time(s)
- D Sample not received in appropriate containers
- E Headspace present in sample container
- F Sample not chemically fixed (where appropriate)
- G Sample not cooled
- H Other (specify)

| Lab ref | Sample id | Depth (m) | Deviating | Tests (Reason for deviation) |
|---------|-----------|-----------|-----------|------------------------------|
| 52205-1 | TP K      | 1.50      | N         |                              |
| 52205-2 | TP K      | 2.50      | N         |                              |
| 52205-3 | TP K      | 3.60      | N         |                              |
| 52205-4 | TP L      | 2.80      | N         |                              |
| 52205-5 | TP L      | 2.50      | N         |                              |



# LABORATORY REPORT



4043

**Contract Number: PSL14/1976**

Client's Reference:

Report Date: 13 May 2014

Client Name: Arc Environmental  
Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
Durham  
DH7 8PN

**For the attention of: Nicola Watson**

Contract Title: Phase 2, Liverpool Business Park, Speke

Date Received: 23/4/2014

Date Commenced: 23/4/2014

Date Completed: 13/5/2014

**Notes: Observations and Interpretations are outside the UKAS Accreditation**

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

Checked and Approved Signatories:

  
R Gunson  
(Director)

A Watkins  
(Director)

M Beastall  
(Laboratory Manager)

D Lambe  
(Senior Technician)

S Royle  
(Senior Technician)

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# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole Number | Sample Number | Sample Type | Depth m   | Description of Sample                               |
|-------------|---------------|-------------|-----------|-----------------------------------------------------|
| BH1         |               | B           | 1.50-2.00 | Brown slightly gravelly clayey very silty SAND.     |
| BH1         |               | U           | 3.50-3.95 | Brown slightly gravelly very sandy CLAY.            |
| BH2         |               | D           | 2.00      | Brown slightly gravelly very sandy CLAY.            |
| BH2         |               | U           | 2.50-2.95 | Stiff brown slightly gravelly very sandy CLAY.      |
| BH2         |               | U           | 4.50-4.95 | Stiff brown slightly gravelly very sandy CLAY.      |
| BH3         |               | U           | 1.50-1.95 | Soft brown slightly gravelly very sandy CLAY.       |
| BH3         |               | B           | 2.50-3.00 | Brown slightly gravelly very sandy CLAY.            |
| BH4         |               | D           | 2.00      | Brown slightly gravelly very sandy CLAY.            |
| BH4         |               | U           | 2.50-2.95 | Very stiff brown slightly gravelly very sandy CLAY. |
| BH4         |               | U           | 4.50-4.95 | Stiff brown slightly gravelly very sandy CLAY.      |
| BH5         |               | B           | 1.50-2.00 | Brown slightly gravelly clayey very silty SAND.     |
| BH5         |               | B           | 2.50-3.00 | Brown slightly gravelly very sandy CLAY.            |
| BH5         |               | U           | 3.50-3.95 | Stiff brown slightly gravelly very sandy CLAY.      |
| BH5         |               | U           | 5.50-5.95 | Stiff brown slightly gravelly very sandy CLAY.      |
| BH6         |               | D           | 2.00      | Brown slightly gravelly very sandy CLAY.            |
| BH6         |               | U           | 2.50-2.95 | Stiff brown slightly gravelly very sandy CLAY.      |
| BH6         |               | B           | 3.50-4.00 | Brown slightly gravelly very sandy CLAY.            |
| BH7         |               | D           | 2.00      | Brown slightly gravelly very sandy CLAY.            |
| BH7         |               | U           | 2.50-2.95 | Brown gravelly very sandy silty CLAY.               |

|                                                                                       |          |                                                                                     |          |                                                                                     |            |
|---------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|------------|
| Compiled by                                                                           | Date     | Checked by                                                                          | Date     | Approved by                                                                         | Date       |
|  | 13/05/14 |  | 13/05/14 |  | 13/05/14   |
| PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE.                                              |          |                                                                                     |          | Contract No:                                                                        | PSL14/1976 |
|                                                                                       |          |                                                                                     |          | Client Ref:                                                                         | 14-156     |



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

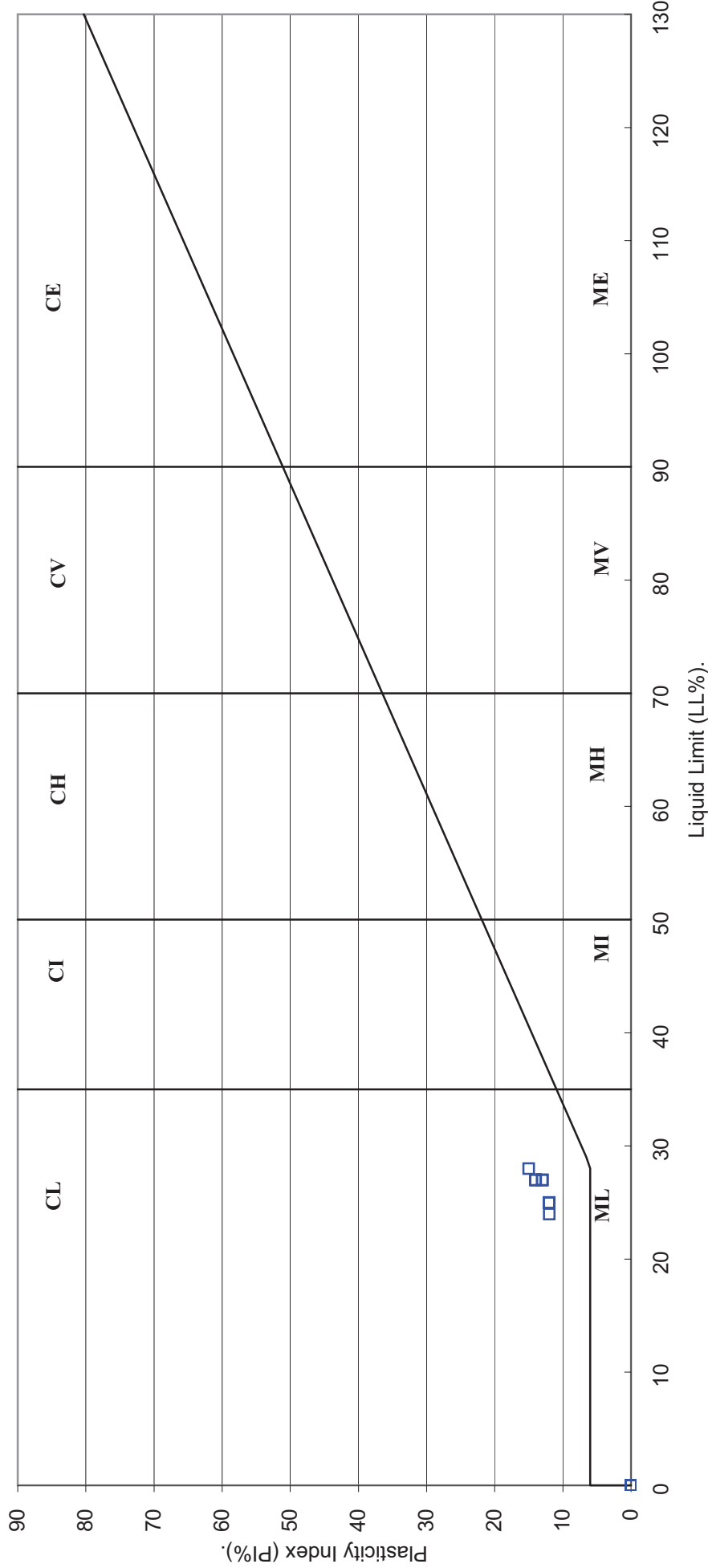
**SYMBOLS: NP : Non Plastic**

**PST**  
Professional Soils Laboratory

|                                                                                       |          |                                                                                     |          |                                                                                     |          |              |  |            |  |
|---------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|----------|--------------|--|------------|--|
| Compiled by                                                                           | Date     | Checked by                                                                          | Date     | Approved by                                                                         | Date     |              |  |            |  |
|  | 13/05/14 |  | 13/05/14 |  | 13/05/14 |              |  |            |  |
| <b>PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE.</b>                                       |          |                                                                                     |          |                                                                                     |          |              |  |            |  |
|                                                                                       |          |                                                                                     |          |                                                                                     |          | Contract No: |  | PSL14/1976 |  |
|                                                                                       |          |                                                                                     |          |                                                                                     |          | Client Ref:  |  | 14-156     |  |

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)





**Professional Soils Laboratory**

|                                                                                                      |                  |                                                                                                   |                  |                                                                                                    |                  |
|------------------------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------|------------------|
| Compiled by<br> | Date<br>13/05/14 | Checked by<br> | Date<br>13/05/14 | Approved by<br> | Date<br>13/05/14 |
| PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE.                                                             |                  |                                                                                                   |                  | Contract No:                                                                                       | PSL14/1976       |
|                                                                                                      |                  |                                                                                                   |                  | Client Ref:                                                                                        | 14-156           |

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

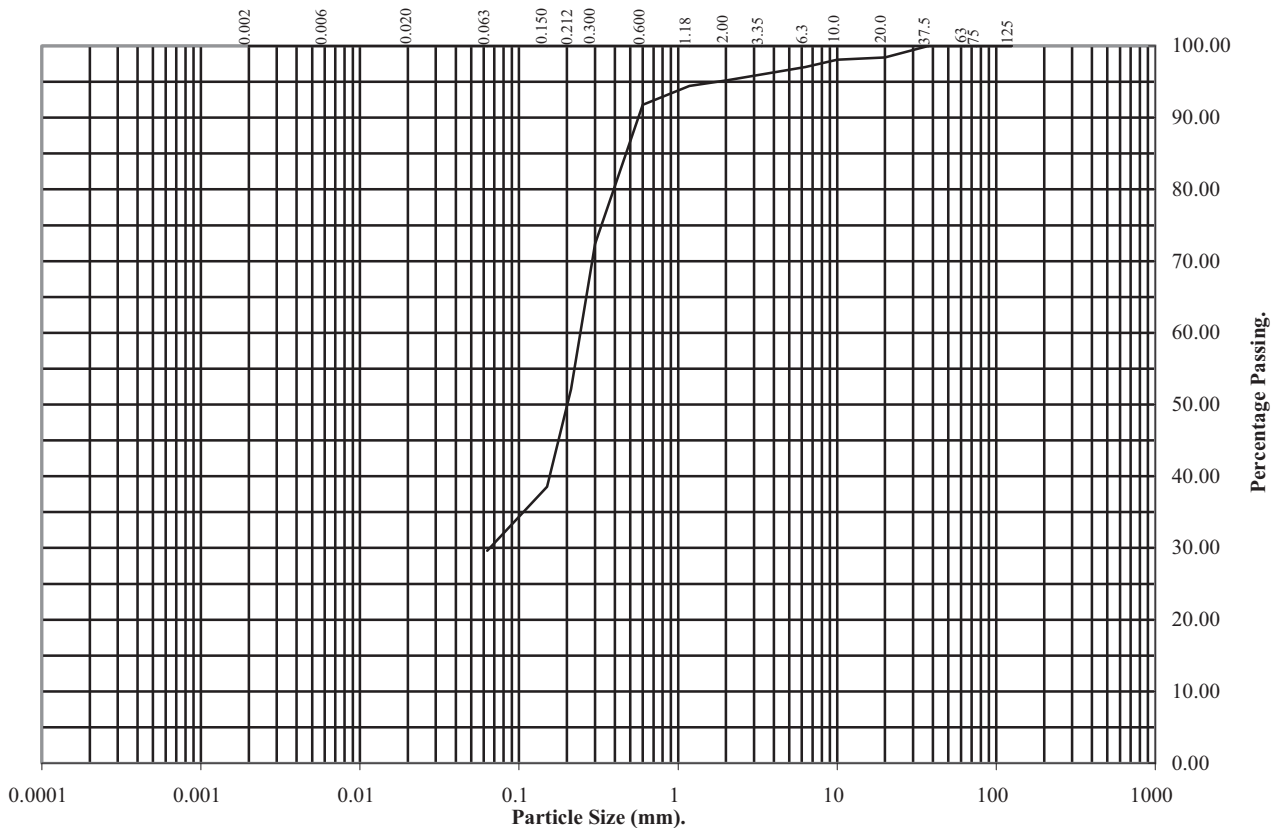
Wet Sieve, Clause 9.2

Hole Number: BH1

Depth (m): 1.50-2.00

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 98                 |
| 10            | 98                 |
| 6.3           | 97                 |
| 3.35          | 96                 |
| 2             | 95                 |
| 1.18          | 94                 |
| 0.6           | 92                 |
| 0.3           | 72                 |
| 0.212         | 52                 |
| 0.15          | 39                 |
| 0.063         | 30                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 5                |
| Sand          | 65               |
| Silt / Clay   | 30               |

**Remarks:**  
See summary of soils descriptions.

| Checked By         | Date     | Approved By        | Date     |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 13/05/14 | <i>[Signature]</i> | 13/05/14 |

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

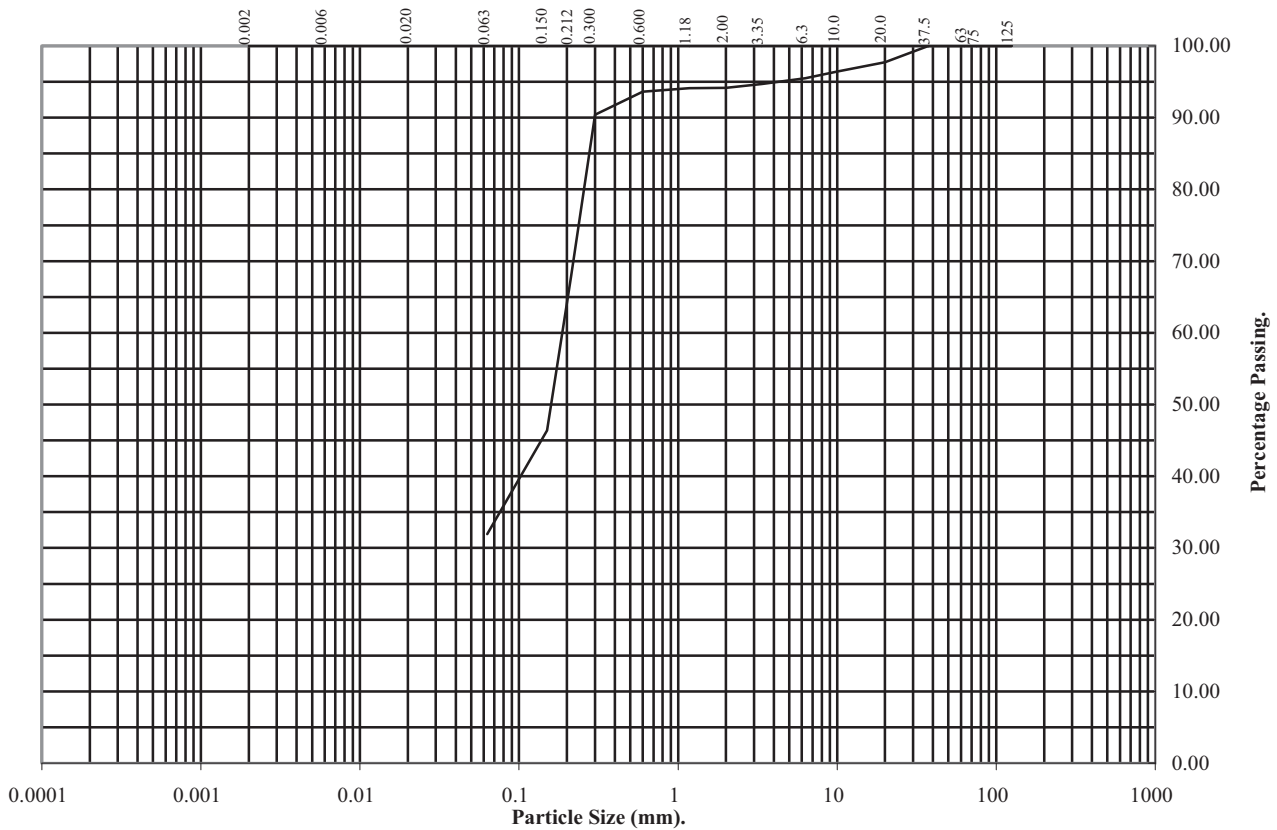
Wet Sieve, Clause 9.2

Hole Number: BH5

Depth (m): 1.50-2.00

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 98                 |
| 10            | 96                 |
| 6.3           | 95                 |
| 3.35          | 95                 |
| 2             | 94                 |
| 1.18          | 94                 |
| 0.6           | 94                 |
| 0.3           | 90                 |
| 0.212         | 68                 |
| 0.15          | 46                 |
| 0.063         | 32                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 6                |
| Sand          | 62               |
| Silt / Clay   | 32               |

**Remarks:**  
See summary of soils descriptions.

| Checked By         | Date     | Approved By        | Date     |
|--------------------|----------|--------------------|----------|
| <i>[Signature]</i> | 13/05/14 | <i>[Signature]</i> | 13/05/14 |

# One Dimensional Consolidation Properties

BS 1377: Part 5: 1990

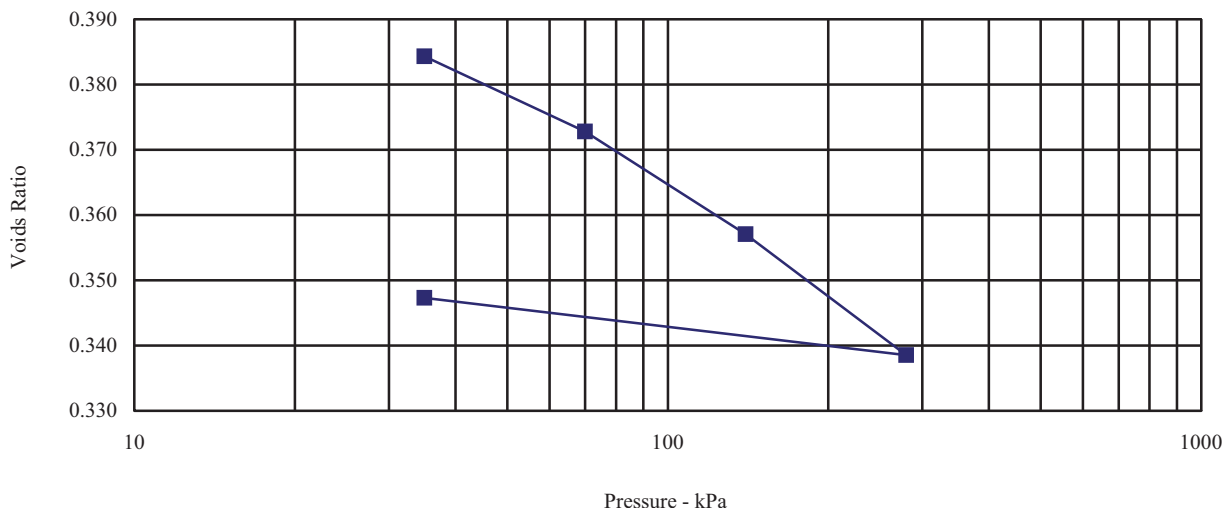
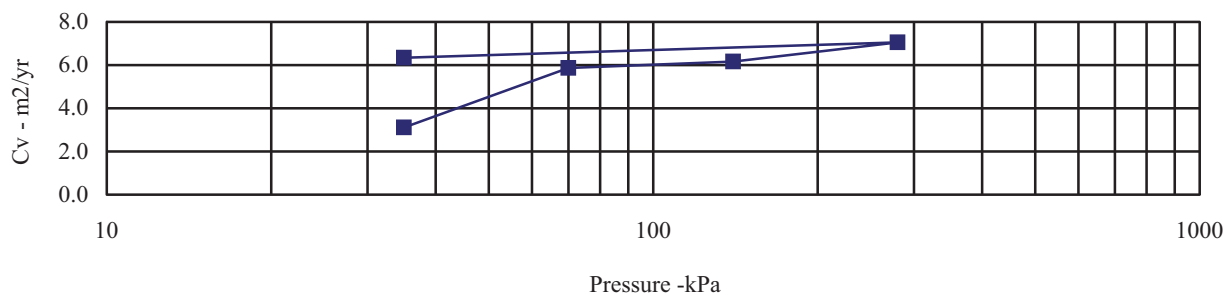
Hole Number: BH1

Depth (m): 3.50-3.95

Sample Number:

Sample Type: U

| Initial Conditions        |        | Pressure Range               |   |     | Mv    | Cv    | Specimen location   |     |
|---------------------------|--------|------------------------------|---|-----|-------|-------|---------------------|-----|
| Moisture Content (%):     | 15     | kPa                          |   |     | m2/MN | m2/yr | within tube:        | N/A |
| Bulk Density (Mg/m3):     | 2.17   | 0                            | - | 35  | 0.307 | 3.115 | Method used to      |     |
| Dry Density (Mg/m3):      | 1.89   | 35                           | - | 70  | 0.238 | 5.860 | determine CV:       | t90 |
| Voids Ratio:              | 0.3993 | 70                           | - | 140 | 0.164 | 6.168 | Nominal temperature |     |
| Degree of saturation:     | 97.4   | 140                          | - | 280 | 0.098 | 7.051 | during test ' C:    | 20  |
| Height (mm):              | 19.93  | 280                          | - | 35  | 0.027 | 6.343 | Remarks:            |     |
| Diameter (mm)             | 75.14  | Remoulded with 2.5Kg rammer. |   |     |       |       |                     |     |
| Particle Density (Mg/m3): | 2.65   |                              |   |     |       |       |                     |     |
| Assumed                   |        |                              |   |     |       |       |                     |     |



| Checked by | Date     | Approved by | Date     |
|------------|----------|-------------|----------|
| <i>Re</i>  | 13/05/14 | <i>Re</i>   | 13/05/14 |



**PHASE 2, LIVERPOOL BUSINESS  
PARK, SPEKE.**

**Contract No.**

**PSL14/1976**

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# One Dimensional Consolidation Properties

BS 1377: Part 5: 1990

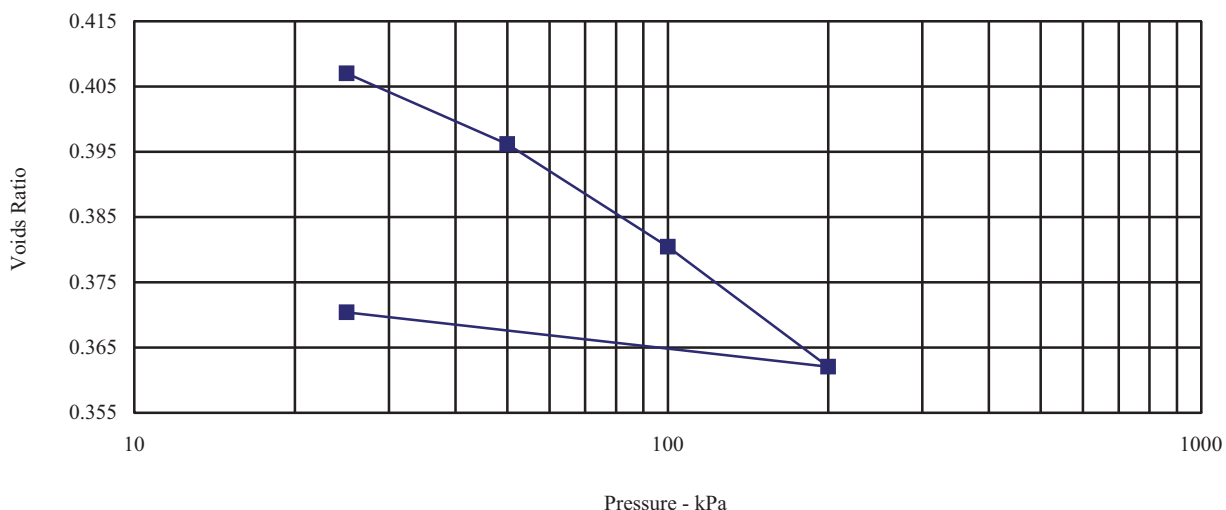
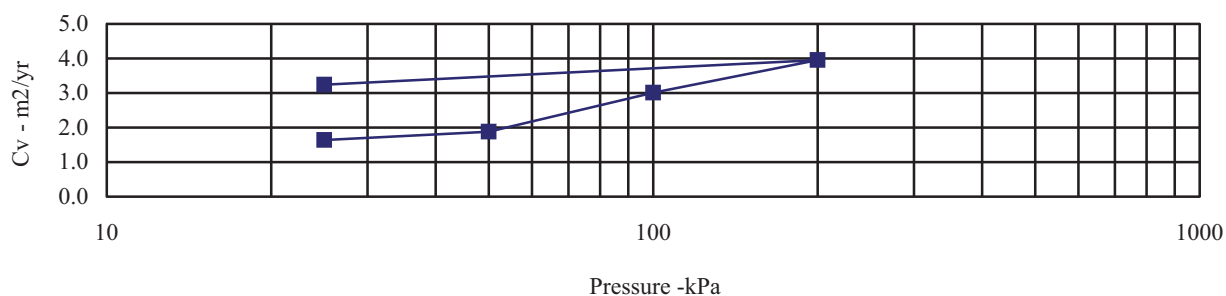
Hole Number: BH7

Depth (m): 2.50-2.95

Sample Number:

Sample Type: U

| Initial Conditions        |        | Pressure Range               |   |     | Mv    | Cv    | Specimen location   |     |
|---------------------------|--------|------------------------------|---|-----|-------|-------|---------------------|-----|
| Moisture Content (%):     | 15     | kPa                          |   |     | m2/MN | m2/yr | within tube:        | N/A |
| Bulk Density (Mg/m3):     | 2.15   | 0                            | - | 25  | 0.349 | 1.635 | Method used to      |     |
| Dry Density (Mg/m3):      | 1.87   | 25                           | - | 50  | 0.308 | 1.884 | determine CV:       | t90 |
| Voids Ratio:              | 0.4194 | 50                           | - | 100 | 0.226 | 3.010 | Nominal temperature |     |
| Degree of saturation:     | 96.5   | 100                          | - | 200 | 0.133 | 3.953 | during test 'C':    | 20  |
| Height (mm):              | 19.92  | 200                          | - | 25  | 0.035 | 3.239 | Remarks:            |     |
| Diameter (mm)             | 75.1   | Remoulded with 2.5Kg rammer. |   |     |       |       |                     |     |
| Particle Density (Mg/m3): | 2.65   |                              |   |     |       |       |                     |     |
| Assumed                   |        |                              |   |     |       |       |                     |     |



| Checked by | Date     | Approved by | Date     |
|------------|----------|-------------|----------|
| <i>Re</i>  | 13/05/14 | <i>Re</i>   | 13/05/14 |



PHASE 2, LIVERPOOL BUSINESS  
PARK, SPEKE.

Contract No.

PSL14/1976

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# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

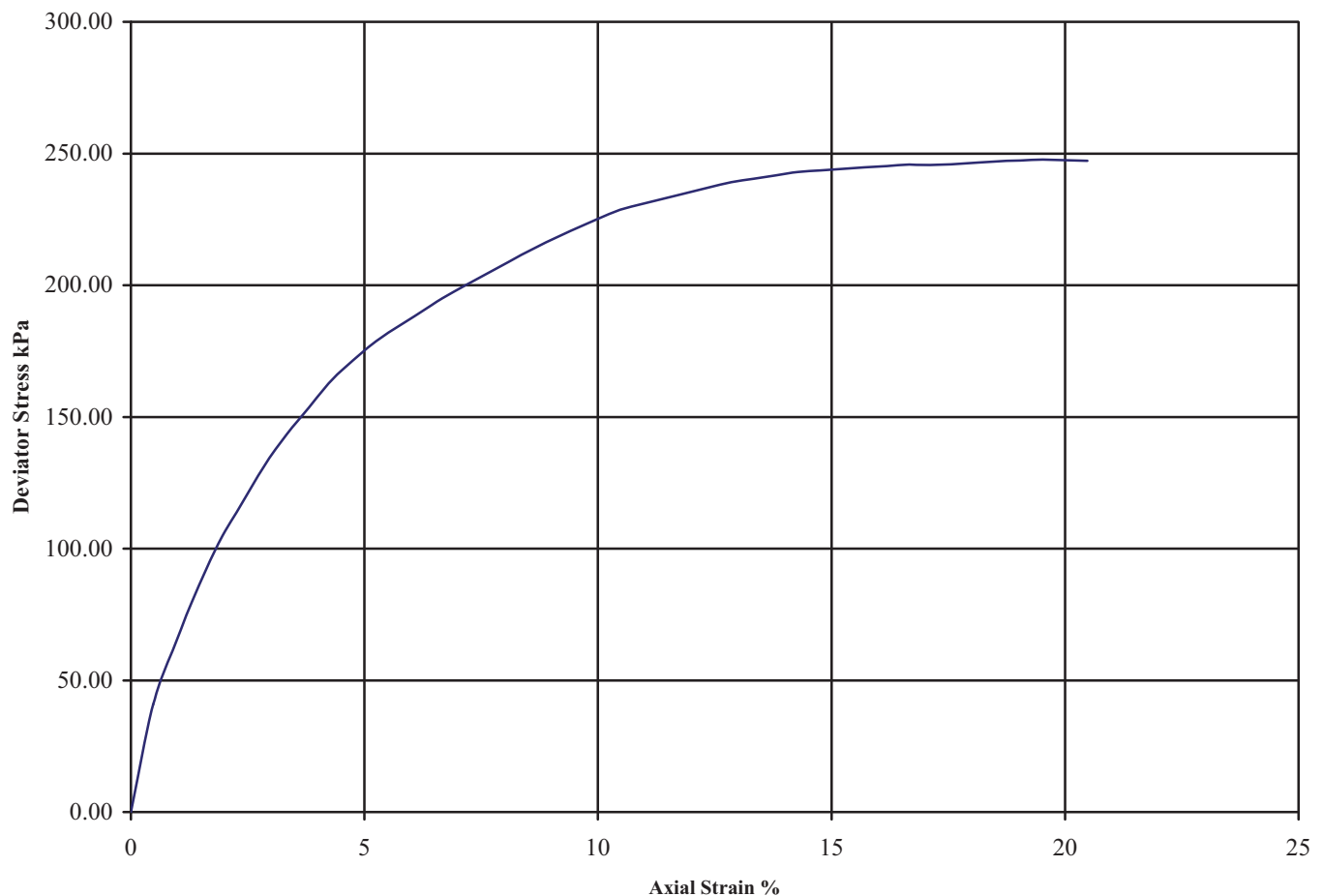
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH2

Depth (m): 2.50-2.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.33 kPa                     |          |                                                                                       |          |
| A                                                | 13                   | 2.27                 | 2.02                | 50                                       | 248                              | 124                     | 19.5                 | Plastic         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

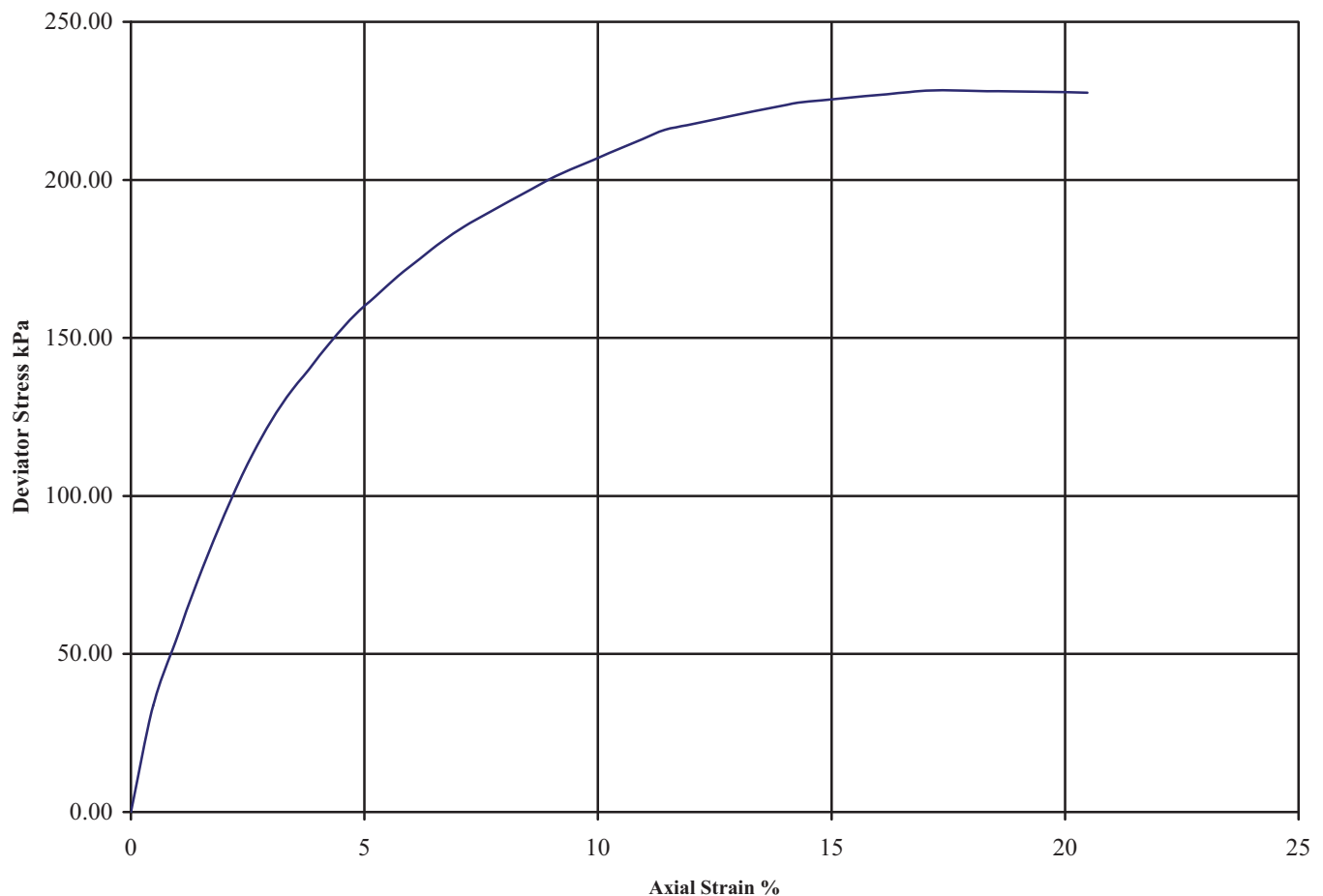
B.S. 1377 : Part 7 : Clause 8 : 1990

Hole Number: BH2

Depth (m): 4.50-4.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.34 kPa                     |          |                                                                                       |          |
| A                                                | 13                   | 2.25                 | 1.99                | 90                                       | 228                              | 114                     | 17.1                 | Plastic         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

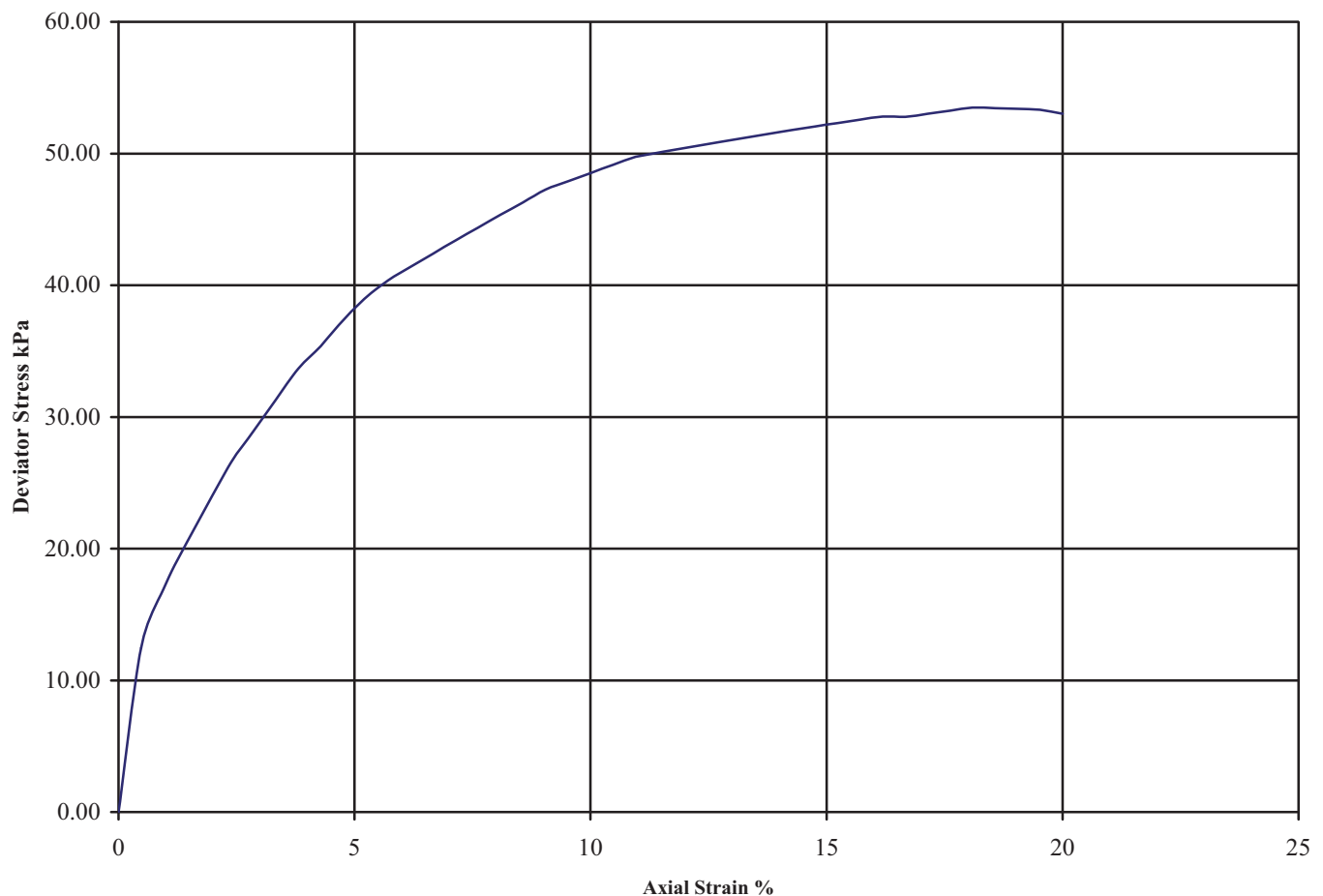
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH3

Depth (m): 1.50-1.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.34 kPa                     |          |                                                                                       |          |
| A                                                | 18                   | 2.19                 | 1.86                | 30                                       | 53                               | 27                      | 18.1                 | Plastic         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

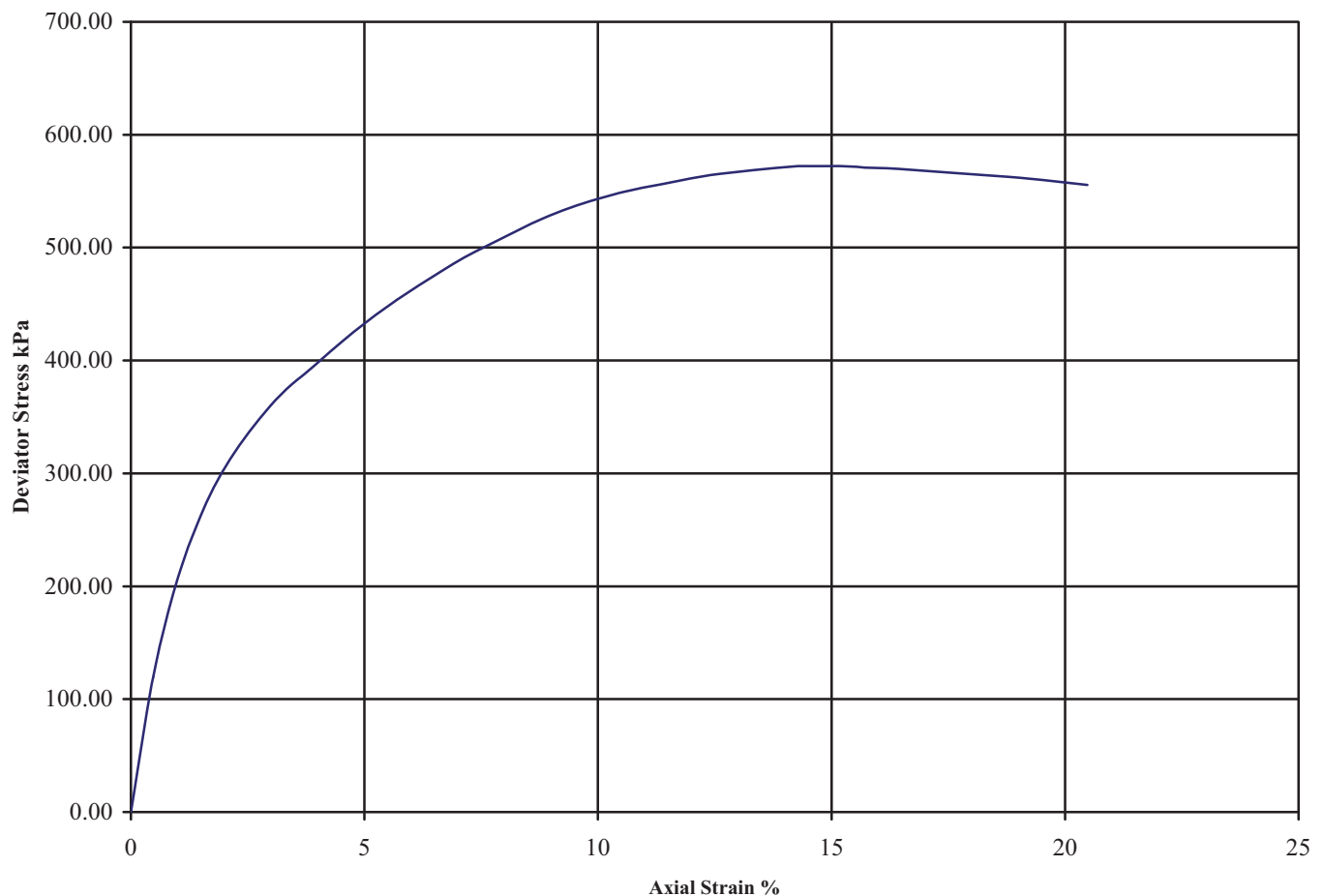
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH4

Depth (m): 2.50-2.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.34 kPa                     |          |                                                                                       |          |
| A                                                | 11                   | 2.20                 | 1.98                | 50                                       | 572                              | 286                     | 15.2                 | Compound        | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

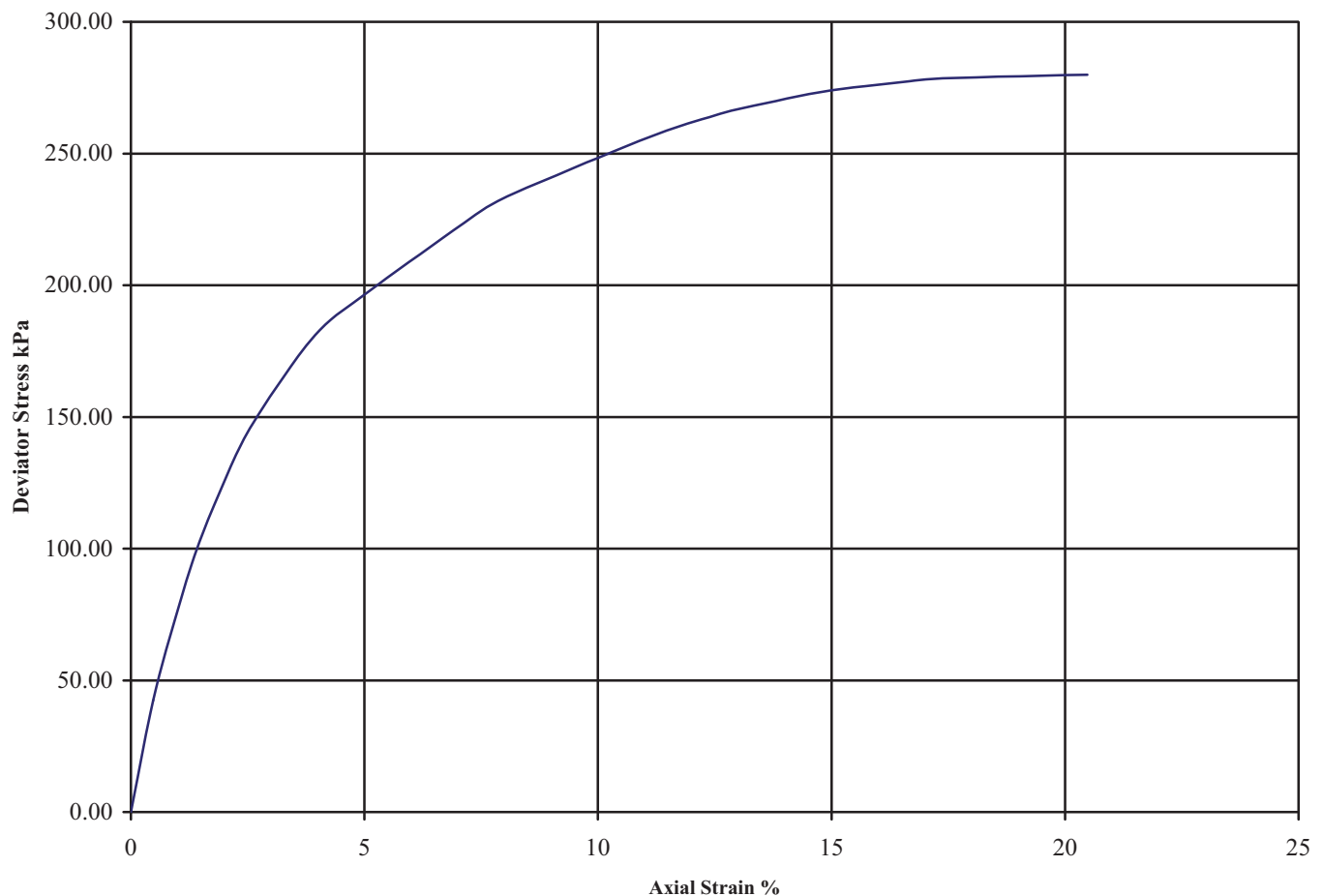
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH4

Depth (m): 4.50-4.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.33 kPa                     |          |                                                                                       |          |
| A                                                | 14                   | 2.31                 | 2.03                | 90                                       | 280                              | 140                     | 20.5                 | Plastic         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

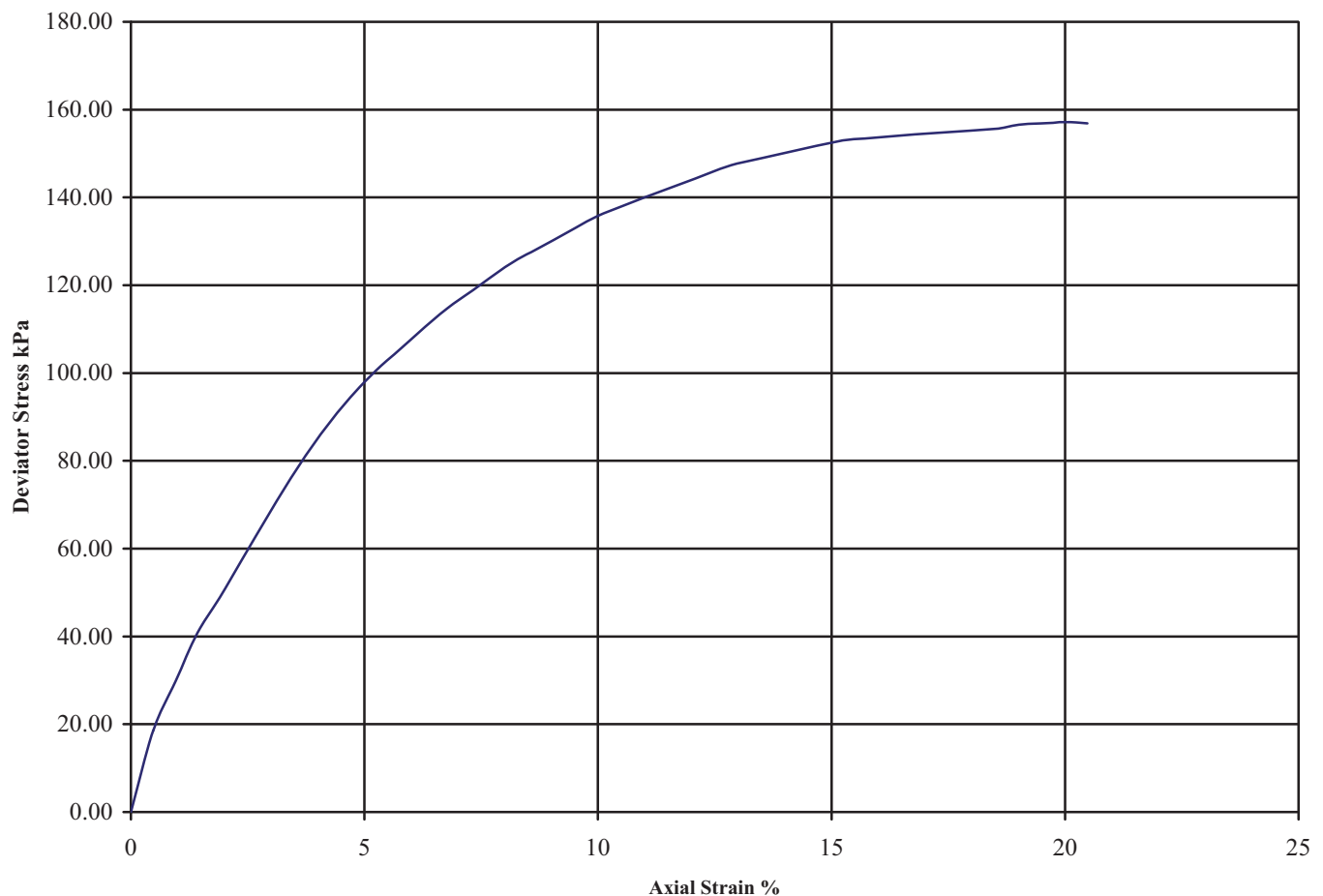
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH5

Depth (m): 3.50-3.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.33 kPa                     |          |                                                                                       |          |
| A                                                | 15                   | 2.21                 | 1.93                | 70                                       | 157                              | 79                      | 20.0                 | Plastic         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

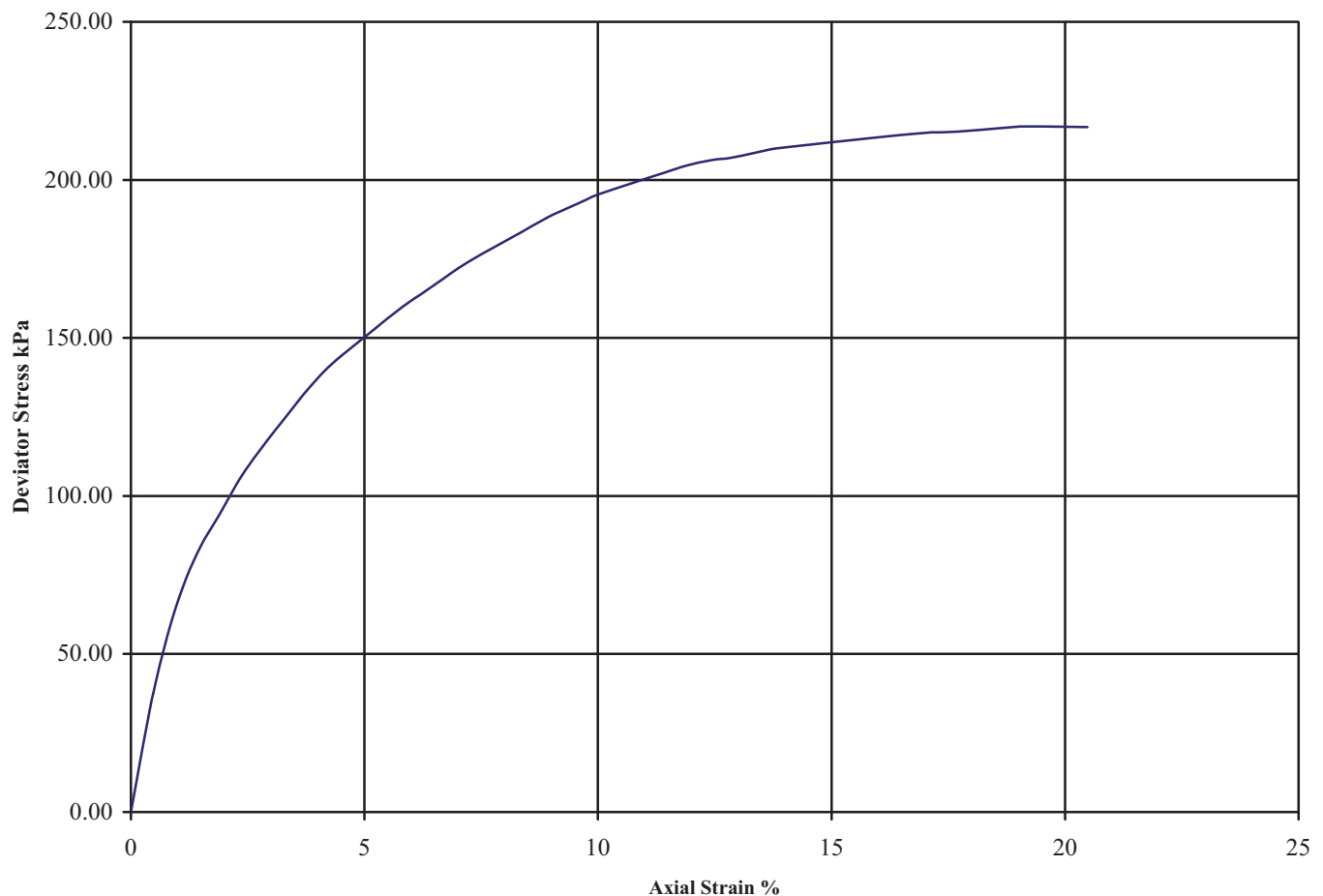
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH5

Depth (m): 5.50-5.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|-----------------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                                     | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                                 | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.34 kPa                     |          |                                                                                       |          |
| A                                                | 13                   | 2.23                 | 1.97                | 110                                                 | 217                              | 108                     | 19.0                 | Compound        | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
|                                                  |                      |                      |                     |                                                     |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | <div>PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE.</div> |                                  |                         |                      |                 | <div>Contract No:<br/>PSL14/1976</div>                                                |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

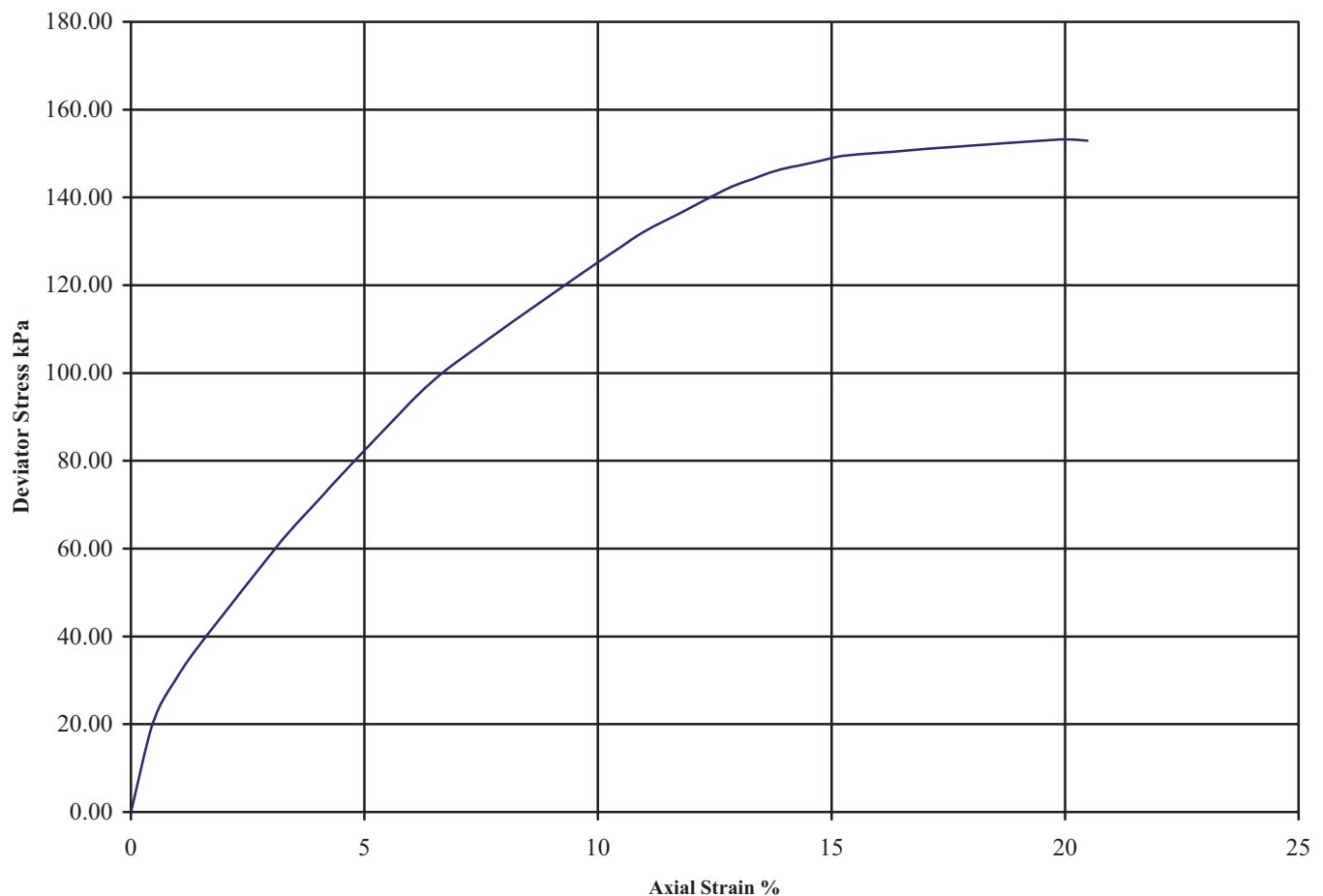
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH6

Depth (m): 2.50-2.95

Sample Number:

Sample Type: U



|                |                      |                      |                     |                     |                       |                         |                      |                 |                                                                                       |                                                                   |                                                                                       |          |
|----------------|----------------------|----------------------|---------------------|---------------------|-----------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm): |                      | 102.0                | Height (mm):        |                     | 210.0                 | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |                                                                   |                                                                                       |          |
| Specimen       | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa) | Corr. Max.            | Shear                   | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |                                                                   |                                                                                       |          |
|                |                      |                      |                     |                     | Deviator Stress (kPa) | Cu (kPa)                |                      |                 | Sample taken from top of tube                                                         |                                                                   |                                                                                       |          |
|                |                      |                      |                     |                     | $\theta_3$            | $(\theta_1-\theta_3)_f$ |                      |                 | $\frac{1}{2}(\theta_1-\theta_3)_f$                                                    | Rate of strain = 1.9 %/min                                        |                                                                                       |          |
|                |                      |                      |                     |                     |                       |                         |                      |                 |                                                                                       | Latex Membrane used 0.2 mm thickness, Correction applied 0.33 kPa |                                                                                       |          |
| A              | 14                   | 2.25                 | 1.97                | 50                  | 153                   | 77                      | 20.0                 | Plastic         | See summary of soil descriptions.                                                     |                                                                   |                                                                                       |          |
|                |                      |                      |                     |                     |                       |                         |                      |                 | Checked                                                                               | Date                                                              | Approved                                                                              | Date     |
|                |                      |                      |                     |                     |                       |                         |                      |                 |  | 13/05/14                                                          |  | 13/05/14 |
|                |                      |                      |                     |                     |                       |                         |                      |                 | <div>PSL<br/>Professional Soils Laboratory</div>                                      |                                                                   |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

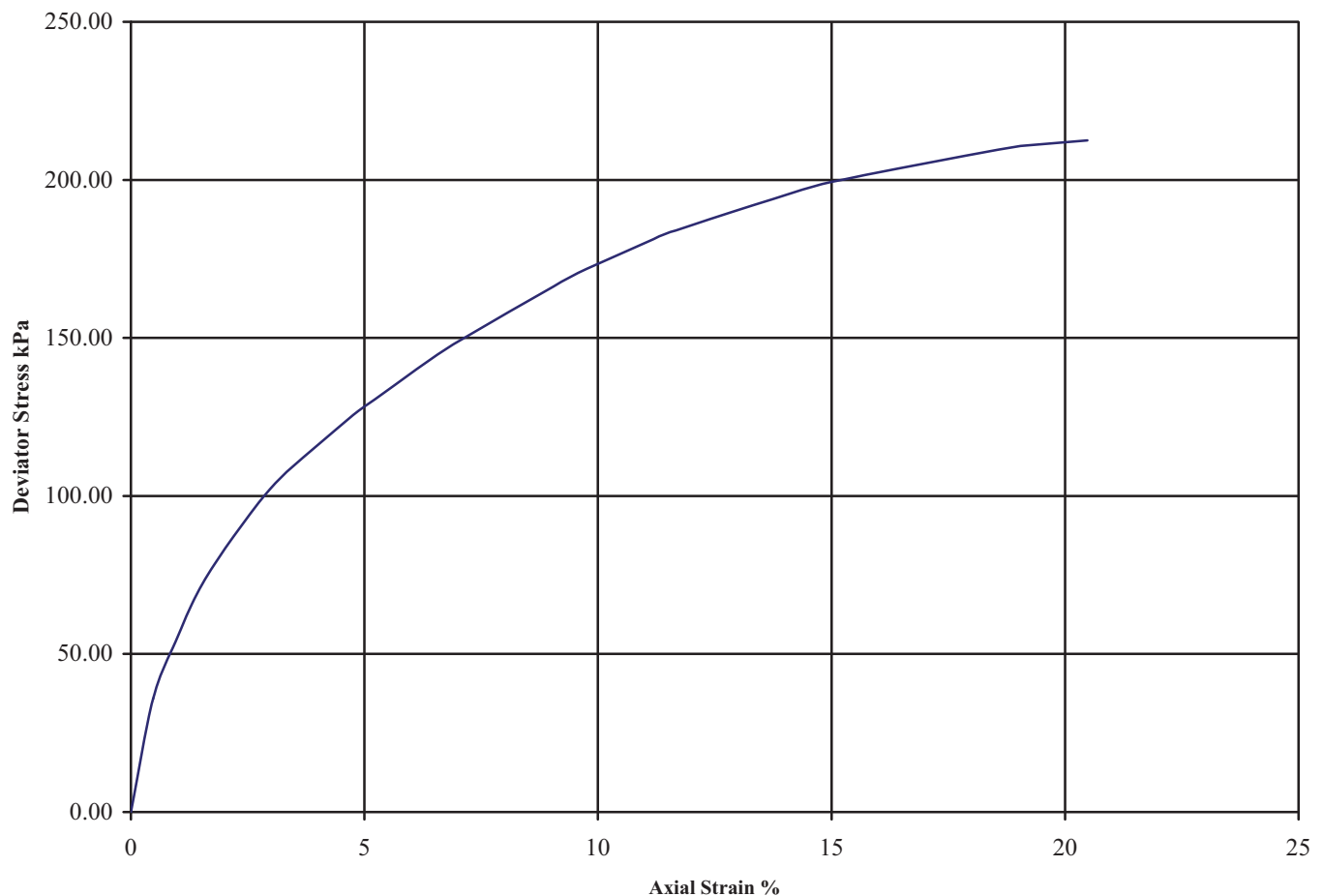
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH7

Depth (m): 4.50-4.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness,                                                 |          |                                                                                       |          |
| A                                                | 15                   | 2.23                 | 1.95                | 90                                       | 212                              | 106                     | 20.5                 | Plastic         | Correction applied 0.33 kPa                                                           |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

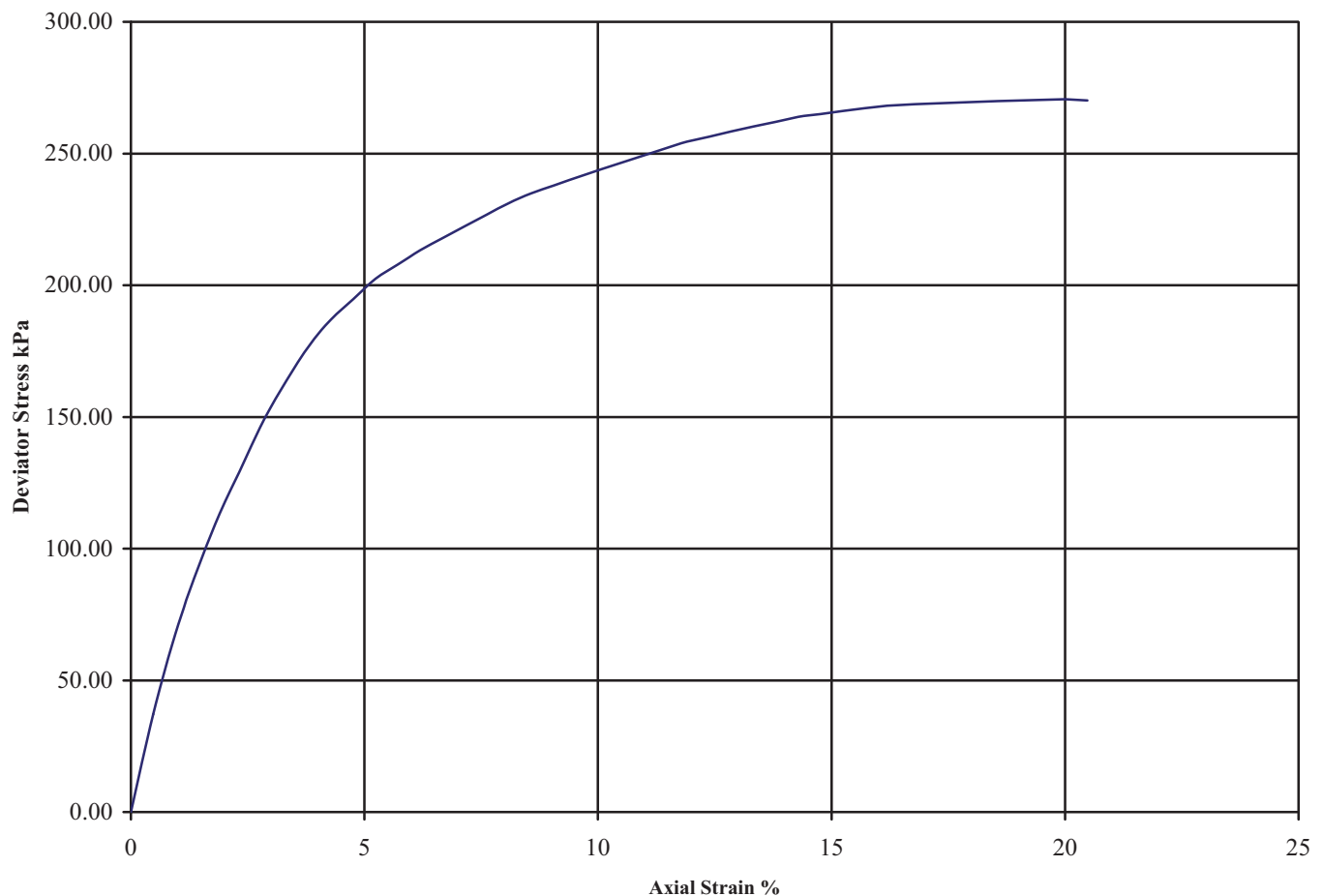
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH8

Depth (m): 4.50-4.95

Sample Number:

Sample Type: U



|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|--------------------------------------------------|----------------------|----------------------|---------------------|------------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                   |                      | 102.0                | Height (mm):        |                                          | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                         | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                      | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Sample taken from top of tube                                                         |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.33 kPa                     |          |                                                                                       |          |
| A                                                | 14                   | 2.26                 | 1.98                | 90                                       | 271                              | 135                     | 20.0                 | Plastic         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |  | 13/05/14 |  | 13/05/14 |
|                                                  |                      |                      |                     |                                          |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No:<br>PSL14/1976                                                            |          |                                                                                       |          |



# LABORATORY REPORT



4043

**Contract Number: PSL14/2300**

Client's Reference:

Report Date: 20 May 2014

Client Name: Arc Environmental  
Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
Durham  
DH7 8PN

**For the attention of: Nicola Watson**

Contract Title: Phase 2, Liverpool Business Park, Speke

Date Received: 12/5/2014

Date Commenced: 12/5/2014

Date Completed: 20/5/2014

**Notes: Observations and Interpretations are outside the UKAS Accreditation**

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

Checked and Approved Signatories:

R Gunson  
(Director)

A Watkins  
(Director)

M Beastall  
(Laboratory Manager)

D Lambe  
(Senior Technician)

S Royle  
(Senior Technician)

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e-mail: [rgunson@prosoils.co.uk](mailto:rgunson@prosoils.co.uk)  
[awatkins@prosoils.co.uk](mailto:awatkins@prosoils.co.uk)

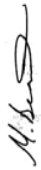
Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole Number | Sample Number | Sample Type | Depth m   | Description of Sample                          |
|-------------|---------------|-------------|-----------|------------------------------------------------|
| TP01        |               | B           | 2.40-2.80 | Brown gravelly very sandy CLAY.                |
| TP02        |               | B           | 1.70-2.00 | Brown gravelly sandy CLAY.                     |
| TP03        |               | B           | 0.80-1.20 | Dark brown slightly gravelly silty SAND.       |
| TP03        |               | B           | 1.80-2.20 | Brown gravelly very sandy CLAY.                |
| TP04        |               | B           | 1.20-1.60 | Brown silty SAND.                              |
| TP04        |               | B           | 2.20-2.40 | Brown gravelly very sandy CLAY.                |
| TP05        |               | B           | 0.70-1.00 | Dark brown slightly gravelly very clayey SAND. |
| TP05        |               | B           | 2.40-2.80 | Brown gravelly very sandy CLAY.                |
| TP06        |               | B           | 2.40-2.60 | Brown gravelly very sandy CLAY.                |
| TP08        |               | B           | 1.60-1.80 | Brown slightly gravelly very silty SAND.       |
| TP08        |               | B           | 2.40-2.60 | Brown very sandy CLAY.                         |
|             |               |             |           |                                                |
|             |               |             |           |                                                |
|             |               |             |           |                                                |
|             |               |             |           |                                                |
|             |               |             |           |                                                |
|             |               |             |           |                                                |
|             |               |             |           |                                                |
|             |               |             |           |                                                |



**Professional Soils Laboratory**

|                                                                                       |          |                                                                                     |          |                                                                                     |            |
|---------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|------------|
| Compiled by                                                                           | Date     | Checked by                                                                          | Date     | Approved by                                                                         | Date       |
|  | 20/05/14 |  | 20/05/14 |  | 20/05/14   |
| PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE.                                              |          |                                                                                     |          | Contract No:                                                                        | PSL14/2300 |
|                                                                                       |          |                                                                                     |          | Client Ref:                                                                         | 14-156     |

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

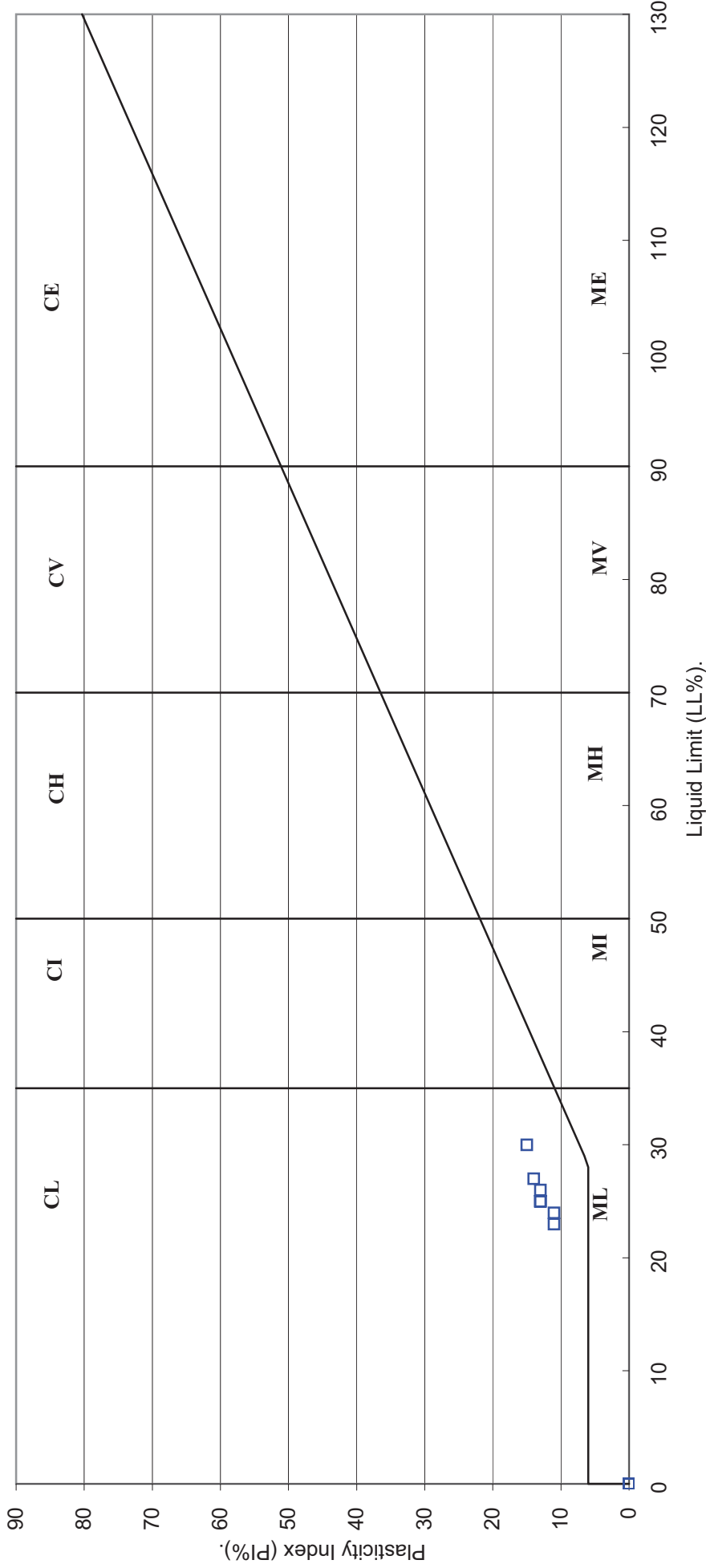
**SYMBOLS: NP : Non Plastic**

\* : Liquid Limit and Plastic Limit Wet Sieved.

PSLR002 Issue 1

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



|                                          |          |            |          |              |            |
|------------------------------------------|----------|------------|----------|--------------|------------|
| Compiled by                              | Date     | Checked by | Date     | Approved by  | Date       |
|                                          | 20/05/14 |            | 20/05/14 |              | 20/05/14   |
| PHASE 2, LIVERPOOL BUSINESS PARK, SPEKE. |          |            |          | Contract No: | PSL14/2300 |
|                                          |          |            |          | Client Ref:  | 14-156     |

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

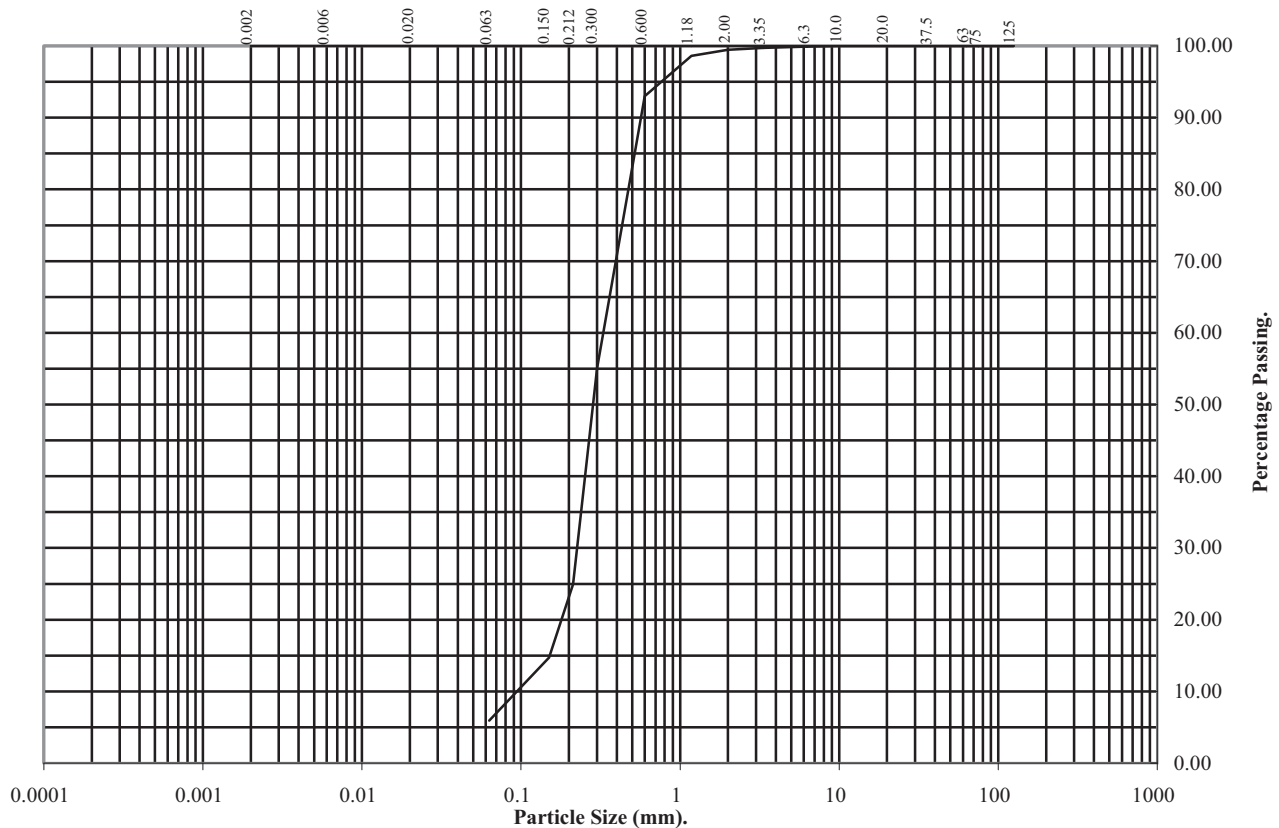
Wet Sieve, Clause 9.2

Hole Number: TP03

Depth (m): 0.80-1.20

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 100                |
| 10            | 100                |
| 6.3           | 100                |
| 3.35          | 100                |
| 2             | 99                 |
| 1.18          | 99                 |
| 0.6           | 93                 |
| 0.3           | 55                 |
| 0.212         | 25                 |
| 0.15          | 15                 |
| 0.063         | 6                  |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 1                |
| Sand          | 93               |
| Silt / Clay   | 6                |

**Remarks:**  
See summary of soils descriptions.

| Checked By         | Date     | Approved By        | Date     |
|--------------------|----------|--------------------|----------|
| <i>M. J. Smith</i> | 20/05/14 | <i>M. J. Smith</i> | 20/05/14 |

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

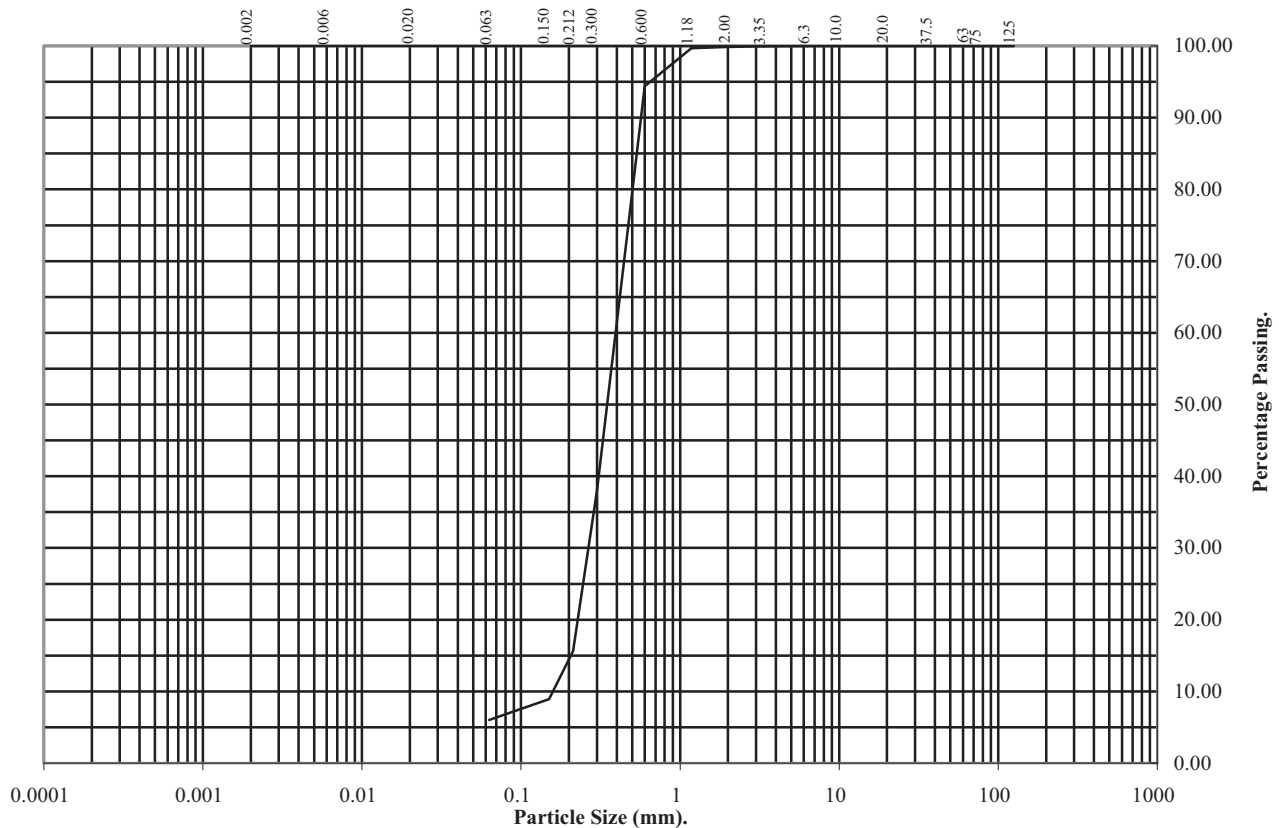
Wet Sieve, Clause 9.2

Hole Number: TP04

Depth (m): 1.20-1.60

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 100                |
| 10            | 100                |
| 6.3           | 100                |
| 3.35          | 100                |
| 2             | 100                |
| 1.18          | 100                |
| 0.6           | 94                 |
| 0.3           | 38                 |
| 0.212         | 16                 |
| 0.15          | 9                  |
| 0.063         | 6                  |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 0                |
| Sand          | 94               |
| Silt / Clay   | 6                |

**Remarks:**  
See summary of soils descriptions.

| Checked By      | Date     | Approved By     | Date     |
|-----------------|----------|-----------------|----------|
| <i>H. S. D.</i> | 20/05/14 | <i>H. S. D.</i> | 20/05/14 |

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

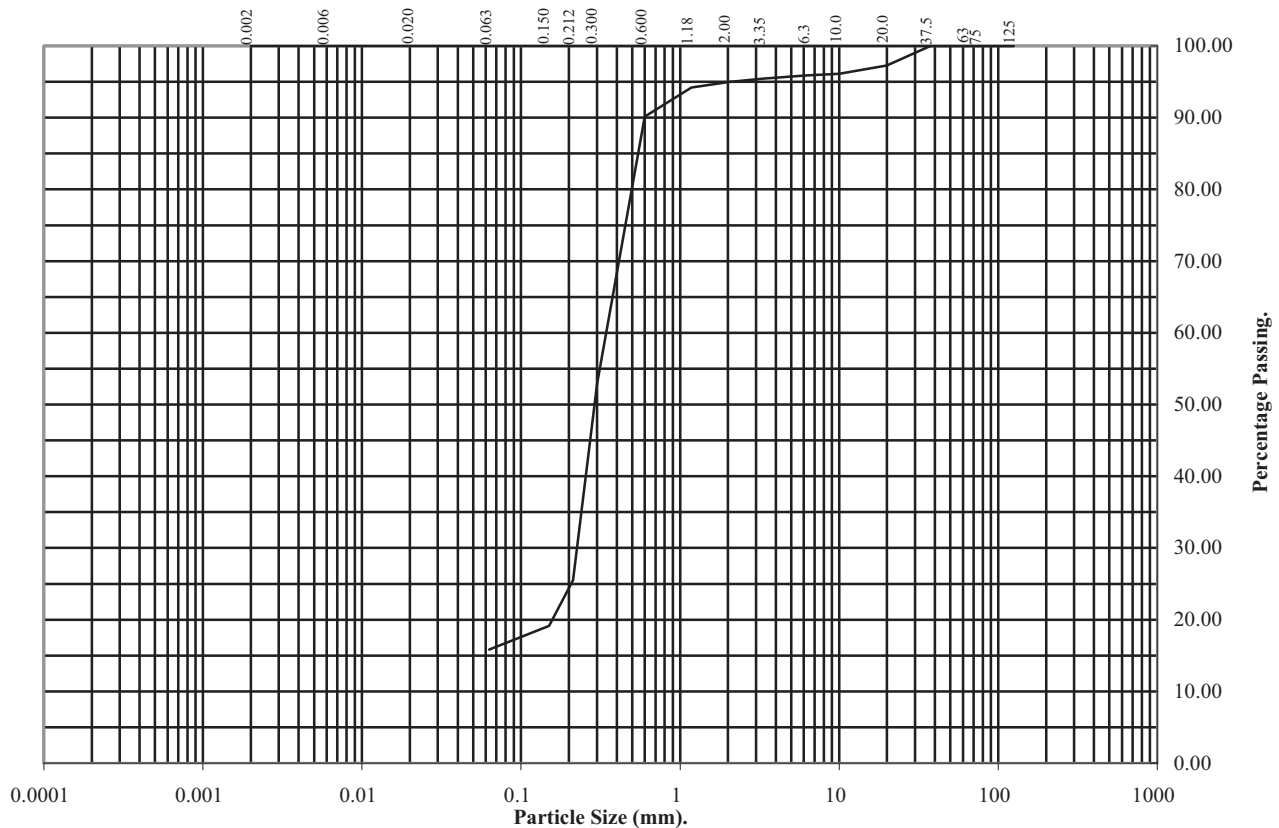
Wet Sieve, Clause 9.2

Hole Number: TP05

Depth (m): 0.70-1.00

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 97                 |
| 10            | 96                 |
| 6.3           | 96                 |
| 3.35          | 95                 |
| 2             | 95                 |
| 1.18          | 94                 |
| 0.6           | 90                 |
| 0.3           | 53                 |
| 0.212         | 26                 |
| 0.15          | 19                 |
| 0.063         | 16                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 5                |
| Sand          | 79               |
| Silt / Clay   | 16               |

## Remarks:

See summary of soils descriptions.

| Checked By         | Date     | Approved By        | Date     |
|--------------------|----------|--------------------|----------|
| <i>M. J. Smith</i> | 20/05/14 | <i>M. J. Smith</i> | 20/05/14 |

**PSL**

Professional Soils Laboratory

PHASE 2, LIVERPOOL BUSINESS PARK,  
SPEKE.

Contract No.:  
PSL14/2300

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

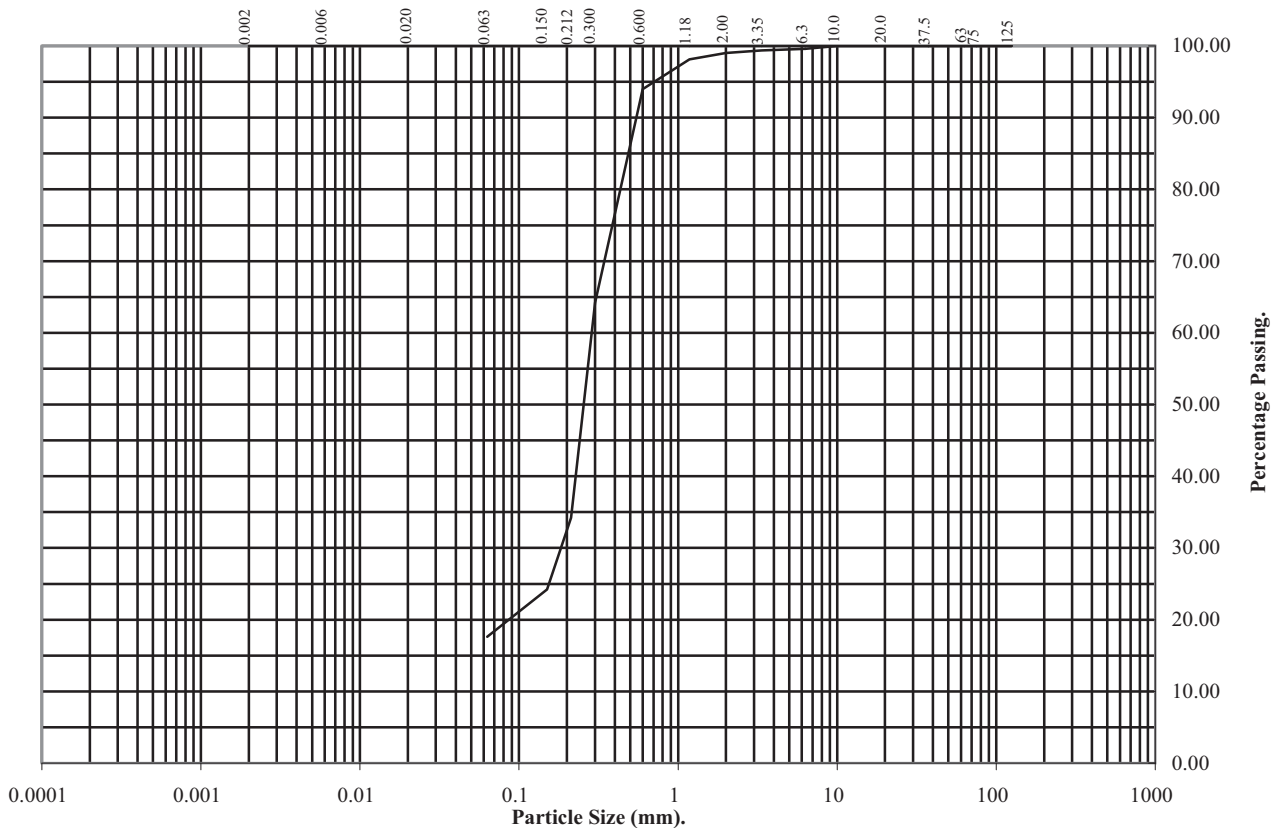
Wet Sieve, Clause 9.2

Hole Number: TP08

Depth (m): 1.60-1.80

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 100                |
| 10            | 100                |
| 6.3           | 100                |
| 3.35          | 99                 |
| 2             | 99                 |
| 1.18          | 98                 |
| 0.6           | 94                 |
| 0.3           | 64                 |
| 0.212         | 34                 |
| 0.15          | 24                 |
| 0.063         | 18                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 1                |
| Sand          | 81               |
| Silt / Clay   | 18               |

**Remarks:**  
See summary of soils descriptions.

| Checked By      | Date     | Approved By     | Date     |
|-----------------|----------|-----------------|----------|
| <i>H. S. D.</i> | 20/05/14 | <i>H. S. D.</i> | 20/05/14 |

**Contract Number: PSL14/3631**

Client's Reference:

Report Date: 11 August 2014

Client Name: Arc Environmental  
Solum House  
Unit 1 Elliott Court  
St Johns Road, Meadowfield  
Durham  
DH7 8PN

**For the attention of: Matt Bradford**

Contract Title: Phase 2 Liverpool Business Park, Speke

Date Received: 24/7/2014

Date Commenced: 24/7/2014

Date Completed: 11/8/2014

**Notes: Observations and Interpretations are outside the UKAS Accreditation**

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

Checked and Approved Signatories:

R Gunson  
(Director)

A Watkins  
(Director)

M Beastall  
(Laboratory Manager)



D Lambe  
(Senior Technician)

S Royle  
(Senior Technician)

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole Number | Sample Number | Sample Type | Depth m     | Description of Sample                                 |
|-------------|---------------|-------------|-------------|-------------------------------------------------------|
| BH9         |               | B           | 2.50-3.00   | Dark brown gravelly clayey silty SAND.                |
| BH9         |               | B           | 6.00-6.50   | Brown slightly gravelly very sandy CLAY.              |
| BH9         |               | U           | 7.50-7.95   | Firm reddish brown slightly gravelly very sandy CLAY. |
| BH9         |               | B           | 12.00-12.50 | Brown slightly gravelly very sandy CLAY.              |
| BH9         |               | U           | 13.50-13.95 | Firm brown gravelly very sandy CLAY.                  |
| BH10        |               | U           | 4.50-4.95   | Firm brown very sandy CLAY.                           |
| BH11        |               | B           | 3.50-4.00   | Brown slightly gravelly very sandy CLAY.              |
| TP10        |               | B           | 2.00        | Brown silty SAND.                                     |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |
|             |               |             |             |                                                       |



**Professional Soils Laboratory**

|                                         |          |                    |          |                    |            |
|-----------------------------------------|----------|--------------------|----------|--------------------|------------|
| Compiled by                             | Date     | Checked by         | Date     | Approved by        | Date       |
| <i>Mar</i>                              | 11/08/14 | <i>[Signature]</i> | 11/08/14 | <i>[Signature]</i> | 11/08/14   |
| PHASE 2 LIVERPOOL BUSINESS PARK, SPEKE. |          |                    |          | Contract No:       | PSL14/3631 |
|                                         |          |                    |          | Client Ref:        | 14-156     |

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

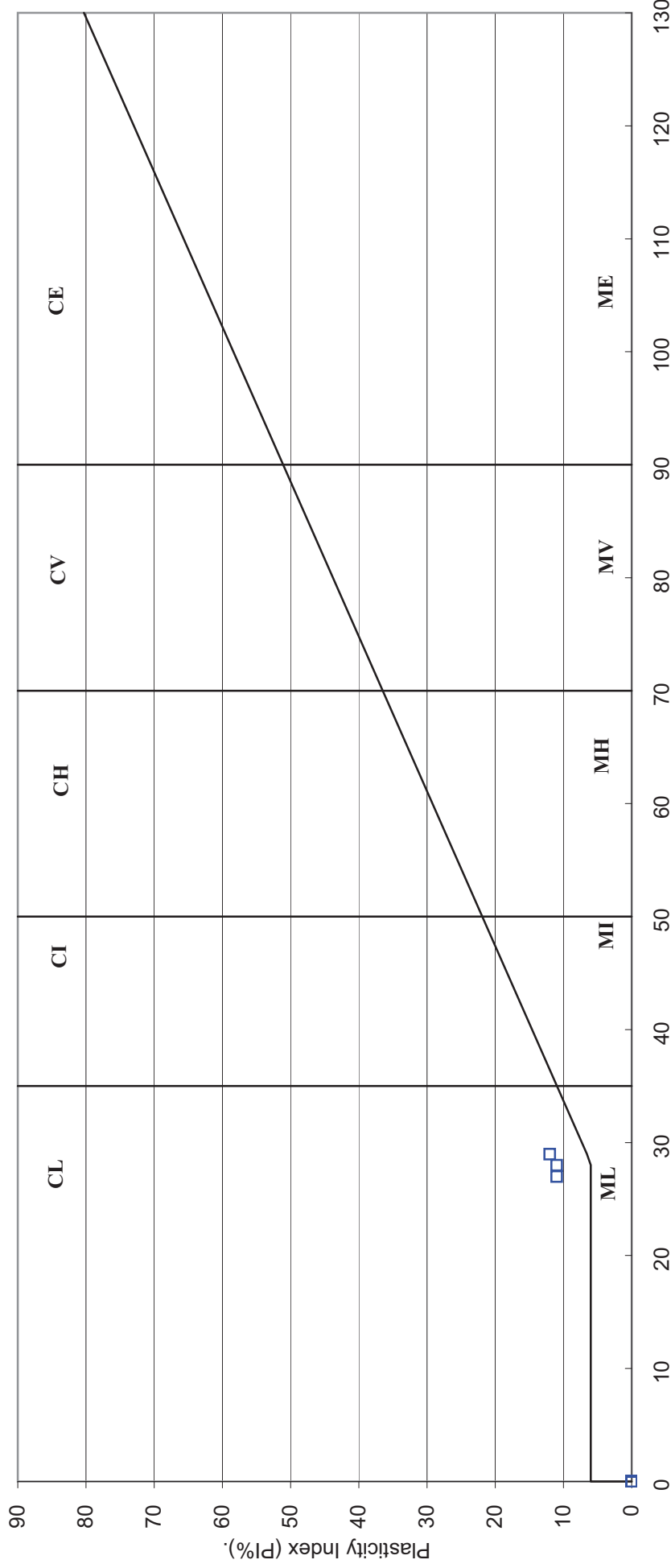
**SYMBOLS: NP : Non Plastic**

**\*: Liquid Limit and Plastic Limit Wet Sieved.**

PSLR002 Issue 1

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



|                                         |          |            |          |              |            |
|-----------------------------------------|----------|------------|----------|--------------|------------|
| Compiled by                             | Date     | Checked by | Date     | Approved by  | Date       |
| <i>Mar</i>                              | 11/08/14 | <i>Mar</i> | 11/08/14 | <i>Mar</i>   | 11/08/14   |
| PHASE 2 LIVERPOOL BUSINESS PARK, SPEKE. |          |            |          | Contract No: | PSL14/3631 |
|                                         |          |            |          | Client Ref:  | 14-156     |

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

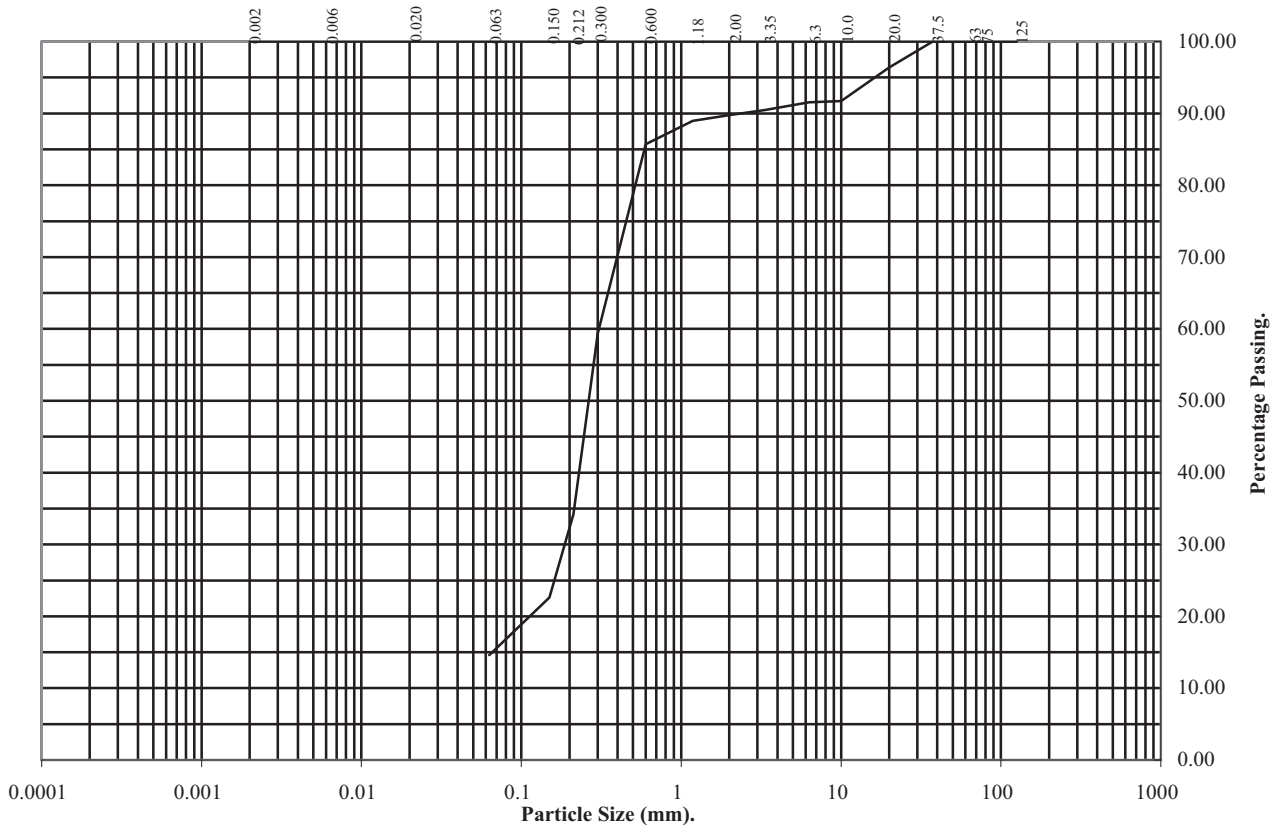
Wet Sieve, Clause 9.2

Hole Number: BH9

Depth (m): 2.50-3.00

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 96                 |
| 10            | 92                 |
| 6.3           | 92                 |
| 3.35          | 90                 |
| 2             | 90                 |
| 1.18          | 89                 |
| 0.6           | 86                 |
| 0.3           | 59                 |
| 0.212         | 34                 |
| 0.15          | 23                 |
| 0.063         | 15                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 10               |
| Sand          | 75               |
| Silt / Clay   | 15               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 11/08/14 |             | 11/08/14 |

**PSL**

Professional Soils Laboratory

PHASE 2 LIVERPOOL BUSINESS PARK,  
SPEKE.

Contract No.:  
PSL14/3631

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

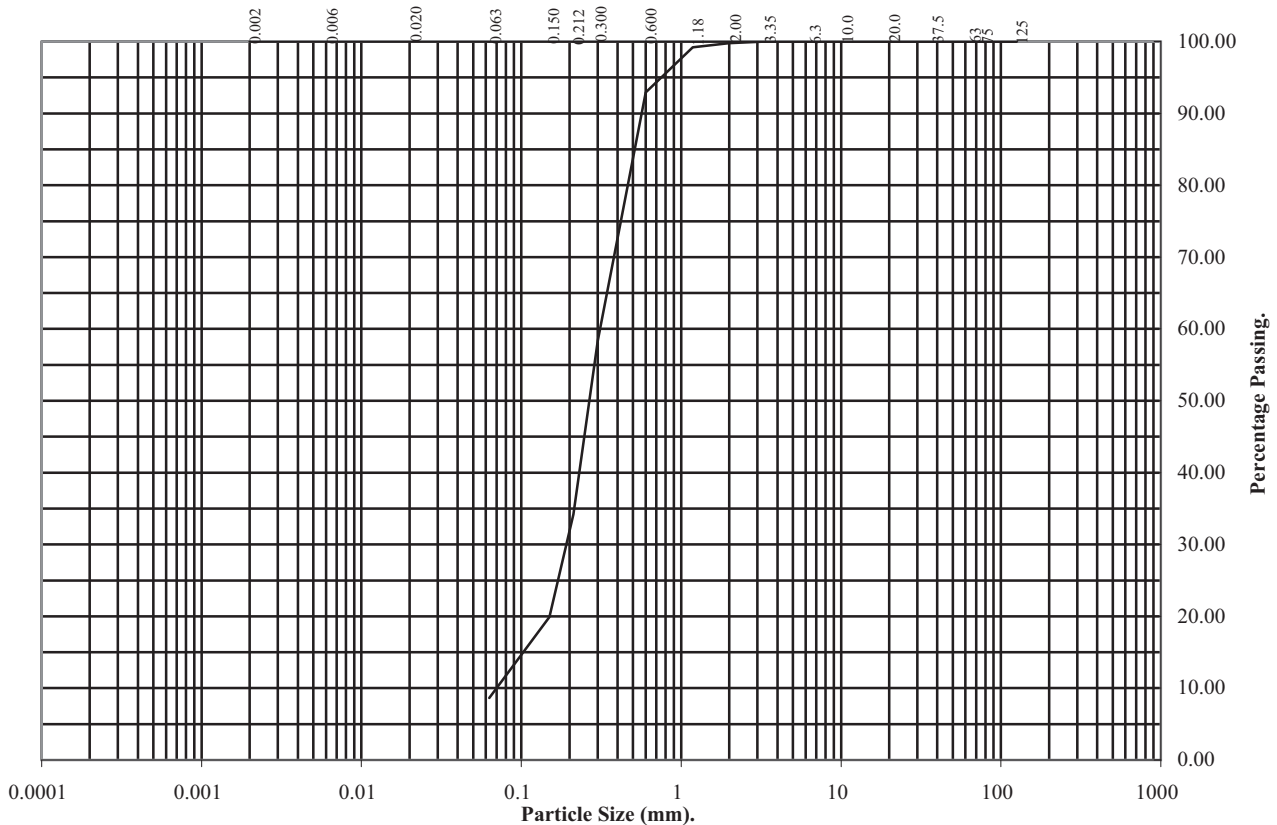
Wet Sieve, Clause 9.2

Hole Number: TP10

Depth (m): 2.00

Sample Number:

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 100                |
| 10            | 100                |
| 6.3           | 100                |
| 3.35          | 100                |
| 2             | 100                |
| 1.18          | 99                 |
| 0.6           | 93                 |
| 0.3           | 58                 |
| 0.212         | 34                 |
| 0.15          | 20                 |
| 0.063         | 9                  |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 0                |
| Sand          | 91               |
| Silt / Clay   | 9                |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 11/08/14 |             | 11/08/14 |

**PSL**

Professional Soils Laboratory

PHASE 2 LIVERPOOL BUSINESS PARK,  
SPEKE.

Contract No.:  
PSL14/3631

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

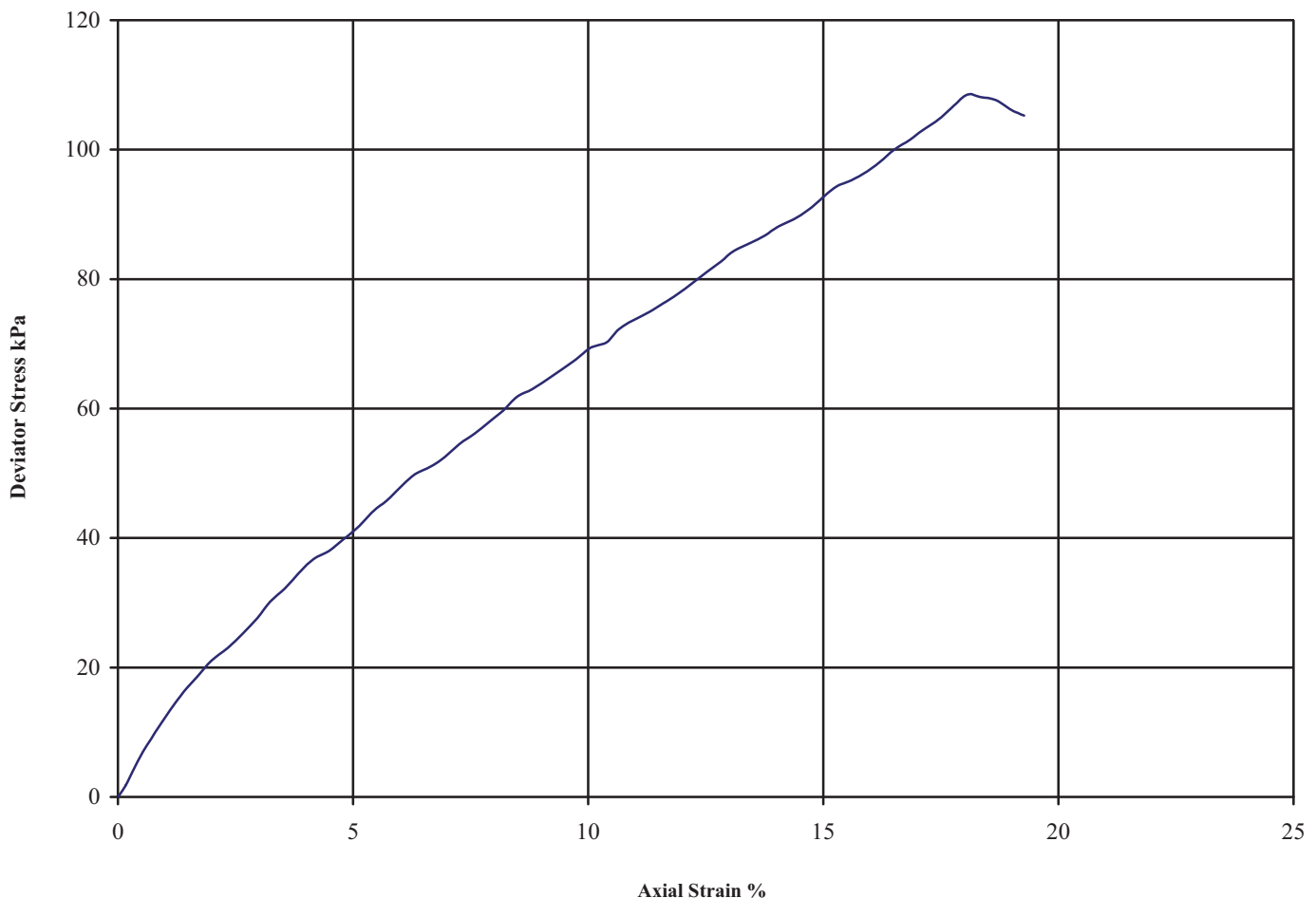
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH9

Depth (m): 7.50-7.95

Sample Number:

Sample Type: U



|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|------------------------------------------------------------------------------------|----------------------|----------------------|---------------------|-----------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                                                     |                      | 102.0                | Height (mm):        |                                         | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                                                           | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                     | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Sample taken from Bottom of tube                                                      |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Latex Membrane used 0.4 mm thickness, Correction applied 0.34 kPa                     |          |                                                                                       |          |
| A                                                                                  | 15                   | 2.24                 | 1.96                | 150                                     | 109                              | 54                      | 18.1                 | Brittle         | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 |  | 11/08/14 |  | 11/08/14 |
|  |                      |                      |                     | PHASE 2 LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No: PSL14/3631                                                               |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

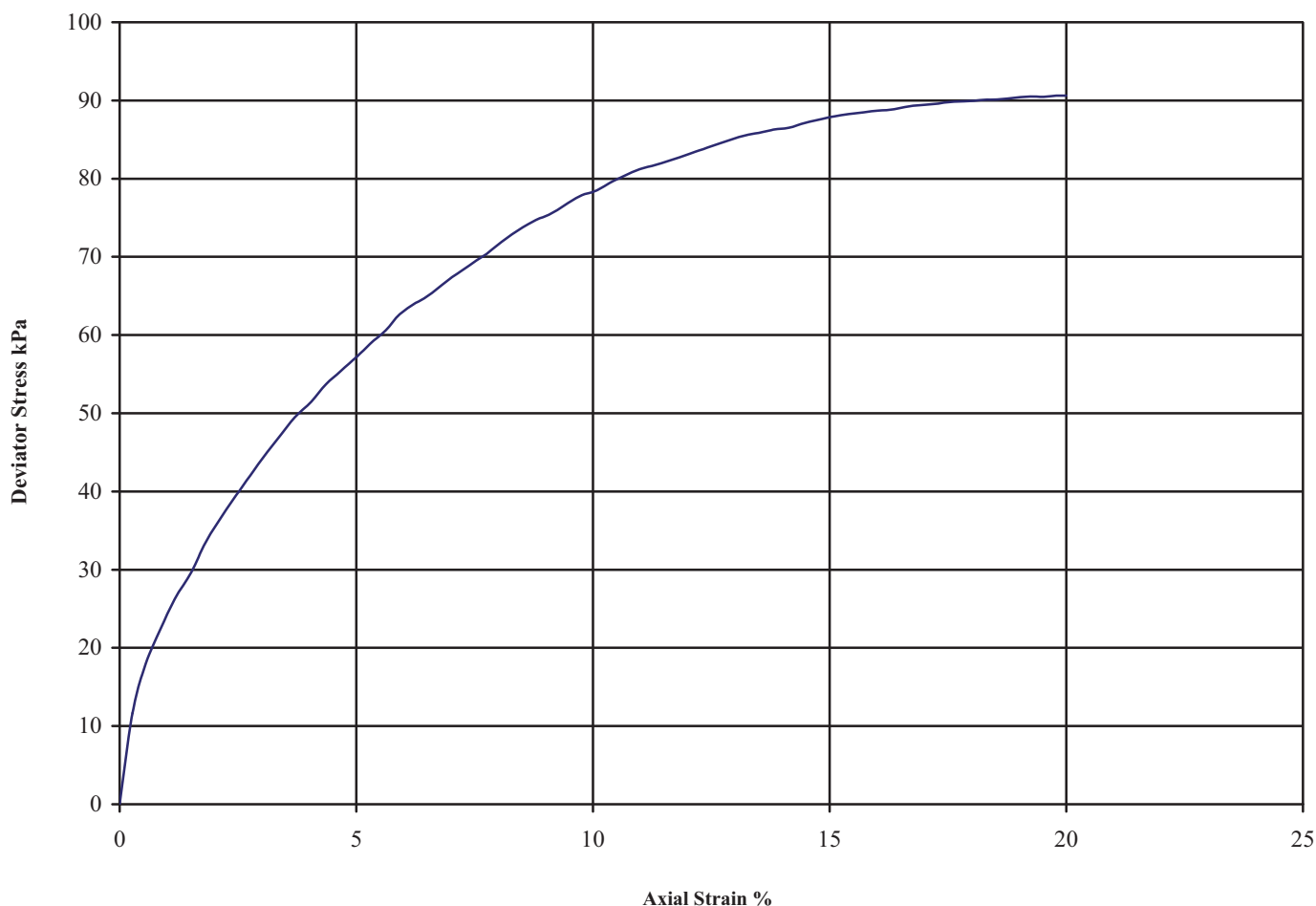
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH9

Depth (m): 13.50-13.95

Sample Number:

Sample Type: U



|                                                                                                                      |                      |                      |                     |                                         |                       |                         |                                    |                 |                                                                                                                                                                             |          |                                                                                       |          |
|----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|---------------------|-----------------------------------------|-----------------------|-------------------------|------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                                                                                       |                      | 102.0                | Height (mm):        |                                         | 210.0                 | Test:                   | 100 mm Single Stage.               |                 | Undisturbed                                                                                                                                                                 |          |                                                                                       |          |
| Specimen                                                                                                             | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                     | Corr. Max.            | Shear                   | Failure                            | Mode of Failure | Remarks                                                                                                                                                                     |          |                                                                                       |          |
|                                                                                                                      |                      |                      |                     |                                         | Deviator Stress (kPa) | Strength Cu (kPa)       | Strain (%)                         |                 |                                                                                                                                                                             |          |                                                                                       |          |
|                                                                                                                      |                      |                      |                     |                                         | $\theta_3$            | $(\theta_1-\theta_3)_f$ | $\frac{1}{2}(\theta_1-\theta_3)_f$ |                 |                                                                                                                                                                             |          |                                                                                       |          |
|                                                                                                                      |                      |                      |                     |                                         |                       |                         |                                    |                 |                                                                                                                                                                             |          |                                                                                       |          |
|                                                                                                                      |                      |                      |                     |                                         |                       |                         |                                    |                 |                                                                                                                                                                             |          |                                                                                       |          |
| A                                                                                                                    | 14                   | 2.19                 | 1.92                | 279                                     | 91                    | 45                      | 20.0                               | Compound        | Sample taken from Bottom of tube<br>Rate of strain = 1.9 %/min<br>Latex Membrane used 0.4 mm thickness,<br>Correction applied 0.33 kPa<br>See summary of soil descriptions. |          |                                                                                       |          |
|                                                                                                                      |                      |                      |                     |                                         |                       |                         |                                    |                 | Checked                                                                                                                                                                     | Date     | Approved                                                                              | Date     |
|                                                                                                                      |                      |                      |                     |                                         |                       |                         |                                    |                 |                                                                                        | 11/08/14 |  | 11/08/14 |
| <br>Professional Soils Laboratory |                      |                      |                     | PHASE 2 LIVERPOOL BUSINESS PARK, SPEKE. |                       |                         |                                    |                 | Contract No:<br>PSL14/3631                                                                                                                                                  |          |                                                                                       |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

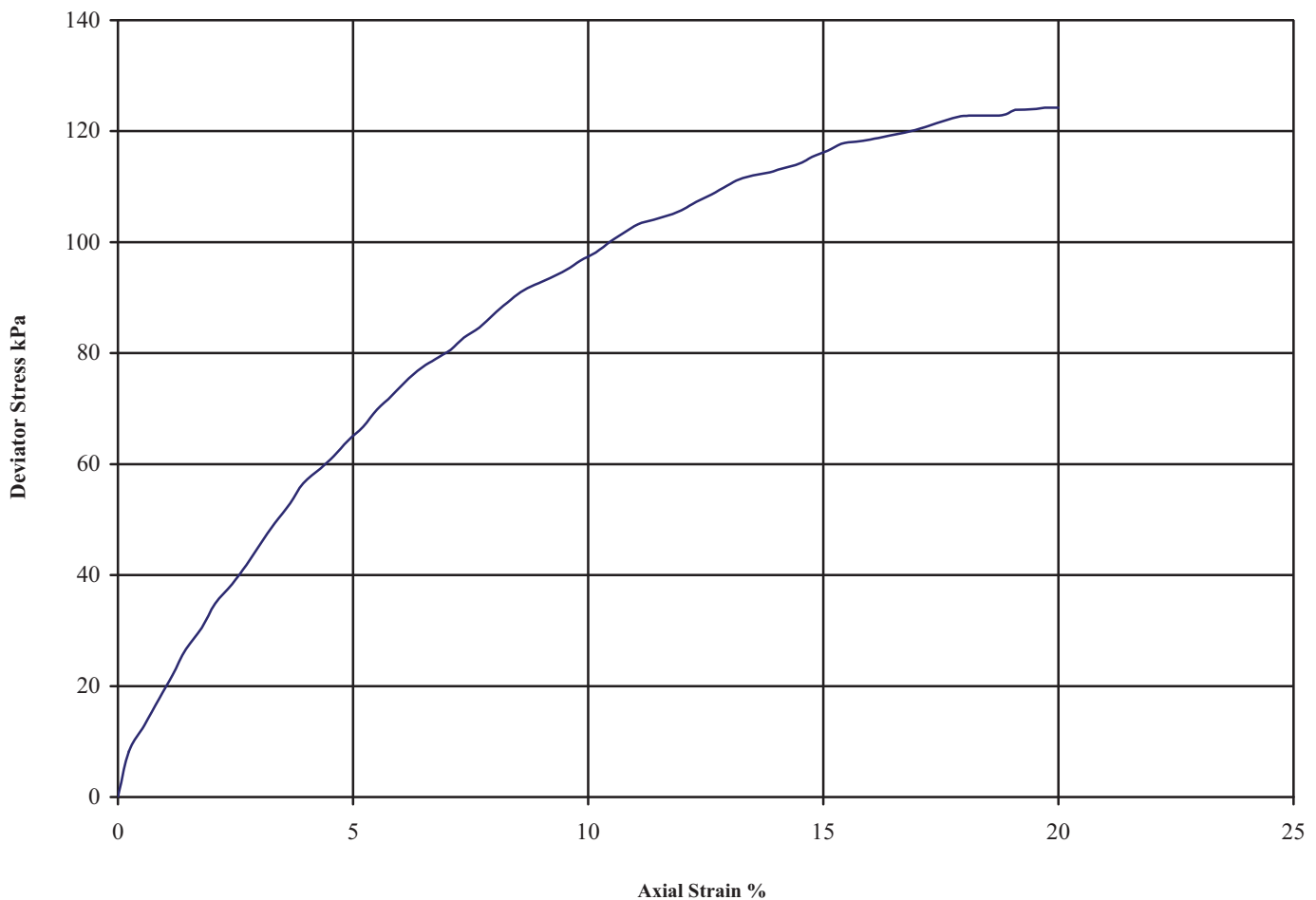
B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH10

Depth (m): 4.50-4.95

Sample Number:

Sample Type: U



|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 |                                                                                       |          |                                                                                       |          |
|------------------------------------------------------------------------------------|----------------------|----------------------|---------------------|-----------------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|----------|
| Diameter (mm):                                                                     |                      | 102.0                | Height (mm):        |                                         | 210.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed                                                                           |          |                                                                                       |          |
| Specimen                                                                           | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)                     | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks                                                                               |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Sample taken from Bottom of tube                                                      |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Rate of strain = 1.9 %/min                                                            |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Latex Membrane used 0.4 mm thickness, Correction applied 0.33 kPa                     |          |                                                                                       |          |
| A                                                                                  | 15                   | 2.22                 | 1.94                | 99                                      | 124                              | 62                      | 20.0                 | Compound        | See summary of soil descriptions.                                                     |          |                                                                                       |          |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 | Checked                                                                               | Date     | Approved                                                                              | Date     |
|                                                                                    |                      |                      |                     |                                         |                                  |                         |                      |                 |  | 11/08/14 |  | 11/08/14 |
|  |                      |                      |                     | PHASE 2 LIVERPOOL BUSINESS PARK, SPEKE. |                                  |                         |                      |                 | Contract No: PSL14/3631                                                               |          |                                                                                       |          |