

## Results - Soil

Client: Richard Jackson Limited		Chemtest Job No.:		17-03897	17-03897	17-03897	17-03897	17-03897	17-03897
Quotation No.:		Chemtest Sample ID.:		413410	413411	413412	413413	413414	413415
Order No.:		Client Sample Ref.:		TP1	TP2	TP3	TP4	TP6	TP7
		Client Sample ID.:		ES1	ES1	ES1	ES1	ES1	ES1
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.2	0.1	0.2	0.3	0.3	0.2
		Date Sampled:		14-Feb-2017	14-Feb-2017	14-Feb-2017	14-Feb-2017	14-Feb-2017	14-Feb-2017
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	1.3	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	M	2800	mg/kg	0.10	2.2	0.44	0.24	0.22	0.12
Acenaphthylene	N	2800	mg/kg	0.10	0.19	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	0.30	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	0.62	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	2.1	0.77	0.20	0.29	0.43
Anthracene	M	2800	mg/kg	0.10	0.33	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	3.2	2.0	0.59	0.59	1.3
Pyrene	M	2800	mg/kg	0.10	2.6	1.6	0.46	0.51	1.0
Benzo[a]anthracene	M	2800	mg/kg	0.10	1.2	0.72	0.21	0.15	0.37
Chrysene	M	2800	mg/kg	0.10	1.5	0.82	0.21	0.16	0.48
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	2.3	1.1	0.35	0.27	0.75
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	0.85	0.40	0.10	< 0.10	0.21
Benzo[a]pyrene	M	2800	mg/kg	0.10	1.7	0.75	0.22	0.20	0.46
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	1.5	0.66	0.27	0.15	0.43
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	0.34	0.11	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	1.3	0.71	0.21	0.15	0.40
Total Of 16 PAH's	N	2800	mg/kg	2.0	22	10	3.1	2.7	6.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene*; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

## **Report Information**

### **Key**

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- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

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- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.co.uk](mailto:customerservices@chemtest.co.uk)

## **47875 – Queenswood School, Hatfield**

### **Geo-environmental Assessment** **Reference Criteria**

#### **Soils**

In 2014 Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH) published 'Suitable 4 Use Levels' (S4ULs) for human health risk assessment. The S4ULs have been derived in accordance with UK legislation, national and Environment Agency policy using a modified version of the Contaminated Land Exposure Assessment (CLEA) software. The S4ULs are based on minimal or tolerable risk as described in SR2 (Environment Agency, 2009a).

The S4ULs are intended to replace the 2<sup>nd</sup> edition of the LQM/CIEH Generic Assessment Criteria (GAC).

The S4ULs have also been used to replace the Environment Agency Soil Guideline Values (SGVs), which were defined in 2009 alongside updates to the CLEA methodology and software.

The parameters detailed in the LQM/CIEH S4ULs publication have been adapted using the CLEA software to reflect site specific conditions, including the Soil Organic Matter (SOM), where these are significantly different from the values used to derive the SGV.

It is understood the site is to be developed as a sports hall within school grounds, therefore S4ULs for residential without homegrown have been adopted for this site.

A SOM of 6 % has been adopted for organic chemicals for the purposes of the initial assessment on the basis of laboratory analysis. A SOM of 6% has been adopted for inorganic chemical as detailed in 'The LQM / CIEH S4ULS for human health assessment', (2015).

Only the three most hazardous PAHs, benzo(a)pyrene, dibenz(a,h)anthracene and naphthalene have been considered on this occasion.

In the absence an S4UL for lead the Category 4 Screening Level (C4SL) for lead has been adopted. In March 2014 DEFRA published C4SLs for six contaminants including lead. The C4SLs are based on a unique toxicological benchmark, 'Low Level of Toxicological Concern' rather than the 'minimal or tolerable level of risk' which forms the basis for the S4ULs.

A summary of the tier one screening values for human health is given in the Table, below.

Contaminant	Origin of Screening Value	Screening Value (mg/kg)
Arsenic	S4UL <sup>1</sup>	40
Cadmium	S4UL <sup>1</sup>	85
Chromium	S4UL <sup>1</sup>	910
Copper	S4UL <sup>1</sup>	7100
Nickel	S4UL <sup>1</sup>	180
Lead	C4SL <sup>2</sup>	310
Selenium	S4UL <sup>1</sup>	430
Mercury	S4UL <sup>1</sup>	56
Zinc	S4UL <sup>1</sup>	40000
Benzo(a)pyrene	S4UL <sup>3</sup>	3.2
Dibenz(a,h)anthracene	S4UL <sup>3</sup>	0.32
Naphthalene	S4UL <sup>3</sup>	13
Total Phenols	S4UL <sup>3</sup>	2300
TPH Aromatic C <sub>5</sub> -C <sub>7</sub>	S4UL <sup>3</sup>	1400
TPH Aromatic C <sub>7</sub> -C <sub>8</sub>	S4UL <sup>3</sup>	3900
TPH Aromatic C <sub>8</sub> -C <sub>10</sub>	S4UL <sup>3</sup>	270
TPH Aromatic C <sub>10</sub> -C <sub>12</sub>	S4UL <sup>3</sup>	1200
TPH Aromatic C <sub>12</sub> -C <sub>16</sub>	S4UL <sup>3</sup>	2500
TPH Aromatic C <sub>16</sub> -C <sub>21</sub>	S4UL <sup>3</sup>	1900
TPH Aromatic C <sub>21</sub> -C <sub>35</sub>	S4UL <sup>3</sup>	1900
TPH Aliphatic C <sub>5</sub> -C <sub>6</sub>	S4UL <sup>3</sup>	160
TPH Aliphatic C <sub>6</sub> -C <sub>8</sub>	S4UL <sup>3</sup>	530
TPH Aliphatic C <sub>8</sub> -C <sub>10</sub>	S4UL <sup>3</sup>	150
TPH Aliphatic C <sub>10</sub> -C <sub>12</sub>	S4UL <sup>3</sup>	70*
TPH Aliphatic C <sub>12</sub> -C <sub>16</sub>	S4UL <sup>3</sup>	4400*
TPH Aliphatic C <sub>16</sub> -C <sub>35</sub>	S4UL <sup>3</sup>	110000
Benzene	S4UL <sup>3</sup>	1.4
Toluene	S4UL <sup>3</sup>	3900
Ethylbenzene	S4UL <sup>3</sup>	440

M & P Xylene	S4UL <sup>3</sup>	430
O Xylene	S4UL <sup>3</sup>	480

<sup>1</sup> Value derived for site specific conditions use using CLEA software, S4UL parameters, at an SOM of 6% for Residential Without Homegrown.

<sup>2</sup> Category 4 Screening Level adopted based on DEFRA (2014)

<sup>3</sup> Value derived for site specific conditions use using CLEA software, S4UL parameters, at an SOM of 6% for Residential Without Homegrown.

\*Although soils up to this value may not be harmful to human health, it should be noted that soils would be saturated at this value and remediation may still be necessary. Results will therefore be reviewed on a case by case basis.

## **Appendix E**

Geotechnical test results



# TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

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Serial No.

Queenswood School, Hatfield

S30997



**CLIENT:**

Richard Jackson Ltd  
847 The Crescent  
Colchester Business Park  
Colchester  
ESSEX  
CO4 9YQ

## *Soil Property Testing Ltd.*

15,16 & 18 Halcyon Court, St Margarets Way,  
Stukeley Meadows, Huntingdon,  
Cams. PE29 6DG.

Telephone (01480) 455579 Fax (01480) 453619  
Email enquiries@soilpropertytesting.com

**SAMPLES SUBMITTED BY:**

Richard Jackson Ltd

**APPROVED SIGNATORIES:**

- J.C.GARNER B.Eng (Hons.) FGS  
Technical Director
- S.P.TOWNEND FGS  
Quality Manager
- W.JOHNSTONE  
Materials Lab Manager

**SAMPLES LABELLED:**

Queenswood School, Hatfield

**DATE RECEIVED:** 16/02/17

**SAMPLES TESTED BETWEEN** 16/02/17 and 03/03/17

**REMARKS:** For the attention of Mr B Fagg  
Your reference 47875

- NOTES:**
- 1 All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
  - 2 (a) UKAS - United Kingdom Accreditation Service.  
(b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
  - 3 Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
  - 4 This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.





# TEST REPORT.

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## SCHEDULE OF LABORATORY TESTS

Bh./ Tp No.	Sample Ref	Depth (from)	<div style="text-align: center; font-size: small;">                     1:Moisture Content Determination                      3:Liquid /Plastic Limit 4 point                      10:PSD by Hydr. Inc pre-sieve                      700:Sulphate Test (2:1 Water Sol)                      702:Ph value of Soil or Water                      5:Wet Sieve Preparation for Limb                      7:PSD by Wet Sieve BS1377                 </div>										Remarks								
			*	*	*	*	*	*	*	*	*	*		*							
TP1	D1	1.20	*	*																	
	D2	2.00	*	*	*																
TP2	D1	1.00	*																		
	B1	1.50			*	*	*														
TP3	D1	1.10	*	*																	
TP4	D1	0.50	*																		
	D2	1.00	*	*		*	*	*													
TP5	D1	1.20	*	*																	
	B2	3.00							*												
TP6	D1	0.50	*																		
	D2	1.00	*	*																	
TP7	D1	1.20	*	*																	
	D2	2.00	*			*	*														
-	-	-	11	7	2	3	3	1	1												← Total Number of Tests →

Scheduled by: Richard Jackson Ltd

Target Date: 02/03/17



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## SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plast- icity Index (%)	Liqu- idity Index (%)	SAMPLE PREPARATION				Description	CLASS
								Method S/N	Ret'd 0.425mm (%)	Corr'd M/C <0.425mm	Curing Time (hrs.)		
TP1	1.20	D1	31	72	22	50	0.18	N	0 (A)		27	Firm mottled light grey and orange CLAY with rare fine gravel and recently active roots	CV
TP1	2.00	D2	20	42	18	24	0.08	N	0 (A)		25	Stiff orange sandy CLAY with occasional light grey mottling	CI
TP2	1.00	D1	18	-	-	-						Stiff orange slightly sandy gravelly CLAY with rare recently active roots. Gravel is fine to coarse flint	-
TP3	1.10	D1	32	82	25	57	0.12	N	0 (A)		30	Firm mottled light grey and orange CLAY with rare fine gravel and recently active roots	CV
TP4	0.50	D1	34	-	-	-						Soft mottled orange and light grey slightly sandy silty CLAY with occasional recently active and decayed roots	-
TP4	1.00	D2	19	59	22	37	0.11*	S	28 (M)	26	24	Very stiff orange slightly gravelly slightly sandy CLAY with occasional light grey mottling and rare recently active roots. Gravel is fine and medium flint	CH
TP5	1.20	D1	35	84	24	60	0.18	N	0 (A)		29	Firm mottled light grey and orange CLAY with rare fine gravel and recently active roots	CV
TP6	0.50	D1	32	-	-	-						Firm orange slightly sandy gravelly CLAY with occasional light grey mottling and rare recently active roots. Gravel is fine and medium flint	-
TP6	1.00	D2	31	68	20	48	0.23	N	0 (A)		28	Firm mottled light grey and orange CLAY locally slightly sandy with rare fine gravel and recently active roots	CH

METHOD OF PREPARATION : BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

S = Wet Sieved Specimen  
N = prepared from Natural

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter. A = Assumed, M = Measured

COMMENTS : Liquidity Index, \*=calculated liquidity index assumes material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



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## SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	SAMPLE PREPARATION				Description	CLASS
								Method S/N	Ret'd 0.425mm (%)	Corr'd M/C <0.425mm	Curing Time (hrs.)		
TP7	1.20	D1	36	76	25	51	0.22	N	0 (A)		26	Firm mottled light grey and orange CLAY with rare fine gravel and recently active and decayed roots	CV
TP7	2.00	D2	19	-	-	-						Firm mottled light grey and orange slightly gravelly slightly sandy silty CLAY with rare recently active roots. Gravel is fine and medium flint	-

METHOD OF PREPARATION : BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

S = Wet Sieved Specimen  
N = prepared from Natural

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter. A = Assumed, M = Measured

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.



# TEST REPORT.

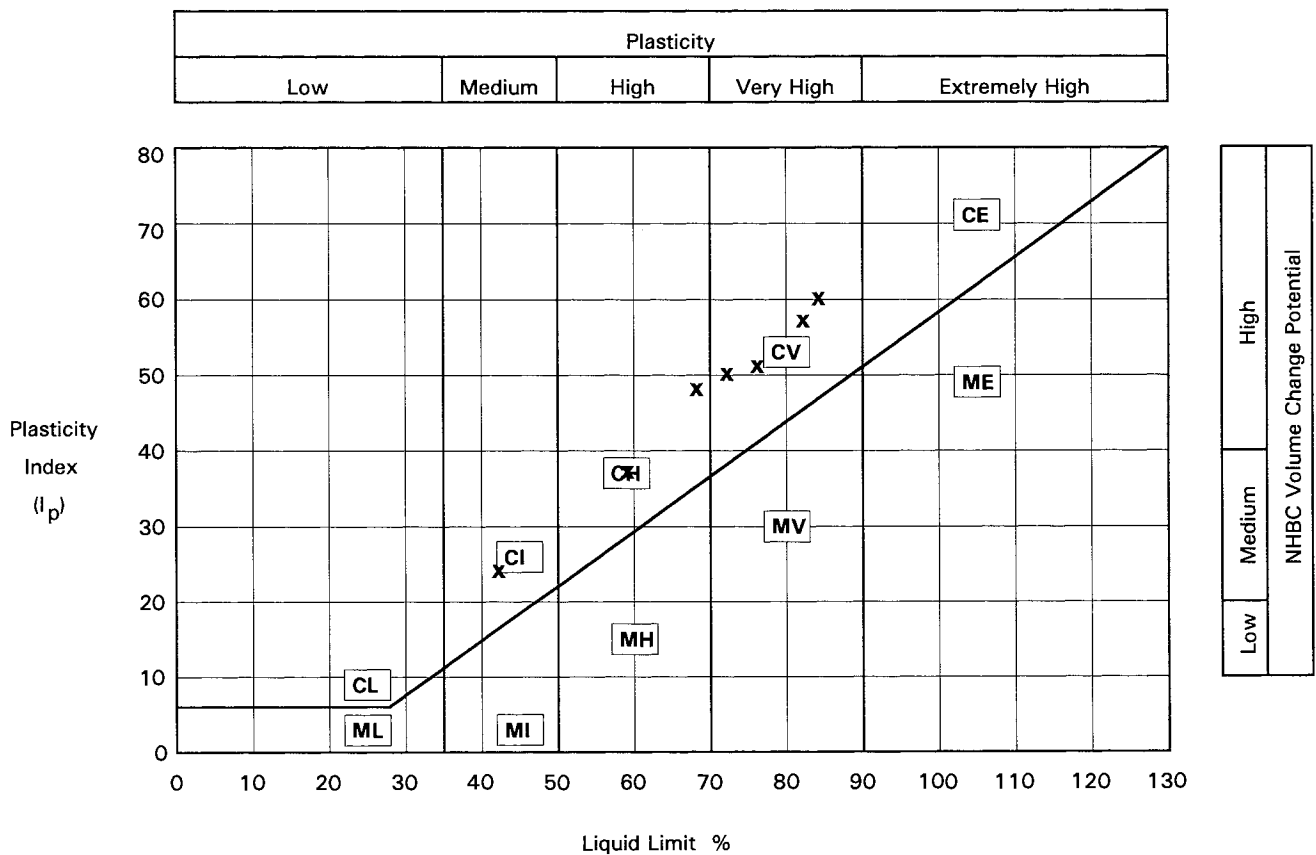
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## PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index PLASTICITY CHART BS5930:1999:Figure 18



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## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

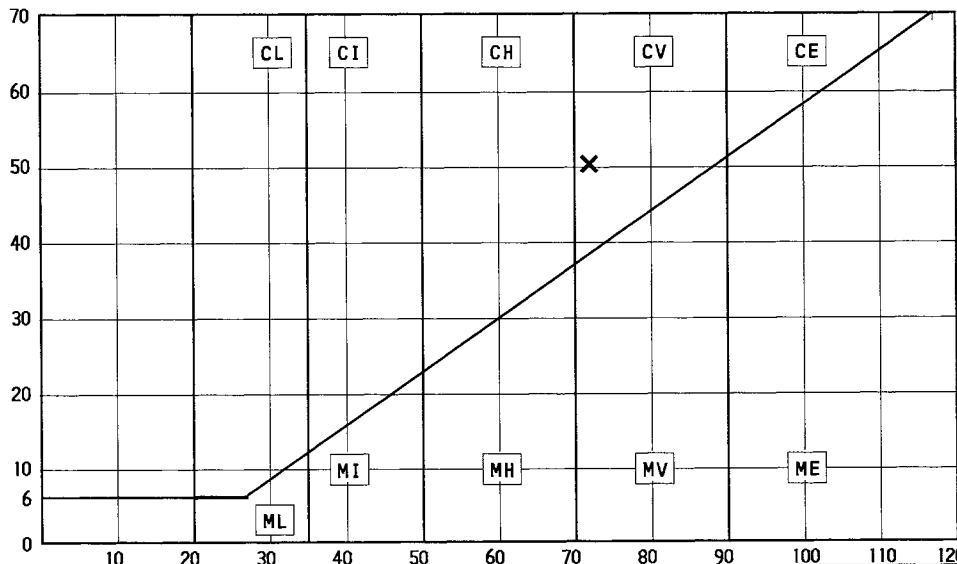
Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP1	1.20	D1	31	Firm mottled light grey and orange CLAY with rare fine gravel and recently active roots	

PREPARATION				Liquid Limit	72 %
Method of Preparation	Specimen from Natural Soil			Plastic Limit	22 %
Sample retained 0.425 sieve	(Assumed)	0 %		Plasticity Index	50 %
Corrected moisture content for material passing 0.425mm		%		Liquidity Index	0.18
Curing Time	27 Hours			Clay Content	Not analysed. %
				Derived Activity (PI/CC)	Not analysed.

C = CLAY

Plasticity  
Index %  
(I<sub>p</sub>)

M = SILT



High	NHBC Volume Change Potential
Medium	
Low	

Liquid Limit %

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)  
<1% gravel by dry mass picked out by hand and excluded from limits tests.



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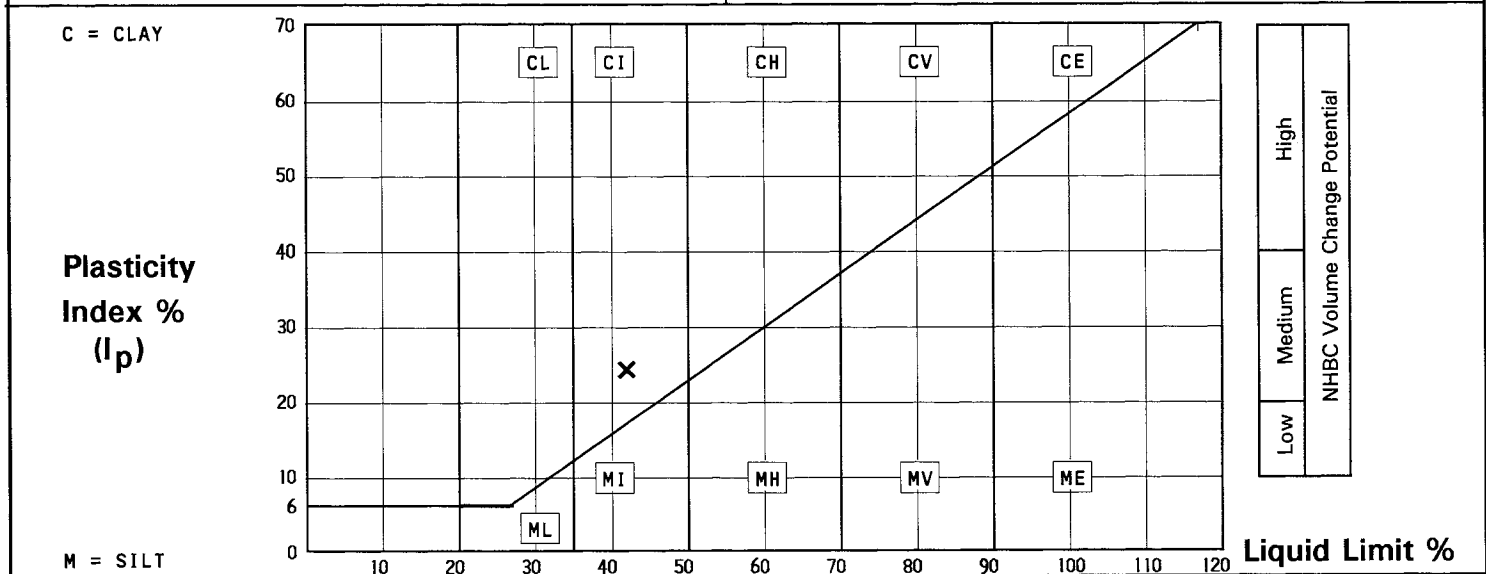
Serial No.  
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## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP1	2.00	D2	20	Stiff orange sandy CLAY with occasional light grey mottling	

PREPARATION				Liquid Limit	42 %
Method of Preparation	Specimen from Natural Soil			Plastic Limit	18 %
Sample retained 0.425 sieve	(Assumed)	0 %	Plasticity Index	24 %	
Corrected moisture content for material passing 0.425mm				Liquidity Index	0.08
Curing Time	25 Hours			Clay Content	29 %
				Derived Activity (PI/CC)	0.83



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)  
<1% gravel by dry mass picked out by hand and excluded from limits tests.



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S30997



## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

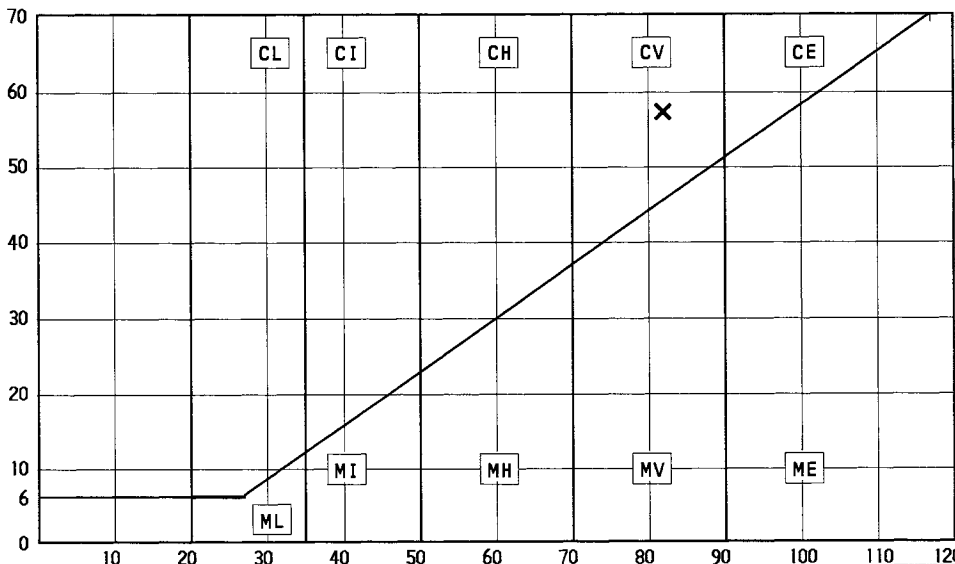
Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP3	1.10	D1	32	Firm mottled light grey and orange CLAY with rare fine gravel and recently active roots	

PREPARATION				Liquid Limit	82 %
Method of Preparation Specimen from Natural Soil				Plastic Limit	25 %
Sample retained 0.425 sieve (Assumed) 0 %				Plasticity Index	57 %
Corrected moisture content for material passing 0.425mm %				Liquidity Index	0.12
Curing Time 30 Hours				Clay Content	Not analysed. %
				Derived Activity (PI/CC)	Not analysed.

C = CLAY

Plasticity  
Index %  
(I<sub>p</sub>)

M = SILT



High	NHBC Volume Change Potential
Medium	
Low	

Liquid Limit %

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)



# TEST REPORT.

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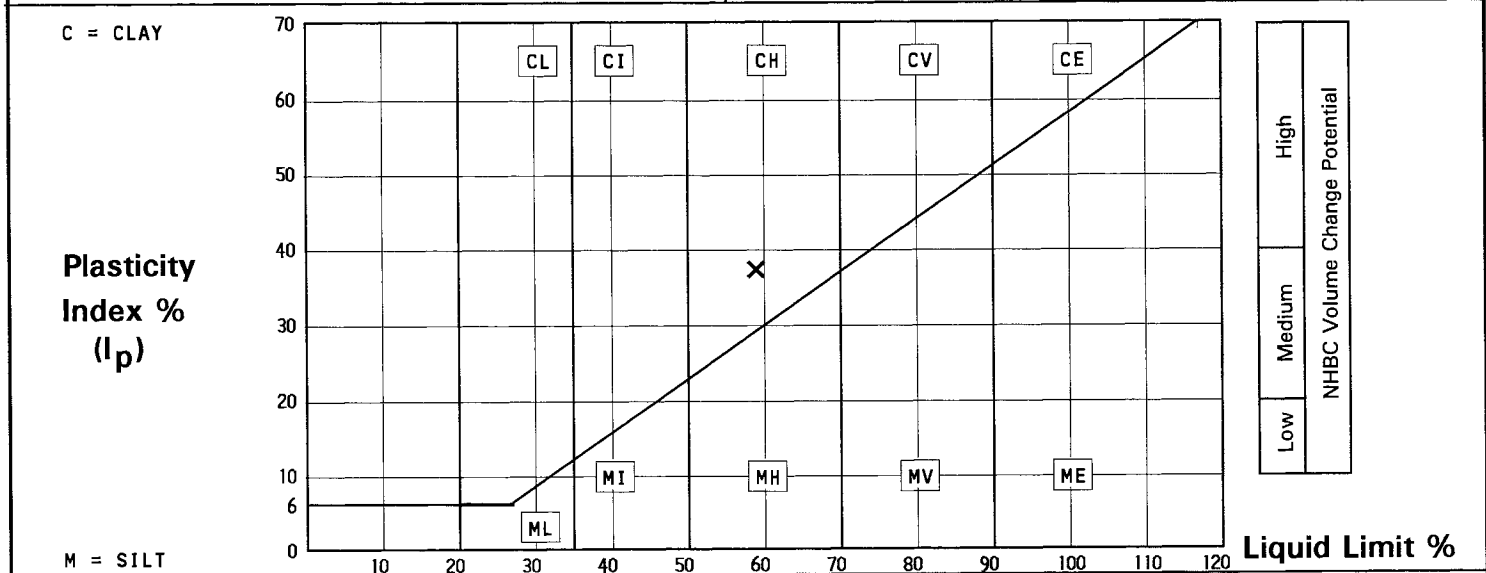
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## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP4	1.00	D2	19	Very stiff orange slightly gravelly slightly sandy CLAY with occasional light grey mottling and rare recently active roots. Gravel is fine and medium flint	

PREPARATION				Liquid Limit	59 %
Method of Preparation Sieved Specimen				Plastic Limit	22 %
Sample retained 0.425 sieve (Measured)			28 %	Plasticity Index	37 %
Corrected moisture content for material passing 0.425mm			26 %	Liquidity Index	0.11
Curing Time			24 Hours	Clay Content	Not analysed. %
				Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)  
3% retained on 2mm sieve.  
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.





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## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

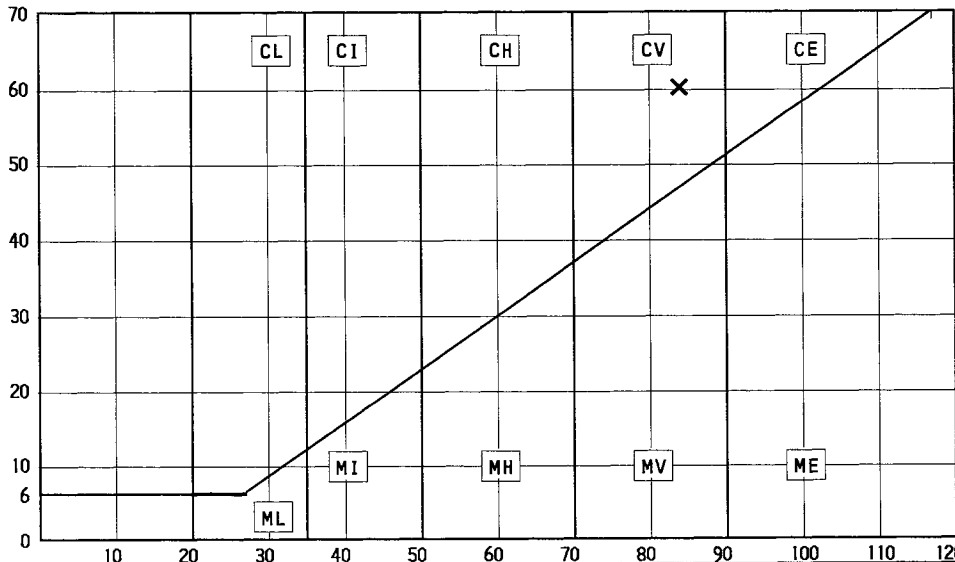
Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP5	1.20	D1	35	Firm mottled light grey and orange CLAY with rare fine gravel and recently active roots	

PREPARATION				Liquid Limit	84 %
Method of Preparation Specimen from Natural Soil				Plastic Limit	24 %
Sample retained 0.425 sieve (Assumed) 0 %				Plasticity Index	60 %
Corrected moisture content for material passing 0.425mm %				Liquidity Index	0.18
Curing Time 29 Hours				Clay Content	Not analysed. %
				Derived Activity (PI/CC)	Not analysed.

C = CLAY

Plasticity  
Index %  
(I<sub>p</sub>)

M = SILT



High	NHBC Volume Change Potential
Medium	
Low	

Liquid Limit %

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)



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## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

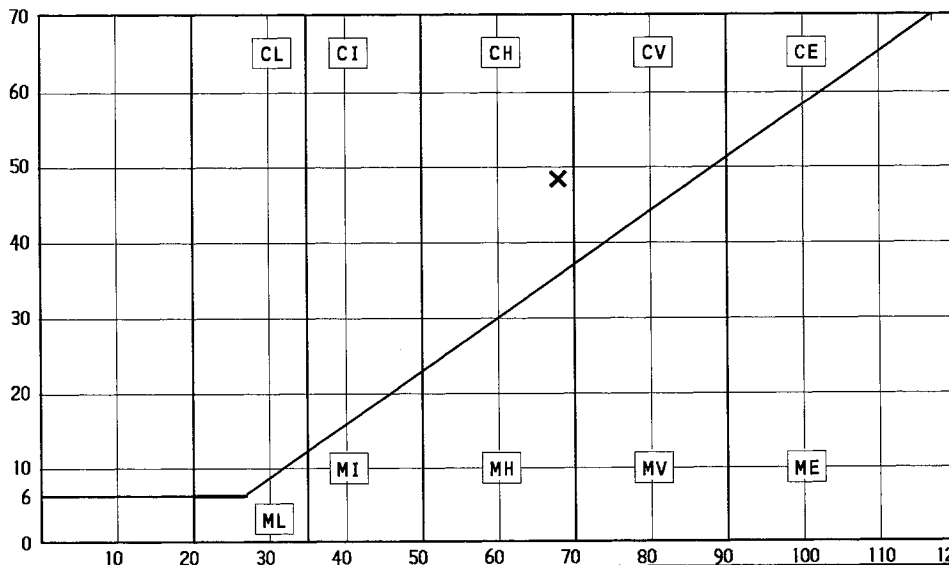
Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP6	1.00	D2	31	Firm mottled light grey and orange CLAY locally slightly sandy with rare fine gravel and recently active roots	

PREPARATION				Liquid Limit	68 %
Method of Preparation	Specimen from Natural Soil			Plastic Limit	20 %
Sample retained 0.425 sieve	(Assumed)	0 %		Plasticity Index	48 %
Corrected moisture content for material passing 0.425mm		%		Liquidity Index	0.23
Curing Time	28 Hours			Clay Content	Not analysed. %
				Derived Activity (PI/CC)	Not analysed.

C = CLAY

Plasticity  
Index %  
(I<sub>p</sub>)

M = SILT



High	NHBC Volume Change Potential
Medium	
Low	

Liquid Limit %

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)



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## DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

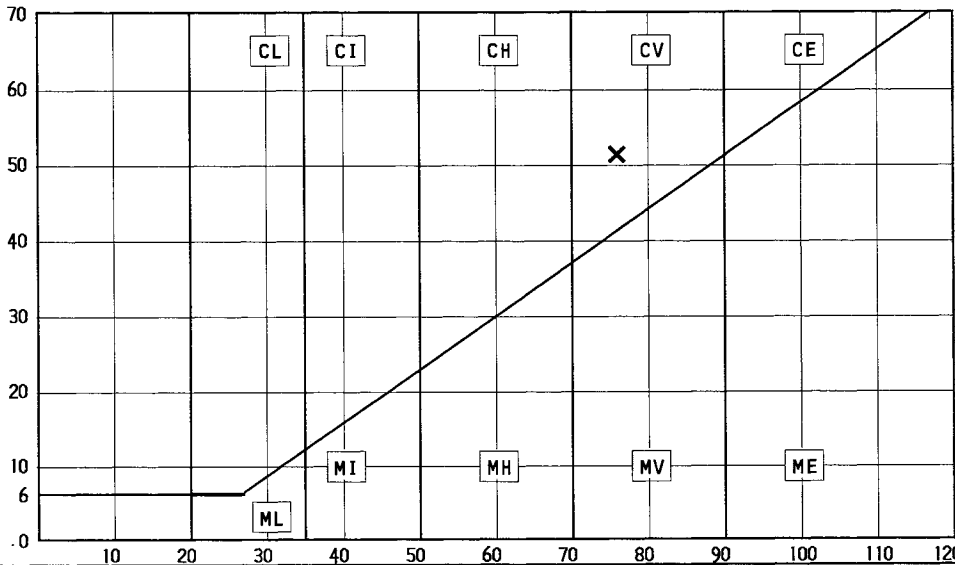
Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
TP7	1.20	D1	36	Firm mottled light grey and orange CLAY with rare fine gravel and recently active and decayed roots	One piece of coarse flint excluded from tests as unrepresentative

PREPARATION				Liquid Limit	76 %
Method of Preparation	Specimen from Natural Soil			Plastic Limit	25 %
Sample retained 0.425 sieve	(Assumed)	0 %	Plasticity Index	51 %	
Corrected moisture content for material passing 0.425mm				Liquidity Index	0.22
Curing Time	26 Hours			Clay Content	Not analysed. %
				Derived Activity (PI/CC)	Not analysed.

C = CLAY

Plasticity Index %  
(I<sub>p</sub>)

M = SILT



High	NHBC Volume Change Potential
Medium	
Low	

Liquid Limit %

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.3, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18  
VOLUME CHANGE POTENTIAL: NHBC Standards Chapter 4.2 Unmodified Plasticity Index  
NOTE: Modified Plasticity Index I'<sub>p</sub> = I<sub>p</sub> x (% less than 425 microns/100)



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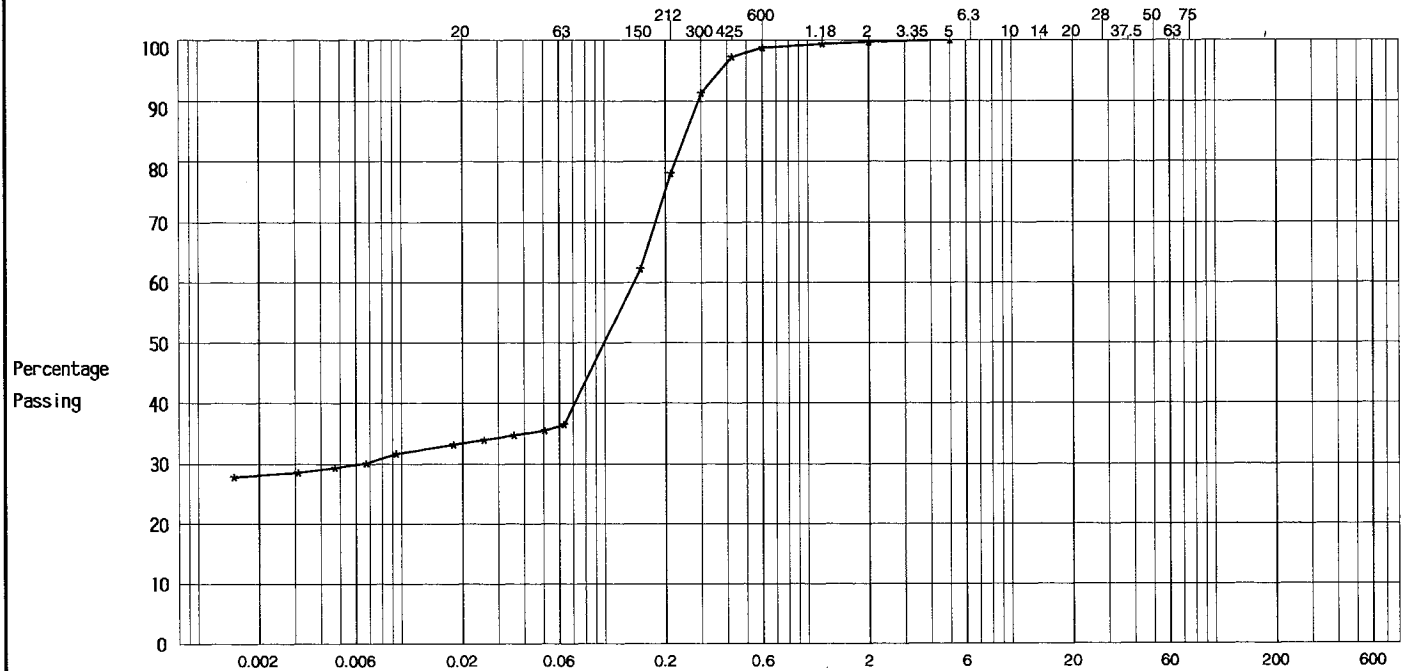


## DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole/ Pit No.	Depth m.	Sample	Description	Remarks
TP1	2.00	D2	Stiff orange sandy CLAY with occasional light grey mottling	

Method of Test: Wet Sieve + Hydrometer      Method of pre-treatment: Not required

Sieve Size	Size (microns)														Size (mm)											
	1.5	3.1	4.7	6.7	9.4	18	25.4	35.8	50.5	63	150	212	300	425	600	1.18	2	5	6.3	10	14	20	28	37.5	50	75
Percentage by Mass passing Sieve	28	29	29	30	32	33	34	35	35	36	62	78	91	97	99	99	100	100	-	-	-	-	-	-	-	-



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.3 & 7.4.5

METHOD OF TEST : BS 1377:PART 2:1990:9.2 + 9.5

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.