

Hand pit Photographs HP01



Hand pit Photographs HP03



Hand pit Photographs HP03



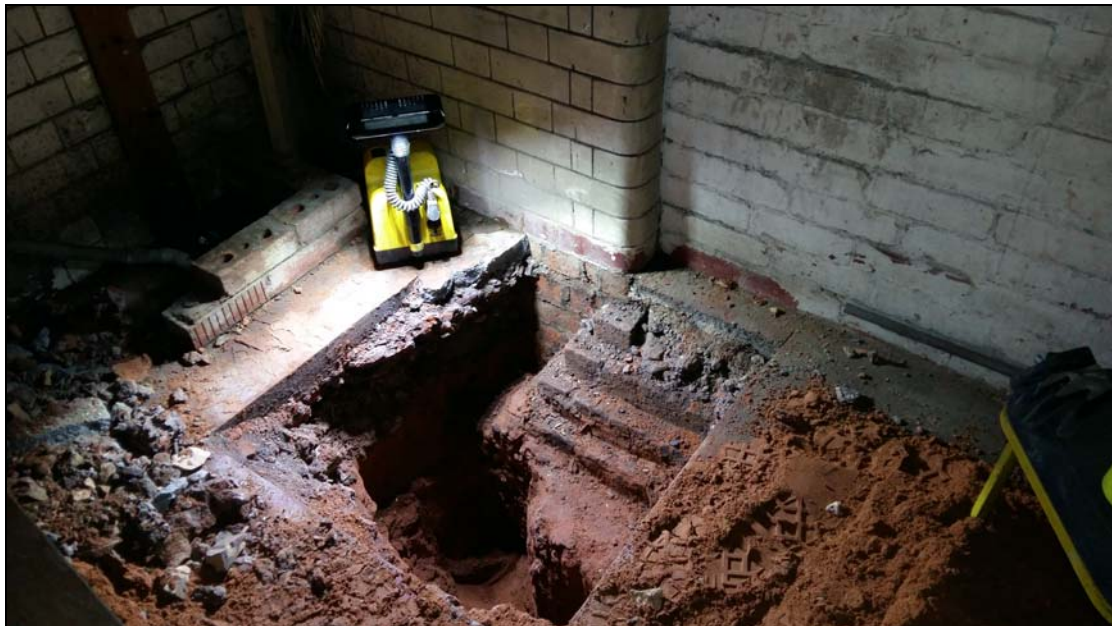
Hand pit Photographs HP04



Hand pit Photographs HP04



Hand pit Photographs HP06



Hand pit Photographs HP07



Hand pit Photographs HP07



Hand pit Photographs HP08

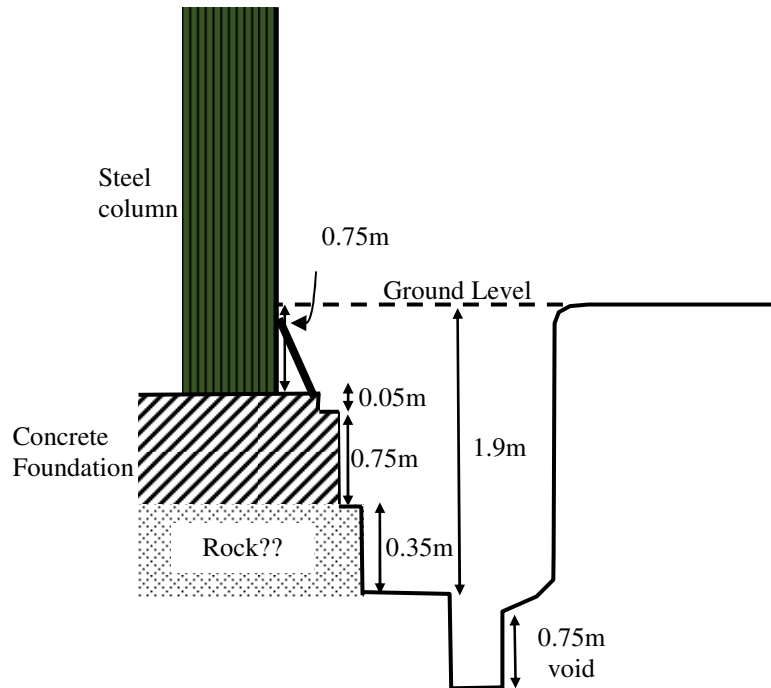


Hand pit Photographs HP08

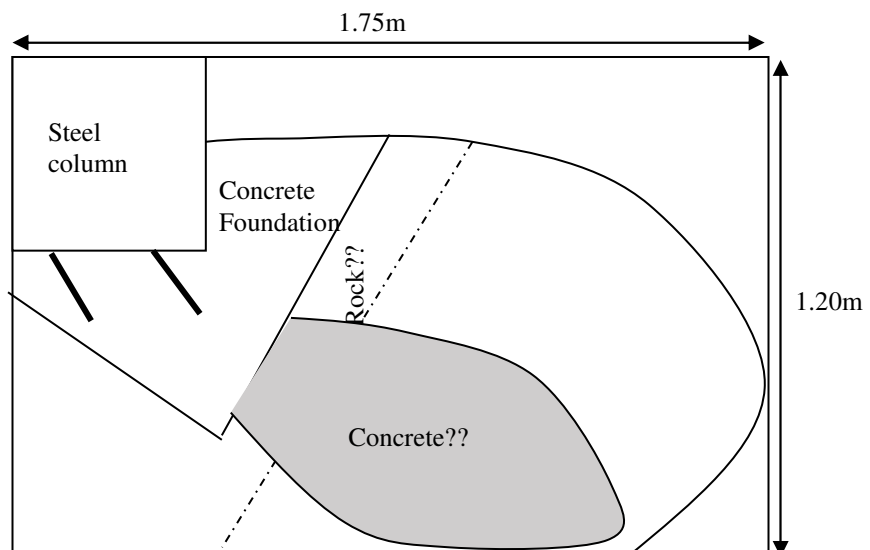


Hand Pit Drawings HP01

Cross Section

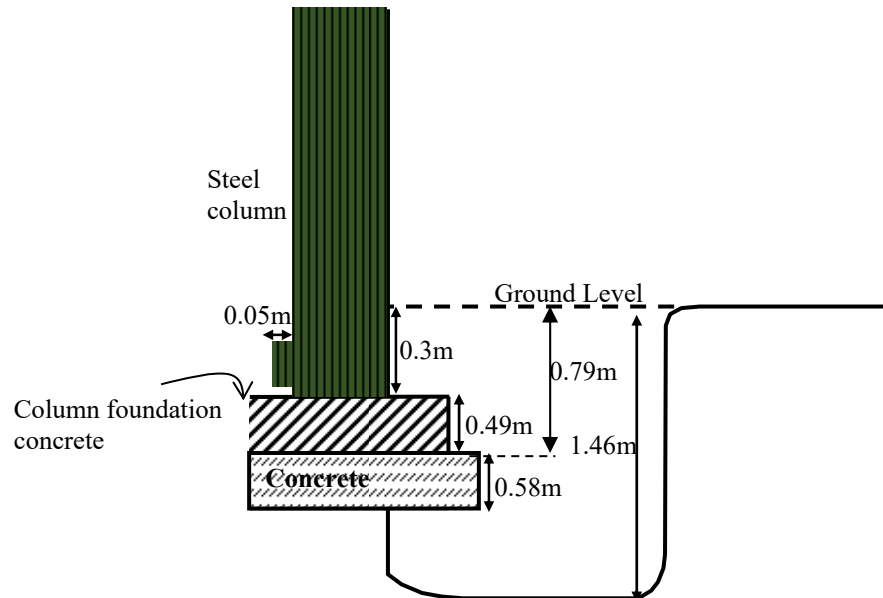


Plan View

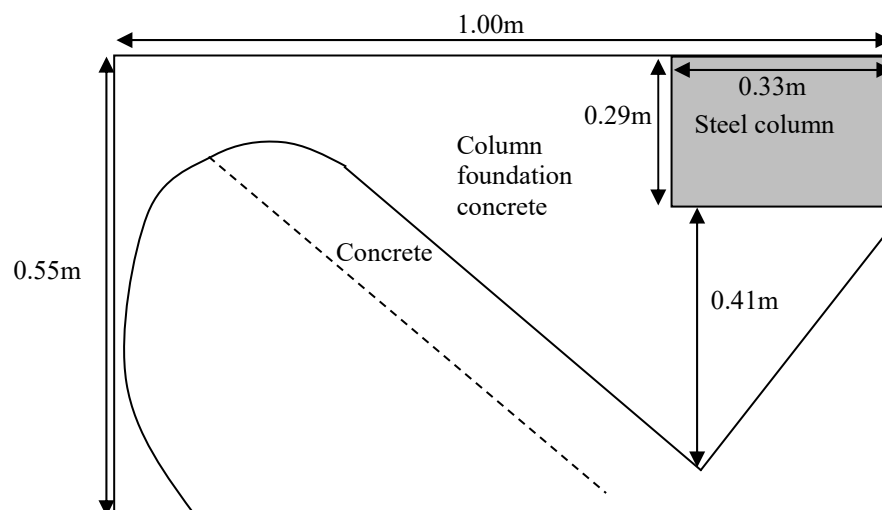


Foundation Pit Drawings HP03

Cross Section

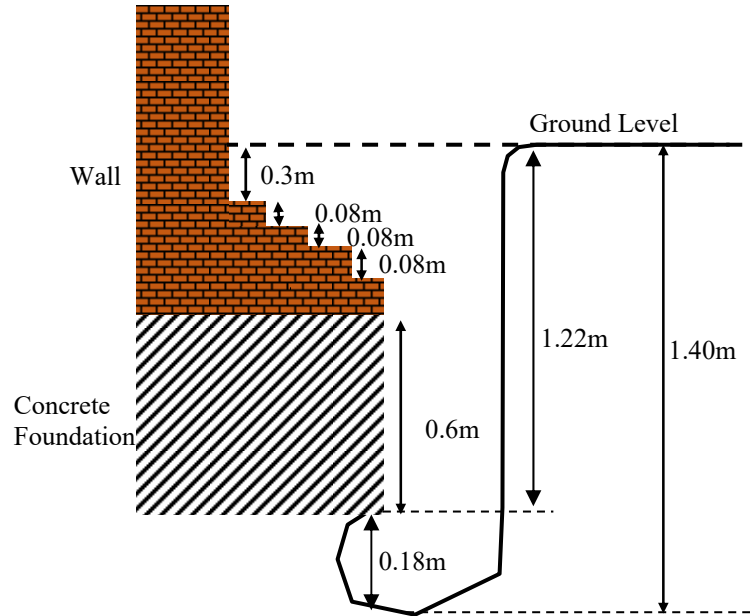


Plan View

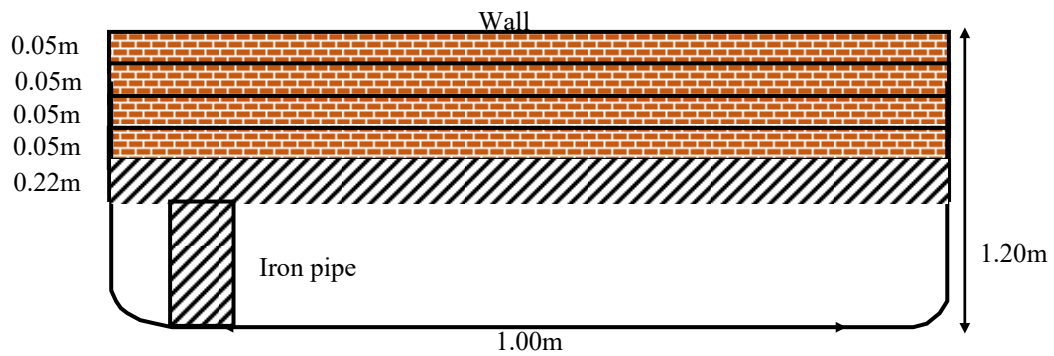


Hand Pit Drawings HP04

Cross Section

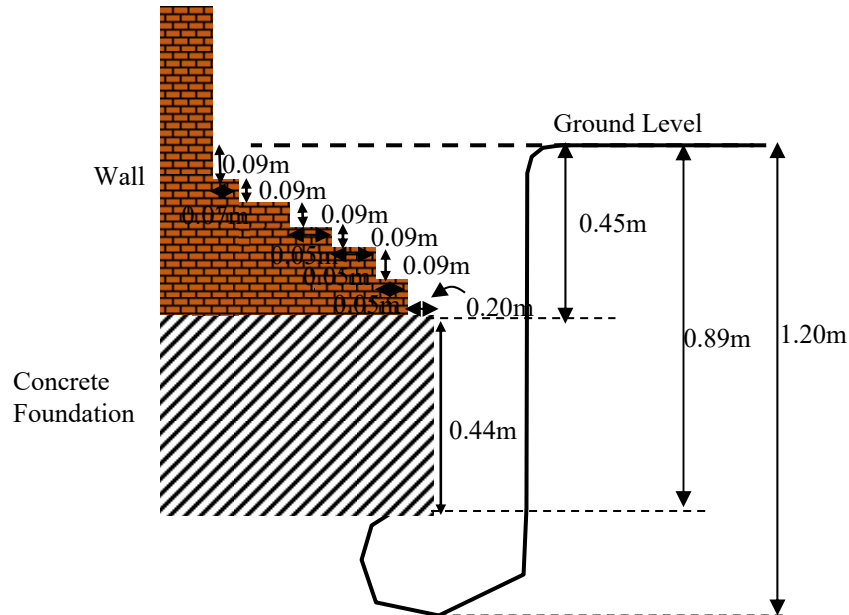


Plan View

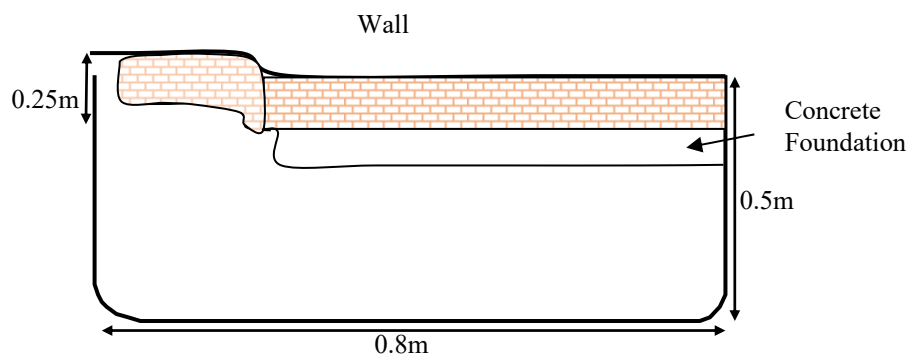


Hand Pit Drawings HP06

Cross Section

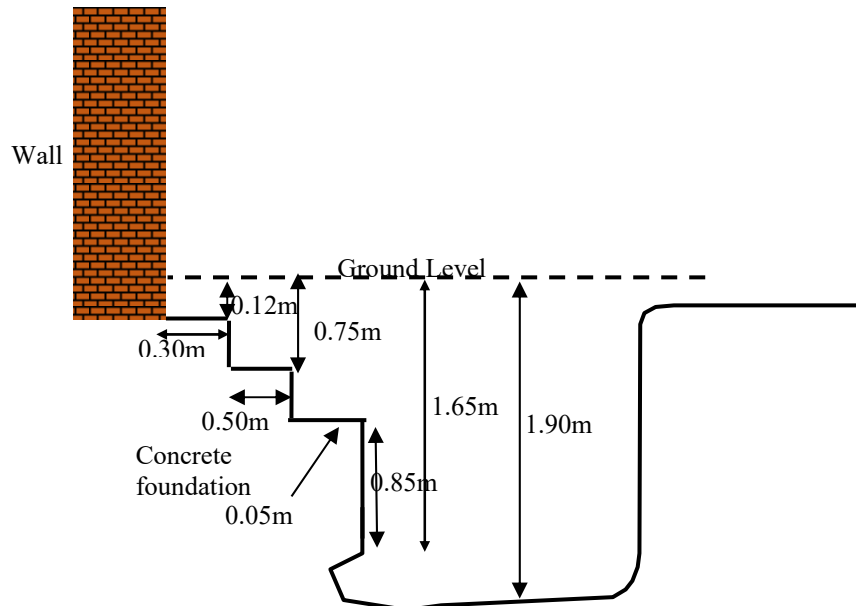


Plan View

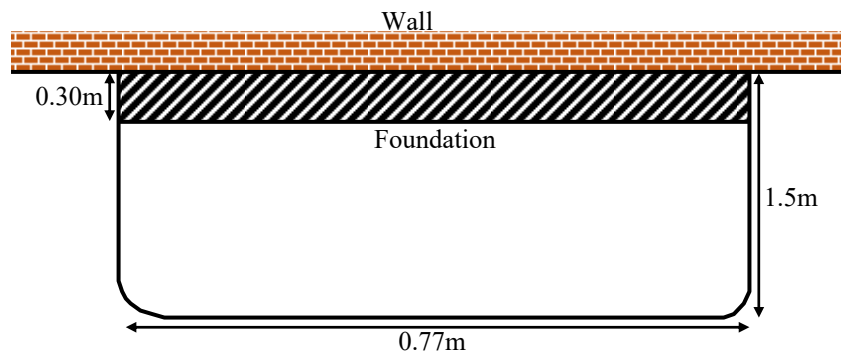


Hand Pit Drawings HP08

Cross Section



Plan View



Trial pit Photographs TP02



Trial pit Photographs TP02



Trial pit Photographs TP03



Trial pit Photographs TP03



Trial pit Photographs TP04

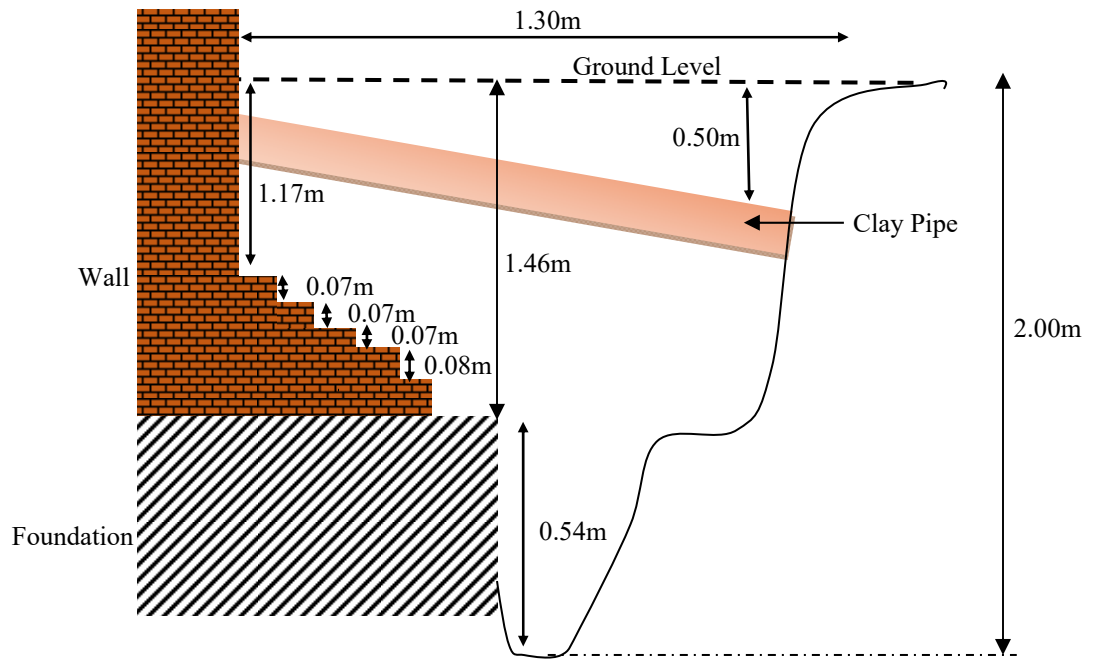


Trial pit Photographs TP04

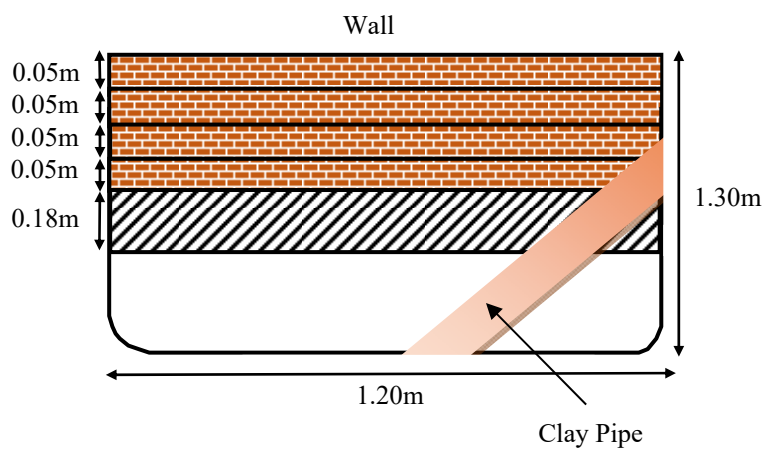


Trial Pit Drawings TP02

Cross Section

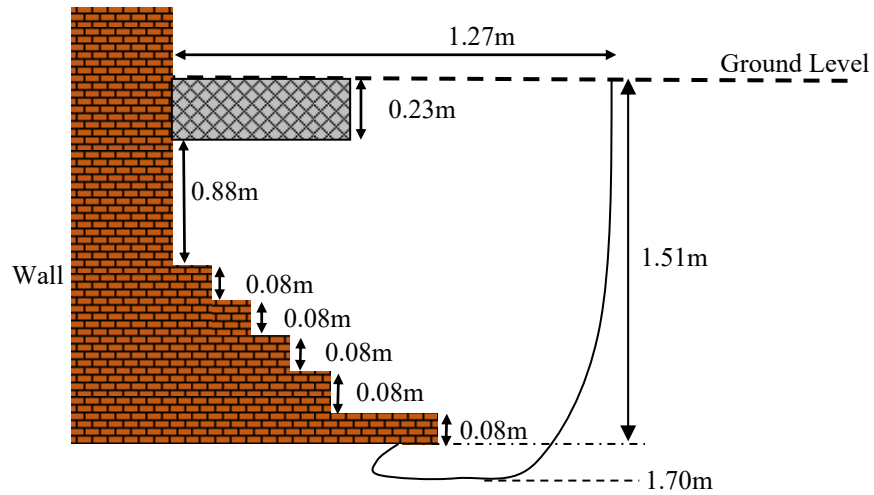


Plan View

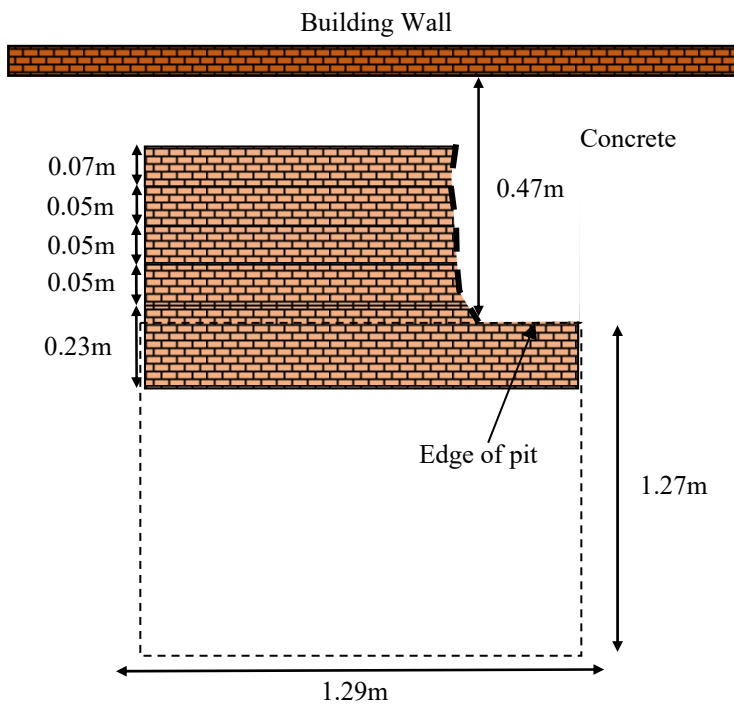


Trial Pit Drawings TP03

Cross Section

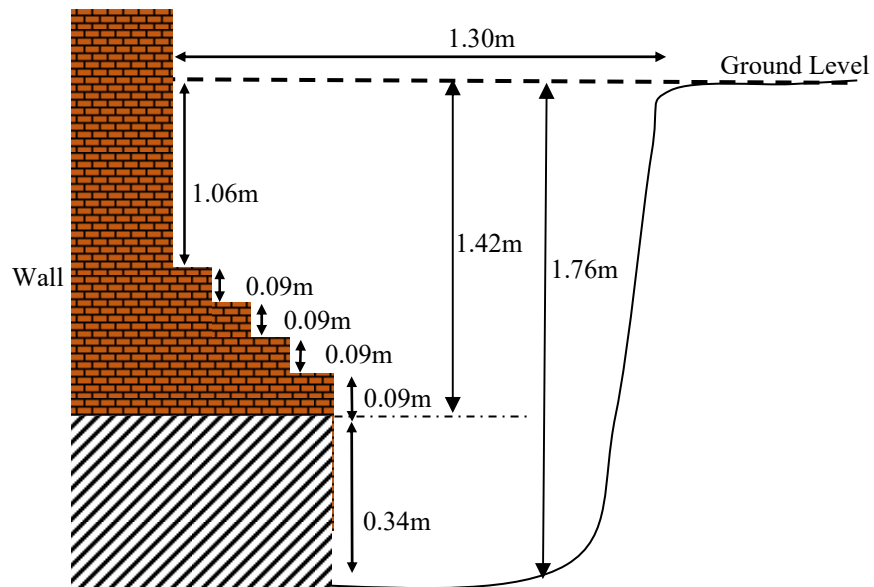


Plan View

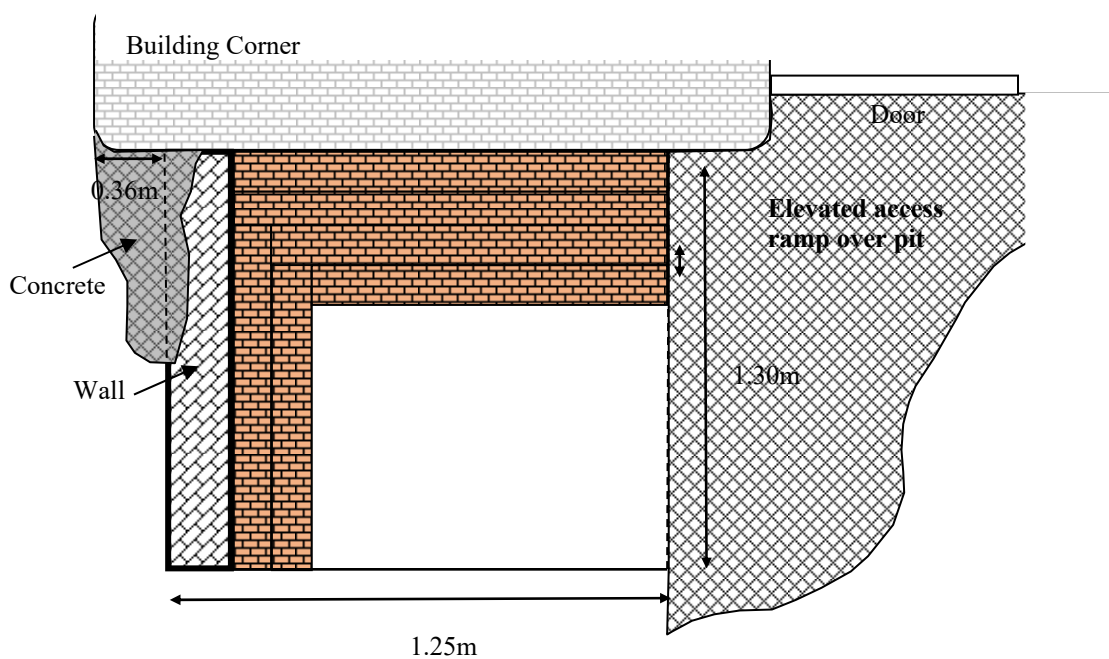


Trial Pit Drawings TP04

Cross Section



Plan View



Core Photographs BH 102

Runs 1, 2 & 3 10.00m – 14.50m



Core Photographs BH 102

Runs 3 & 4 14.50m – 17.00m



Appendix A3 – Laboratory Testing & Monitoring Results

- Scientific Analysis Laboratories Ltd, Environmental Chemistry Analysis Results (Soil), Certificate No. 597753 (14/10/2016).
- Dets Ltd Environmental Chemistry Analysis Results (Soil), Certificate No. 16-78192 (14/09/2016).
- Geotechnical Analysis Results:
 - Archway Engineering (UK) Ltd, SPT Hammer Energy Test Report, Ref. AR1181 (12/01/2016)
 - SPT 'N' Value versus Depth graph
 - Dynamic Sampling UK Ltd, Hammer Energy Test Report, Ref. 110.45.LT (27/06/2016)
 - Ian Farmers Ltd Test Report, Ref. 41953/1 (29/09/2016)
 - Ian Farmers Ltd Point Load Strength Index Test Results, Ref. 41953R/1 (21/09/2016)
- Gas Monitoring Visit 1-3 Results

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: Supplemental to 597753-1

Date of Report: 14-Oct-2016

Customer: Curtins Consulting Ltd.
Rose Wharf
Ground Floor
East Street Leeds
LS9 8EE

Customer Contact: Niall Farnworth

Customer Job Reference: B061230

Customer Purchase Order: EBMA260

Customer Site Reference: London Road Fire Station

Date Job Received at SAL: 26-Aug-2016

Date Analysis Started: 06-Sep-2016

Date Analysis Completed: 16-Sep-2016

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with SAL SOPs

All results have been reviewed in accordance with Section 25 of the SAL Quality Manual



Report checked
and authorised by :
Bianca Prince
Customer Service Manager

Issued by :
Bianca Prince
Customer Service Manager

SAL Reference: 597753 Project Site: London Road Fire Station Customer Reference: B061230 Soil Analysed as Soil Heavy Metals(9)									
SAL Reference				597753 001	597753 002	597753 003	597753 004	597753 005	
Customer Sample Reference				BH01 ES1	BH01 ES5	BH01 ES7	BH02 ES1	BH02 ES9	
Depth				0.2	1.7	2.7	0.2	2.7	
Date Sampled				26-AUG-2016	26-AUG-2016	26-AUG-2016	30-AUG-2016	30-AUG-2016	
Type				Clay	Sandy Soil	Clay	Sandy Soil	Clay	
Determinand	Method	Test Sample	LOD	Units					
Arsenic	T6	M40	2	mg/kg	12	9	8	17	9
Cadmium	T6	M40	1	mg/kg	1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	16	15	22	14	27
Copper	T6	M40	1	mg/kg	46	39	33	280	27
Lead	T6	M40	1	mg/kg	350	110	56	110	27
Mercury	T6	M40	1	mg/kg	2	17	8	1	1
Nickel	T6	M40	1	mg/kg	16	19	25	17	30
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	400	260	100	160	83

SAL Reference: 597753 Project Site: London Road Fire Station Customer Reference: B061230 Soil Analysed as Soil Heavy Metals(9)									
SAL Reference				597753 006	597753 007	597753 008	597753 009	597753 010	
Customer Sample Reference				BH03 ES1	BH03 ES3	BH03 ES7	TP02	TP03	
Depth				0.2	0.7	2.7	0.5	0.6	
Date Sampled				25-AUG-2016	25-AUG-2016	25-AUG-2016	01-SEP-2016	01-SEP-2016	
Type				Sandy Soil	Sandy Soil	Clay	Clay	Clay	
Determinand	Method	Test Sample	LOD	Units					
Arsenic	T6	M40	2	mg/kg	16	21	8	21	19
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	20	22	26	22	25
Copper	T6	M40	1	mg/kg	69	68	26	56	67
Lead	T6	M40	1	mg/kg	410	450	24	120	160
Mercury	T6	M40	1	mg/kg	2	3	1	1	2
Nickel	T6	M40	1	mg/kg	20	24	33	30	32
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	300	170	64	110	160

SAL Reference: 597753 Project Site: London Road Fire Station Customer Reference: B061230 Soil Analysed as Soil Heavy Metals(9)									
SAL Reference				597753 011	597753 012				
Customer Sample Reference				WS03	WS03				
Depth				0.4	0.8				
Date Sampled				31-AUG-2016	31-AUG-2016				
Type				Sandy Soil	Clay				
Determinand	Method	Test Sample	LOD	Units					
Arsenic	T6	M40	2	mg/kg	26	10			
Cadmium	T6	M40	1	mg/kg	<1	<1			
Chromium	T6	M40	1	mg/kg	16	32			
Copper	T6	M40	1	mg/kg	110	29			
Lead	T6	M40	1	mg/kg	360	22			
Mercury	T6	M40	1	mg/kg	1	1			
Nickel	T6	M40	1	mg/kg	27	38			
Selenium	T6	M40	3	mg/kg	<3	<3			
Zinc	T6	M40	1	mg/kg	200	67			

SAL Reference: 597753									
Project Site: London Road Fire Station									
Customer Reference: B061230									
Soil					Analysed as Soil				
Curtins Suite A									
SAL Reference					597753 001	597753 002	597753 004	597753 006	597753 007
Customer Sample Reference					BH01 ES1	BH01 ES5	BH02 ES1	BH03 ES1	BH03 ES3
Depth					0.2	1.7	0.2	0.2	0.7
Date Sampled					26-AUG-2016	26-AUG-2016	30-AUG-2016	25-AUG-2016	25-AUG-2016
Type					Clay	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Asbestos ID	T27	AR			N.D.	N.D.	N.D.	N.D.	N.D.
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1
pH	T7	AR			10.6	9.1	8.5	8.4	8.2
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1
Soil Organic Matter	T287	M40	0.1	%	3.1	2.9	11	5.2	6.2
SO4(Total)	T6	M40	0.01	%	0.37	0.07	0.17	0.24	0.13
Sulphide	T4	AR	10	mg/kg	<10	<10	<10	<10	<10
Sulphur (total)	T6	M40	0.01	%	0.12	0.02	0.06	0.06	0.04

SAL Reference: 597753								
Project Site: London Road Fire Station								
Customer Reference: B061230								
Soil			Analysed as Soil					
Curtins Suite A								
SAL Reference					597753 009	597753 010	597753 011	
Customer Sample Reference					TP02	TP03	WS03	
Depth					0.5	0.6	0.4	
Date Sampled					01-SEP-2016	01-SEP-2016	31-AUG-2016	
Type					Clay	Clay	Sandy Soil	
Determinand	Method	Test Sample	LOD	Units				
Asbestos ID	T27	AR			N.D.	N.D.	N.D.	
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	
pH	T7	AR			8.1	8.2	8.9	
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1	
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	
Soil Organic Matter	T287	M40	0.1	%	7.7	6.6	24	
SO4(Total)	T6	M40	0.01	%	0.18	0.08	0.38	
Sulphide	T4	AR	10	mg/kg	<10	<10	<10	
Sulphur (total)	T6	M40	0.01	%	0.05	0.03	0.12	

SAL Reference: 597753							
Project Site: London Road Fire Station							
Customer Reference: B061230							
Soil				Analysed as Soil			
TPH (CWG)							
SAL Reference					597753 009	597753 010	597753 011
Customer Sample Reference					TP02	TP03	WS03
Depth					0.5	0.6	0.4
Date Sampled					01-SEP-2016	01-SEP-2016	31-AUG-2016
Type					Clay	Clay	Sandy Soil
Determinand	Method	Test Sample	LOD	Units			
Benzene	T54	AR	1	µg/kg	(13) <1	(13) <1	(13) <1
Toluene	T54	AR	1	µg/kg	(13) 2	(13) <1	(13) 2
EthylBenzene	T54	AR	1	µg/kg	<1	<1	<1
M/P Xylene	T54	AR	1	µg/kg	<1	<1	<1
O Xylene	T54	AR	1	µg/kg	<1	<1	<1
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	<1	<1	<1
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	0.61
TPH (C10-C12 aliphatic)	T8	M105	1	mg/kg	(13) <1	(13) <1	(13) <1
TPH (C12-C16 aliphatic)	T8	M105	1	mg/kg	(13) <1	(13) <1	(13) <1
TPH (C16-C21 aliphatic)	T8	M105	1	mg/kg	(13) <1	(13) <1	(13) 1
TPH (C21-C35 aliphatic)	T8	M105	1	mg/kg	(13) 4	(13) 2	(13) 11
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	<0.010	<0.010	<0.010
TPH (C10-C12 aromatic)	T8	M105	1	mg/kg	(13) <1	(13) <1	(13) <1
TPH (C12-C16 aromatic)	T8	M105	1	mg/kg	(13) 3	(13) 2	(13) 7
TPH (C16-C21 aromatic)	T8	M105	1	mg/kg	(13) 7	(13) 6	(13) 31
TPH (C21-C35 aromatic)	T8	M105	1	mg/kg	(13) 15	(13) 9	(13) 55

SAL Reference: 597753 Project Site: London Road Fire Station Customer Reference: B061230 Soil MCERTS Preparation Analysed as Soil									
SAL Reference				597753 001	597753 002	597753 003	597753 004	597753 005	
Customer Sample Reference				BH01 ES1	BH01 ES5	BH01 ES7	BH02 ES1	BH02 ES9	
Depth				0.2	1.7	2.7	0.2	2.7	
Date Sampled				26-AUG-2016	26-AUG-2016	26-AUG-2016	30-AUG-2016	30-AUG-2016	
Type				Clay	Sandy Soil	Clay	Sandy Soil	Clay	
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	23	15	17	16	16

SAL Reference: 597753 Project Site: London Road Fire Station Customer Reference: B061230									
Soil					Analysed as Soil				
MCERTS Preparation									
SAL Reference				597753 006	597753 007	597753 008	597753 009	597753 010	
Customer Sample Reference				BH03 ES1	BH03 ES3	BH03 ES7	TP02	TP03	
Depth				0.2	0.7	2.7	0.5	0.6	
Date Sampled				25-AUG-2016	25-AUG-2016	25-AUG-2016	01-SEP-2016	01-SEP-2016	
Type				Sandy Soil	Sandy Soil	Clay	Clay	Clay	
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	18	20	14	21	25

SAL Reference: 597753 Project Site: London Road Fire Station Customer Reference: B061230 Soil Analysed as Soil MCERTS Preparation						
SAL Reference			597753 011		597753 012	
Customer Sample Reference			WS03		WS03	
Depth			0.4		0.8	
Date Sampled			31-AUG-2016		31-AUG-2016	
Type			Sandy Soil		Clay	
Determinand	Method	Test Sample	LOD	Units		
Moisture @105C	T162	AR	0.1	%	13	15

SAL Reference: 597753														
Project Site: London Road Fire Station														
Customer Reference: B061230														
Soil					Analysed as Soil									
Total and Speciated USEPA16 PAH														
SAL Reference					597753 001		597753 002		597753 003		597753 004		597753 005	
Customer Sample Reference					BH01 ES1		BH01 ES5		BH01 ES7		BH02 ES1		BH02 ES9	
Depth					0.2		1.7		2.7		0.2		2.7	
Date Sampled					26-AUG-2016		26-AUG-2016		26-AUG-2016		30-AUG-2016		30-AUG-2016	
Type					Clay		Sandy Soil		Clay		Sandy Soil		Clay	
Determinand		Method	Test Sample	LOD	Units									
Naphthalene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	2.2	<0.1				
Acenaphthylene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1				
Acenaphthene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	1.8	<0.1				
Fluorene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	1.7	<0.1				
Phenanthrene		T207	M105	0.1	mg/kg	0.2	0.2	<0.1	11	<0.1				
Anthracene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	4.0	<0.1				
Fluoranthene		T207	M105	0.1	mg/kg	0.3	0.3	<0.1	9.6	<0.1				
Pyrene		T207	M105	0.1	mg/kg	0.3	0.3	<0.1	9.3	<0.1				
Benzo(a)Anthracene		T207	M105	0.1	mg/kg	0.2	0.1	<0.1	6.5	<0.1				
Chrysene		T207	M105	0.1	mg/kg	0.2	0.1	<0.1	7.5	<0.1				
Benzo(b/k)Fluoranthene		T207	M105	0.1	mg/kg	0.2	0.2	<0.1	11	<0.1				
Benzo(a)Pyrene		T207	M105	0.1	mg/kg	0.2	<0.1	<0.1	6.7	<0.1				
Indeno(123-cd)Pyrene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	4.2	<0.1				
Dibenzo(ah)Anthracene		T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	1.2	<0.1				
Benzo(ghi)Perylene		T207	M105	0.1	mg/kg	0.1	<0.1	<0.1	5.0	<0.1				
PAH(total)		T207	M105	0.1	mg/kg	1.7	1.2	<0.1	82	<0.1				

SAL Reference: 597753									
Project Site: London Road Fire Station									
Customer Reference: B061230									
Soil					Analysed as Soil				
Total and Speciated USEPA16 PAH									
SAL Reference					597753 006	597753 007	597753 008	597753 009	597753 010
Customer Sample Reference					BH03 ES1	BH03 ES3	BH03 ES7	TP02	TP03
Depth					0.2	0.7	2.7	0.5	0.6
Date Sampled					25-AUG-2016	25-AUG-2016	25-AUG-2016	01-SEP-2016	01-SEP-2016
Type					Sandy Soil	Sandy Soil	Clay	Clay	Clay
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	1.1	0.4	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	0.7	0.3	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	1.0	0.4	<0.1	0.1	0.1
Fluorene	T207	M105	0.1	mg/kg	1.4	0.7	<0.1	<0.1	0.1
Phenanthrene	T207	M105	0.1	mg/kg	7.7	4.0	<0.1	1.3	1.3
Anthracene	T207	M105	0.1	mg/kg	2.2	1.0	<0.1	0.3	0.3
Fluoranthene	T207	M105	0.1	mg/kg	8.6	3.6	<0.1	1.7	1.7
Pyrene	T207	M105	0.1	mg/kg	8.4	3.5	<0.1	1.8	1.8
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	5.2	1.8	<0.1	0.8	0.9
Chrysene	T207	M105	0.1	mg/kg	6.0	2.1	<0.1	0.9	0.9
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	8.5	2.5	<0.1	1.2	1.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	5.1	1.5	<0.1	0.7	0.6
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	2.6	0.7	<0.1	0.4	0.3
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	0.8	0.2	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	2.9	0.9	<0.1	0.4	0.3
PAH(total)	T207	M105	0.1	mg/kg	62	24	<0.1	9.6	9.5

SAL Reference: 597753						
Project Site: London Road Fire Station						
Customer Reference: B061230						
Soil		Analysed as Soil				
Total and Speciated USEPA16 PAH						
SAL Reference					597753 011	597753 012
Customer Sample Reference					WS03	WS03
Depth					0.4	0.8
Date Sampled					31-AUG-2016	31-AUG-2016
Type					Sandy Soil	Clay
Determinand	Method	Test Sample	LOD	Units		
Naphthalene	T207	M105	0.1	mg/kg	0.3	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	0.2	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	2.1	<0.1
Anthracene	T207	M105	0.1	mg/kg	0.6	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	2.7	<0.1
Pyrene	T207	M105	0.1	mg/kg	2.9	<0.1
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	2.3	<0.1
Chrysene	T207	M105	0.1	mg/kg	2.6	<0.1
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	4.5	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	3.5	<0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	2.3	<0.1
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	0.6	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	4.2	<0.1
PAH(total)	T207	M105	0.1	mg/kg	29	<0.1

Index to symbols used in Supplemental to 597753-1

Value	Description
AR	As Received
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C

M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
N.D.	Not Detected
13	Results have been blank corrected.
110	LOD raised due to low internal standard recovery.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos was subcontracted to REC Asbestos
Supplemental report to include updated Boron results

Method Index

Value	Description
T8	GC/FID
T27	PLM
T287	Calc TOC/0.58
T4	Colorimetry
T54	GC/MS (Headspace)
T162	Grav (1 Dec) (105 C)
T546	Colorimetry (CF)
T206	GC/FID (MCERTS)
T7	Probe
T2	Grav
T6	ICP/OES
T207	GC/MS (MCERTS)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Asbestos ID	T27	AR			SU	001-002,004,006-007,009-011
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-012
Chromium VI	T6	AR	1	mg/kg	N	001-012
Cyanide(Total)	T546	AR	1	mg/kg	M	001-012
pH	T7	AR			M	001-012
Phenols(Mono)	T546	AR	1	mg/kg	M	001-012
Retained on 10mm sieve	T2	M40	0.1	%	N	001-012
Soil Organic Matter	T287	M40	0.1	%	N	001-012
SO4(Total)	T6	M40	0.01	%	N	001-012
Sulphide	T4	AR	10	mg/kg	N	001-012
Sulphur (total)	T6	M40	0.01	%	N	001-012
Arsenic	T6	M40	2	mg/kg	M	001-012
Cadmium	T6	M40	1	mg/kg	M	001-012
Chromium	T6	M40	1	mg/kg	M	001-012
Copper	T6	M40	1	mg/kg	M	001-012
Lead	T6	M40	1	mg/kg	M	001-012
Mercury	T6	M40	1	mg/kg	M	001-012
Nickel	T6	M40	1	mg/kg	M	001-012
Selenium	T6	M40	3	mg/kg	M	001-012
Zinc	T6	M40	1	mg/kg	M	001-012
Naphthalene	T207	M105	0.1	mg/kg	M	001-012
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-012
Acenaphthene	T207	M105	0.1	mg/kg	M	001-012
Fluorene	T207	M105	0.1	mg/kg	M	001-012
Phenanthrene	T207	M105	0.1	mg/kg	M	001-012
Anthracene	T207	M105	0.1	mg/kg	U	001-012
Fluoranthene	T207	M105	0.1	mg/kg	M	001-012
Pyrene	T207	M105	0.1	mg/kg	M	001-012
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-012
Chrysene	T207	M105	0.1	mg/kg	M	001-012
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	M	001-012
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-012
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-012
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-012

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-012
PAH(total)	T207	M105	0.1	mg/kg	U	001-012
Benzene	T54	AR	1	µg/kg	U	001-002,004,006-007,009-011
Toluene	T54	AR	1	µg/kg	U	001-002,004,006-007,009-011
EthylBenzene	T54	AR	1	µg/kg	U	001-002,004,006-007,009-011
M/P Xylene	T54	AR	1	µg/kg	U	001-002,004,006-007,009-011
O Xylene	T54	AR	1	µg/kg	U	001-002,004,006-007,009-011
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	001-002,004,006-007,009-011
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	001-002,004,006-007,009-011
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	001-002,004,006-007,009-011
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	001-002,004,006-007,009-011
TPH (C10-C12 aliphatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C12-C16 aliphatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C16-C21 aliphatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C21-C35 aliphatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	001-002,004,006-007,009-011
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	001-002,004,006-007,009-011
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	001-002,004,006-007,009-011
TPH (C10-C12 aromatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C12-C16 aromatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C16-C21 aromatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C21-C35 aromatic)	T8	M105	1	mg/kg	N	001-002,004,006-007,009-011
TPH (C8-C10)	T8	M105	1	mg/kg	U	003,005,008,012
TPH (C10-C12)	T206	M105	1	mg/kg	M	003,005,008,012
TPH (C12-C16)	T206	M105	1	mg/kg	M	003,005,008,012
TPH (C16-C21)	T206	M105	1	mg/kg	M	003,005,008,012
TPH (C21-C35)	T206	M105	1	mg/kg	M	003,005,008,012
Moisture @105C	T162	AR	0.1	%	N	001-012





Certificate of Analysis

Certificate Number 16-78192

14-Sep-16

Client Ian Farmer Associates
14-15 Rufford Court
Hardwick Grange
Woolston
Warrington
Cheshire
WA1 4RF

Our Reference 16-78192

Client Reference 41953

Order No 41331

Contract Title London Road Fire Station, Manchester

Description 6 Soil samples.

Date Received 10-Sep-16

Date Started 10-Sep-16

Date Completed 14-Sep-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. 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. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis Soil Samples

Our Ref 16-78192

Client Ref 41953

Contract Title London Road Fire Station, Manchester

Lab No	1050366	1050367	1050368	1050369	1050370	1050371
Sample ID	BH01	BH02	BH02	BH02	BH03	BH03
Depth	1.20-1.65	1.80	1.20-1.65	3.60	1.20-1.65	3.50
Other ID	6	16	19	9	6	14
Sample Type	B	D	B	D	B	D
Sampling Date	26/08/16	30/08/16	30/08/16	30/08/16	31/08/16	31/08/16
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Inorganics									
pH	DETSC 2008#			8.8	8.6	8.5	8.4	8.4	8.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	100	350	150	120	44	49

Information in Support of the Analytical Results

Our Ref 16-78192
Client Ref 41953
Contract London Road Fire Station, Manchester

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1050366	BH01 1.20-1.65 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1050367	BH02 1.80 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1050368	BH02 1.20-1.65 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1050369	BH02 3.60 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1050370	BH03 1.20-1.65 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1050371	BH03 3.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: AR1181
Test Date: 12/01/2016
Report Date: 12/01/2016
File Name: AR1181.spt
Test Operator: SH

Instrumented Rod Data

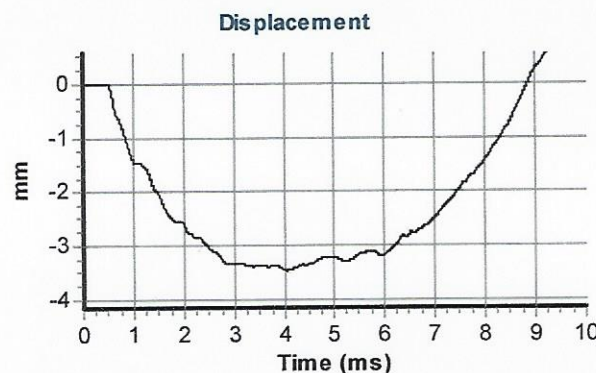
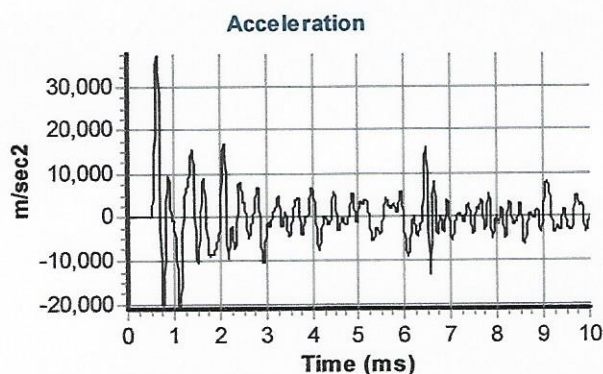
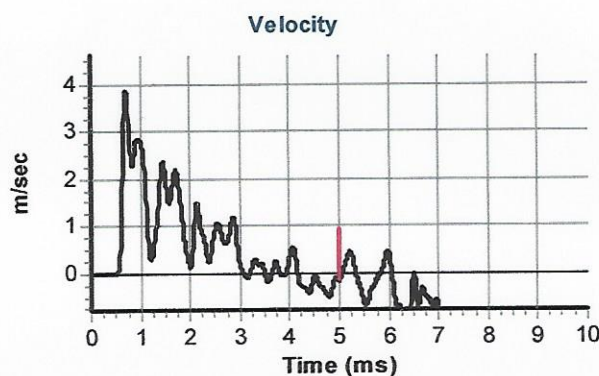
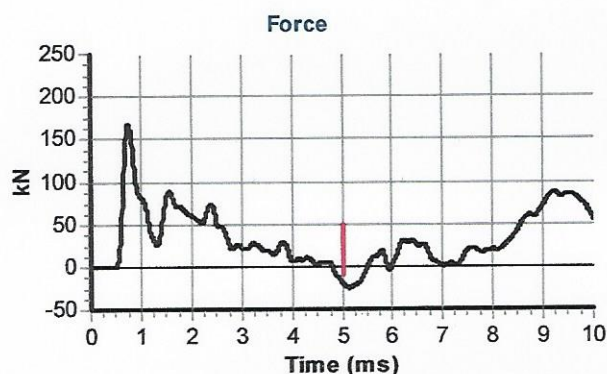
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.1
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 7079
Accelerometer No.2: 7080

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location

CALIBRATION



Calculations

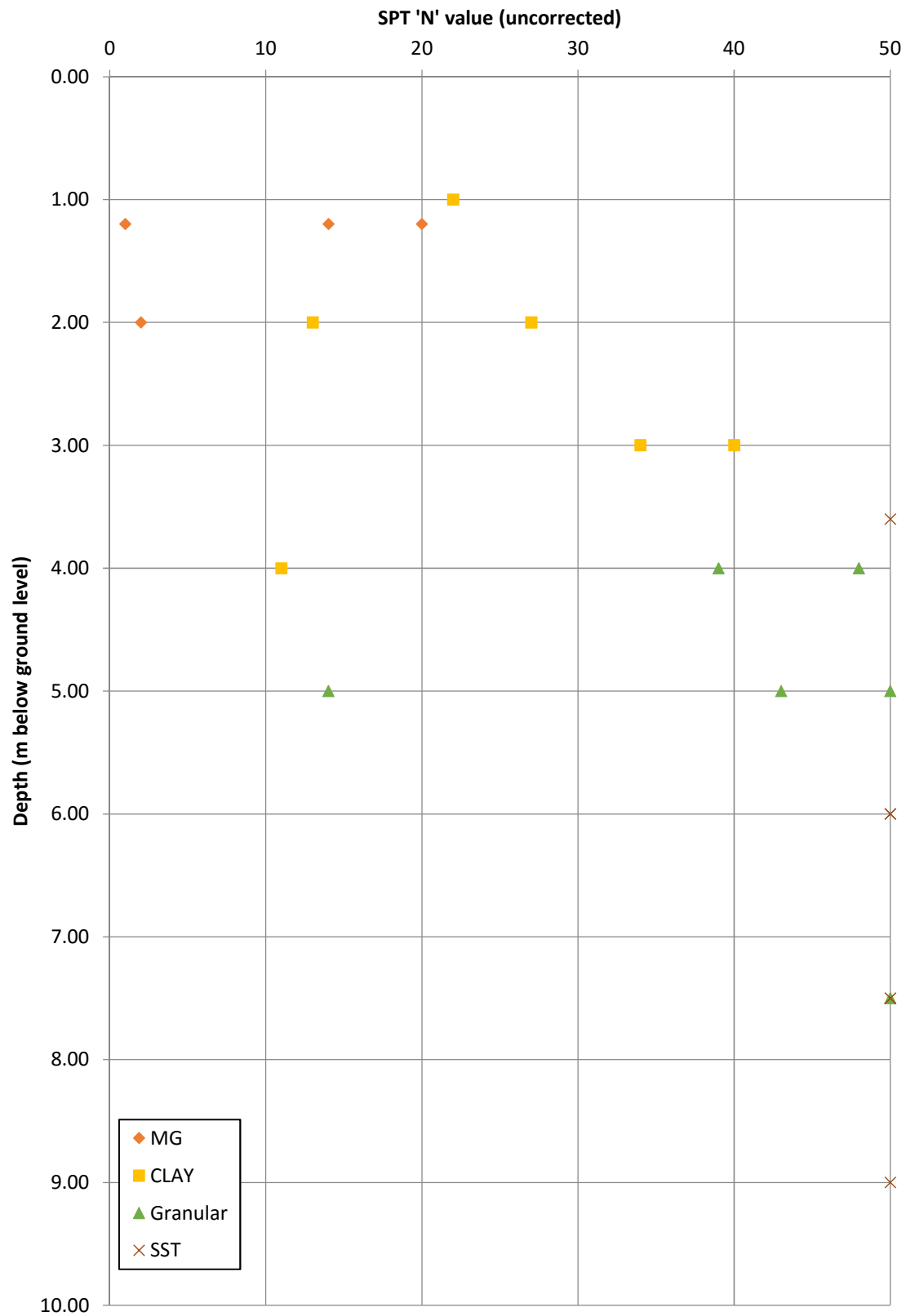
Area of Rod A (mm^2): 918
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 267

Energy Ratio E_r (%): **56**

Signed: M.GARDNER
Title: FITTER

The recommended calibration interval is 12 months

Figure A1.4 London Road Fire Station
SPT 'N' value versus depth





Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Dynamic sampling uk ltd
6-8 victory parkway
victory road
Derby
DE24 8ZF

Hammer Ref: 110.45.LT
Test Date: 27/06/2016
Report Date:
File Name: 110.45.LT.spt
Test Operator: TP

Instrumented Rod Data

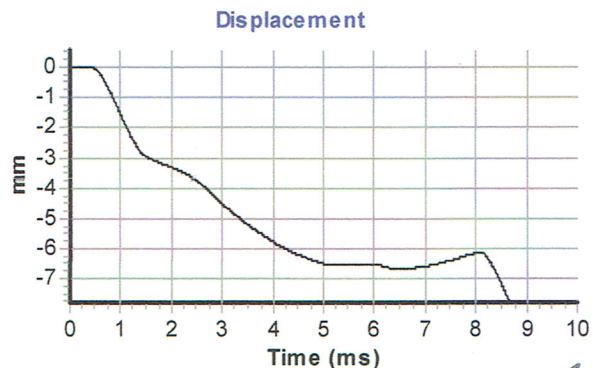
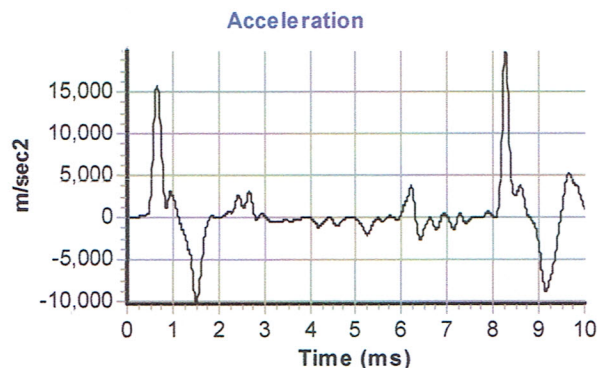
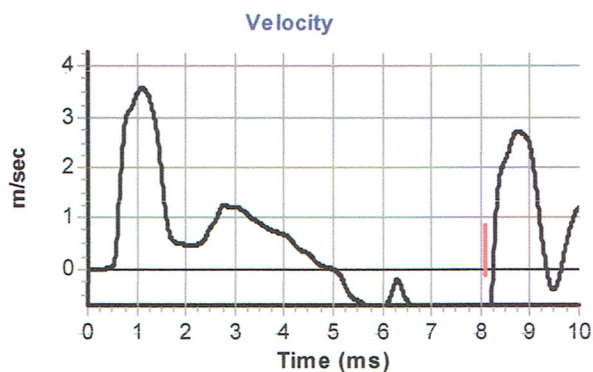
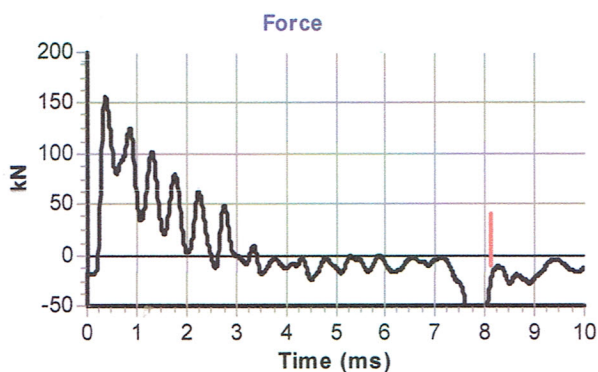
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.9
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 6455
Accelerometer No.2: 6457

Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
String Length L (m): 15.0

Comments / Location

Hammer tested at Dynamic samplings yard.



Calculations

Area of Rod A (mm²): 1021
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 346

Energy Ratio E_r (%): **73**

Signed: A.parker
Title: Manager

The recommended calibration interval is 12 months

Merchant Exchange
17-19 Whitworth Street West
Manchester
M1 5WG

F.A.O.

Test Report - 41953 /1

Site: London Road Fire Station, Manchester

Job Number: 41953

Originating Client: Curtins

Originating Reference: 41953

Date Sampled: Not Given

Date Scheduled: 12/09/2016

Date Testing Started: 14/09/2016

Date Testing Finished: 29/09/2016

Remarks:

Authorised By:



Daniel Smith
Laboratory Supervisor

Date: 29/09/2016

Page. 1

Site: London Road Fire Station, Manchester

Job Number: 41953

Client: Curtins

Page: 2

Determination of Water Content, Liquid Limit and Plastic Limit and Derivation of Plasticity and Liquidity Index

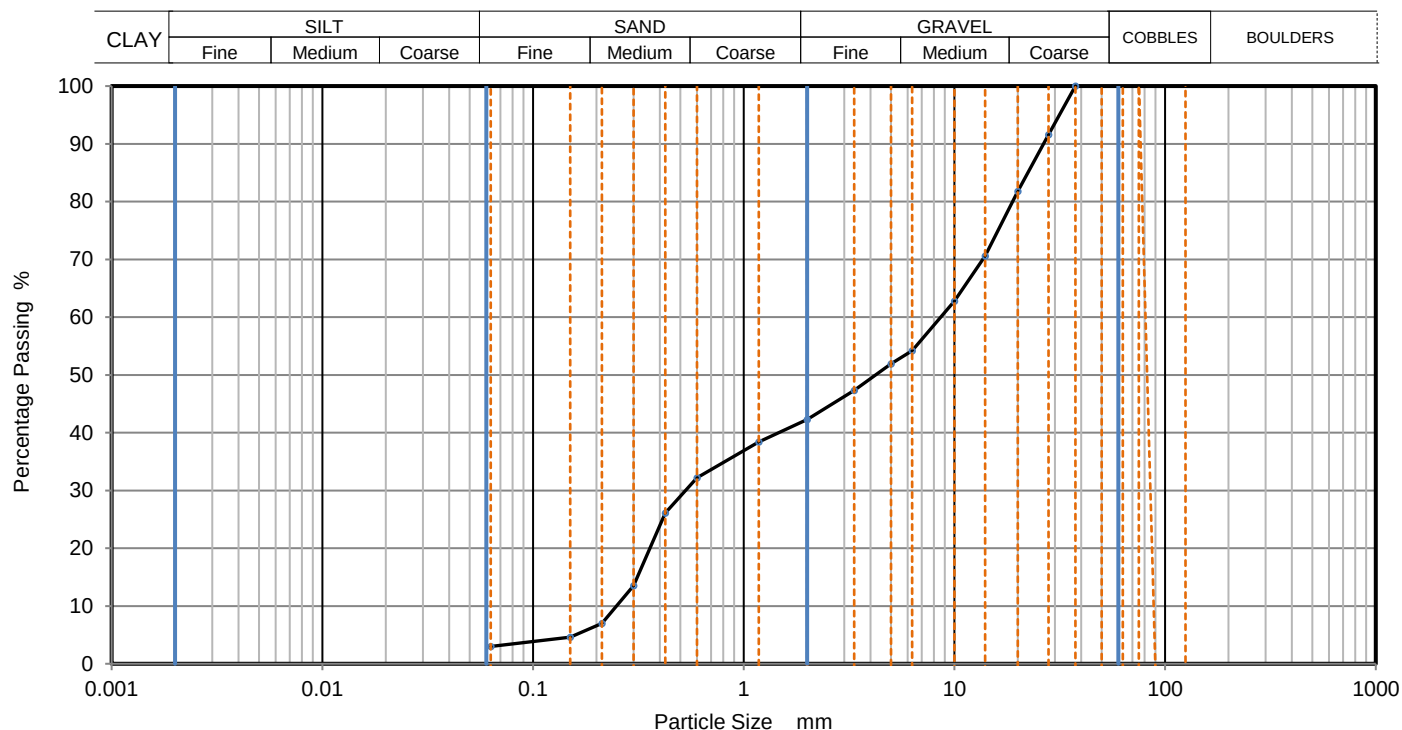
Borehole / Trial Pit	Depth (m)	Sample	Natural / Sieved	Natural Water Content %	Sample Passing 425 µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description / Remarks
					Percentage %	Water Content %						
BH01	3.00	U12	Natural	16.2	90	17.0	36	18	18	-0.03	CI	Brown slightly sandy, gravelly CLAY
BH02	2.00	U15	Natural	15	83	17.0	38	18	20	-0.04	CI	Brown slightly sandy, gravelly CLAY
BH03	3.00	U13	Natural	18.3	93	19.0	40	20	20	-0.03	CI	Brown slightly gravelly CLAY

Method of Preparation: BS EN ISO 17892 : Part 1 : 2014 : Clause 5.1 Water content test preparation
BS 1377 : Part 1 : 2016 : Clause 8.4.3 Preparation of samples for plasticity tests
BS 1377 : Part 2 : 1990 : Clause 4.2 Preparation of samples for plastic limit tests

Method of Test: BS EN ISO 17892 : Part 1 : 2014 : Clause 5.2 Water content test execution
BS 1377 : Part 2 : 1990 : Clause 4.3 or 4.4 Determination of the liquid limit
BS 1377 : Part 2 : 1990 : Clause 5.3 Determination of the plastic limit and plasticity index

**Site:** London Road Fire Station, Manchester**Job Number:** 41953**Client:** Curtins**Page:** 3**DETERMINATION OF PARTICLE SIZE DISTRIBUTION**

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH01	4.00	B15	Wet Sieve	Brown very gravelly SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
37.5	100		
28	92		
20	82		
14	71		
10	63		
6.3	54		
5	52		
3.35	47		
2	42		
1.18	38		
0.6	32		
0.425	26		
0.3	14		
0.212	7		
0.15	5		
0.063	3		

Dry Mass of sample, g

5245

Sample Proportions	% dry mass
Very coarse	0
Gravel	58
Sand	39
Fines <0.063mm	3

Grading Analysis		
D100	mm	37.5
D60	mm	8.58
D30	mm	0.53
D10	mm	0.249
Uniformity Coefficient		34
Curvature Coefficient		0.13

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Method of Preparation: BS 1377:Part 1:1990, clause 7.3 Initial preparation
BS 1377:Part 1:1990, clause 7.4.5 Preparation of particle size tests

Method of Test: BS1377:Part 2:1990, clause 9.2 Determination of particle size distribution by wet sieving method





Site: London Road Fire Station, Manchester

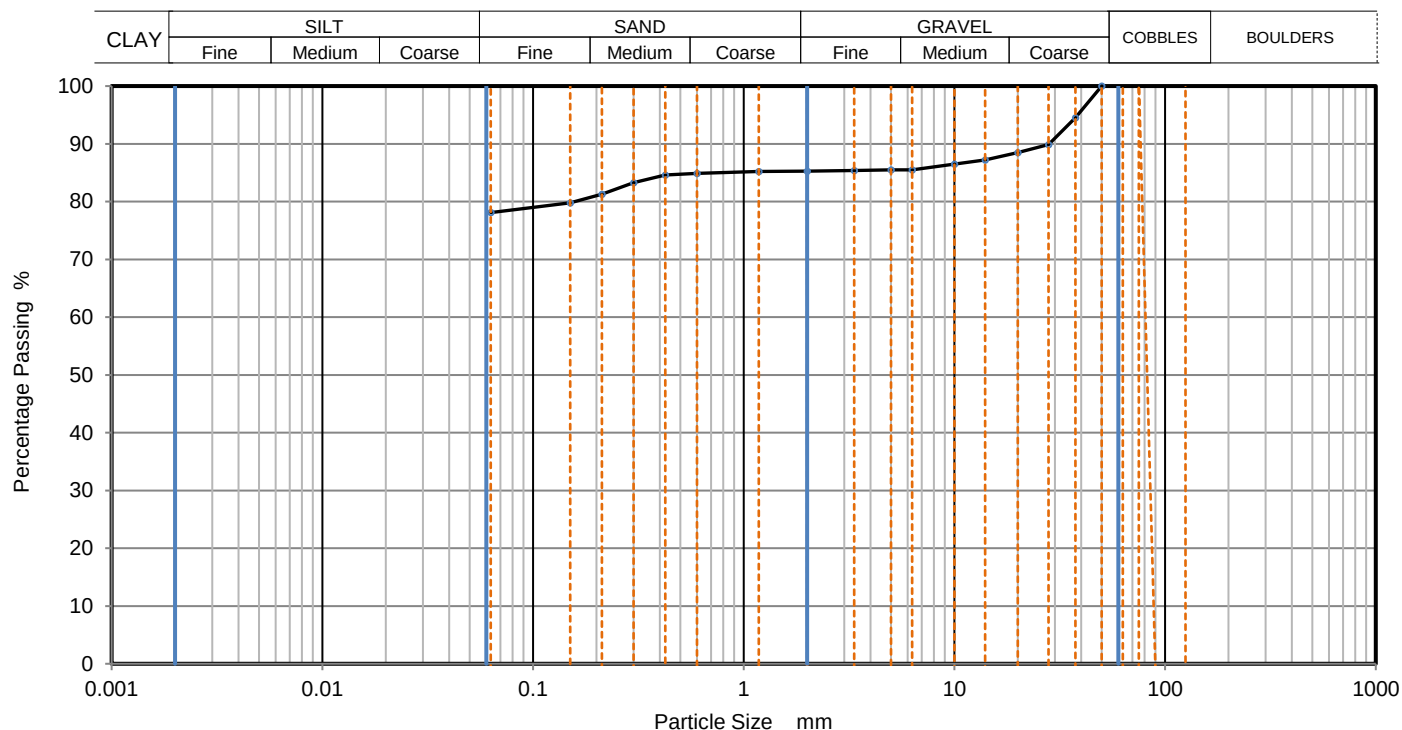
Job Number: 41953

Client: Curtins

Page: 4

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH02	4.00	B8	Wet Sieve	Brown slightly gravelly, slightly clayey SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
50	100		
37.5	95		
28	90		
20	89		
14	87		
10	87		
6.3	86		
5	86		
3.35	85		
2	85		
1.18	85		
0.6	85		
0.425	85		
0.3	83		
0.212	81		
0.15	80		
0.063	78		

Dry Mass of sample, g

2179

Sample Proportions	% dry mass
Very coarse	0
Gravel	15
Sand	7
Fines <0.063mm	78

Grading Analysis		
D100	mm	50
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

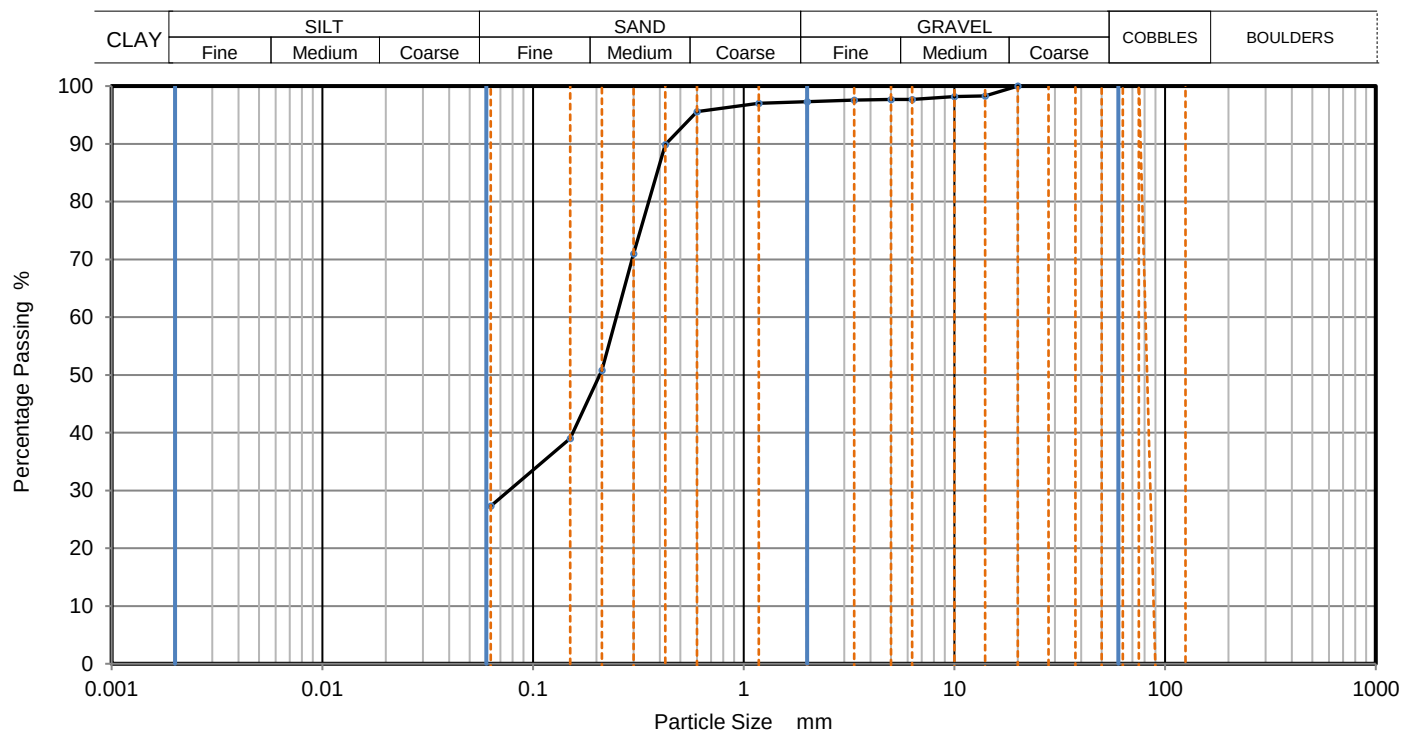
Method of Preparation: BS 1377:Part 1:1990, clause 7.3 Initial preparation
BS 1377:Part 1:1990, clause 7.4.5 Preparation of particle size tests

Method of Test: BS1377:Part 2:1990, clause 9.2 Determination of particle size distribution by wet sieving method



**Site:** London Road Fire Station, Manchester**Job Number:** 41953**Client:** Curtins**Page:** 5**DETERMINATION OF PARTICLE SIZE DISTRIBUTION**

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
BH03	5.00	B17	Wet Sieve	Brown clayey SAND



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
20	100		
14	98		
10	98		
6.3	98		
5	98		
3.35	98		
2	97		
1.18	97		
0.6	96		
0.425	90		
0.3	71		
0.212	51		
0.15	39		
0.063	27		

Dry Mass of sample, g

1451

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	70
Fines <0.063mm	27

Grading Analysis		
D100	mm	20
D60	mm	0.248
D30	mm	0.0772
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Method of Preparation: BS 1377:Part 1:1990, clause 7.3 Initial preparation
BS 1377:Part 1:1990, clause 7.4.5 Preparation of particle size tests

Method of Test: BS1377:Part 2:1990, clause 9.2 Determination of particle size distribution by wet sieving method



Site: London Road Fire Station, Manchester

Job Number: 41953

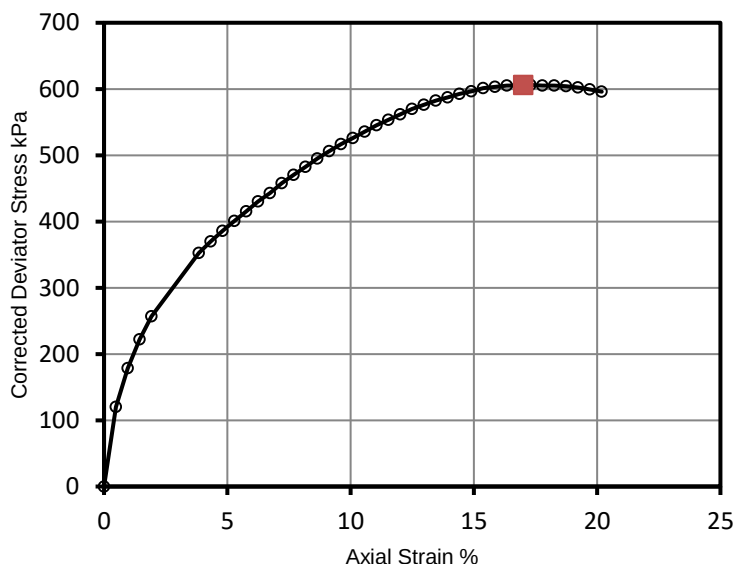
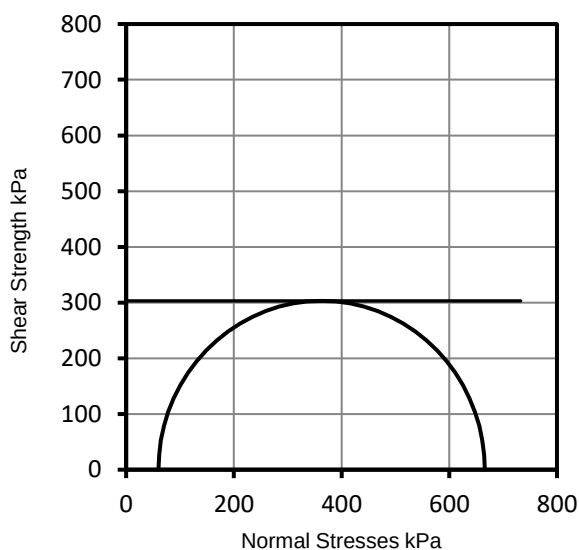
Client: Curtins

Page: 6

Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen (Definitive Method)

Borehole / Trial Pit	Depth (m)	Sample	Description
BH01	3.00	U12	Brown slightly sandy, gravelly CLAY

Initial Sample	Test Number	1
	Original Length (mm)	410.00
	Depth from Top (mm)	15.00
	Condition	Undisturbed
	Orientation	Vertical
Length (mm)		208.06
Diameter (mm)		102.16
Moisture Content (%)		15.30
Bulk Density (Mg/m ³)		2.18
Dry Density (Mg/m ³)		1.89
Membrane Thickness (mm)		0.44
Membrane Type		Latex
Rate of Strain (%/min)		1.9
Test Results	Cell Pressure (kPa)	60
	Axial Strain (%)	17
	Membrane Corr. (kPa)	1.47
	Deviator Stress, ($\sigma_1 - \sigma_3$)f (kPa)	606
	Undrained Shear Strength, $c_u = \frac{1}{2}(\sigma_1 - \sigma_3)$ f (kPa)	303
Mode of Failure		Plastic

Deviator Stress v Axial Strain

Mohr Circles


Deviator stress corrected for area change and membrane effects

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

Method of Preparation: BS 1377:PT1:1990:8.3 Preparation of undisturbed samples for testing or BS 1377:PT1:1990:7.7.5.2 Preparation of disturbed samples for testing

Method of Test: BS 1377:PT2:1990:7.2 Determination of density by linear measurement.
BS 1377:PT7:1990:8.4 Determination of undrained shear strength in triaxial compression without measurement of pore pressure (Definitive method)

Site: London Road Fire Station, Manchester

Job Number: 41953

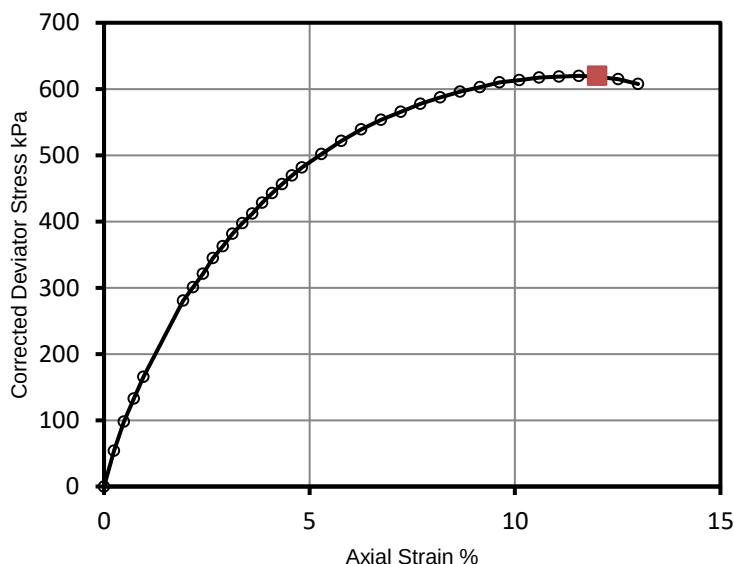
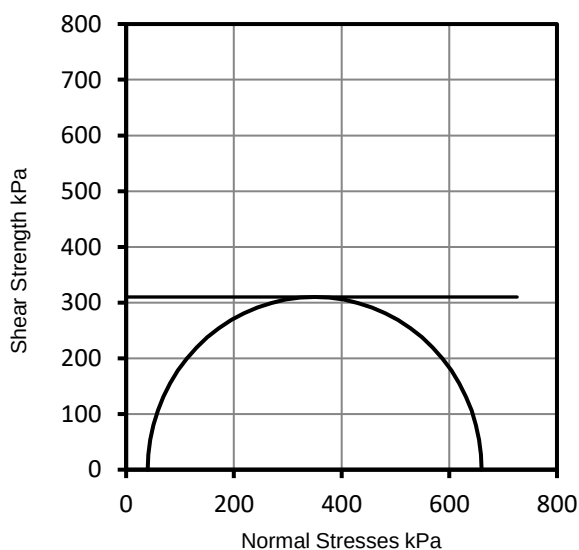
Client: Curtins

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Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen (Definitive Method)

Borehole / Trial Pit	Depth (m)	Sample	Description
BH02	2.00	U15	Brown slightly sandy, gravelly CLAY

Initial Sample	Test Number	1
	Original Length (mm)	370.00
	Depth from Top (mm)	7.00
	Condition	Undisturbed
	Orientation	Vertical
Length (mm)		207.76
Diameter (mm)		102.11
Moisture Content (%)		21.70
Bulk Density (Mg/m ³)		2.17
Dry Density (Mg/m ³)		1.78
Membrane Thickness (mm)		0.47
Membrane Type		Latex
Rate of Strain (%/min)		1.9
Test Results	Cell Pressure (kPa)	40
	Axial Strain (%)	12
	Membrane Corr. (kPa)	1.14
	Deviator Stress, ($\sigma_1 - \sigma_3$)f (kPa)	620
	Undrained Shear Strength, $c_u = \frac{1}{2}(\sigma_1 - \sigma_3)f$ (kPa)	310
Mode of Failure		Compound

Deviator Stress v Axial Strain

Mohr Circles


Deviator stress corrected for area change and membrane effects

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

Method of Preparation: BS 1377:PT1:1990:8.3 Preparation of undisturbed samples for testing or BS 1377:PT1:1990:7.7.5.2 Preparation of disturbed samples for testing

Method of Test: BS 1377:PT2:1990:7.2 Determination of density by linear measurement.
BS 1377:PT7:1990:8.4 Determination of undrained shear strength in triaxial compression without measurement of pore pressure (Definitive method)

Site: London Road Fire Station, Manchester

Job Number: 41953

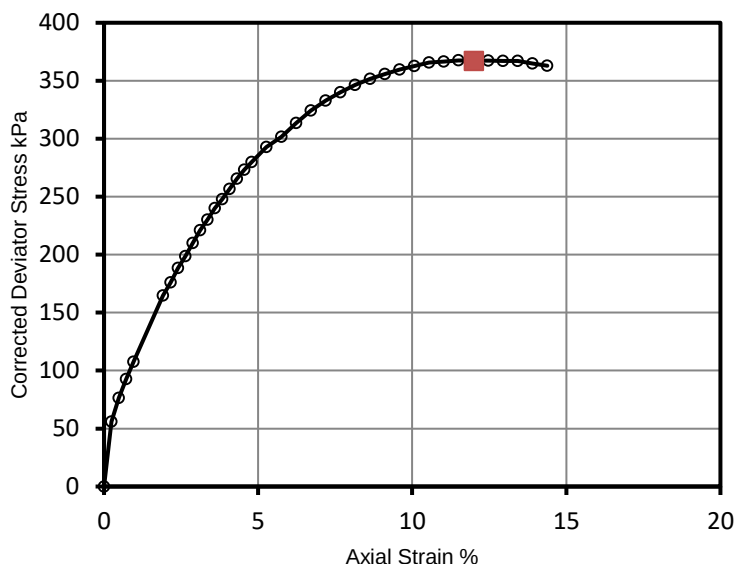
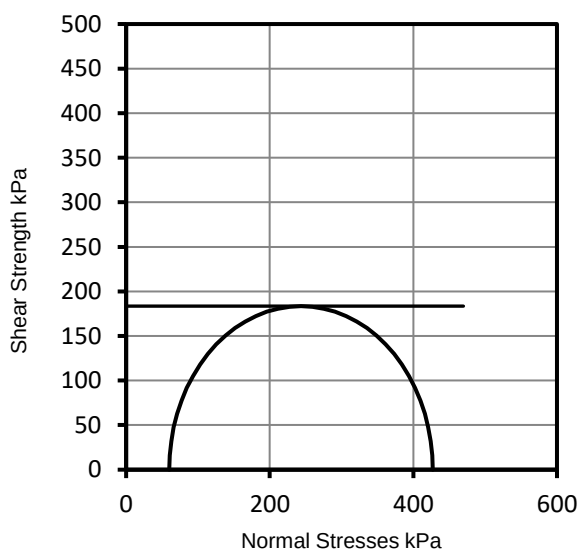
Client: Curtins

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Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen (Definitive Method)

Borehole / Trial Pit	Depth (m)	Sample	Description
BH03	3.00	U13	Brown slightly gravelly CLAY

Initial Sample	Test Number	1
	Original Length (mm)	356.42
	Depth from Top (mm)	22.91
	Condition	Undisturbed
	Orientation	Vertical
Length (mm)		208.59
Diameter (mm)		101.25
Moisture Content (%)		17.80
Bulk Density (Mg/m ³)		2.19
Dry Density (Mg/m ³)		1.85
Membrane Thickness (mm)		0.39
Membrane Type		Latex
Rate of Strain (%/min)		1.9
Test Results	Cell Pressure (kPa)	60
	Axial Strain (%)	12
	Membrane Corr. (kPa)	0.95
	Deviator Stress, ($\sigma_1 - \sigma_3$)f (kPa)	367
	Undrained Shear Strength, $c_u = \frac{1}{2}(\sigma_1 - \sigma_3)$ f (kPa)	184
Mode of Failure		Compound

Deviator Stress v Axial Strain

Mohr Circles


Deviator stress corrected for area change and membrane effects

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

Method of Preparation: BS 1377:PT1:1990:8.3 Preparation of undisturbed samples for testing or BS 1377:PT1:1990:7.7.5.2 Preparation of disturbed samples for testing

Method of Test: BS 1377:PT2:1990:7.2 Determination of density by linear measurement.
BS 1377:PT7:1990:8.4 Determination of undrained shear strength in triaxial compression without measurement of pore pressure (Definitive method)



Site: London Road Fire Station, Manchester

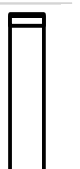
Job Number: 41953

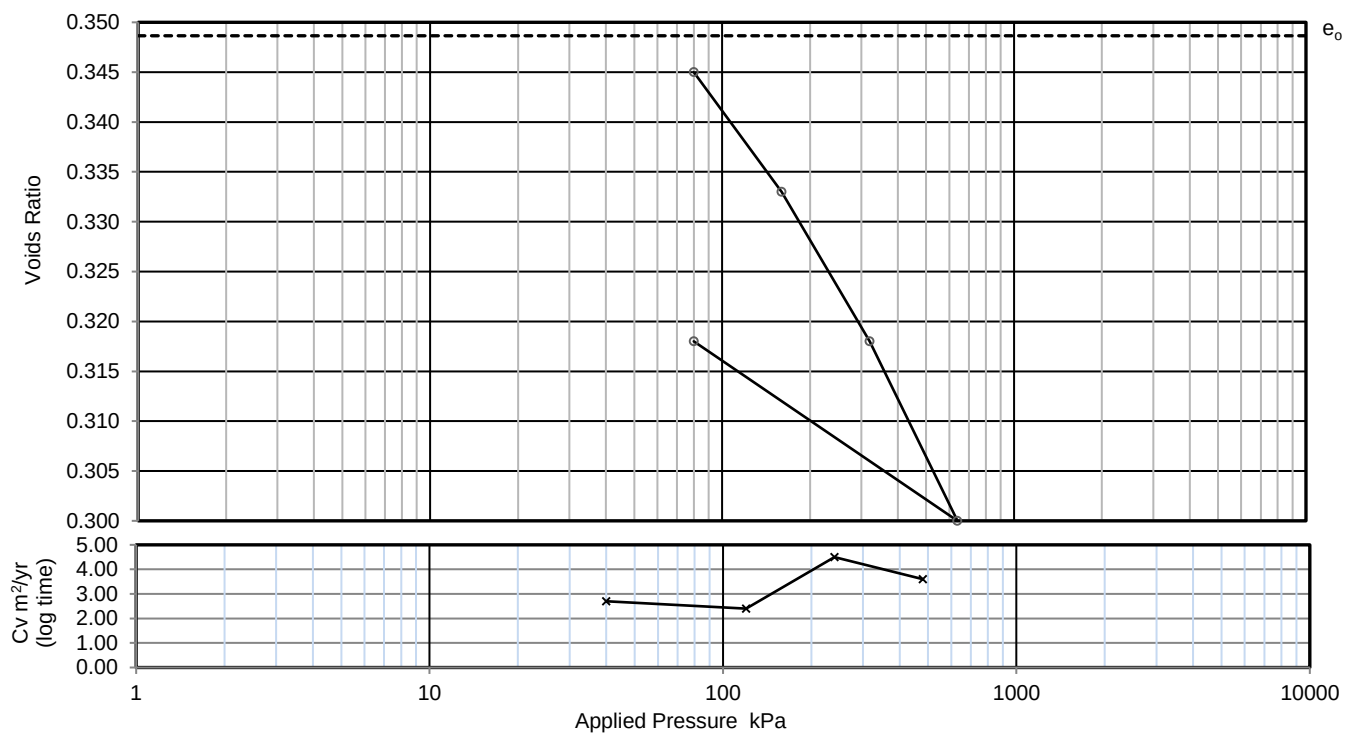
Client: Curtins

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DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole / Trial Pit	Depth (m)	Sample	Description
BH01	3	U12	Brown slightly sandy, gravelly CLAY

Initial Specimen		Length of Sample (mm)	410.00	Diameter (mm)	74.92
		Depth from top of specimen (mm)	5.00	Particle density (Mg/m ³)	2.65 assumed
		Condition of Sample:	Undisturbed	Swelling Pressure (kPa)	40
		Orientation:	Vertical	Lab Temp. (°C)	22



Applied Pressure kPa	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec	Voids ratio
40.0	-	-	-	-	0.349
80	0.032	2.7	4.1	0.00045	0.345
160	0.11	2.4	10	0.00031	0.333
320	0.071	4.5	34	0.00079	0.318
640	0.043	3.6	31	0.00062	0.300
80	0.043				0.318

	Initial	Final
Height (mm)	18.71	18.28
Water Content (%)	13.9	15.0
Bulk density (Mg/m ³)	2.24	2.31
Dry density (Mg/m ³)	1.96	2.01
Voids Ratio	0.349	0.318
Degree of Saturation (%)	105	125

Method of Preparation: BS 1377:Part 5:1990, clause 3.3 Preparation of specimen
BS 1377:Part 5:1990, clause 3.4 Preparation and assembly of apparatus

Method of Test: BS 1377:Part 5:1990, clause 4.3 Measurement of swelling pressure
BS 1377:Part 5:1990, clause 3.5 Determination of the one-dimensional consolidation properties





Site: London Road Fire Station, Manchester

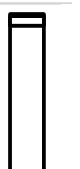
Job Number: 41953

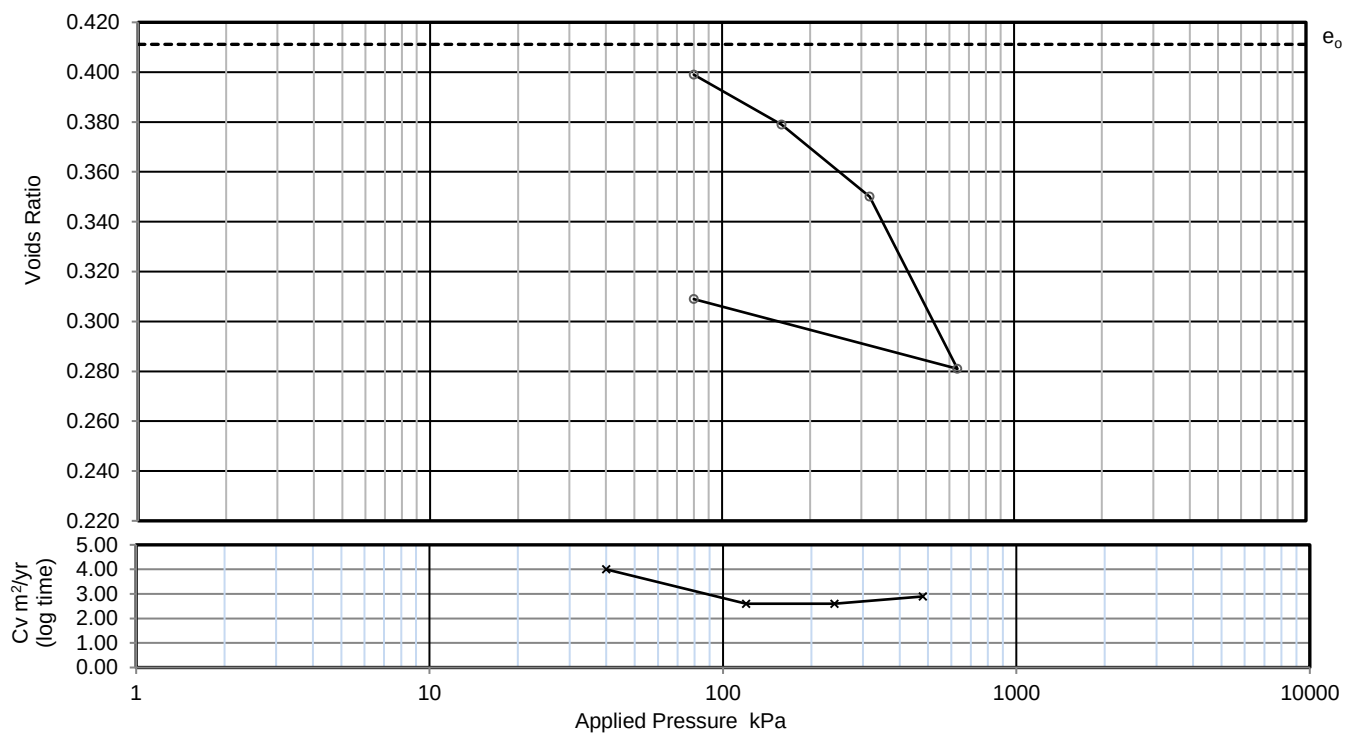
Client: Curtins

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DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole / Trial Pit	Depth (m)	Sample	Description
BH02	2	U15	Brown slightly sandy, gravelly CLAY

Initial Specimen		Length of Sample (mm)	370.00	Diameter (mm)	74.97
		Depth from top of specimen (mm)	0.00	Particle density (Mg/m ³)	2.65 assumed
		Condition of Sample:	Undisturbed	Swelling Pressure (kPa)	40
		Orientation:	Vertical	Lab Temp. (°C)	22



Applied Pressure kPa	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec	Voids ratio
40.0	-	-	-	-	0.411
80	0.1	4	17	0.00069	0.399
160	0.18	2.6	12	0.00066	0.379
320	0.13	2.6	33	0.00089	0.350
640	0.16	2.9	6.6	0.0013	0.281
80	0.039				0.309

	Initial	Final
Height (mm)	18.87	17.51
Water Content (%)	16.3	17.3
Bulk density (Mg/m ³)	2.18	2.37
Dry density (Mg/m ³)	1.88	2.02
Voids Ratio	0.411	0.309
Degree of Saturation (%)	105	148

Method of Preparation: BS 1377:Part 5:1990, clause 3.3 Preparation of specimen
BS 1377:Part 5:1990, clause 3.4 Preparation and assembly of apparatus

Method of Test: BS 1377:Part 5:1990, clause 4.3 Measurement of swelling pressure
BS 1377:Part 5:1990, clause 3.5 Determination of the one-dimensional consolidation properties





Site: London Road Fire Station, Manchester

Job Number: 41953

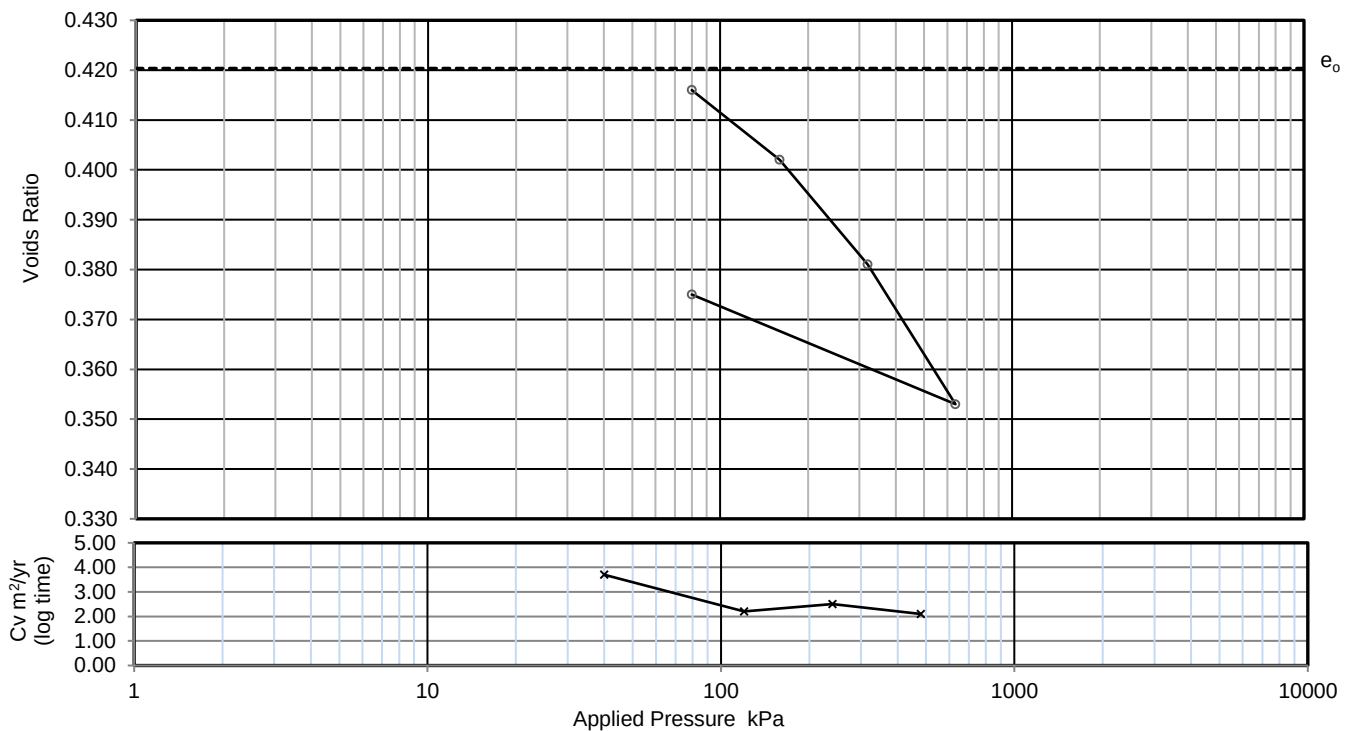
Client: Curtins

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DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole / Trial Pit	Depth (m)	Sample	Description
BH03	3	U13	Brown slightly gravelly CLAY

Initial Specimen		Length of Sample (mm)	356.00	Diameter (mm)	74.90
		Depth from top of specimen (mm)	10.00	Particle density (Mg/m ³)	2.65 assumed
		Condition of Sample:	Undisturbed	Swelling Pressure (kPa)	
		Orientation:	Vertical	Lab Temp. (°C)	22



Applied Pressure kPa	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec	Voids ratio
0.0	-	-	-	-	0.420
80	0.041	3.7	18	0.00045	0.416
160	0.12	2.2	7.8	0.00049	0.402
320	0.094	2.5	6.8	0.00085	0.381
640	0.063	2.1	4.2	0.00092	0.353
80	0.033				0.375

	Initial	Final
Height (mm)	19.71	19.08
Water Content (%)	16.6	16.6
Bulk density (Mg/m ³)	2.18	2.25
Dry density (Mg/m ³)	1.87	1.93
Voids Ratio	0.420	0.375
Degree of Saturation (%)	105	117

Method of Preparation: BS 1377:Part 5:1990, clause 3.3 Preparation of specimen
BS 1377:Part 5:1990, clause 3.4 Preparation and assembly of apparatus

Method of Test: BS 1377:Part 5:1990, clause 3.5 Determination of the one-dimensional consolidation properties



Merchant Exchange
17-19 Whitworth Street West
Manchester
M1 5WG

F.A.O.

Test Report - 41953R /1

Site: London Road Fire Station, Manchester

Job Number: 41953R

Originating Client: Curtins

Originating Reference: 41953R

Date Sampled: Not Given

Date Scheduled: 19/09/2016

Date Testing Started: 20/09/2016

Date Testing Finished: 21/09/2016

Remarks:

Authorised By:



Daniel Smith
Laboratory Supervisor

Date: 22/09/2016

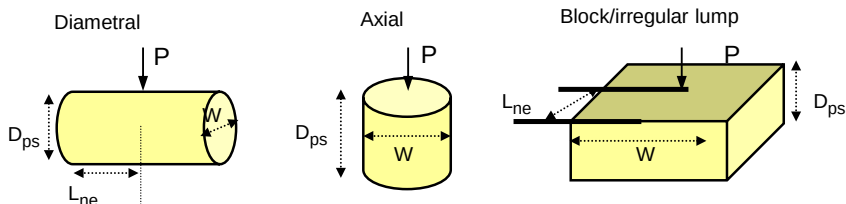
Page. 1

Job Number: 41953R

Page: 2

[illegible]

Dps - Distance between platens (platen separation)
 Dps' - at failure (see ISRM note 6)
 Lne - Length from platens to nearest free end
 W - Width of shortest dimension perpendicular to load, P
 Size factor, $F = (De/50)0.45$ for all tests.



Method of Test: ISRM 2007 Suggested method for point load strength index (pages 125 - 132)

GAS MONITORING LOG SHEET	
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Project:	London Road Fire Station	Date:	27/09/16
Job Number:	B061230	Visit:	1
Client:	Allied London	Weather:	Overcast
Barometric State:	Rising	Ground Conditions:	Damp

[illegible]

Notes

Logged by _____

1% gas volume = 10,000 ppm
Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.
All other gases recorded at 'steady state' unless otherwise stated

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.
All other gases recorded at 'steady state' unless otherwise stated

GAS MONITORING LOG SHEET	
--------------------------	--

Project:	London Road Fire Station	Date:	12/10/16
Job Number:	B061230	Visit:	2
Client:	Allied London	Weather:	Dry
Barometric State:	Falling	Ground Conditions:	Dry

[illegible]

Notes

Logged by _____

JB

1% gas volume = 10,000 ppm
Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.
All other gases recorded at 'steady state' unless otherwise stated

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

GAS MONITORING LOG SHEET	
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Project:	London Road Fire Station	Date:	25/10/16
Job Number:	B061230	Visit:	3
Client:	Allied London	Weather:	Dry
Barometric State:	Rising	Ground Conditions:	Dry

Borehole Reference	Barometric Pressure mb	Flow		Methane		Carbon Dioxide		Oxygen	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Note
		l/hr		%		%						
		Max	SS	Max	SS	Max	SS					
BH01	1016	0.0	0.0	0.0	0.0	0.0	0.0	20.7	0	0	Dry	1
BH02	1016	0.0	0.0	0.0	0.0	1.1	1.1	14.6	2	0	11.78	
WS03	-	-	-	-	-	-	-	-	-	-	-	
BH03	1015	0.0	0.0	0.0	0.0	0.0	0.0	19.9	1	0	Dry	

Notes

1 Unable to access monitoring well.

Logged by _____

JB

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Appendix A4 – Tier 1 Thresholds

- Generic Assessment Criteria (GAC) for a '*Commercial*' end-use, 1% SOM

Tier 1 Thresholds



Soil Contaminants: Initial Assessment of Risk

The following tables can be used for the initial assessment with regard to the potential for the identified contaminants within a sandy matrix with an average Soil Organic Matter (SOM) content of 1% to present a risk of significant harm to the 'Commercial' end user.

The list of determinands is non-industry specific and it should be recognised that additional site specific determinands may need to be accounted for.

Table 1.0 Inorganic Species and Phenols

Contaminants	Threshold Trigger Concentration For Planned End Use	
	Source (ref. 1)	Value (mg/kg)
Antimony	ATRISK ^{soil} Soil Screening Value	4830
Arsenic	CLEA SGV for commercial end use published May 09	640
Beryllium	ATRISK ^{soil} Soil Screening Value	1010
Boron	Recognised threshold to prevent phytotoxic affects	3
Cadmium	CLEA SGV for commercial end use published July 09	230
Chromium (VI)	ATRISK ^{soil} Soil Screening Value	330
Copper	ATRISK ^{soil} Soil Screening Value	109000
Cyanide (Free)	ATRISK ^{soil} Soil Screening Value	34
Lead	ATRISK ^{soil} Soil Screening Value	6490
Mercury	ATRISK ^{soil} Soil Screening Value (ref. 2)	4.3 ; 3600 ; 66.4
Nickel	CLEA SGV for commercial end use published May 09	1800
Selenium	CLEA SGV for commercial end use published March 09	13000
Sulphate	Recognised threshold for protection of sub-surface concrete	2400
Sulphur (Free)	Recognised threshold for all end uses	5000
Sulphide	Recognised threshold for all end uses	250
Vanadium	ATRISK ^{soil} Soil Screening Value	7530
Zinc	ATRISK ^{soil} Soil Screening Value	≤1,000,000
pH	Typical value in uncontaminated soils	6-8
Phenols	Recognised threshold for protection of services (ref. 3)	5

1. The tables are for guidance only and must be read in conjunction with relevant source documentation.
2. Three values correspond to: elemental mercury (Hg); inorganic mercury (Hg²⁺) and methyl mercury (Hg⁺⁴).
3. For human health consider using ATRISK^{soil} Soil Screening Value of 686mg/kg.

Table 1.1 BTEX Species

Contaminants	Threshold Trigger Concentration For Planned End Use	
	Source	Value (mg/kg)
Benzene	ATRISK ^{soil} Soil Screening Value	13.1
Toluene	ATRISK ^{soil} Soil Screening Value (ref. 4)	414000
Ethylbenzene	ATRISK ^{soil} Soil Screening Value (ref. 4)	180000
m-Xylene	ATRISK ^{soil} Soil Screening Value (ref. 4)	276000
o-Xylene	ATRISK ^{soil} Soil Screening Value (ref. 4)	296000
p-Xylene	ATRISK ^{soil} Soil Screening Value (ref. 4)	279000

Tier 1 Thresholds



Soil Contaminants: Initial Assessment of Risk

Table 1.2 PAH Species

Contaminants	Threshold Trigger Concentration For Planned End Use	
	Source	Value (mg/kg)
Acenaphthene	ATRISK ^{soil} Soil Screening Value (ref. 4)	109000
Anthracene	ATRISK ^{soil} Soil Screening Value (ref. 4)	536000
Benz(a)anthracene	ATRISK ^{soil} Soil Screening Value (ref. 4)	131
Benzo(a)pyrene	ATRISK ^{soil} Soil Screening Value (ref. 4)	14.3
Benzo(b)fluoranthene	ATRISK ^{soil} Soil Screening Value (ref. 4)	142
Benzo(ghi)perylene	ATRISK ^{soil} Soil Screening Value (ref. 4)	1440
Benzo(k)fluoranthene	ATRISK ^{soil} Soil Screening Value (ref. 4)	1430
Chrysene	ATRISK ^{soil} Soil Screening Value (ref. 4)	14000
Dibenz(ah)anthracene	ATRISK ^{soil} Soil Screening Value (ref. 4)	14.3
Fluoranthene	ATRISK ^{soil} Soil Screening Value (ref. 4)	72300
Fluorene	ATRISK ^{soil} Soil Screening Value (ref. 4)	66800
Indeno(123cd)pyrene	ATRISK ^{soil} Soil Screening Value (ref. 4)	142
Naphthalene	ATRISK ^{soil} Soil Screening Value (ref. 4)	8180
Pyrene	ATRISK ^{soil} Soil Screening Value (ref. 4)	54200

4. Where free product is not observed, otherwise consider revising.

Table 1.3 Total Petroleum Hydrocarbon (TPH) Bandings (All values in mg/kg)

Carbon Range	Threshold Trigger Concentration For Planned End Use		
	Source	Aromatic	Aliphatic
C5 – C6	ATRISK ^{soil} Soil Screening Value (ref. 5)	13.1 (C5-C7)	327 (ref. 9)
C6 – C8	ATRISK ^{soil} Soil Screening Value (ref. 6)	414000 (C7-C8)	158 (ref. 9)
C8 – C10	ATRISK ^{soil} Soil Screening Value (ref. 7)	58600	167000
C10 – C12	ATRISK ^{soil} Soil Screening Value (ref. 7)	68300	171000
C12 – C16	ATRISK ^{soil} Soil Screening Value (ref. 7)	68400	171000
C16 – C21	ATRISK ^{soil} Soil Screening Value	28400	≤1,000,000
C21 – C35	ATRISK ^{soil} Soil Screening Value	28400	

5. Based on total benzene concentration in the soil.

6. Based on total toluene concentration in the soil.

8. Aliphatic & Aromatic: where free product is not observed, otherwise consider revising.

9. Modelled threshold <1kg/kg; lowest of either aqueous or vapour saturation limits presented.

ATRISK^{soil} Soil Screening Values are published by Atkins Limited

Appendix A5 – Qualitative/Quantitative Risk Assessment Rationale

The site-specific qualitative/quantitative risk assessment of environmental harm, as detailed in Sections 3.0 and 9.0 of this reporting, is summarised in Table A5.1 hereafter; the principle being to establish whether connecting links exist between a hazardous source to a potential receptor via an exposure pathway.

The qualitative/quantitative risk assessment corresponds with the total site area and incorporates both descriptive (qualitative) and, where available, numerical (quantitative) lines of evidence.

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the hazardous source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore the presence of hazard on a site does not necessarily mean there is a risk.

By considering where a viable pathway exists which connects a source with a receptor the risk assessment in Section 3.0 and Table A5.1 identifies where pollutant linkage exists. If there is no pollutant linkage there is no risk and only where a pollutant linkage is established does the risk assessment consider the level of risk.

The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the hazard and receptor and the integrity of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	Medium	Mild	Minor
Probability (Likelihood)	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

In accordance with DoE guidance, the following categorisation of **probability** has been developed.

Classification	Definition
High Likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a <i>high probability</i> that <i>severe harm</i> could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	<i>Harm is likely to arise</i> to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	<i>It is possible</i> that without appropriate further action <i>harm could arise</i> to a designated receptor. It is relatively <i>unlikely</i> that any such harm would be <i>severe</i> , and if any harm were to occur it is <i>more likely</i> that such harm would be <i>relatively mild</i> .
Low Risk	<i>It is possible</i> that <i>harm could arise</i> to a designated receptor from an identified hazard. It is <i>likely</i> that, at worst, if any harm was realised any effects would be <i>mild</i> .
Negligible Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term 'risk' in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.

Our Locations

Birmingham

2 The Wharf
Bridge Street
Birmingham
B1 2JS
T. 0121 643 4694
birmingham@curtins.com

Bristol

Quayside
40-58 Hotwell Road
Bristol
BS8 4UQ
T. 0117 302 7560
bristol@curtins.com

Cardiff

3 Cwrt-y-Parc
Earlswood Road
Cardiff
CF14 5GH
T. 029 2068 0900
cardiff@curtins.com

Douglas

Varley House
29-31 Duke Street
Douglas
Isle of Man
IM1 2AZ
T. 01624 624 585
douglas@curtins.com

Dublin

39 Fitzwilliam Square
Dublin 2
Ireland
T. 00353 1 507 9447
dublin@curtins.com

Edinburgh

1a Belford Road
Edinburgh
EH4 3BL
T. 0131 225 2175
edinburgh@curtins.com

Glasgow

Queens House
29 St Vincent Place
Glasgow
G1 2DT
T. 0141 319 8777
glasgow@curtins.com

Kendal

28 Lowther Street
Kendal
Cumbria
LA9 4DH
T. 01539 724 823
kendal@curtins.com

Leeds

Rose Wharf
Ground Floor
Leeds
L29 8EE
T. 0113 274 8509
leeds@curtins.com

Liverpool

Curtin House
Columbus Quay
Riverside Drive
Liverpool
L3 4DB
T. 0151 726 2000
liverpool@curtins.com

London

40 Compton Street
London
EC1V 0BD
T. 020 7324 2240
london@curtins.com

Manchester

Merchant Exchange
17-19 Whitworth Street West
Manchester
M1 5WG
T. 0161 236 2394
manchester@curtins.com

Nottingham

56 The Ropewalk
Nottingham
NG1 5DW
T. 0115 941 5551
nottingham@curtins.com