

Appendix C

Contamination Assessment Criteria

Tier 1 Acceptance Criteria for Residential Development with home grown produce (1% SOM)

Table 7	Assessment of Contamination Results
Table 8	Summary of Groundwater Results
Table 9	Risk Classification Matrix
Table 10	Classification of Consequence
Table 11	Classification of Probability
Table 12	Classification of Risk and Likely Action Required

Table 10 - Assessment of Contamination Results

Target	Material Type	Sample Location	Concentrations above Assessment Criteria (AC)	Testing Undertaken
Main Site	Made Ground	BH01	Benzo(a)pyrene = 6.8mg/kg (AC= 4.95mg/kg)	GS, Asb, sPAH, sTPH,
	Made Ground	BH01A	Sulphate Aqueous Extract as SO ₄ = 1500mg/l & pH = 10.1 = DS-2, ACEC Class AC-2	CS
	Made Ground	BH02	None	GS, Asb, sPAH, sTPH, CS
	Made Ground	TP01	None	GS, Asb, sPAH, sTPH
	Made Ground	TP02	None	GS, Asb, sPAH, sTPH
	Made Ground	TP04	Lead = 910mg/kg (AC = 200 mg/kg) Sulphate Aqueous Extract as SO ₄ = 1400mg/l & pH = 8.9 = DS-2, ACEC Class AC-2	GS, Asb, sPAH, sTPH, CS

Table 11 - Summary of Groundwater Concentrations above Assessment Level

Target	BH ID	Concentrations above Assessment Criteria	Testing Undertaken
	BH02	None	sPAH

Abbreviations			
GS	Arsenic, Cadmium, Chromium (III, VI, Total), Copper, Lead, Mercury, Nickel, Selenium, Zinc, pH, Cyanides (total, free, complex), Thiocyanate, Sulphur (free), Sulphate, Sulphide, Monohydric Phenols, TPH Screen and speciated PAH		
CS	Total Sulphate, Water Soluble Sulphate, Sulphide, Total Sulphur, Water Soluble Magnesium, Ammonium ion, pH, Chloride ions, Nitrate ions		
sPAH	Speciated Polyaromatic Hydrocarbons	sTPH	Speciated Total Petroleum Hydrocarbons
Asb	Asbestos		

Table 12 – Risk Classification Matrix

		Consequence			
		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High (Hi)	Very high risk	High Risk	Moderate Risk	Moderate/low risk
	Likely (Li)	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood (Lw)	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely (Ul)	Moderate/low risk	Low risk	Very low risk	Very low risk

After CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001

Table 13 – Classification of Consequence

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 (note: Water Resources Act contains no scope for considering significance 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 (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	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 (“significant harm” as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem or organism forming part of such ecosystem, (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects of carbon dioxide
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services (“significant harm” as defined in the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. 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.

After CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001

Table 14 – Classification of Probability

Probability 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.

After CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001

Table 15 - Classification of Risk and Likely Action Required

Very high risk (Vh)	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High risk (Hi)	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.
Moderate risk (Md)	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk (Lw)	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk (VI)	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

After CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001

Appendix D

Gas and groundwater monitoring results

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.



>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Appendix E

Photographs

Site Walk Over – 16th October 2016

Main Site

Photograph 1 – Looking south from the northern corner of the site.



Photograph 2 – Looking south-east from the north-west corner of the site along the south-west boundary.



Basement

Photograph 3 – Access to the basement through a fire exit off of Back Piccadilly.



Photograph 4 – Previous excavation in the basement.



Photograph 5 – Previous excavation identified, covered by a wooden board.



Appendix F

Factual Report on Ground Conditions

FAIRHURST

GARDENS HOTEL, MANCHESTER

**FACTUAL REPORT ON
GROUND INVESTIGATION**

Contract: 41977

Date: December 2016

Ian Farmer Associates (1998) Limited
14-15 Rufford Court, Hardwick Grange,
Warrington, WA1 4RF
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**FACTUAL REPORT ON
GROUND INVESTIGATION**

carried out at
GARDENS HOTEL, MANCHESTER

Prepared for
**FAIRHURST
51a St. Pauls Street,
Leeds
LS1 2TE**

Contract No: 41977

Date: December 2016

Issue & Revision Record			
Contract Number:		41977	
Contract Name:		Gardens Hotel, Manchester	
Client:		Fairhurst	
Engineer:		Fairhurst	
Report Title:		Factual Report on Ground Investigation	
Version	Issue Date	Report / revision details	Distribution
V1	22/12/2016	Complete report on ground investigation.	PDF copy to Fairhurst

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Reports 16-83004 & 16-83490-1	-	Results of Laboratory Tests – concrete suite
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1.0 INTRODUCTION

- 1.1 On the instructions of Fairhurst, a ground investigation was undertaken to determine ground and groundwater conditions at the site.
- 1.2 This report has been prepared for the sole use of the Client for the purpose described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.
- 1.3 Any comments given in this report and the opinions expressed herein are based on the information received, the conditions encountered during site works, and on the results of tests made in the field and laboratory. However, there may be conditions prevailing at the site which have not been disclosed by the investigation and which have not been taken into account in the report.
- 1.4 Groundwater observations may be made at the time the site work was carried out or during subsequent monitoring. It should be noted that groundwater levels may vary outside the limits of these observations due to seasonal or other effects.

2.0 THE SITE

2.1 Site Location

2.1.1 The site is situated off Little Lever Street approximately 0.5km to the northeast of Manchester City centre.

2.1.2 The site may be located by National Grid reference SJ 845 982

2.1.3 A site location plan is included in Appendix 1, Figure A1.1.

2.2 Site Description

2.2.1 At the time of investigation there were two areas of investigation.

2.2.2 Area 1 comprised a level parcel of derelict land surrounded by 2m high wooden hoarding.

2.2.3 Area 2 comprised a basement beneath Gardens Hotel.

2.2.4 The entrance to Area 1 was off Little Lever Street to the west via a locked gate. Area 2 was accessed to the north via roller shutter doors to the rear of the existing Gardens Hotel off Back Piccadilly.

2.2.5 Area 1 was bound to the north by Cavell Street, to the east by an existing office building, to the south by Back Piccadilly and to the west by Little Lever Street.

2.2.6 Area 2 was bound to the north by Back Piccadilly, to the east by Manchester Academy of English, to the south by Piccadilly and to the west by Wetherspoons.

2.2.7 A site plan is included in Appendix 1, Figure A1.2.

3.0 SITE WORK

- 3.1 The site work was carried out between 25th and 28th October 2016.
- 3.2 The locations of exploratory holes were agreed on site with the Engineer.
- 3.3 The site works were carried out on the basis of the practices set out in and BS 5930:2015 (ref. 5.1), BS EN ISO 14688-1:2002+A1:2013 (ref. 5.2) and BS 10175:2011+A1:2013 (ref. 5.3).
- 3.4 The following exploratory holes were undertaken:
- BH01, BH01A & BH02: Cable percussion boreholes
 - WS04 & WS05: Window sampler boreholes
 - TP01, TP02 & TP04: Machine excavated trial pits
 - HP01 & HP02: Hand excavated trial pits
- 3.5 A site plan showing the position of the exploratory holes is presented in Appendix 1 as Figure A1.2.
- 3.6 The depths of the exploratory holes, descriptions of strata encountered and comments on groundwater conditions are presented on the records in Appendix 2
- 3.7 A photographic record of the trial pits (TP01, TP02, TP04, HP01 and HP02) is presented in Appendix 6. Foundation sketches encountered within HP01 and HP02 are presented in Appendix 6.
- 3.8 A Cable Avoidance Tool (CAT) survey was undertaken at each exploratory hole location prior to excavation. At the location of boreholes an inspection pit was excavated by hand to a depth of 1.20m below ground level to check for buried services.
- 3.9 Representative disturbed and undisturbed samples were taken at the depths shown on the exploratory hole record. Samples for environmental purposes were collected in appropriate containers and kept in cool boxes for daily despatch to the analytical laboratory.
- 3.10 Standard penetration tests (SPT) (ref. 5.3) were carried out in boreholes in the various strata to assess the relative density or consistency. The values of penetration resistance are presented on the borehole records.
- 3.11 A perforated standpipe, surrounded by pea shingle and protected at surface by a lockable flush stopcock cover was installed in borehole BH02. The details of the installation are presented on the borehole record in Appendix 2.
- 3.12** Gas and groundwater monitoring visits have been undertaken upon completion of site works.

4.0 LABORATORY TESTS

4.1 Geotechnical Testing

4.1.1 Schedules for geotechnical testing were prepared by Fairhurst.

4.1.2 Soil samples for testing were prepared in accordance with BS1377: Part One: 1990 (ref. 5.5) and representative sub-samples were taken for testing. The following tests were carried out:

- 9 No. Moisture contents
- 4 No. Atterberg Limits (Liquid and Plastic Limit)
- 3 No. Undrained single stage Triaxial
- 2 No. One dimensional consolidation test

4.1.3 The results of the soil tests are presented in Appendix 3, Test Report 41977C/1.

4.2 Chemical Testing

4.2.1 Schedules for chemical testing were prepared by Fairhurst.

4.2.2 Chemical analysis was carried out on eleven samples of soil and one sample of water. The nature of the analysis is detailed below:

4.2.3 General suite comprises:

- arsenic, cadmium, chromium IV and hexavalent, lead, mercury, selenium, boron (water soluble), copper, nickel, zinc
- pH, total sulphate, water soluble sulphate, sulphur
- total phenols, total, complex and free cyanide, sulphide
- speciated PAH, total petroleum hydrocarbons (TPH)
- organic matter, asbestos screen and quantification

4.2.4 General concrete suite comprises (soil):

- total sulphate, water soluble sulphate, sulphide, total sulphur, water soluble magnesium, ammonium ion, pH, chloride ions, nitrate ions, all tested in accordance with BRE Special Digest No.1 2005.

4.2.5 General Water suite comprises:

- arsenic, cadmium, chromium IV and hexavalent, lead, mercury, selenium, boron (water soluble), copper, nickel, zinc

- pH, total sulphate, water soluble sulphate, sulphur
- total phenols, total, complex and free cyanide, sulphide
- speciated PAH, total petroleum hydrocarbons (TPH)
- total organic content

4.2.6 General concrete suite comprises (water):

- total sulphate, water soluble sulphate, sulphide, total sulphur, water soluble magnesium, ammonium ion, pH, chloride ions, nitrate ions, all tested in accordance with BRE Special Digest No.1 2005.

4.2.7 The results of chemical analysis on soil samples are presented in Appendix 4, Test Report 16-82761, 16-83004 & 16-83490-1.

4.2.8 The results of chemical analysis on water samples are presented in Appendix 4, Test Report 16-83927.

5.0 REFERENCES

- 5.1 British Standards Institution: BS 5930:2015 'Code of practice for ground investigations.' BSI 2015.
- 5.2 British Standards Institution: BS EN ISO 14688-1:2002+A1:2013. 'Geotechnical investigation and testing – Identification and Classification of Soil – Part 1 Identification and description.' BSI 2013.
- 5.3 British Standards Institute: BS 10175 'The investigation of potentially contaminated sites. Code of practice', BSI:2011+A1:2013.
- 5.4 British Standards Institute: BS EN ISO 22476-3: 2005 + A1: 2011. 'Geotechnical investigation and testing. Field testing. Standard penetration test.'
- 5.5 British Standard 1377:1990, Part 1-9, 'Methods of Test for Soils for Civil Engineering Purposes'.

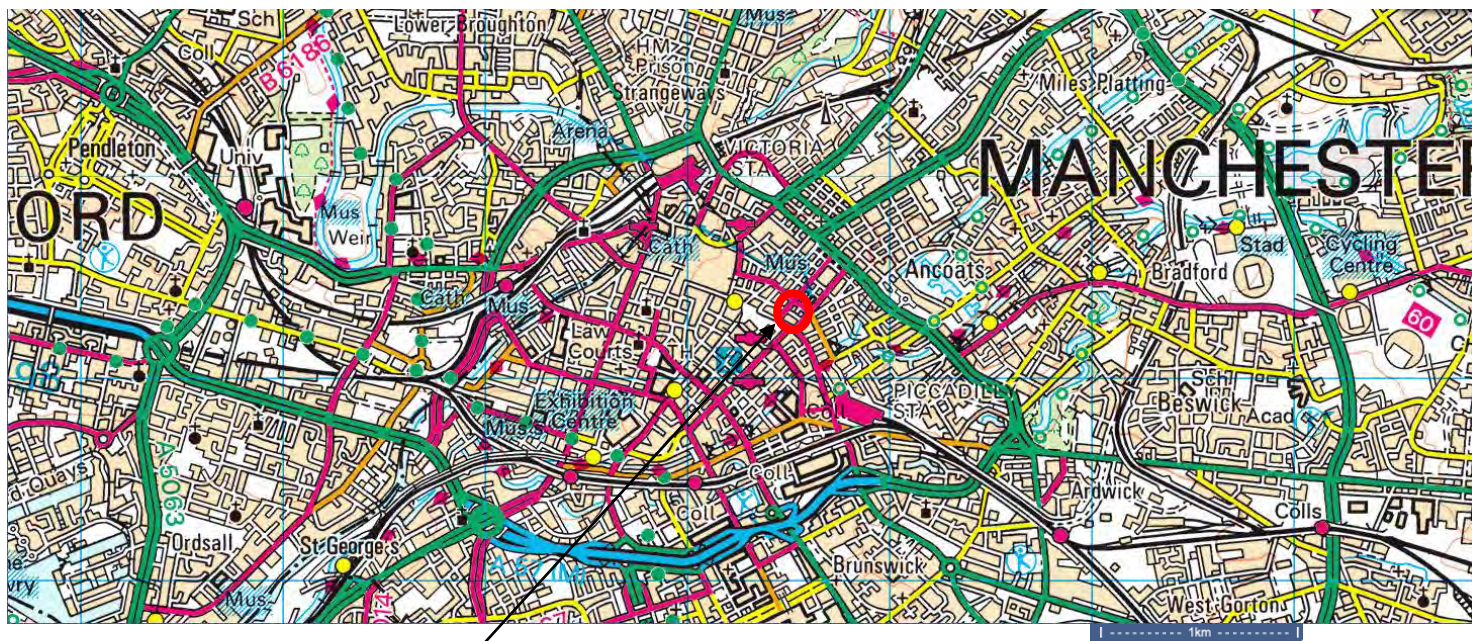
For and on behalf of Ian Farmer Associates (1998) Limited

H L Hadwin
BSc (Hons) MSc FGS
Engineering Geologist

J A Latimer
BSc (Hons) FGS
Director

APPENDIX 1

DRAWINGS



Site

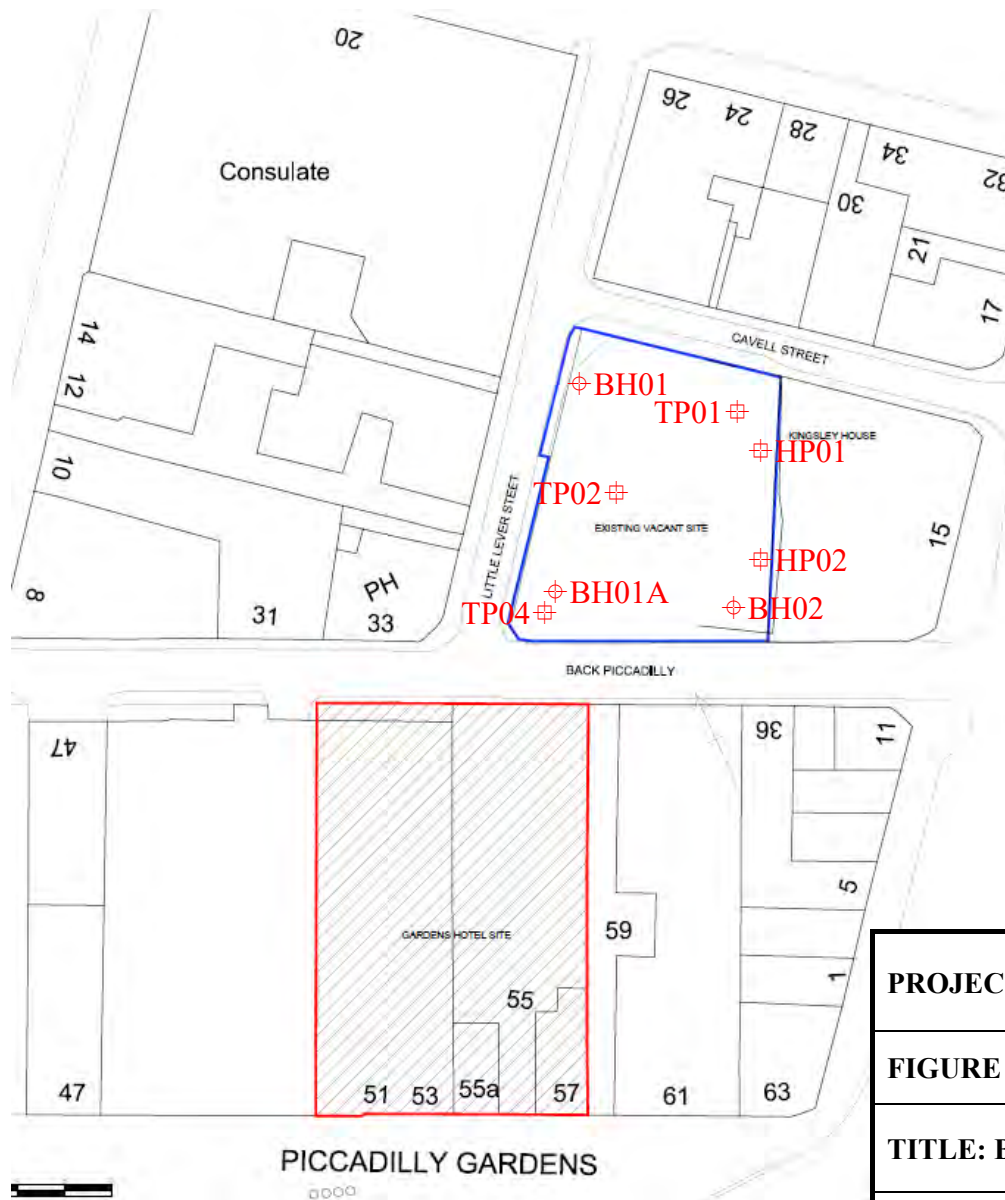
PROJECT: 41977 Garden Hotel, Manchester

FIGURE No. A1.1

SCALE: As Indicated

TITLE: Site Location Plan





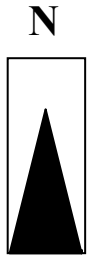
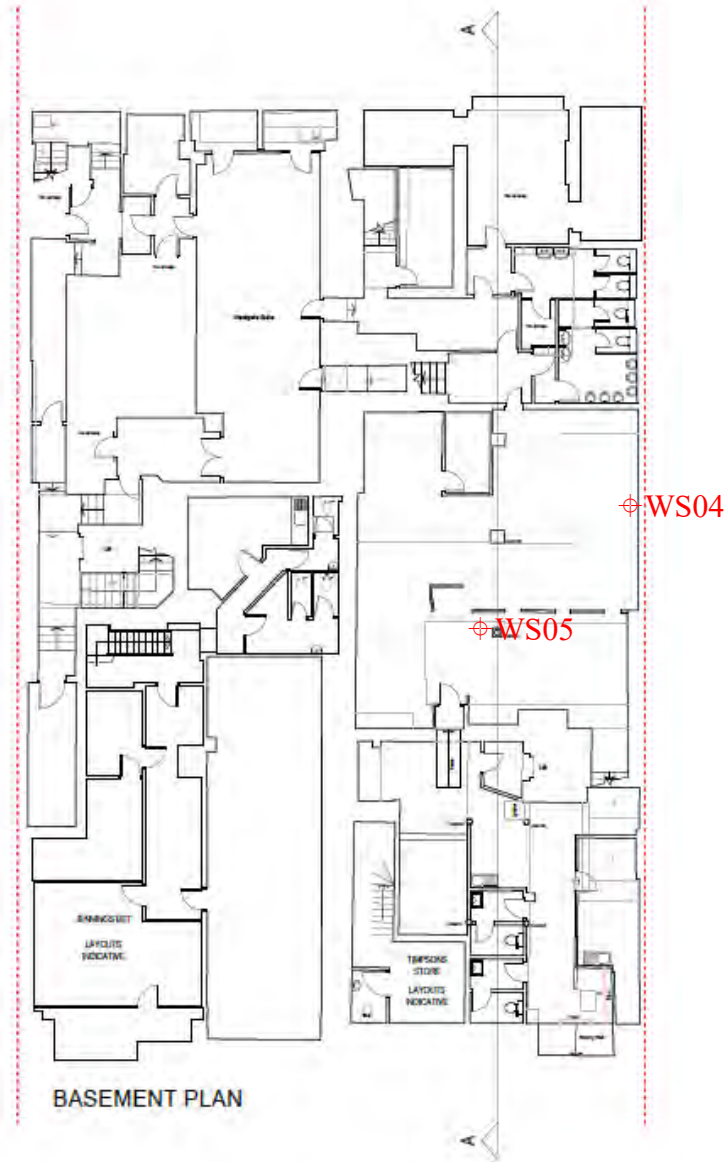
PROJECT: 41877 Gardens Hotel, Manchester

FIGURE No. A1.1

SCALE: As Indicated

TITLE: Borehole Location Plan

if IAN FARMER
ASSOCIATES
Geotechnical & Environmental Specialists



PROJECT: 41877 Gardens Hotel, Manchester

FIGURE No. A1.1

SCALE: As Indicated

TITLE: Hand Pit Location Plan

APPENDIX 2

SITE WORK

APPENDIX 2

GENERAL NOTES ON SITE WORKS

A2.1 SITE WORK

A2.1.1 Light Cable Percussion Boring

For routine soil exploration to depths in excess of 3m, the light cable percussion rig is generally employed for boring through soils and weak rocks. It consists of a powered winch and tripod frame, with running wheels that are permanently attached so that the rig may be towed behind a suitable vehicle. The rig is towed into position and set up using its own winching system.

The locations of services are checked to make sure the borehole is not situated unacceptably near any services. Regardless of the proximity of services, a CAT scan is undertaken at the borehole location and a trial hole dug to 1.20m by hand.

Boreholes are advanced in soil by the percussive action of the cable tool. The force of the cylindrical tool as it is dropped a short distance cuts a plug of cohesive soil that is removed by the tool.

In non-cohesive soils, the borehole is advanced by a 'shell', otherwise known as a 'bailer' or 'sand pump', which incorporates a clack valve. Material is transferred into the shell and retained by the clack valve. The water level in a borehole is maintained above that in the surrounding granular soil to allow for temporary reductions in the head of water as the shell is withdrawn from the borehole. Water should flow from the borehole into the surrounding soil at all times to prevent 'piping' and loosening the soil at the base of the hole. The casing is always advanced with the borehole in granular soil so that material is drawn from the base rather than the borehole sides.

Obstructions to boring are overcome by fitting a serrated chiselling ring to the base of the percussion tool. For large obstructions, a heavy chisel with a hardened cutting edge may have to be used.

Disturbed samples are taken in polythene bags, jars or tubs that are sealed against air or water loss.

Undisturbed samples are generally taken in cohesive materials at changes in strata and at one metre intervals to 5 metres then at 1.5 metre intervals to the full depths of the borehole. The general purpose open-tube sampler is suitable for firm to stiff clays, but is often used to retrieve disturbed samples of weak rocks, soft or hard clay and also clayey sand or silts. This has been adopted for routine use, and usually consists of a 100mm internal diameter tube (U100), which is capable of taking soil samples up to 450mm in length. The undisturbed samples are sealed at each end using micro-crystalline wax to prevent drying.

Standard penetration tests are generally carried out in non-cohesive soils but also in stiff clays and soft rocks at frequencies similar to that of undisturbed sampling.

A2.1.2 Drive-in Window Sampler

The drive-in window sampler, consists generally of a track mounted window sampler and a series of cylindrical sample tubes, generally varying in diameter from 98mm to 35mm. A cutting shoe is fitted to the bottom of each tube, while a window, representing about a quarter of the circumference, is cut along the length of the tube. Soil samples are extracted through the window of the tube.

The borehole is extended by using progressively smaller diameter tubes.

Alternatively, undisturbed samples may be collected in plastic liners, known as *windowless sampling*.

A2.1.3 Trial Pits

Shallow trial pits are generally dug by mechanical excavator, however, in difficult access locations or adjacent to structures, such pits may be hand dug. Pits are best used where the ground will stand unsupported and generally, the maximum depth of machine dug pits is 4m to 5m. Where personnel are required to enter pits, it is essential that side support is provided. Entry by personnel into unsupported pits deeper than 1.2m is not allowed for health and safety reasons.

Trial pits allow the in-situ condition of the ground to be examined both laterally and vertically and also allow discontinuities to be recorded. The field record should give the orientation of the pit with details of which face was logged, assessment of stability of sides of pit and groundwater as well as the strata encountered. Photographs of the pit should also be taken.

In-situ testing, such as hand penetrometer, hand vane, Macintosh probe, or similar, can be undertaken in the sides or base of pits while both disturbed and undisturbed samples recovered.

It is generally advisable to backfill the pits as soon as possible, open pits should not be left unattended.

A2.2 IN-SITU TESTS

A2.2.1 Standard Penetration Test

The Standard Penetration Test is carried out in accordance with the proposals recommended in ref 5.3.

The standard penetration test, **SPT**, covers the determination of the resistance of soils to the penetration of a split barrel sampler. A 50mm diameter split barrel sampler is driven 450mm into the soil using a 65kg hammer with a 760mm drop. The penetration resistance is expressed as the number of blows required to obtain 300mm penetration below an initial seating drive of 150mm through any disturbed ground at the bottom of the borehole. The number of blows to achieve the standard penetration of 300mm is reported as the 'N' value.

The test is generally carried out in fine soils, however, it may also be carried out in coarse granular soils, weak rocks and glacial tills using the same procedure as for the SPT but with a 50mm diameter, 60° apex solid cone replacing the split spoon sampler, **CPT**.

When attempting the standard penetration test in very dense material or weathered rocks it may be necessary to terminate the test before completion to prevent damage to the equipment. In these circumstances it is important to distinguish how the blow count relates to the penetration of the sampler. This may be achieved in the following manner:

- Where the seating drive has been completed, the test drive is terminated if 50 blows are reached before the full penetration of 300mm is achieved. The penetration for 50 blows is recorded and an approximate N value obtained by linear extrapolation of the number of blows for the partial test drive.
- If the seating drive of 150mm is not achieved within the first 25 blows, the penetration after 25 blows is recorded and the test drive then commenced.
- For tests in soft rocks, the test drive should be terminated after 100 blows where the penetration of 300mm has not been achieved.

The N-value obtained from the Standard Penetration Test may be used to assess the relative density of sands and gravels as follows:

Term	SPT N-Value : Blows/300mm Penetration
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

A2.3 SAMPLES

U(x) represents undisturbed 100mm diameter sample with (x) being the number of blows required to obtain sample.

U NR| indicates undisturbed sample not recovered

B represents large bulk disturbed samples

D represents small disturbed sample

ES represents environmental sample

W represents water sample

∇ represents water strike

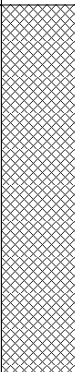
▼ represents level to which water rose

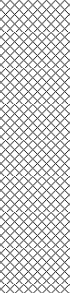
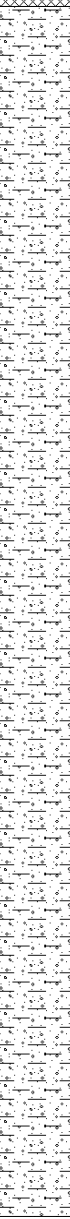
A2.4 DESCRIPTION OF SOILS

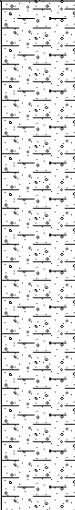
A2.4.1 General

The procedures and principles given in BS EN ISO 14688-1:2002+A1:2013 (ref. 5.2) and BS 5930:2015 (ref. 5.3) have been used in the soil descriptions contained within this report.

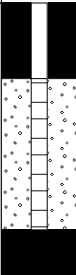
Borehole Records

	Contract Name: Gardens Hotel, Manchester				Client: Fairhurst				Borehole ID: BH01					
	Contract Number: 41977		Date Started: 26/10/2016		Logged By: N/A		Checked By: HH		Status: DRAFT					
Cable Percussion Borehole Log		Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 22/12/2016		Sheet 1 of 1 Scale: 1:50		
Weather:				Termination:				SPT Hammer: N/R, Energy Ratio: N/R						
Samples & In Situ Testing				Strata Details						Groundwater				
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation			
0.40 0.50 - 1.00 0.70 0.90	ES1 B2 ES3 ES4					MADE GROUND: Brick/Concrete (driller's description).				1				
1.20 1.20 - 1.65	B5	SPT(C) N=45 (4,7/9,9,12,15)		(2.45)										
2.00		SPT(C) N=45 (6,10/14,9,10,12)		2.45		End of Borehole at 2.45m				2				
										3				
										4				
										5				
										6				
										7				
										8				
										9				
										10				
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Service inspection pit hand excavated from GL to 1.20m. Borehole terminated at 2.45m due to an obstruction, relocated to BH01A.					
					2.00	150	2.00	150						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
1.90	2.00	01:00												
IFA CP Template Issue Number: 5a Issue Date: 30/11/16														

	Contract Name: Gardens Hotel, Manchester			Client: Fairhurst			Borehole ID: BH01A				
	Contract Number: 41977		Date Started: 26/10/2016		Logged By: BL		Checked By: HH		Status: DRAFT		
	Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 22/12/2016		
Cable Percussion Borehole Log										Scale: 1:50	
Weather:				Termination:				SPT Hammer: N/R, Energy Ratio: N/R			
Samples & In Situ Testing				Strata Details						Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation
0.30 0.50 - 1.00 0.60	ES1 B2 ES3	SPT(C) N=27 (4,8/7,8,6,6)		(2.00)		MADE GROUND: Soft, brown, slightly sandy, gravelly CLAY. Gravel is angular to subangular, fine and medium including brick and woodchips.				1	
1.00 1.20 1.20 - 1.65	ES4 B5										
2.00 2.00 2.00 - 2.45 2.00 - 2.45	ES6 B7 D8										
3.00 - 3.45	U9					20 blows. 80% recovery					
3.50	D10										
4.00 4.00 - 4.45 4.00 - 4.45	B11 D12	SPT(S) N=15 (3,3/4,3,4,4)		2.00		Firm, brown, slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse including sandstone, coal and mudstone.				2	
5.00 - 5.45	U13	24 blows. 100% recovery				3					
5.50	D14										
6.00 6.00 - 6.45 6.00 - 6.45	B15 D16	SPT(S) N=16 (2,4/4,4,4,4)		(11.38)		Below 4.00m: stiff.				4	
7.00 - 7.45	U17	27 blows. 100% recovery				5					
7.50	D18										
8.00 8.00 - 8.45 8.00 - 8.45	B19 D20	SPT(S) N=22 (3,3/5,5,6,6)	6								
9.00 - 9.45	U21	32 blows. 100% recovery				7					
9.50	D22										
									8		
								9			
								10			
Start & End of Shift Observations			Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Service inspection pit hand excavated from GL to 1.20m.		
					13.38	150	14.00	150			
					Water Strikes						
Chiselling					Installation						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)
0.00	1.20	01:00							Time (mins)	Rose to (m)	Remarks
IFA CP Template Issue Number: 5a Issue Date: 30/11/16											

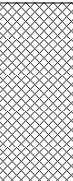
	Contract Name: Gardens Hotel, Manchester			Client: Fairhurst			Borehole ID: BH01A														
	Contract Number: 41977		Date Started: 26/10/2016		Logged By: BL		Checked By: HH		Status: DRAFT												
Cable Percussion Borehole Log		Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 22/12/2016		Sheet 2 of 2 Scale: 1:50									
Weather:				Termination:				SPT Hammer: N/R, Energy Ratio: N/R													
Samples & In Situ Testing						Strata Details						Groundwater									
Depth		Sample ID		Test Result		Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation							
10.00				SPT(S) N=34 (5,7/8,8,8,10)					Firm, brown, slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse including sandstone, coal and mudstone.												
10.00 - 10.45		B23																			
10.00 - 10.45		D24											11								
11.50 - 11.95		U25		42 blows. 100% recovery																	
12.00		D26											12								
13.00													13								
13.00 - 13.38		D27		SPT(S) 50 (6,10/50 for 225mm)			13.38		End of Borehole at 13.38m												
													14								
													15								
													16								
													17								
													18								
													19								
													20								
Start & End of Shift Observations						Borehole Diameter		Casing Diameter		Remarks:											
Date		Time		Depth (m)		Casing (m)		Water (m)		Depth (m)		Dia (mm)		Depth (m)		Dia (mm)		Service inspection pit hand excavated from GL to 1.20m.			
										13.38		150		14.00		150					
Chiselling						Installation						Water Strikes									
Strike (m)		Casing (m)		Sealed (m)		Time (mins)		Rose to (m)		Remarks											
From (m)		To (m)		Duration		Remarks		Top (m)		Base (m)		Type		Dia (mm)							
IFA CP Template Issue Number: 5a Issue Date: 30/11/16																					

	Contract Name: Gardens Hotel, Manchester			Client: Fairhurst			Borehole ID: BH02			
	Contract Number: 41977	Date Started: 25/10/2016	Logged By: BL	Checked By: HH	Status: DRAFT					
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 22/12/2016	Sheet 1 of 2 Scale: 1:50				
	Weather:		Termination:		SPT Hammer: N/R, Energy Ratio: N/R					
Samples & In Situ Testing			Strata Details					Groundwater		
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation	
0.30	ES1			(1.20)		MADE GROUND: Brown, gravelly, fine to coarse SAND with low cobble content. Gravel is angular to subrounded, fine to coarse including brick and concrete.	1			
0.50 - 1.00	B2									
0.60	ES3									
0.90	ES4	SPT(C) N=12 (4,3/3,3,3,3)	1.20	(0.50)		MADE GROUND: Firm, brown, sandy, gravelly CLAY. Gravel is subangular to subrounded, fine to coarse including brick and concrete.	2			
1.20	B5									
1.20 - 1.65										
2.00 - 2.45	U6	22 blows. 60% recovery		1.70		Firm, laminated, brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine including mudstone, siltstone and sandstone.	3			
2.50	D7									
3.00										
3.00 - 3.45	B8	SPT(C) N=18 (3,3/4,5,4,5)		(7.70)		At 3.00m: sand lenses Below 3.00m: stiff.	4			
3.00 - 3.45	D9									
4.00 - 4.45	U10									28 blows. 70% recovery
4.50	D11						5			
5.00 - 5.45	B12									
5.00 - 5.45	D13									
6.00 - 6.45	U14	26 blows. 90% recovery					6			
6.50	D15									
7.00										
7.00 - 7.45	B16	SPT(C) N=17 (2,3/3,5,5,4)					7			
7.00 - 7.45	D17									
8.00 - 8.45	U18									33 blows. 70% recovery
8.50	D19					Below 8.50m: sandy	8			
9.00										
9.00 - 9.45	B20									
9.00 - 9.45	D21	SPT(S) 50 (4,6/50 for 225mm)		9.40		Dense, brown, medium SAND.	9			
							10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Service inspection pit hand excavated from GL to 1.20m.	
Chiselling					Installation				Water Strikes	
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)
9.00	10.00	01:00			0.00	10.50	PLAIN			
					10.50	11.50	SLOTTED			
									Issue Number: 5a Issue Date: 30/11/16	

	Contract Name: Gardens Hotel, Manchester			Client: Fairhurst			Borehole ID: BH02		
	Contract Number: 41977	Date Started: 25/10/2016	Logged By: BL	Checked By: HH	Status: DRAFT				
Cable Percussion Borehole Log	Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 22/12/2016	Sheet 2 of 2 Scale: 1:50			
	Weather:		Termination:		SPT Hammer: N/R, Energy Ratio: N/R				
Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
10.00 10.00 - 10.45	D22	SPT(S) N=50 (6,6/10,12,12,16)		(2.40)		At 11.50m: very dense		11	
11.50 11.50	D23	SPT(C) 75 (10,14/75 for 150mm)		11.80				End of Borehole at 11.80m	
								13	
								14	
								15	
								16	
								17	
								18	
								19	
								20	
Start & End of Shift Observations			Borehole Diameter		Casing Diameter		Remarks:		
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Service inspection pit hand excavated from GL to 1.20m.
Chiselling			Installation		Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)
11.00	11.50	00:30		0.00	10.50	PLAIN			
				10.50	11.50	SLOTTED			
IFA CP Template Issue Number: 5a Issue Date: 30/11/16									

Trial Pit Records

	Contract Name: Gardens Hotel, Manchester			Client: Fairhurst			Borehole ID: WS04					
	Contract Number: 41977		Date Started: 28/10/2016		Logged By: BL		Checked By: HH		Status: DRAFT			
	Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 22/12/2016			
Dynamic Sample Borehole Log										Scale: 1:50		
Weather:				Termination:				SPT Hammer: N/R, Energy Ratio: N/R				
Samples & In Situ Testing				Strata Details						Groundwater		
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description					Water Strike	Backfill/Installation
0.20 - 1.20	B1			0.10		MADE GROUND: Tiles over concrete. Stiff, laminated, dark brown CLAY.						
				(1.10)							1	
1.20 - 1.65	D2	SPT(S) N=11 (2,2/2,2,3,4) HVP=232kPa		1.20		Stiff, laminated, dark brown, slightly gravelly CLAY. Gravel is subangular to rounded, fine and medium including coal, mudstone and sandstone.						
1.20												
1.20												
1.50	ES3	HVP=183kPa										
1.50												
2.00 - 2.45	D4	SPT(S) N=18 (3,3/4,4,5,5)				Below 2.00m: stiff					2	
2.00												
2.50	D5											
3.00 - 3.45	D6	SPT(S) N=16 (2,3/3,4,4,5)									3	
3.00												
3.50	D7	HVP=200kPa										
3.50												
4.00 - 4.45	D8	SPT(S) N=18 (3,3/4,4,5,5)									4	
4.00												
4.50	D9	HVP=104kPa										
4.50												
5.00 - 5.45	D10	SPT(S) N=44 (5,5/8,12,12,12)									5	
5.00												
				5.45		End of Borehole at 5.45m						
											6	
											7	
											8	
											9	
											10	
Borehole Diameter		Installation				Remarks:						
Depth (m)	Dia (m)	Depth Top	Base (m)	Diameter	Pipe Type	Service inspection pit hand excavated from GL to 1.20m. Between 1.20m and 2.00m: recovery = 100%. Between 2.00m and 3.00m: recovery = 100%. Between 3.00m and 4.00m: recovery = 100%. Between 4.00m and 5.00m: recovery = 100%.						
Water Strikes												
Depth Strike	Depth Casing	Depth Sealed	Time (mins)	Rose to (m)	Remarks							
IFA DS Template Issue Number: 3 Issue Date: 20-12-16												

	Contract Name: Gardens Hotel, Manchester			Client: Fairhurst			Borehole ID: WS05		
	Contract Number: 41977	Date Started: 28/10/2016	Logged By: BL	Checked By: HH	Status: DRAFT	Sheet 1 of 1			
Dynamic Sample Borehole Log	Easting:		Northing:		Ground Level:	Plant Used:	Print Date: 22/12/2016	Scale: 1:50	
	Weather:			Termination:					
Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/ Installation
0.10 - 1.20	B1			(1.20)		MADE GROUND: Black, sandy, angular to subangular, fine to coarse GRAVEL including concrete and brick.		1	
1.20 - 1.50	B2			1.20 (0.30) 1.50		MADE GROUND: Brick.			
						End of Borehole at 1.50m			
								2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	
Borehole Diameter		Installation				Remarks:			
Depth (m)	Dia (m)	Depth Top	Base (m)	Diameter	Pipe Type	Service inspection pit hand excavated from GL to 1.20m. WS05 terminated 1.50m due to obstruction.			
Water Strikes									
Depth Strike	Depth Casing	Depth Sealed	Time (mins)	Rose to (m)	Remarks				
IFA DS Template Issue Number: 3 Issue Date: 20-12-16									

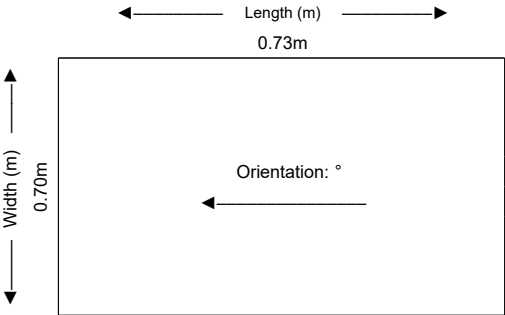
Hand Pit Records

	Contract Name: Gardens Hotel, Manchester		Client: Fairhurst			Trial Pit ID: TP01		
	Contract Number: 41977	Date: 25/10/2016	Logged By: MH	Checked By: HH	Status: DRAFT	Sheet 1 of 1		
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: JCB 3CX	Date Printed: 22/12/2016	Scale: 1:40		
	Weather:		Hole Termination:		Stability: Trial pit remained dry during excavation. Slight spalling of trial pit sides during excavation.			
Samples & In Situ Testing			Strata Details					Water
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description		
0.10 0.20 - 0.50 0.50 0.50 0.70 - 1.00 1.00 1.00 1.50 1.50 - 2.50 2.00 2.00 2.50 2.50 3.00 - 3.50 3.00 3.50 3.70	ES1 B2 D4 ES3 B5 ES6 ES7 D8 B9 D11 ES10 B12 D13	HVP=122kPa HVP=122kPa HVP=122kPa		0.20 (0.40) 0.60 (3.10) 3.70	                                 			

	Contract Name: Gardens Hotel, Manchester		Client: Fairhurst			Trial Pit ID: TP02																		
	Contract Number: 41977	Date: 25/10/2016	Logged By: MH	Checked By: HH	Status: DRAFT	Sheet 1 of 1																		
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: JCB 3CX	Date Printed: 22/12/2016	Scale: 1:40																		
	Weather:		Hole Termination:		Stability: Trial pit remained dry with slight spalling of trial pit sides during excavation between 0.00m and 1.00m.																			
Samples & In Situ Testing			Strata Details					Water																
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description																		
0.00 - 0.20 0.10	B1 ES2	HVP=122kPa		0.20		MADE GROUND: Black, sandy, subangular to subrounded, fine to coarse GRAVEL including brick, clinker and ash.		1																
0.50 0.50 - 1.00	ES3 D4		(1.10)		MADE GROUND: Brown, gravelly, fine to coarse SAND with medium cobble content. Gravel is angular to subrounded, fine to coarse including brick, tile, metal, glass and mudstone. Cobbles are angular including brick and tile.																			
1.00	B5		1.30		Stiff, high strength, brownish grey mottled, slightly sandy CLAY with occasional gravel. Gravel is subangular to subrounded, fine including mudstone and coal.		2																	
1.50	D6		(2.60)		End of Trial Pit at 3.90m			3																
2.00 2.00 - 2.50 2.00	D8 ES7				3.90		End of Trial Pit at 3.90m		4															
2.50	B9	3.90								End of Trial Pit at 3.90m		5												
3.00 3.00 - 3.00 3.00	D11 ES10									3.90			End of Trial Pit at 3.90m		6									
3.50	D12	3.90		End of Trial Pit at 3.90m		6																		
3.80	D13			3.90			End of Trial Pit at 3.90m		6															
Dimensions:				General Remarks:																				
Final Depth: 3.90m				← Length (m) → 2.40m ↑ Width (m) ↓ 1.40m Orientation: ° <table><tr><th colspan="4">Water Strikes</th></tr><tr><th>Strike (m)</th><th>Time (mins)</th><th>Rose to (m)</th><th>Remarks</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>					Water Strikes				Strike (m)	Time (mins)	Rose to (m)	Remarks								
Water Strikes																								
Strike (m)	Time (mins)	Rose to (m)	Remarks																					
HBSI TP Template Issue Number: 2 Issue Date: 27/04/16																								

						Contract Name: Gardens Hotel, Manchester								Client: Fairhurst							Trial Pit ID: TP04																														
												Contract Number: 41977				Date: 25/10/2016				Logged By: MH				Checked By: HH				Status: DRAFT				Sheet 1 of 1																			
Trial Pit Log												Easting:				Northing:				Ground Level:				Plant Used: JCB 3CX				Date Printed: 22/12/2016				Scale: 1:40																			
Weather:												Hole Termination:												Stability: Trial pit remained dry during excavation. Slight spalling of trial pit sides during excavation between 0.00m and 1.90m.																											
Samples & In Situ Testing												Strata Details																						Water																	
Depths		Sample ID		Test Result								Reduced Level		Depth (m) (Thickness)		Legend		Strata Description																																	
0.00 - 0.50 0.20		B1 ES2												(1.00)				MADE GROUND: Brown, gravelly, fine to coarse SAND with low cobble content. Gravel is angular to subrounded, fine to coarse including brick, wood, concrete, tile, plastic and ash. Cobbles are angular including brick, wood, metal, plastic and tile.																																	
0.50 0.50		D4 ES3																																																	
1.00 1.00 - 1.60		ES5 B6																																1																	
1.30 1.50 - 1.90		ES7 B8																																																	
				HVP=122kPa										1.00				MADE GROUND: Firm, brown and black mottled, slightly sandy CLAY with occasional gravel. Gravel is subangular to subrounded, fine including mudstone.																																	
				HVP=122kPa										(0.50)				MADE GROUND: Black COBBLES with plastic bags and cloth fragments.																																	
				HVP=122kPa										1.50				Stiff, high strength, brown grey mottled, slightly sandy, slightly gravelly CLAY with occasional laminations. Gravel is subangular to subrounded, fine and medium including mudstone and coal.																																	
				HVP=122kPa										1.90				End of Trial Pit at 3.60m																																	
														(1.70)																																					
														3.60																																					

	Contract Name: Gardens Hotel, Manchester		Client: Fairhurst			Trial Pit ID: HP01													
	Contract Number: 41977	Date: 25/10/2016	Logged By: MH	Checked By: HH	Status: DRAFT	Sheet 1 of 1													
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: Hand excavated	Date Printed: 22/12/2016	Scale: 1:40													
	Weather:		Hole Termination:		Stability: Trial pit remained dry and stable during excavation														
Samples & In Situ Testing			Strata Details					Water											
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description													
0.00 - 0.30 0.20	B1 ES2			(0.30)		MADE GROUND: Brown, gravelly, clayey, fine to coarse SAND with low cobble content. Gravel is angular to subrounded, fine to coarse including brick, wood, plastic, slate, tile, concrete, mould and mudstone. Cobbles are angular including brick.		1											
0.60 0.60	D4 ES3			(0.35) 0.65		Firm, brownish grey mottled, slightly sandy CLAY with occasional gravel. Gravel is subangular to subrounded, fine including mudstone and coal. Below 0.30m: medium cobble content. End of Trial Pit at 0.65m													
								2											
								3											
								4											
								5											
								6											
Dimensions:			General Remarks:																
Final Depth: 0.65m			Refer to hand pit sketch for further details.																
← Length (m) → 0.65m ↑ Width (m) ↓ 0.70m Orientation: ° ←																			
			<table><tr><th colspan="4">Water Strikes</th></tr><tr><th>Strike (m)</th><th>Time (mins)</th><th>Rose to (m)</th><th>Remarks</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>					Water Strikes				Strike (m)	Time (mins)	Rose to (m)	Remarks				
Water Strikes																			
Strike (m)	Time (mins)	Rose to (m)	Remarks																
			HBSI TP Template Issue Number: 2 Issue Date: 27/04/16																

	Contract Name: Gardens Hotel, Manchester		Client: Fairhurst			Trial Pit ID: HP02										
	Contract Number: 41977	Date: 25/10/2016	Logged By: MH	Checked By: HH	Status: DRAFT	Sheet 1 of 1										
Trial Pit Log	Easting:	Northing:	Ground Level:	Plant Used: Hand excavated	Date Printed: 22/12/2016	Scale: 1:40										
	Weather:		Hole Termination:		Stability: Trial pit remained dry and stable during excavation											
Samples & In Situ Testing			Strata Details					Water								
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description										
0.10	ES1			(0.39)	 	MADE GROUND: Brown, gravelly fine to coarse SAND with low cobble content. Gravel is angular to subrounded, fine to coarse including brick, wood, tile, glass, metal, plastic, slate, concrete and mudstone.		1								
0.30	D2			0.39		Firm, brown and grey mottled, slightly sandy CLAY with occasional gravel. Gravel is subangular to subrounded, fine, including mudstone.			2							
0.39 - 0.49	B4			0.49		End of Trial Pit at 0.49m		3								
0.45	ES3								4							
								5								
									6							
Dimensions:					General Remarks:											
Final Depth: 0.49m					Please refer to sketch for further details.											
																
					Water Strikes											
					<table><tr><th>Strike (m)</th><th>Time (mins)</th><th>Rose to (m)</th><th>Remarks</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>				Strike (m)	Time (mins)	Rose to (m)	Remarks				
Strike (m)	Time (mins)	Rose to (m)	Remarks													
					HBSI TP Template Issue Number: 2 Issue Date: 27/04/16											

APPENDIX 3

GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX 3

GENERAL NOTES ON LABORATORY TESTS ON SOILS

A3.1 GENERAL

- A3.1.1 Where applicable all tests are carried out in accordance with the relevant British Standard. The laboratory test procedures are as below:

Test Name	Procedures BS1377:1990 Part:Clause
Moisture Content	2:3
Liquid Limit	2:4
Plastic Limit and Plastic Index	2:5
Linear Shrinkage	2:6
Particle Size Distribution	2:9
Loss on Ignition	3:4*
Sulphate content	3:5
Chloride Content	3:7*
pH Value	3:9
Compaction Test	4:3*
Moisture condition Value	4:5
California Bearing Ratio	4:7
Consolidation	5:3
Bulk Density	7:2*
Laboratory Vane Tests	7:3*
Shear Box	7:4*
Triaxial Compression	
Total Stress Single-Stage	7:8
Total Stress Multi-Stage	7:9
Effective Stress	Note 1*
Permeability	Note 2*
Desiccation	Note 3*
In-situ density by Sand replacement	Part 9
Core Cutter	Part 9
Nuclear density	Part 9
	BS812 Part:Clause
Ten % fines (Dry and Soaked)	111
Aggregate crushing value	110
Particle density and water absorption	2
Particle size distribution	103
Moisture content – oven drying	109
Soundness	121

BS:1881
Part:Clause

Chloride Content	124:10.2
Sulphate content	124:10.3
Curing/density and compressive strength of concrete tubes	116-111-114
Location of reinforcement	204
Carbonation	Note 4
Resistivity	Note 5
Sampling of concrete dust by drilling	Note 6
Half cell potential	Note 7

Note 1 - Manual of soils laboratory testing volume 3: 1985, section 19.2 by K.H. Head

Note 2 - Manual of soils laboratory testing volume 2: 1985, section 10.7 by K.H. Head

Note 3 - BRE Information paper IP4 issued February 1993

Note 4 - BRE Information paper IP6/81

Note 5 - In-house document number 109

Note 6 - In-house document number 112

Note 7 - ASTM C876-91

* Tests are not included in UKAS accreditation

A3.1.2 Any discussion in this report is based on the values and results obtained from the appropriate tests. Due allowance should be made, when considering any result in isolation, of the possible inaccuracy of any such individual result. Details of the accuracy of results are included in this section, where applicable.

F.A.O.

Test Report - 41977C /1

Site: Gardens Hotel, Manchester

Job Number: 41977C

Originating Client: Fairhurst

Originating Reference: 41977C

Date Sampled: Not Given

Date Scheduled: 10/11/2016

Date Testing Started: 15/11/2016

Date Testing Finished: 23/11/2016

Remarks:

Authorised By:



Daniel Smith
Laboratory Supervisor

Date: 28/11/2016

Page. 1



Site: Gardens Hotel, Manchester

Job Number: 41977C

Client: Fairhurst

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 %						
BH01A	2.00	D8	Natural	21.6	100	22.0	42	19	23	0.11	CI	Brown CLAY
BH01A	3.00	U9		21.3								Brown gravelly CLAY
BH01A	5.00	U13		17.8								Brown gravelly CLAY
BH01A	7.00	U17	Natural	25.3	100	25.0	31	17	14	0.59	CL	Brown gravelly CLAY
BH02	2.00	U6		20.2								Brown gravelly CLAY
BH02	2.50	D7	Natural	20.7	100	21.0	42	20	22	0.03	CI	Brown gravelly CLAY
BH02	4.00	U10		17.8								Brown gravelly CLAY
TP04	2.50	D11		20.2								Brown gravelly CLAY
WS04	1.50	ES3	Natural	19.5	98	20.0	40	19	21	0.04	CI	Brown 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: Gardens Hotel, Manchester

Job Number: 41977C

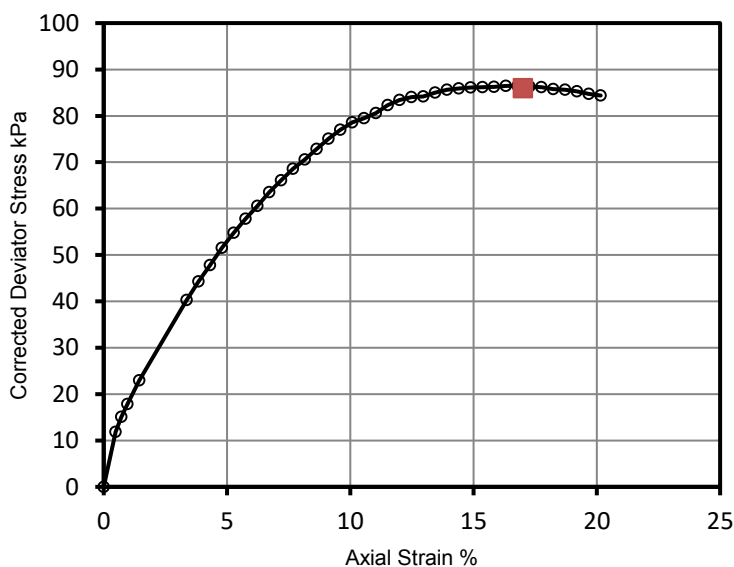
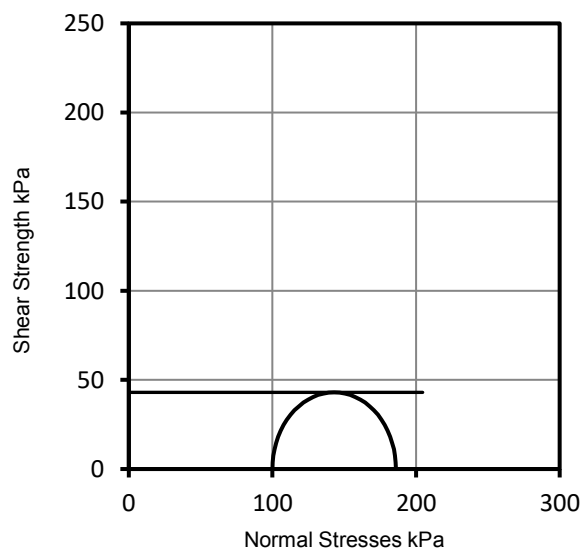
Client: Fairhurst

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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
BH01A	5.00	U13	Brown gravelly CLAY

Initial Sample	Test Number	1
	Original Length (mm)	416.17
	Depth from Top (mm)	186.27
	Condition	Undisturbed
	Orientation	Vertical
Length (mm)		208.37
Diameter (mm)		102.56
Moisture Content (%)		20.20
Bulk Density (Mg/m ³)		2.12
Dry Density (Mg/m ³)		1.77
Membrane Thickness (mm)		0.3
Membrane Type		Latex
Rate of Strain (%/min)		1.9
Test Results	Cell Pressure (kPa)	100
	Axial Strain (%)	17
	Membrane Corr. (kPa)	0.97
	Deviator Stress, $(\sigma_1 - \sigma_3) f$ (kPa)	86
	Undrained Shear Strength, $c_u = \frac{1}{2}(\sigma_1 - \sigma_3) f$ (kPa)	43
	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: Gardens Hotel, Manchester

Job Number: 41977C

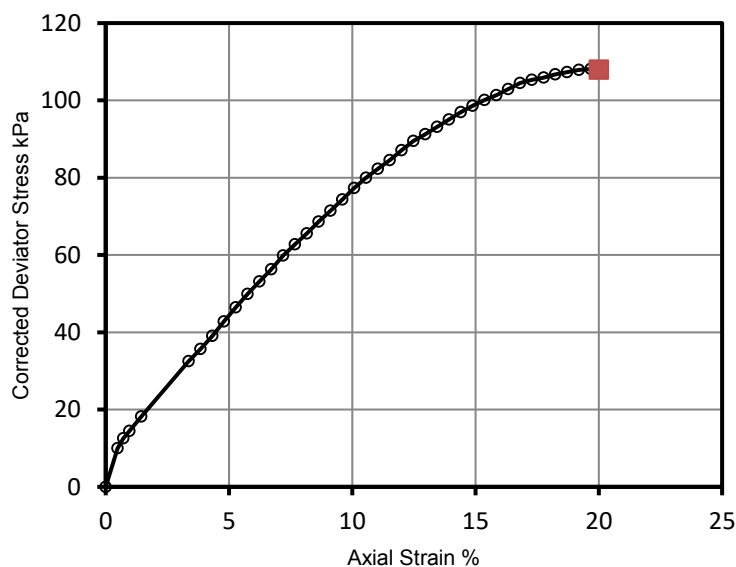
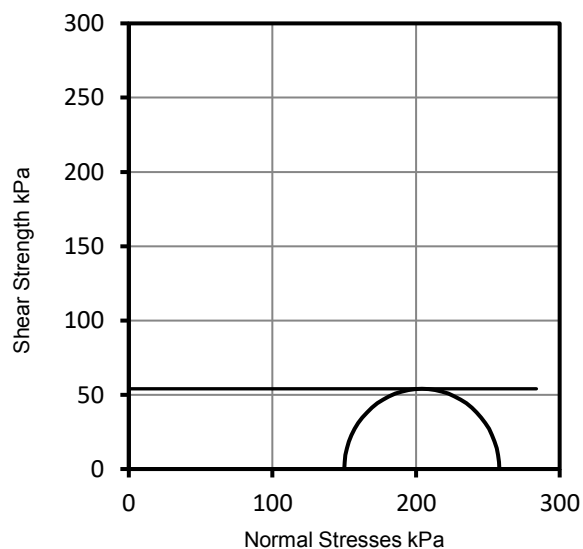
Client: Fairhurst

Page: 4

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

Borehole / Trial Pit	Depth (m)	Sample	Description
BH01A	7.00	U17	Brown gravelly CLAY

Initial Sample	Test Number	1
	Original Length (mm)	438.37
	Depth from Top (mm)	3.56
	Condition	Undisturbed
	Orientation	Vertical
Length (mm)		208.34
Diameter (mm)		103.05
Moisture Content (%)		25.30
Bulk Density (Mg/m ³)		2.01
Dry Density (Mg/m ³)		1.60
Membrane Thickness (mm)		0.27
Membrane Type		Latex
Rate of Strain (%/min)		19.2
Test Results	Cell Pressure (kPa)	150
	Axial Strain (%)	20
	Membrane Corr. (kPa)	1.01
	Deviator Stress, $(\sigma_1 - \sigma_3) f$ (kPa)	108
	Undrained Shear Strength, $c_u = \frac{1}{2}(\sigma_1 - \sigma_3) f$ (kPa)	54
	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: Gardens Hotel, Manchester

Job Number: 41977C

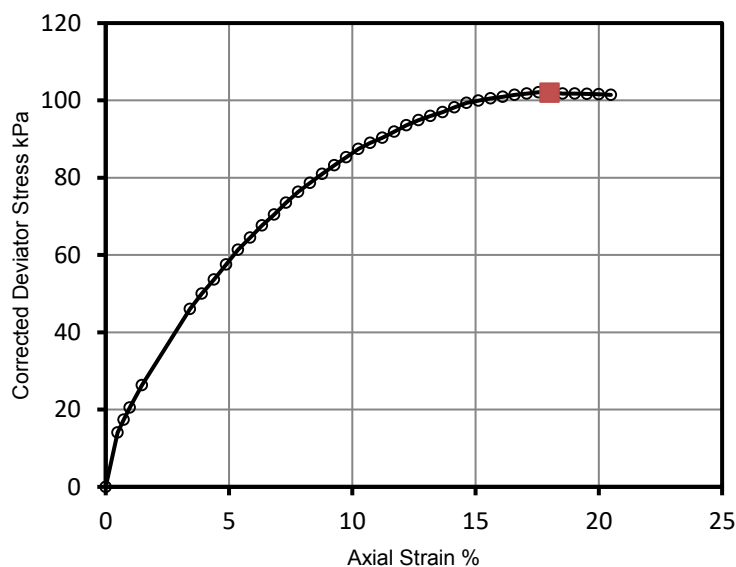
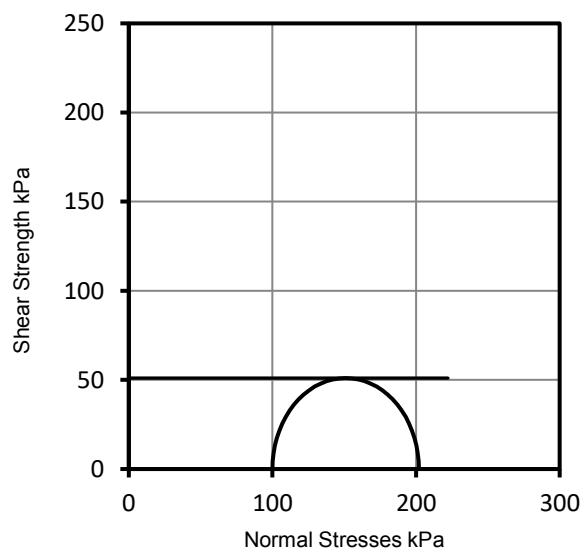
Client: Fairhurst

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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	4.00	U10	Brown gravelly CLAY

Initial Sample	Test Number	1
	Original Length (mm)	268.20
	Depth from Top (mm)	52.81
	Condition	Undisturbed
	Orientation	Vertical
Length (mm)		205.00
Diameter (mm)		100.21
Moisture Content (%)		17.70
Bulk Density (Mg/m ³)		2.12
Dry Density (Mg/m ³)		1.80
Membrane Thickness (mm)		0.25
Membrane Type		Latex
Rate of Strain (%/min)		2.0
Test Results	Cell Pressure (kPa)	100
	Axial Strain (%)	18
	Membrane Corr. (kPa)	0.86
	Deviator Stress, $(\sigma_1 - \sigma_3) f$ (kPa)	102
	Undrained Shear Strength, $c_u = \frac{1}{2}(\sigma_1 - \sigma_3) f$ (kPa)	51
	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: Gardens Hotel, Manchester

Job Number: 41977C

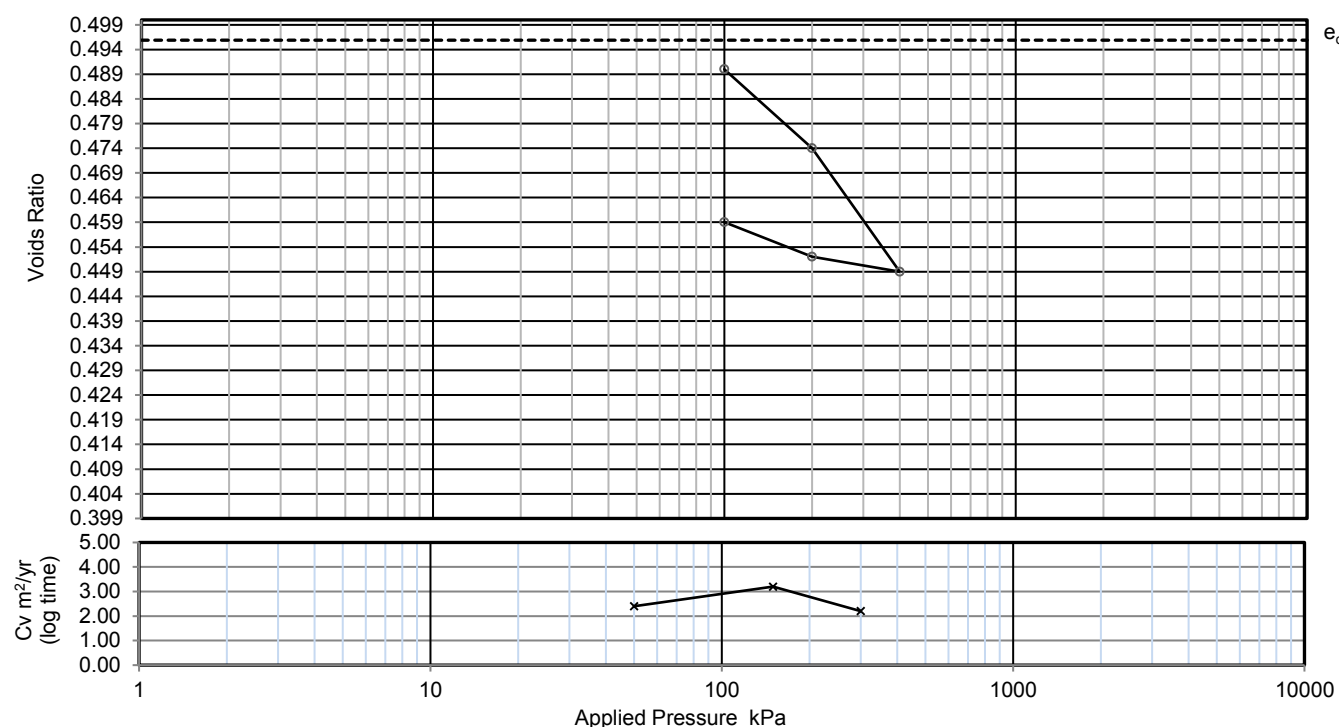
Client: Fairhurst

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DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole / Trial Pit	Depth (m)	Sample	Description
BH01A	3	U9	Brown gravelly CLAY

Initial Specimen		Length of Sample (mm)	320.91	Diameter (mm)	75.04
		Depth from top of specimen (mm)	0.00	Particle density (Mg/m³)	2.65 assumed
		Condition of Sample:	Undisturbed	Swelling Pressure (kPa)	
		Orientation:	Vertical	Lab Temp. (°C)	20



Applied Pressure kPa	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec	Voids ratio
0.0	-	-	-	-	0.496
100	0.038	2.4	5.7	0.00077	0.490
200	0.11	3.2	6.3	0.0012	0.474
400	0.083	2.2	4.2	0.0012	0.449
200	0.011				0.452
100	0.048				0.459

	Initial	Final
Height (mm)	19.04	18.57
Water Content (%)	20.0	21.1
Bulk density (Mg/m³)	2.13	2.20
Dry density (Mg/m³)	1.77	1.82
Voids Ratio	0.496	0.459
Degree of Saturation (%)	107	122

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





Site: Gardens Hotel, Manchester

Job Number: 41977C

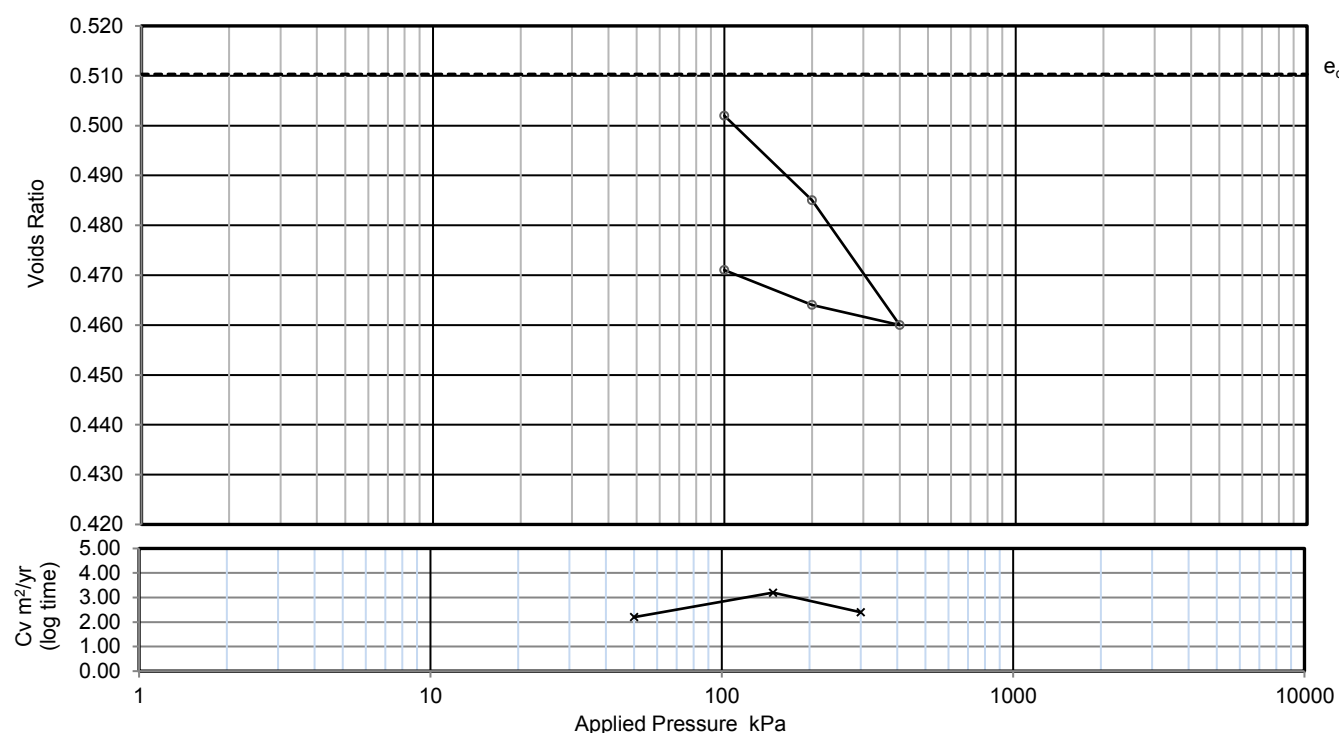
Client: Fairhurst

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DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole / Trial Pit	Depth (m)	Sample	Description
BH02	2	U6	Brown gravelly CLAY

Initial Specimen		Length of Sample (mm)	273.97	Diameter (mm)	75.05
		Depth from top of specimen (mm)	0.00	Particle density (Mg/m ³)	2.65 assumed
		Condition of Sample:	Undisturbed	Swelling Pressure (kPa)	
		Orientation:	Vertical	Lab Temp. (°C)	20



Applied Pressure kPa	Mv m2/MN	Cv (t50, log) m2/yr	Cv (t90, root) m2/yr	Csec	Voids ratio
0.0	-	-	-	-	0.510
100	0.052	2.2	12	0.00027	0.502
200	0.11	3.2	7.4	0.0011	0.485
400	0.085	2.4	5.1	0.00093	0.460
200	0.014				0.464
100	0.053				0.471

	Initial	Final
Height (mm)	19.11	18.61
Water Content (%)	19.9	20.3
Bulk density (Mg/m ³)	2.10	2.17
Dry density (Mg/m ³)	1.75	1.80
Voids Ratio	0.510	0.471
Degree of Saturation (%)	103	114

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





Test Report - 41977C /1

Site: Gardens Hotel, Manchester

Job Number: 41977C

Originating Client: Fairhurst

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

Date: 28/11/2016



Certificate of Analysis

Certificate Number 16-83490-1

16-Nov-16

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

Our Reference 16-83490-1

Client Reference 41977

Order No (not supplied)

Contract Title Gardens Hotel

Description 3 Soil samples.

Date Received 09-Nov-16

Date Started 10-Nov-16

Date Completed 16-Nov-16

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

Notes This report supersedes 16-83490. Sample dates added

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 16-83490-1

Client Ref 41977

Contract Title Gardens Hotel

Lab No	1081473	1081474	1081475
Sample ID	BH01	BH01A	TP04
Depth	0.70	3.50	2.50
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	26/10/16	26/10/16	26/10/16
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	19	22
Inorganics						
pH	DETSC 2008#			8.6	8.5	8.6
Ammonia Aqueous Extract as N	DETSC 2119	10	mg/l	< 10	< 10	< 10
Chloride Aqueous Extract	DETSC 2055	1	mg/l	6.2	24	21
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	23	15
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	180	110	120
Sulphide	DETSC 2024#	10	mg/kg	12	24	40
Sulphur as S, Total	DETSC 2320	0.01	%	0.04	0.02	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.09	0.06	0.06

Information in Support of the Analytical Results

Our Ref 16-83490-1
 Client Ref 41977
 Contract Gardens Hotel

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Containers Received	Holding time exceeded for tests	Inappropriate container for tests
		Sampled				
1081473	BH01 0.70 SOIL	26/10/16		PT 1L	pH + Conductivity (7 days)	
1081474	BH01A 3.50 SOIL	26/10/16		PT 1L	pH + Conductivity (7 days)	
1081475	TP04 2.50 SOIL	26/10/16		PT 1L	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



Certificate of Analysis

Certificate Number 16-83004

09-Nov-16

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

Our Reference 16-83004

Client Reference 41977

Order No 41679

Contract Title Gardens Hotel

Description 3 Soil samples.

Date Received 03-Nov-16

Date Started 03-Nov-16

Date Completed 09-Nov-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 16-83004

Client Ref 41977

Contract Title Gardens Hotel

Lab No	1078627	1078628	1078629
Sample ID	BH01A	BH02	TP04
Depth	0.60	0.60	0.50
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	27/10/16	25/10/16	25/10/16
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10
Inorganics						
pH	DETSC 2008#			10.1	10.8	8.9
Ammonia Aqueous Extract as N	DETSC 2119	10	mg/l	< 10	< 10	< 10
Chloride Aqueous Extract	DETSC 2055	1	mg/l	32	32	14
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	7.1	7.0	6.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1500	440	1400
Sulphide	DETSC 2024#	10	mg/kg	20	28	32
Sulphur as S, Total	DETSC 2320	0.01	%	0.14	0.13	0.42
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.43	0.22	1.5

Information in Support of the Analytical Results

Our Ref 16-83004
 Client Ref 41977
 Contract Gardens Hotel

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Containers Received	Holding time exceeded for tests	Inappropriate container for tests
		Sampled				
1078627	BH01A 0.60 SOIL	27/10/16		GJ 250ml, GV, PT 1L		
1078628	BH02 0.60 SOIL	25/10/16		GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
1078629	TP04 0.50 SOIL	25/10/16		GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar V-Vial 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

APPENDIX 4

CHEMICAL LABORATORY TEST RESULTS



Certificate of Analysis

Certificate Number 16-82761

09-Nov-16

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

Our Reference 16-82761

Client Reference 41977

Order No 41664

Contract Title Little Lever Street/Gardens Hotel

Description 5 Soil samples.

Date Received 02-Nov-16

Date Started 02-Nov-16

Date Completed 09-Nov-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

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 16-82761

Client Ref 41977

Contract Title Little Lever Street/Gardens Hotel

Lab No	1077195	1077196	1077197	1077198	1077199
Sample ID	TP01	TP02	TP04	BH01	BH02
Depth	0.50	0.50	1.00	0.90	0.90
Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	25/10/16	25/10/16	25/10/16	26/10/16	25/10/16
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Metals								
Arsenic	DETSC 2301#	0.2	mg/kg	8.3	11	9.6	9.1	14
Boron, Water Soluble	DETSC 2123#	0.2	mg/kg	1.6	1.4	0.7	0.8	0.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.4	0.2	0.2	0.3
Chromium	DETSC 2301#	0.15	mg/kg	15	26	23	20	18
Chromium III	DETSC 2301*	0.15	mg/kg	15	26	23	20	18
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	33	43	26	22	52
Lead	DETSC 2301#	0.3	mg/kg	760	160	910	750	440
Mercury	DETSC 2325#	0.05	mg/kg	0.68	0.14	0.19	0.14	0.79
Nickel	DETSC 2301#	1	mg/kg	10	14	14	14	25
Selenium	DETSC 2301#	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	180	140	110	99	150
Inorganics								
pH	DETSC 2008#			8.2	8.6	9.1	8.4	6.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.7	0.4	0.9	0.6	0.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide, Complex	DETSC 2130*	0.2	mg/kg	0.6	0.3	0.8	0.5	< 0.2
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Total Organic Carbon	DETSC 2002	0.1	%	2.4	1.8	1.6	1.2	1.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1500	1400	140	330	140
Sulphide	DETSC 2024#	10	mg/kg	48	28	< 10	< 10	< 10
Sulphur as S, Total	DETSC 2320	0.01	%	0.19	0.50	0.06	0.08	0.03
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.81	1.8	0.12	0.16	0.10
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	2.1	< 1.5	4.0	6.8	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	46	5.1	51	75	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	48	< 10	55	82	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.8	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	4.3	5.5	9.3	26	5.3
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	76	31	110	220	11
Aromatic C5-C35	DETSC 3072*	10	mg/kg	80	36	120	240	16
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	130	41	170	330	16

Summary of Chemical Analysis

Soil Samples

Our Ref 16-82761

Client Ref 41977

Contract Title Little Lever Street/Gardens Hotel

Lab No	1077195	1077196	1077197	1077198	1077199
Sample ID	TP01	TP02	TP04	BH01	BH02
Depth	0.50	0.50	1.00	0.90	0.90
Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	25/10/16	25/10/16	25/10/16	26/10/16	25/10/16
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
EPH (C10-C40)	DETSC 3311#	10	mg/kg	120	180	270	1800	< 10
PAHs								
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.56	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.30	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	0.04	0.05	0.04	1.4	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.12	0.26	0.16	5.2	0.06
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.12	0.39	0.16	6.8	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.16	0.57	0.23	8.9	0.06
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	0.25	0.12	3.4	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.07	0.16	0.06	3.2	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.14	0.32	0.19	4.8	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03	0.64	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.27	0.48	0.37	9.5	0.14
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.46	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.21	0.08	3.1	< 0.03
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.30	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.21	0.31	0.29	4.0	0.10
Pyrene	DETSC 3303#	0.03	mg/kg	0.26	0.52	0.35	9.4	0.15
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.5	3.6	2.1	< 52.83	0.60
Phenols								
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.3	< 0.3	< 0.3	0.4	< 0.3

Summary of Asbestos Analysis Soil Samples

Our Ref 16-82761

Client Ref 41977

Contract Title Little Lever Street/Gardens Hotel

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1077195	TP01 0.50	SOIL	NAD	none	Jeff Cruddas
1077196	TP02 0.50	SOIL	NAD	none	Jeff Cruddas
1077197	TP04 1.00	SOIL	NAD	none	Jeff Cruddas
1077198	BH01 0.90	SOIL	NAD	none	Jeff Cruddas
1077199	BH02 0.90	SOIL	NAD	none	Jeff Cruddas

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-82761
Client Ref 41977
Contract Little Lever Street/Gardens Hotel

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1077195	TP01 0.50 SOIL	25/10/16	GJ 250ml, GJ 60ml	pH + Conductivity (7 days)	
1077196	TP02 0.50 SOIL	25/10/16	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1077197	TP04 1.00 SOIL	25/10/16	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
1077198	BH01 0.90 SOIL	26/10/16	GJ 250ml, GJ 60ml, PT 1L x2		
1077199	BH02 0.90 SOIL	25/10/16	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	

Key: G-Glass J-Jar 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



Certificate of Analysis

Certificate Number 16-83927

21-Nov-16

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

Our Reference 16-83927

Client Reference 41977

Order No 41761

Contract Title Garden Hotel, Manchester

Description One Water sample.

Date Received 14-Nov-16

Date Started 14-Nov-16

Date Completed 21-Nov-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

Water Samples

Our Ref 16-83927

Client Ref 41977

Contract Title Garden Hotel, Manchester

Lab No	1083831
Sample ID	BH02
Depth	1.35
Other ID	
Sample Type	WATER
Sampling Date	09/11/16
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.6
Boron, Dissolved	DETSC 2306*	12	ug/l	460
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.05
Chromium, Total	DETSC 2306*	0.25	ug/l	7.0
Chromium III, Dissolved	DETSC 2302*	1	ug/l	130
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	6.8
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.1
Magnesium, Dissolved	DETSC 2306	0.02	mg/l	53
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.05
Nickel, Dissolved	DETSC 2306	0.5	ug/l	3.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	28
Zinc, Dissolved	DETSC 2306	1.3	ug/l	9.8
Inorganics				
pH	DETSC 2008			7.6
Cyanide, Total	DETSC 2130	40	ug/l	< 40
Cyanide, Free	DETSC 2130	20	ug/l	< 20
Cyanide, Complex	DETSC 2130*	40	ug/l	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015
Chloride	DETSC 2055	0.1	mg/l	200
Nitrate as NO3	DETSC 2055	0.1	mg/l	2.4
Sulphate as SO4	DETSC 2055	0.1	mg/l	830
Sulphide	DETSC 2208	10	ug/l	25
Sulphur as S, Total	DETSC 2320*	10	mg/l	380
Total Organic Carbon	DETSC 2085	1	mg/l	92
Petroleum Hydrocarbons				
EPH (C10-C40)	DETSC 3311	10	ug/l	610
PAHs				
Acenaphthene	DETSC 3304	0.01	ug/l	0.03
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02
Anthracene	DETSC 3304	0.01	ug/l	0.06
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.25
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.26
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.38
Benzo(g,h,i)perylene	DETSC 3304*	0.01	ug/l	0.45
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.15
Chrysene	DETSC 3304	0.01	ug/l	0.37
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.06
Fluoranthene	DETSC 3304	0.01	ug/l	0.45
Fluorene	DETSC 3304	0.01	ug/l	0.04

Summary of Chemical Analysis

Water Samples

Our Ref 16-83927

Client Ref 41977

Contract Title Garden Hotel, Manchester

Lab No	1083831
Sample ID	BH02
Depth	1.35
Other ID	
Sample Type	WATER
Sampling Date	09/11/16
Sampling Time	n/s

Test	Method	LOD	Units	
Indeno(1,2,3-c,d)pyrene	DETSC 3304*	0.01	ug/l	0.32
Naphthalene	DETSC 3304	0.01	ug/l	0.09
Phenanthrene	DETSC 3304	0.01	ug/l	0.29
Pyrene	DETSC 3304	0.01	ug/l	0.50
PAH Total	DETSC 3304	0.04	ug/l	3.7
Phenols				
Phenol	*	0.5	ug/l	< 0.50

Information in Support of the Analytical Results

Our Ref 16-83927
Client Ref 41977
Contract Garden Hotel, Manchester

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1083831	BH02 1.35 WATER	09/11/16	GB 1L, GV x2	Chromium, Hexavalent (4 days), Nitrate as NO3 (2 days)	

Key: G-Glass B-Bottle V-Vial

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.

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



Certificate of Analysis

Certificate Number 16-83004

09-Nov-16

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

Our Reference 16-83004

Client Reference 41977

Order No 41679

Contract Title Gardens Hotel

Description 3 Soil samples.

Date Received 03-Nov-16

Date Started 03-Nov-16

Date Completed 09-Nov-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 16-83004

Client Ref 41977

Contract Title Gardens Hotel

Lab No	1078627	1078628	1078629
Sample ID	BH01A	BH02	TP04
Depth	0.60	0.60	0.50
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	27/10/16	25/10/16	25/10/16
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10
Inorganics						
pH	DETSC 2008#			10.1	10.8	8.9
Ammonia Aqueous Extract as N	DETSC 2119	10	mg/l	< 10	< 10	< 10
Chloride Aqueous Extract	DETSC 2055	1	mg/l	32	32	14
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	7.1	7.0	6.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1500	440	1400
Sulphide	DETSC 2024#	10	mg/kg	20	28	32
Sulphur as S, Total	DETSC 2320	0.01	%	0.14	0.13	0.42
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.43	0.22	1.5

Information in Support of the Analytical Results

Our Ref 16-83004
Client Ref 41977
Contract Gardens Hotel

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Containers Received	Holding time exceeded for tests	Inappropriate container for tests
		Sampled				
1078627	BH01A 0.60 SOIL	27/10/16		GJ 250ml, GV, PT 1L		
1078628	BH02 0.60 SOIL	25/10/16		GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
1078629	TP04 0.50 SOIL	25/10/16		GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar V-Vial 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

APPENDIX 5
MONITORING

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.



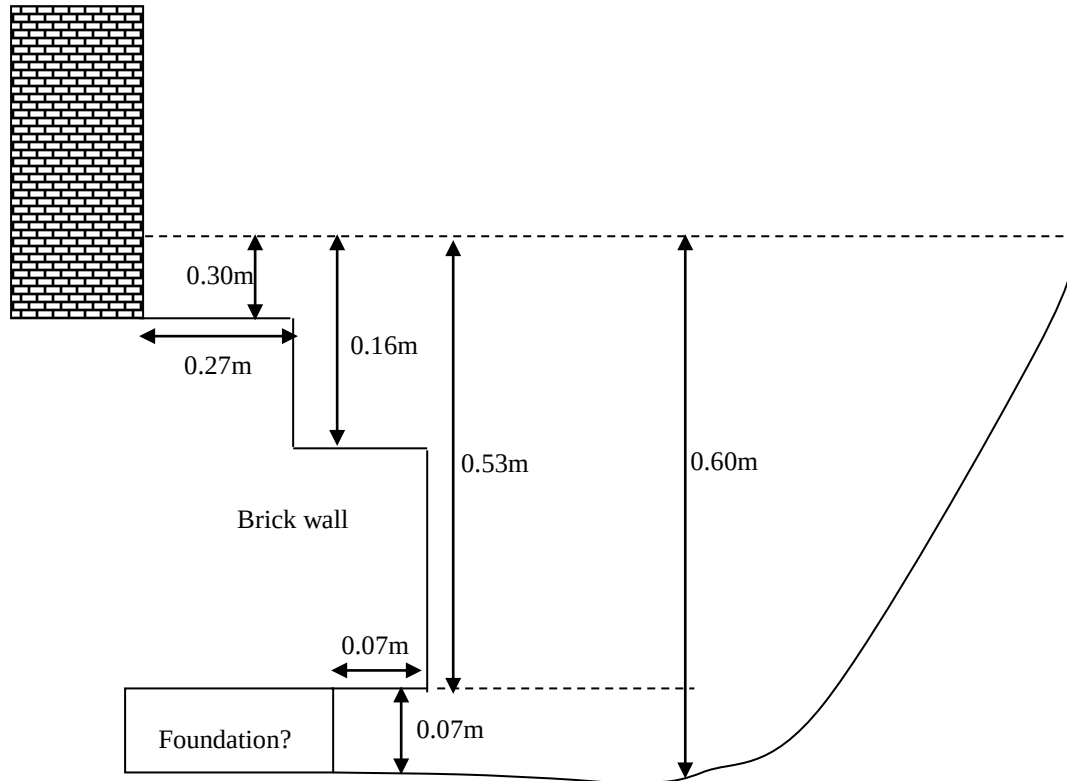
>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

APPENDIX 6
PHOTOGRAPHS & SKETCHES

Hand Pit Photographs HP01



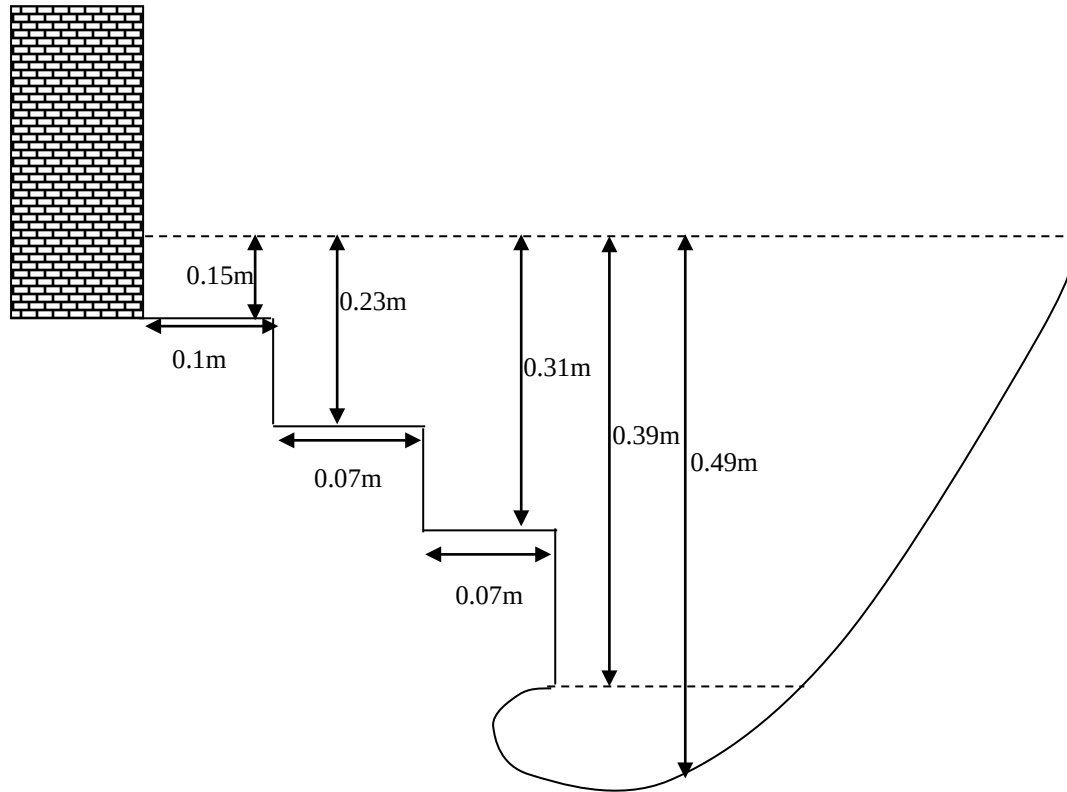
Hand Pit Sketch HP01



Hand Pit Photographs HP02



Hand Pit Sketch HP02



Trial Pit Photographs TP01



Trial Pit Photographs TP01



Trial Pit Photographs TP02



Trial Pit Photographs TP02



Trial Pit Photographs TP04



Appendix G

Specialist Advice

Joshua Blacker

From: Euan Allison <EuanAllison@aarsleff.co.uk>
Sent: 05 June 2018 15:48
To: Joshua Blacker
Subject: 116341 - Manchester - Little Lever Street - Piling 180739

Dear Mr. Blacker,

Thankyou for your valued enquiry.

As a guide price, we would consider say a grid of 4# by 3# caps, giving 60 piles total.

On 300mm section Driven Pre-Cast Concrete piles, driven to refusal in the granular till at say 15m, we would advise an indicative guide price proposal of say £40k for the work to be carried out over 1 working week with a standard large piling rig.

Working platform provision and setting out would be by others.

I trust this helps for your current purposes and we standby to be of further assistance going forwards.

Kind regards

Euan Allison MEng (Hons) CEng MICE

Senior Technical Estimator



AARSLEFF

Hawton Lane
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NG24 3BU

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