



CCG-C-18-10614

**GROUND INVESTIGATION REPORT
FOR SITE AT**

THE CHRISTIE, MANCHESTER

PATERSON REDEVELOPMENT PROJECT

APRIL 2019

Prepared by:

CC GEOTECHNICAL LTD

Unit 1 Deltic Way
Knowsley Industrial Estate
Liverpool
Merseyside
L33 7BA

Telephone: 0151 545 2750
Facsimile: 0151 548 7892

Consulting Engineers:

OVE ARUP & PARTNERS LTD

9th Floor, 3 St Paul's Place
Norfolk Street
Sheffield, S1 2JE

Telephone: 0114 283 3686

Prepared for:

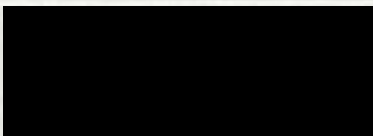
INTERSERVE CONSTRUCTION LTD

Woodhouse Drive
Wigan
WN6 7NT

Telephone: 01942 236 434



DOCUMENT CONTROL FORM

Client:	INTERSERVE CONSTRUCTION LTD
Project Title:	GROUND INVESTIGATION FOR SITE AT THE CHRISTIE, MANCHESTER: PATERSON REDEVELOPMENT PROJECT
Reference Number:	CCG-C-18-10614
Main Author:	Daniel O'Regan BSc(Hons) PIEMA
Signature:	
Reviewed by:	Chris Bolan CEng MICE CEnv
Signature:	
Approved for Issue by:	Chris Bolan CEng MICE CEnv
Signature:	
Date:	For and behalf of CC GEOTECHNICAL LTD March 2019
Revision Number:	0
Comments:	
Status:	Final
Distribution:	INTERSERVE CONSTRUCTION LTD ARUP

This document has been prepared by **CC GEOTECHNICAL LTD** within the terms of the contract, scope of work, and resources agreed in writing with the client. The limitations of liability of **CC GEOTECHNICAL LTD** for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

This document is intended for the sole use of the client indicated above and **CC GEOTECHNICAL LTD** accepts no responsibility of whatever nature to third parties to whom this document or any part of this document is made known. Any such party relies upon that information at their own risk.

The findings and opinions provided in this document are made in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined in this document. The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date. In particular, seasonal groundwater levels, with the effects of precipitation, may affect the conditions found during the investigation. The report should be read in conjunction with the Notes on Limitations included herein.

Where opinions expressed in this report are based on current available guidance and legislation, no liability can be accepted by **CC GEOTECHNICAL LTD** for the effects of any future changes to such guidelines and legislation. Additional information, improved practices, new guidance, changes in legislation, or amendments to design proposals, may necessitate this report having to be reviewed in whole or in part after that date.

Factual data has largely been obtained from enquiries with third parties, the results of which are relied on unless indicated to be inaccurate by contradictory information. Further assessment, investigation, construction activities, could not have been taken into account in the preparation of the report. Where such information might impact upon stated opinions, **CC GEOTECHNICAL LTD** reserves the right to modify such opinions expressed herein.

The findings and opinions conveyed, via this report, are based on information obtained from a variety of sources as detailed in this report, and which **CC GEOTECHNICAL LTD** assumes to be reliable, but has not been independently confirmed. Therefore, **CC GEOTECHNICAL LTD** cannot and does not guarantee the authenticity or reliability of third party information it has referred to.

CC GEOTECHNICAL LTD possesses a non-exclusive and non-transferable Ordnance Survey Licence, but does not possess any right to sub-license any of the rights granted by this licence to any party. Under the terms of **CC GEOTECHNICAL LTD's** Ordnance Survey Licence, copying of figures containing Ordnance Survey data or using figures for any purpose other than as part of this report is not permitted.

1.0 INTRODUCTION

CC GEOTECHNICAL LTD (CCG) was commissioned by **OVE ARUP & PARTNERS LTD (ARUP)** acting as The Engineer, on behalf of The Client **INTERSERVE CONSTRUCTION LIMITED**, to carry out ground investigation works for The Christie NHS Foundation Trust (The Christie) in connection with the Paterson Redevelopment project, at The Christie, Manchester, where it is proposed the existing Paterson building be demolished and replaced with the construction of a new medium-rise research building with an associated new basement structure.

The purpose of the Ground Investigation was to obtain geotechnical and geoenvironmental data relevant to the selection and design of foundation and substructure elements of the proposed development.

The investigation works were carried out in accordance with the Ground Investigation Specification – 263083-00 – P02 – September 2018 – issued by **ARUP**.

This factual report is a compilation of the findings of the investigation and associated testing.

It must be borne in mind that the data and/or opinions contained in this report should be read in conjunction with the Notes on Limitations, given in Appendix J.

2.0 SITE LOCATION AND DESCRIPTION

This site is situated within the grounds of The Christie complex, off Wilmslow Road, Manchester, M20 3DB, centred at Ordnance Survey National Grid Reference SJ 84924 92461. Site location plans are presented on **ARUP** Drawings Figure 1 - 3 in Appendix A.

The site is currently occupied by the existing 4-storey Paterson Building, which has suffered fire damage on the upper floors.

The site investigation works were carried out over two distinct areas – adjacent to the

eastern and western elevations of the Paterson Building. No works were carried out within the existing building footprint.

3.0 DOCUMENTED GEOLOGY

The natural geology prevailing at the site was researched by reference to BGS records. These indicate that the site is underlain by drift deposits of Glacial Till. The solid geology comprises Chester Formation - Sandstone. Sedimentary Bedrock formed approximately in the Triassic Period. Given the history of development of the site it was known that made ground would be present at the surface of the site.

4.0 SCOPE OF INVESTIGATION

The fieldwork was planned in accordance with BS10175: 2013 and was carried out in accordance with BS10175: 2013 and BS5930: 2015, insofar as they related to the scope of the investigation. Investigation works were carried out in January / February 2019 and comprised:

- The sinking of 4nr boreholes (BH01-BH04) to rockhead by cable percussion methods, and further advanced by rotary coring methods in the bedrock to depths of up to 25.0mbgl.

Logs of the boreholes annotated with SPT “N” values, disturbed sampling details, TCR, SCR, RQD, and I_f values, and standpipe construction details are given in Appendix B.

Photographs of rock cores are presented in Appendix F.

- The sinking of a single borehole (WS01) to rockhead by dynamic sampling methods to a depth of 2.4mbgl.

A log of the borehole annotated with SPT “N” values and sampling details, is given in Appendix B.

- The mechanical excavation of 3nr trial pits (TP01-TP03) to depths of 2.9mbgl.

Logs of the trial pits are given in Appendix C.

- The manual excavation of 9nr foundation observation pits (OP01-OP09) to determine the existing foundation depths and projections.

Sketches of the observation pits are presented in Appendix D.

- The determination of permeability values by insitu variable head tests (both falling and rising head test methods) carried out in accordance with both BS EN ISO 5930:1999 and BS EN ISO 22282:2012.

The test worksheets are presented in Appendix E.

The layout of the investigation is presented on **CCG** Drawings 1 - 3 in Appendix A.

5.0 **LABORATORY TESTING**

5.1 **Soil & Rock Engineering Testing**

The following programme of soil and rock engineering testing was undertaken:

- Determination of soil moisture content in accordance with BS 1377: Part 2: 1990 – 8nr tests.
- Determination of Atterberg Limits in accordance with BS 1377: Part 2: 1990 - 5nr tests.
- Determination of particle size distribution by wet sieving in accordance with BS 1377: Part 2: 1990 - 4nr tests
- Determination of sedimentation distribution by pipette in accordance with BS 1377: Part 2: 1990 - 3nr tests.
- Determination of unconsolidated undrained triaxial compression with measurement of pore pressure in accordance with BS 1377: Part 7: 1990 - 1nr test.

- Determination of point load strength of rock in accordance with ISRM 1985: Suggested method - 24nr tests
- Determination of Uniaxial Compressive Strength of rock in accordance with ISRM 2007: Suggested Method - 3nr tests
- Determination of Unconfined Compressive Strength with Youngs Modulus & Poissons Ratio of rock in accordance with ISRM 1981: Suggested Method – 3nr tests

The engineering testing was largely carried out in the UKAS accredited laboratory of **CCG**. The test results are presented in Appendix G.

5.2 **Chemical Analyses**

The following programme of chemical analyses was undertaken at a UKAS/MCERTs laboratory as detailed within the specification and listed hereunder:

Suite E1 (General) - 7nr soil samples analysed:

- Arsenic
- Cadmium
- Chromium (total)
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Zinc
- Antimony
- Beryllium
- Vanadium
- Cyanide (total)
- pH
- Boron (water soluble)
- Phenols (total)
- Total Organic Carbon

Suite E2a - 8nr soil samples analysed:

- Asbestos I.D (soil only)

Suite H - 1nr soil sample analysed:

- Waste acceptance (total soils)

The soil chemical test results are presented in Appendix H.

6.0 GAS & GROUNDWATER MONITORING

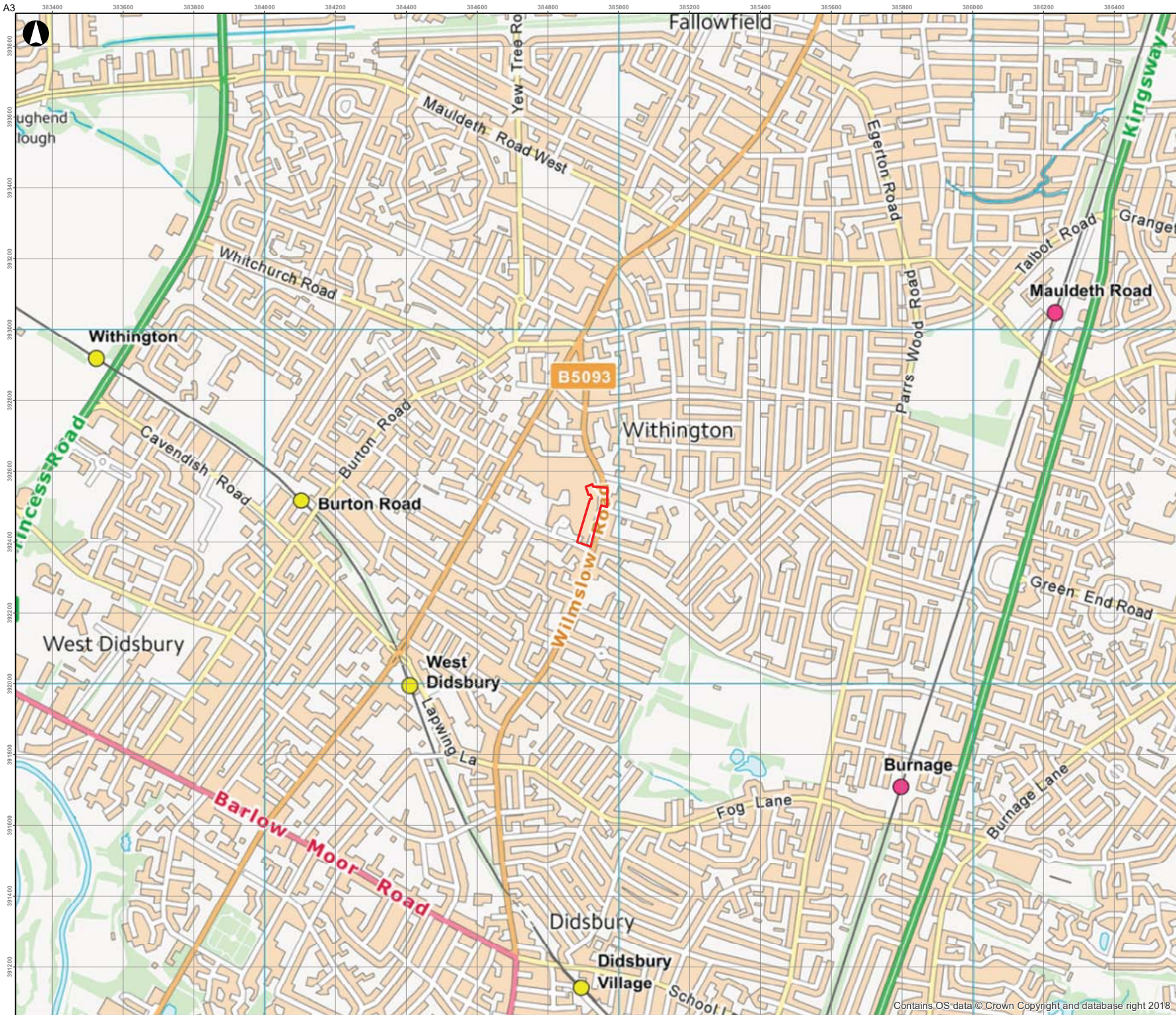
Monitoring standpipe wells were installed in 3nr boreholes (BH01, BH02 & BH04). Each installation was periodically monitored for flow rate and composition of ground gas using a LMsXi infra-red analyser. Immediately following monitoring for gases, the standing water levels were recorded by electronic dipmeter.

The results of the gas and groundwater monitoring, together with calibration certificates of the instruments are given in Appendix I.



APPENDIX A

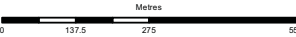
DRAWINGS



Legend

Site Boundary

P0	2016-08-10	PST	HB	JH
Issue	Date	By	Chkd	Appd



ARUP

Arup
6th Floor, 3 Piccadilly Place,
Manchester
M1 3BN
United Kingdom

Client
Interserve Construction Limited

Job Title
Paterson Redevelopment Building

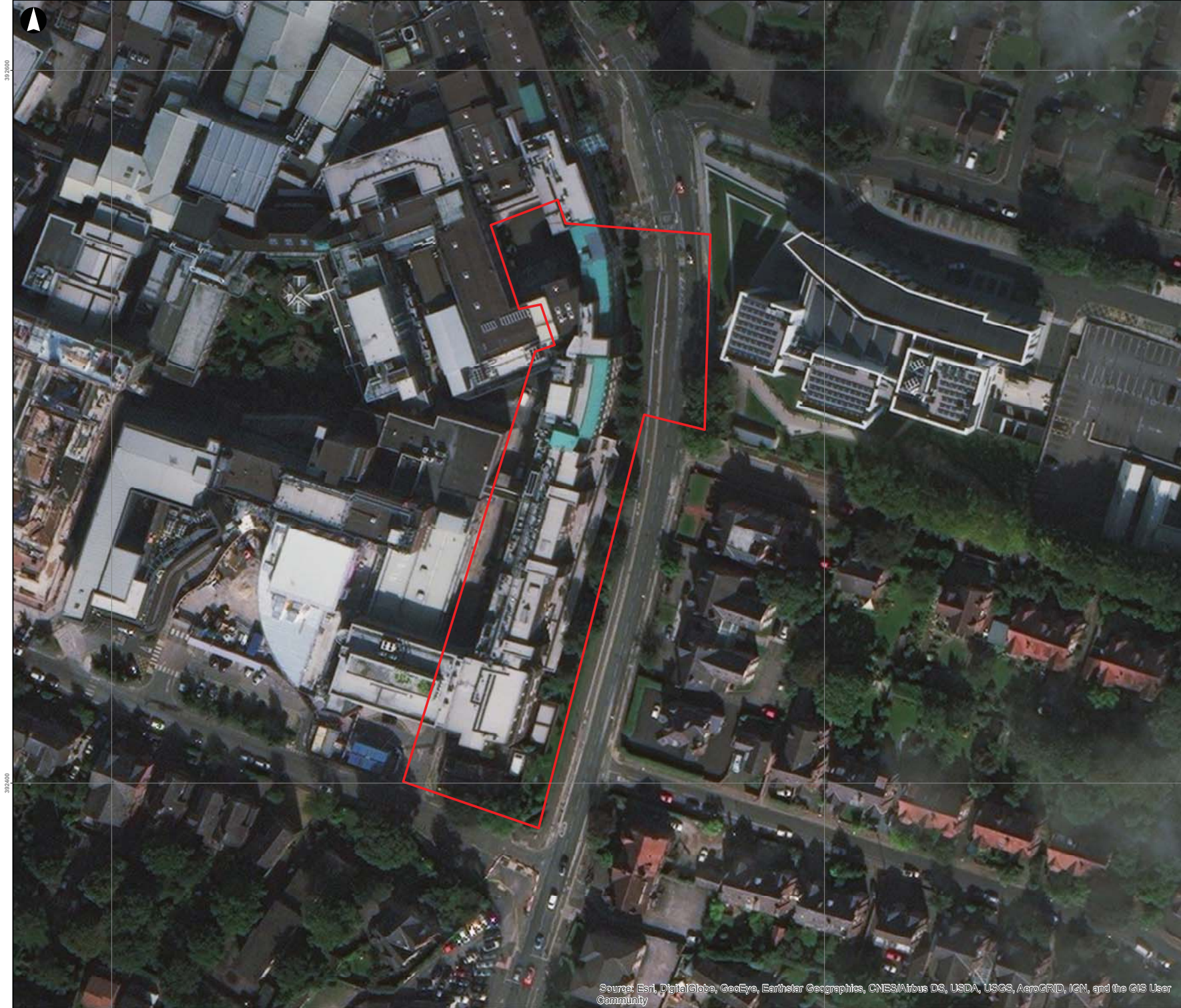
Site location

Scale at A3
1:10,000

Job No 263083-00	Drawing Status Preliminary
----------------------------	--------------------------------------

Drawing No Figure 1	Issue P0
-------------------------------	--------------------

Contains OS data © Crown Copyright and database right 2018.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

Site Boundary

P0	2018-08-10	PST	HB	JH
----	------------	-----	----	----

Issue	Date	By	Chkd	Appd
-------	------	----	------	------



ARUP

Arup
6th Floor, 3 Piccadilly Place,
Manchester
M1 3BN
United Kingdom

Client

Interserve Construction Limited

Job Title

Paterson Redevelopment Building

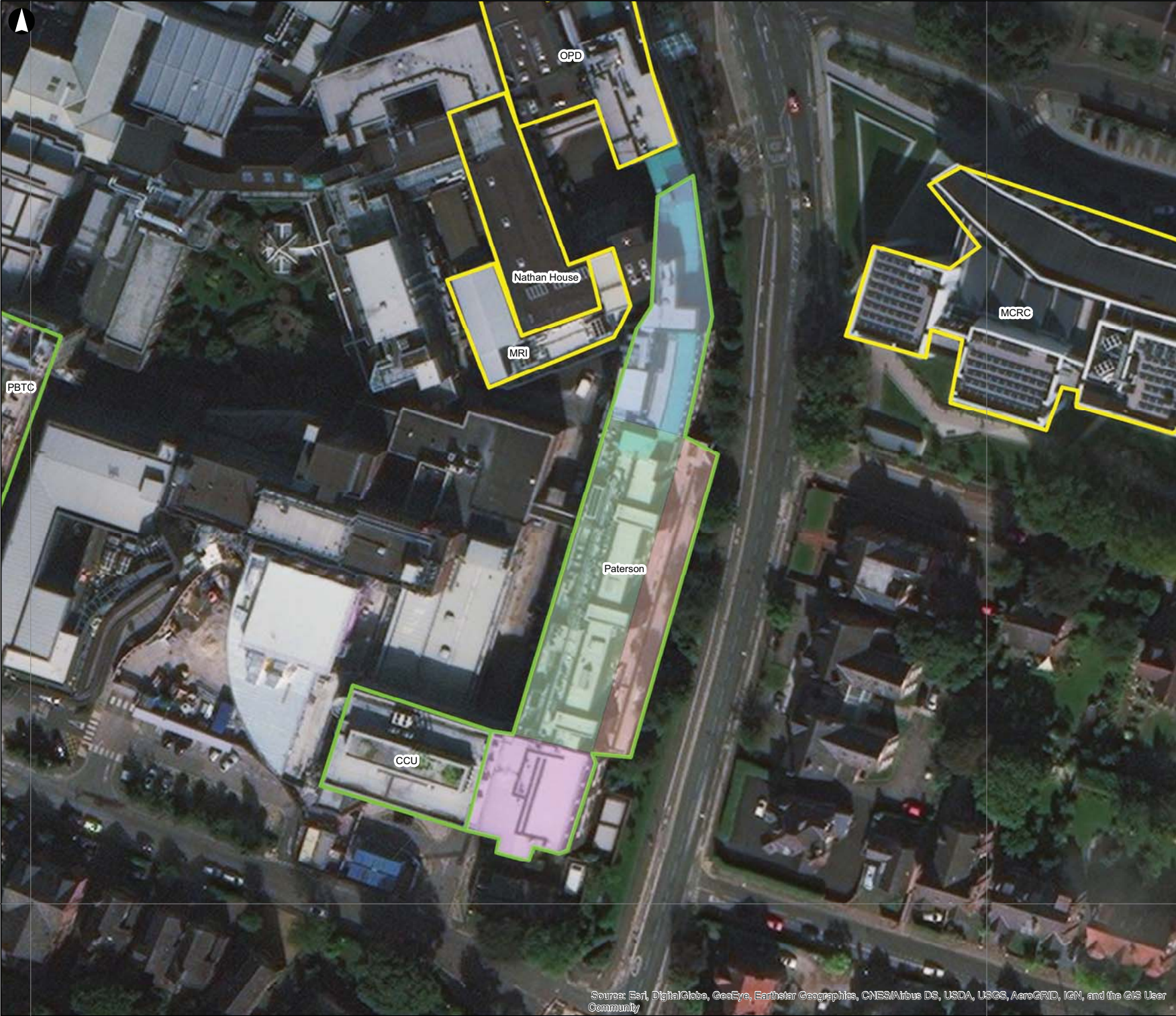
Site boundary

Scale at A3

1:1,000

Job No	Drawing Status
263083-00	Preliminary

Drawing No	Issue
Figure 2	P0



Legend

Phase

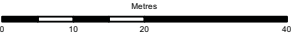
- 1 & 2
- 3 & 4
- 5 & 6
- 7

The Christie buildings. Data

- No
- Yes

P0	2018-08-20	PST	PST	PST
----	------------	-----	-----	-----

Issue	Date	By	Chkd	Appd
-------	------	----	------	------



ARUP

Client
Interserve Construction Limited

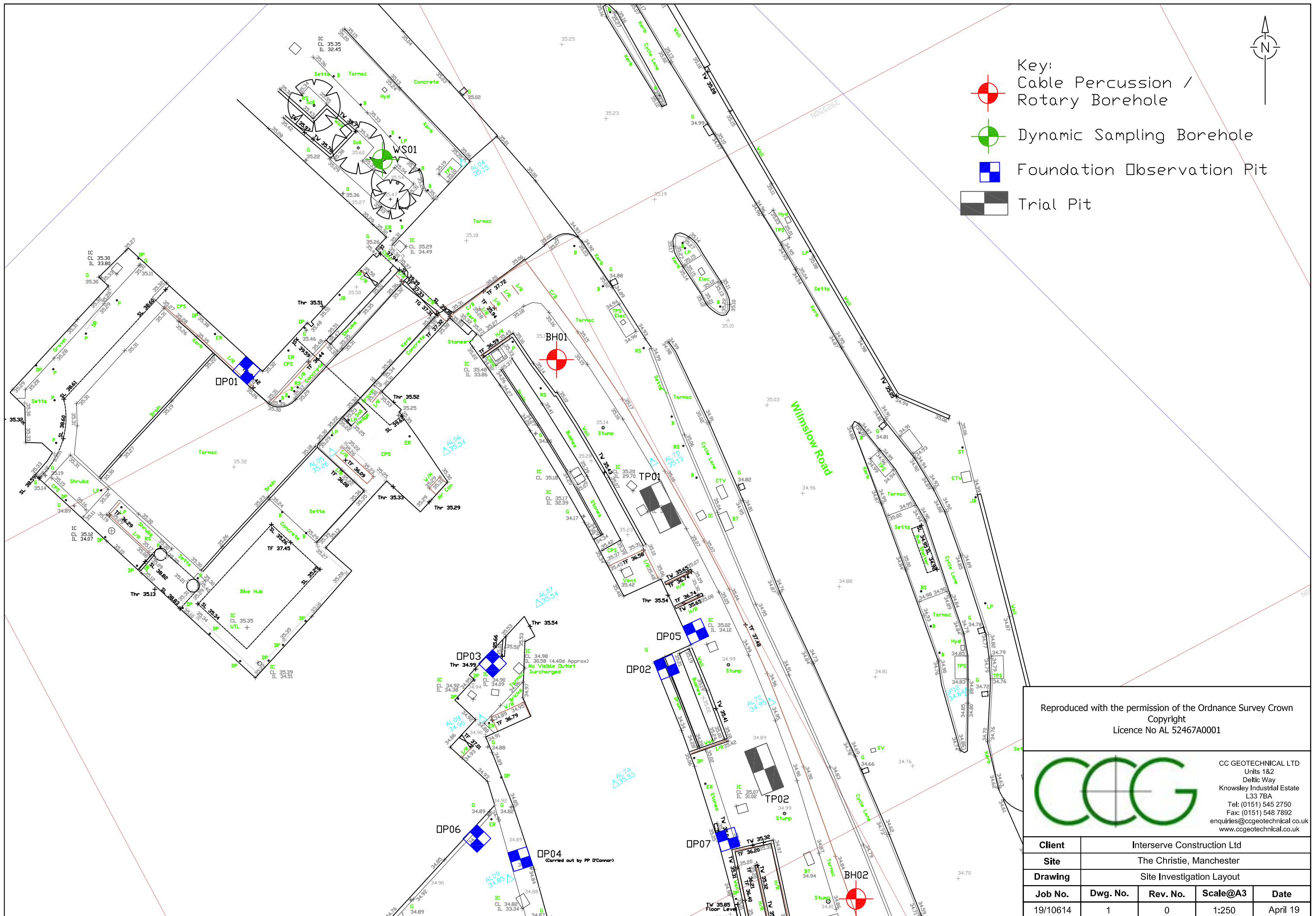
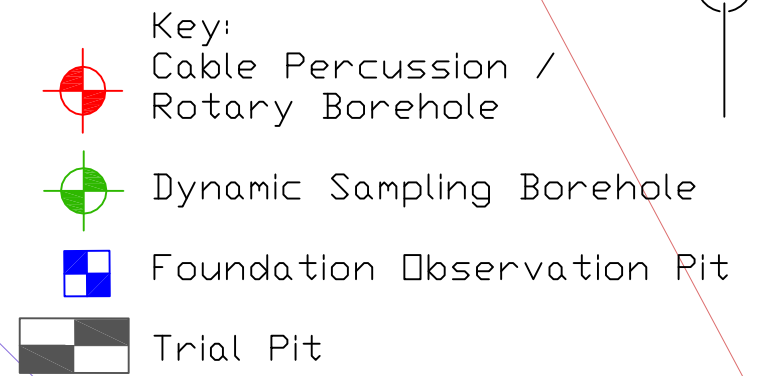
Job Title
Paterson Redevelopment Building

Phases of construction

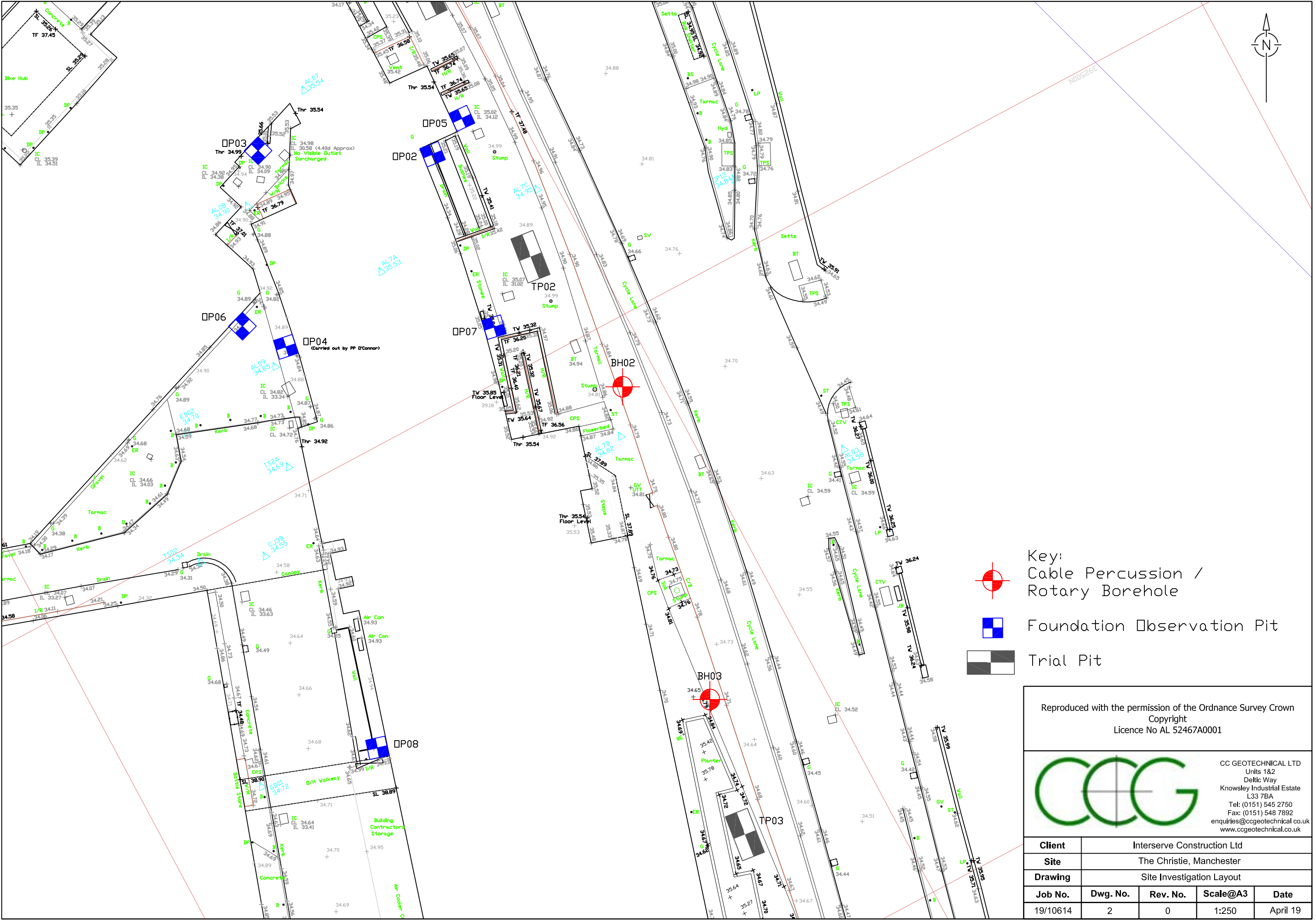
Scale at A3
1:750

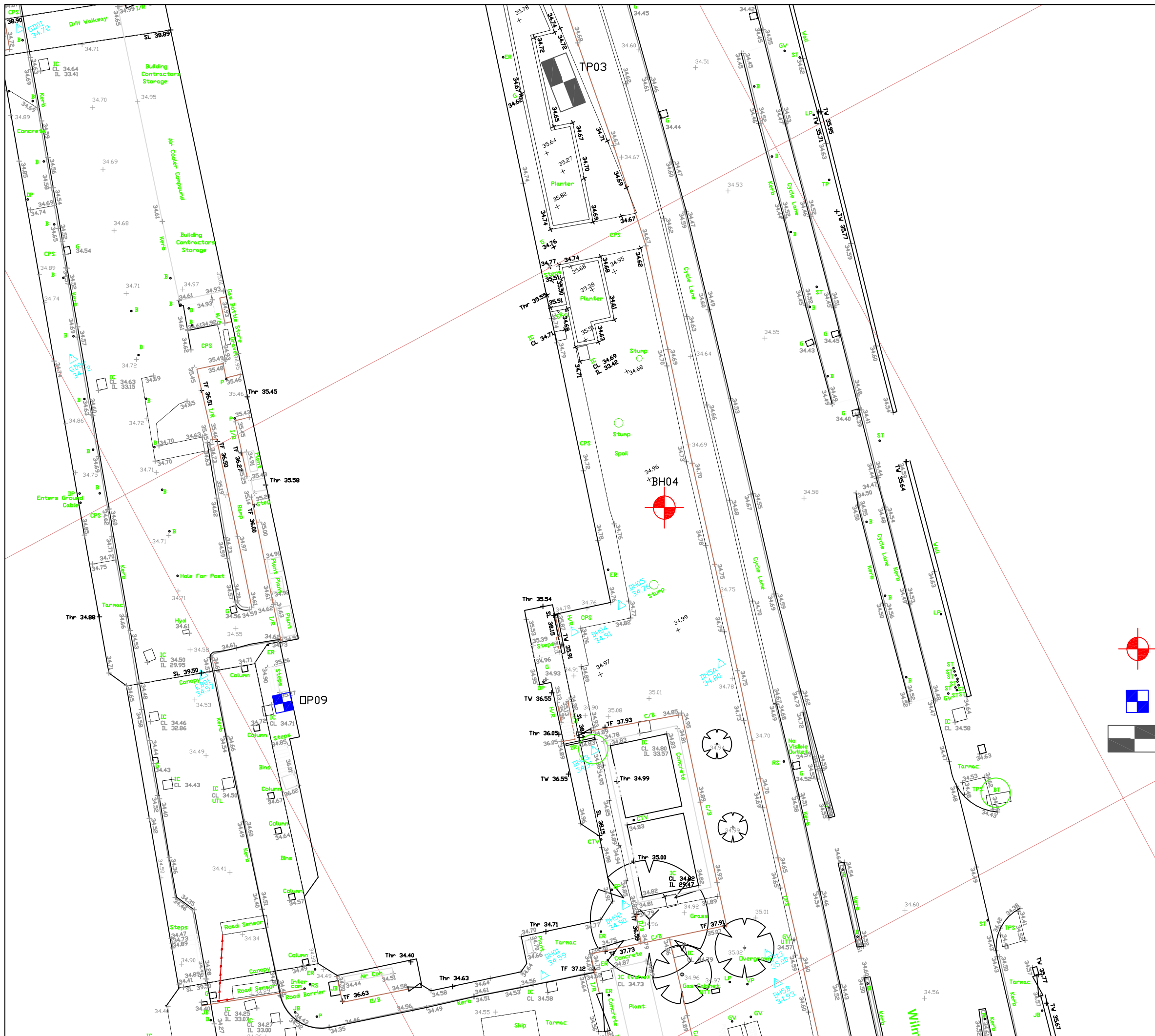
Job No 263083-00	Drawing Status Preliminary
----------------------------	--------------------------------------

Drawing No Figure 3	Issue P0
-------------------------------	--------------------



Client	Interserve Construction Ltd			
Site	The Christie, Manchester			
Drawing	Site Investigation Layout			
Job No.	Dwg. No.	Rev. No.	Scale@A3	Date
19/10614	1	0	1:250	April 19





Reproduced with the permission of the Ordnance Survey Crown
Copyright
Licence No AL 52467A0001



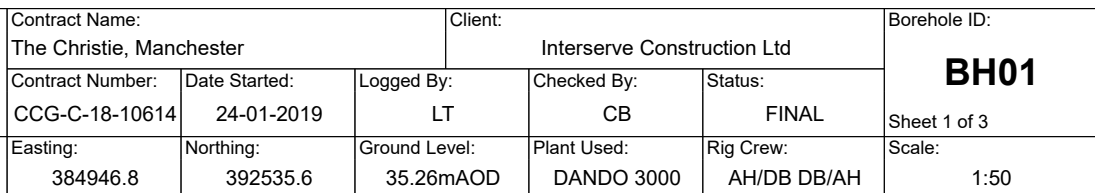
CC GEOTECHNICAL LTD
Units 1&2
Deltic Way
Knowsley Industrial Estate
L33 7BA
Tel: (0151) 545 2750
Fax: (0151) 548 7892
enquiries@ccgeotechnical.co.uk
www.ccgeotechnical.co.uk

Client	Interserve Construction Ltd			
Site	The Christie, Manchester			
Drawing	Site Investigation Layout			
Job No.	Dwg. No.	Rev. No.	Scale@A3	Date
19/10614	3	0	1:250	April 19



APPENDIX B

BOREHOLE LOG SHEETS

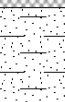
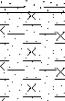
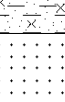
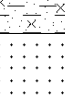
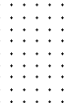
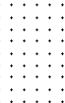


Samples & In Situ Testing	Strata Details	Groundwater
---------------------------	----------------	-------------

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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour set up of falling head permeability test 1 hour carrying out falling head permeability test Permeability test carried out at 2.00mbgl					
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)							
				0.00	0.50	PLAIN								
				0.50	2.30	SLOTTED								
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com														

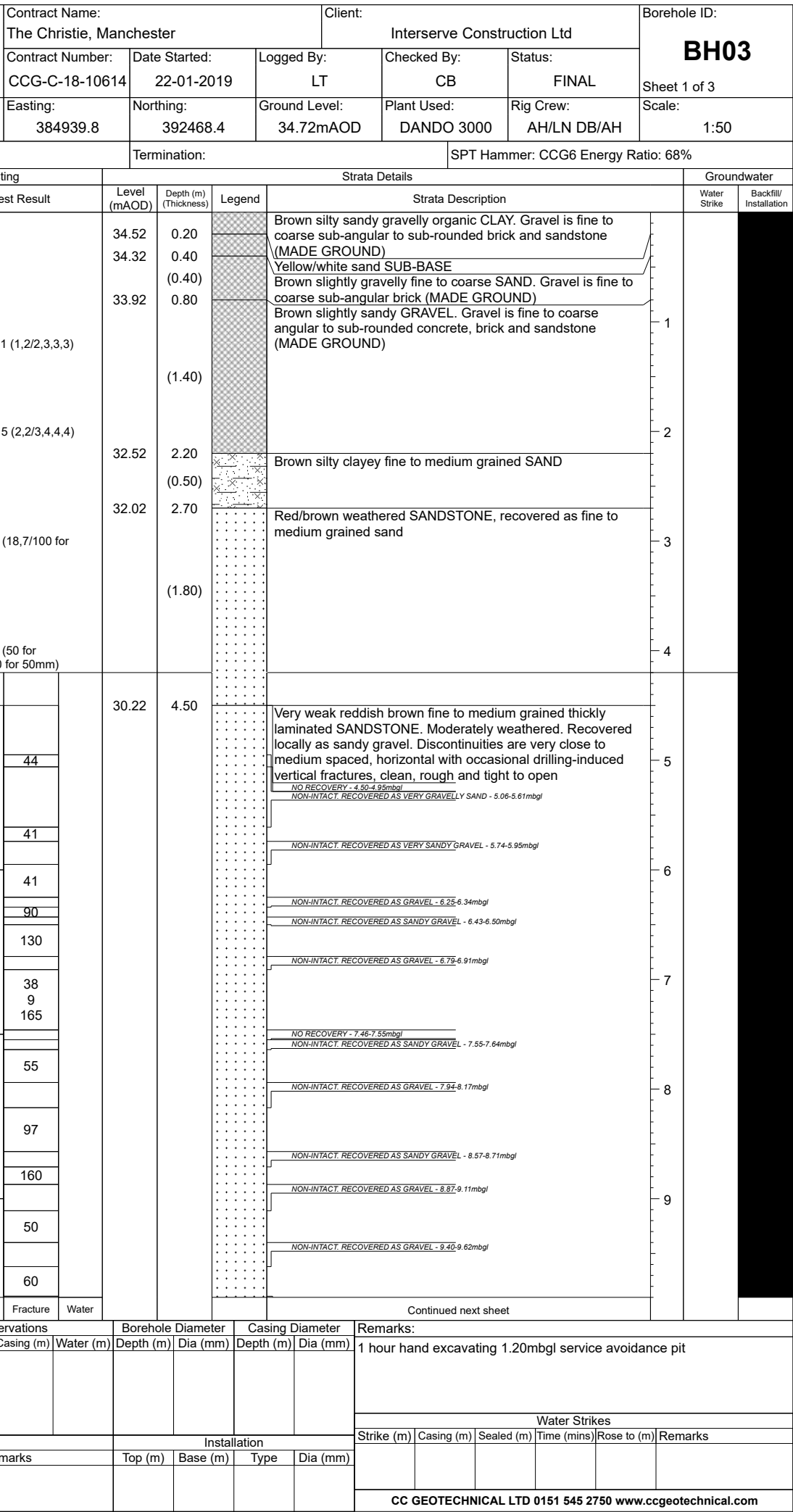
	Contract Name: The Christie, Manchester				Client: Interserve Construction Ltd			Borehole ID: BH01							
	Contract Number: CCG-C-18-10614		Date Started: 24-01-2019		Logged By: LT		Checked By: CB		Status: FINAL						
	Easting: 384946.8		Northing: 392535.6		Ground Level: 35.26mAOD		Plant Used: DANDO 3000		Rig Crew: AH/DB DB/AH						
Rotary Core Drilling Log										Sheet 2 of 3					
										Scale: 1:50					
Weather:				Termination:				SPT Hammer: CCG6 Energy Ratio: 68%							
Samples & In Situ Testing						Strata Details						Groundwater			
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/Installation		
9.50 - 11.00	93	36	17	140					NON-INTACT, RECOVERED AS SANDY GRAVEL - 10.18-10.69mbgl			10			
11.00 - 12.50	95	46	17	80					NON-INTACT, RECOVERED AS VERY CLAYEY SAND - 11.13-11.33mbgl INCLUSION OF WEATHERED MUDSTONE - 11.30mbgl NON-INTACT, RECOVERED AS SANDY GRAVEL - 11.50-11.78mbgl NON-INTACT, RECOVERED AS SANDY GRAVEL - 11.95-12.15mbgl			11			
12.50 - 14.00	97	31	7	60					NO RECOVERY - 12.50-12.55mbgl NON-INTACT, RECOVERED AS SANDY GRAVEL - 12.55-13.61mbgl			12			
14.00 - 15.50	97	55	25	61					NON-INTACT, RECOVERED AS SANDY GRAVEL - 14.18-14.30mbgl NON-INTACT, RECOVERED AS SANDY GRAVEL - 14.97-15.50mbgl			13			
15.50 - 17.00	94	60	43	130					NON-INTACT, RECOVERED AS GRAVEL - 16.07-16.21mbgl NON-INTACT, RECOVERED AS SANDY GRAVEL - 16.48-16.91mbgl			14			
17.00 - 18.50	91	39	29	33 84 145					NO RECOVERY - 15.50-15.59mbgl NON-INTACT, RECOVERED AS GRAVEL - 17.26-17.64mbgl NON-INTACT, RECOVERED AS CLAYEY SANDY GRAVEL - 17.82-18.28mbgl INCLUSION OF WEATHERED MUDSTONE - 18.00mbgl			15			
18.50 - 20.00	98	69	60	86 160 225					NON-INTACT, RECOVERED AS SANDY GRAVEL - 18.50-18.79mbgl NON-INTACT, RECOVERED AS SANDY GRAVEL - 19.17-19.39mbgl			16			
				270								17			
				90								18			
				120								19			
				180											
				35											
				165											
				35 153 315											
Continued next sheet															
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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour set up of falling head permeability test 1 hour carrying out falling head permeability test Permeability test carried out at 2.00mbgl						
										Water Strikes					
										Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
Flush Information						Installation									
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)							
					0.00	0.50	PLAIN								
					0.50	2.30	SLOTTED								
										Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in %					
CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com															

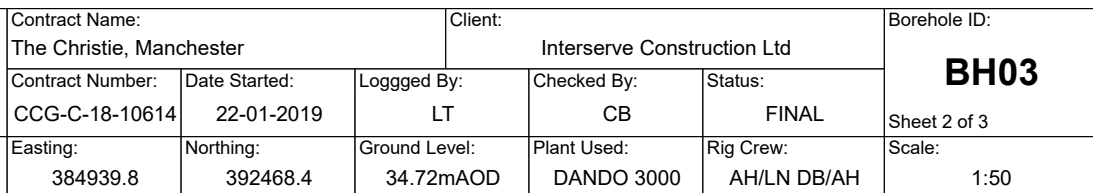
	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Borehole ID: BH01																
	Contract Number: CCG-C-18-10614	Date Started: 24-01-2019	Logged By: LT	Checked By: CB	Status: FINAL																		
Rotary Core Drilling Log	Easting: 384946.8	Northing: 392535.6	Ground Level: 35.26mAOD	Plant Used: DANDO 3000	Rig Crew: AH/DB DB/AH	Scale: 1:50																	
	Weather:		Termination:		SPT Hammer: CCG6 Energy Ratio: 68%																		
Samples & In Situ Testing						Strata Details			Groundwater														
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation												
						15.26	20.00		Very weak to weak reddish brown fine to medium grained thickly laminated SANDSTONE. Moderately weathered. Recovered locally as sandy gravel. Discontinuities are extremely close to medium spaced, horizontal, clean, rough and tight to open End of Borehole at 20.00m	20													
										21													
										22													
										23													
										24													
										25													
										26													
										27													
										28													
										29													
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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour set up of falling head permeability test 1 hour carrying out falling head permeability test Permeability test carried out at 2.00mbgl													
										Water Strikes <table border="1"> <tr> <th>Strike (m)</th> <th>Casing (m)</th> <th>Sealed (m)</th> <th>Time (mins)</th> <th>Rose to (m)</th> <th>Remarks</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks						
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks																		
Flush Information						Installation																	
Top (m)	Base (m)	Flush Type	Return	Flush Colour		Top (m)	Base (m)	Type	Dia (mm)														
						0.00	0.50	PLAIN															
						0.50	2.30	SLOTTED															
Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in % CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com																							

	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Borehole ID: BH02											
	Contract Number: CCG-C-18-10614		Date Started: 24-01-2019		Logged By: LT		Checked By: CB		Status: FINAL									
	Easting: 384944.8		Northing: 392496.5		Ground Level: 34.92mAOD		Plant Used: DANDO 3000		Rig Crew: AH/DB DB/AH									
Cable Percussion Borehole Log			Weather:			Termination:			SPT Hammer: CCG6 Energy Ratio: 68%									
Samples & In Situ Testing						Strata Details						Groundwater						
Depth	Sample ID	Test Result				Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation				
0.50	B	SPT(S)N=7 (1,0/1,2,2,2)				34.22	(0.70)		Brown silty sandy gravelly organic CLAY. Gravel is fine to coarse sub-angular to sub-rounded brick and sandstone (MADE GROUND)				1					
1.00	B										0.70				Loose brown fine to coarse SAND, with frequent clay lenses			
1.50	B										1.40				Stiff brown very sandy silty CLAY			
2.50	B	SPT(S)N=50 (2,3/50 for 235mm)				32.72	(0.80)		Red/brown weathered SANDSTONE, recovered as fine to coarse grained sand				2					
		SPT(S)100 (25 for 85mm/100 for 90mm)					2.20											
3.50 - 5.00	0	0	0			29.92	(2.80)		NO RECOVERY - 3.50-5.71mbgl				4					
5.00 - 6.50	53	0	0				5.00		Very weak reddish brown fine to medium grained thickly laminated SANDSTONE. Moderately weathered. Recovered locally as sandy gravel. Discontinuities are closely spaced, horizontal, clean, rough and tight to open SPT @ 5.00mbgl = 100 (25 for 25mm / 65, 35 for 20mm)									
									NON-INTACT. RECOVERED AS VERY SANDY GRAVEL - 5.71-6.50mbgl									
									NO RECOVERY - 6.50-8.73mbgl									
									NON-INTACT. RECOVERED AS VERY SANDY GRAVEL - 6.73-7.38mbgl									
6.50 - 8.00	85	22	7						NON-INTACT. RECOVERED AS SANDY GRAVEL - 7.49-7.53mbgl									
									NON-INTACT. RECOVERED AS SANDY GRAVEL - 7.76-8.00mbgl									
									NO RECOVERY - 8.00-8.05mbgl									
									NON-INTACT. RECOVERED AS SANDY GRAVEL - 8.05-8.40mbgl									
									NON-INTACT. RECOVERED AS GRAVEL - 8.49-8.60mbgl									
8.00 - 9.50	97	50	30						NON-INTACT. RECOVERED AS SANDY GRAVEL - 8.77-8.95mbgl				9					
								NON-INTACT. RECOVERED AS GRAVELLY SAND - 9.50-9.97mbgl										
								Continued next sheet										
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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour setting up permeability test 1 hour carrying out falling head permeability test Falling head permeability test carried out at 3.30mbgl									
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			
						0.00	3.50	PLAIN										
						3.50	5.00	SLOTTED										
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com																		

	Contract Name: The Christie, Manchester				Client: Interserve Construction Ltd			Borehole ID: BH02						
	Contract Number: CCG-C-18-10614		Date Started: 24-01-2019		Logged By: LT	Checked By: CB	Status: FINAL	Sheet 2 of 3						
	Easting: 384944.8		Northing: 392496.5		Ground Level: 34.92mAOD	Plant Used: DANDO 3000	Rig Crew: AH/DB DB/AH	Scale: 1:50						
Rotary Core Drilling Log				Weather:				Termination:		SPT Hammer: CCG6 Energy Ratio: 68%				
Samples & In Situ Testing						Strata Details						Groundwater		
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation		
9.50 - 11.00	100	43	29	34	(15.00)				NON-INTACT, RECOVERED AS SANDY GRAVEL - 10.19-10.38mbgl	10				
				85					NON-INTACT, RECOVERED AS GRAVEL - 10.94-11.00mbgl	11				
				140					NO RECOVERY - 11.00-11.11mbgl					
150	NON-INTACT, RECOVERED AS GRAVEL - 11.11-11.17mbgl	12												
	NON-INTACT, RECOVERED AS GRAVEL - 11.39-11.60mbgl													
11.00 - 12.50	93	66	11	37					13					
										14				
				21					NON-INTACT, RECOVERED AS GRAVEL - 13.52-13.76mbgl					
69	15													
159		NO RECOVERY - 14.00-14.05mbgl												
12.50 - 14.00	97	57	21	38					16					
				106						NON-INTACT, RECOVERED AS SANDY GRAVEL - 14.12-14.16mbgl				
				110					47	17				
	NO RECOVERY - 15.50-15.65mbgl													
14.00 - 15.50	97	74	26	70					18					
				49						NON-INTACT, RECOVERED AS SANDY GRAVEL - 17.84-18.06mbgl				
				85					NO RECOVERY - 18.50-18.58mbgl	19				
140	NON-INTACT, RECOVERED AS SANDY GRAVEL - 18.58-18.99mbgl													
	53	NON-INTACT, RECOVERED AS SLIGHTLY SANDY SLIGHTLY GRAVELLY SILTY CLAY - 19.11-19.41mbgl												
15.50 - 17.00	90	71	8	34	20									
				79		INCLUSION OF CLAY (MARL) - 19.20mbgl								
				125	NON-INTACT, RECOVERED AS GRAVELLY SAND - 19.54-19.83mbgl									
17.00 - 18.50	93	67	0	24	21									
				557										
				87										
18.50 - 20.00	95	31	8	60	22									
				88										
				90										
	120													
	100													
Continued next sheet														
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)	1 hour hand excavating 1.20mbgl service avoidance pit					
									1 hour setting up permeability test					
									1 hour carrying out falling head permeability test					
									Falling head permeability test carried out at 3.30mbgl					
									Water Strikes					
									Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
Flush Information						Installation								
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)						
					0.00	3.50	PLAIN							
					3.50	5.00	SLOTTED							
Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in %														
CCGEOTECHNICAL LTD 0151 545 2750 www.ccgtechnical.com														

	Contract Name: The Christie, Manchester				Client: Interserve Construction Ltd				Borehole ID: BH02						
	Contract Number: CCG-C-18-10614		Date Started: 24-01-2019		Loggged By: LT		Checked By: CB		Status: FINAL						
	Easting: 384944.8		Northing: 392496.5		Ground Level: 34.92mAOD		Plant Used: DANDO 3000		Rig Crew: AH/DB DB/AH						
Rotary Core Drilling Log										Sheet 3 of 3 Scale: 1:50					
Weather:				Termination:				SPT Hammer: CCG6 Energy Ratio: 68%							
Samples & In Situ Testing						Strata Details						Groundwater			
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/ Installation		
						14.92	20.00	*****	NON-INTACT, RECOVERED AS GRAVEL - 19.93-20.00mbgl End of Borehole at 20.00m			20			
												21			
												22			
												23			
												24			
												25			
												26			
												27			
												28			
												29			
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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour setting up permeability test 1 hour carrying out falling head permeability test Falling head permeability test carried out at 3.30mbgl						
										Water Strikes					
										Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
Flush Information						Installation									
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)	Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in %						
					0.00	3.50	PLAIN								
					3.50	5.00	SLOTTED		CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com						



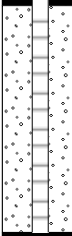
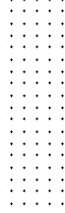
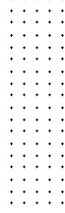


Samples & In Situ Testing	Strata Details	Groundwater
---------------------------	----------------	-------------

Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation						
							(20.50)		NON-INTACT, RECOVERED AS GRAVEL - 9.89-10.09mbgl	10							
				72													
10.50 - 12.00	93	46	19											NON-INTACT, RECOVERED AS SANDY GRAVEL - 10.43-10.50mbgl	11		
														NO RECOVERY - 10.50-10.60mbgl			
														NON-INTACT, RECOVERED AS SLIGHTLY SANDY GRAVEL - 10.60-10.69mbgl			
				27 86 165													
														NON-INTACT, RECOVERED AS SANDY GRAVEL - 11.29-11.74mbgl	12		
													NON-INTACT, RECOVERED AS GRAVEL - 11.82-12.00mbgl				
													NO RECOVERY - 12.00-12.25mbgl				
12.00 - 13.50	83	70	41											NON-INTACT, RECOVERED AS GRAVEL - 12.44-12.52mbgl	13		
				50													
				69 109 132											14		
													NO RECOVERY - 13.50-13.79mbgl				
													NON-INTACT, RECOVERED AS GRAVEL - 13.79-13.87mbgl				
13.50 - 15.00	81	63	16	13 59 141											15		
														NON-INTACT, RECOVERED AS GRAVEL - 14.94-15.00mbgl			
														NO RECOVERY - 15.00-15.20mbgl			
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 15.20-15.79mbgl								
15.00 - 16.50	87	19	0	44						16							
									NON-INTACT, RECOVERED AS VERY SILTY VERY SANDY GRAVEL - 15.97-16.50mbgl								
16.50 - 18.00	0	0	0						NO RECOVERY - 16.50-20.08mbgl	17							
									Brown clayey MUDSTONE - Drillers Description								
										18							
18.00 - 19.00	0	0	0							19							
19.00 - 20.00	0	0	0														
									Continued next sheet								

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: 1 hour hand excavating 1.20mbgl service avoidance pit Water Strikes <table><tr><th>Strike (m)</th><th>Casing (m)</th><th>Sealed (m)</th><th>Time (mins)</th><th>Rose to (m)</th><th>Remarks</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in % CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks						
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks																
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)													
Flush Information					Installation																
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)													

	Contract Name: The Christie, Manchester				Client: Interserve Construction Ltd				Borehole ID: BH03					
	Contract Number: CCG-C-18-10614		Date Started: 22-01-2019		Logged By: LT		Checked By: CB		Status: FINAL					
	Easting: 384939.8		Northing: 392468.4		Ground Level: 34.72mAOD		Plant Used: DANDO 3000		Rig Crew: AH/LN DB/AH					
Rotary Core Drilling Log										Sheet 3 of 3				
										Scale: 1:50				
Weather:				Termination:				SPT Hammer: CCG6 Energy Ratio: 68%						
Samples & In Situ Testing						Strata Details						Groundwater		
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/Installation	
20.00 - 21.00	92	33	20						NON-INTACT, RECOVERED AS GRAVEL - 20.00-20.15mbgl			20		
				NON-INTACT, RECOVERED AS GRAVEL - 20.60-21.00mbgl										
				NO RECOVERY - 21.00-21.20mbgl										
21.00 - 22.50	81	49	35	62					NO RECOVERY - 21.00-21.20mbgl			21		
				170					NON-INTACT, RECOVERED AS VERY SILTY VERY SANDY GRAVEL - 21.90-22.35mbgl					
				201					NON-INTACT, RECOVERED AS GRAVEL - 22.40-22.60mbgl					
22.50 - 24.00	97	69	57	92					NON-INTACT, RECOVERED AS GRAVEL - 22.96-23.06mbgl			22		
				153					NON-INTACT, RECOVERED AS GRAVEL - 22.96-23.06mbgl					
				305					MUDSTONE CLAST - 23.10mbgl					
24.00 - 25.00	89	44	10	110					NON-INTACT, RECOVERED AS GRAVEL - 24.00-24.27mbgl			23		
				53					NON-INTACT, RECOVERED AS SANDY GRAVEL - 24.51-24.63mbgl					
				45					NO RECOVERY - 24.89-25.00mbgl					
25.00 - 26.00				134					End of Borehole at 25.00m			24		
				245										
26.00 - 27.00				30								25		
				79										
27.00 - 28.00												26		
28.00 - 29.00												27		
29.00 - 30.00												28		
30.00 - 31.00												29		
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)	1 hour hand excavating 1.20mbgl service avoidance pit					
Flush Information						Installation				Water Strikes				
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in %														
CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com														

	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Borehole ID: BH04		
	Contract Number: CCG-C-18-10614	Date Started: 18-01-2019	Logged By: DO	Checked By: CB	Status: FINAL				
Cable Percussion Borehole Log	Easting: 384930.1	Northing: 392430.7	Ground Level: 34.93mAOD	Plant Used: Dando 150 S/A Rig	Rig Crew: AH/LN DB/AH	Sheet 1 of 3			
	Weather:			Termination:		SPT Hammer: CCG6 Energy Ratio: 68%			
Samples & In Situ Testing			Strata Details				Groundwater		
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/ Installation	
0.50 0.50	B ES	SPT(S)N=11 (1,2/2,3,3,3)	33.63	(1.30)		Brown slightly silty sandy GRAVEL with occasional pockets of clay. Gravel is fine to coarse angular to sub-angular brick (MADE GROUND)	1		
1.00 1.00	B ES			1.30					
1.50 1.50	B ES								
2.00 - 2.45	UT	SPT(S)N=22 (3,4/5,5,6,6)	31.43	(2.20)		Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium sub-angular to sub-rounded sandstone	2		
2.50	B								
3.50	B								
4.50	B	SPT(C)100 (25 for 75mm/100 for 50mm)		(1.50)		Red weathered SANDSTONE	4		
5.00 - 6.50	72	56	19	27		Very weak reddish brown fine to medium grained thickly laminated SANDSTONE. Moderately weathered. Recovered locally as sandy gravel. Discontinuities are very close to medium spaced, horizontal, clean, rough and tight to wide <i>NO RECOVERY - 5.00-5.42mbgl</i> <i>NO-INTACT, RECOVERED AS GRAVEL - 5.42-5.92mbgl</i> <i>NON-INTACT, RECOVERED AS GRAVEL - 5.61-5.67mbgl</i>	5		
				51 92 170					
6.50 - 8.00	61	31	15	93		<i>NO RECOVERY - 6.50-7.09mbgl</i> <i>NON-INTACT, RECOVERED AS SANDY GRAVEL - 7.09-7.14mbgl</i> <i>NON-INTACT, RECOVERED AS SANDY GRAVEL - 7.34-7.53mbgl</i> <i>NON-INTACT, RECOVERED AS SANDY GRAVEL - 7.77-7.94mbgl</i>	7		
				114					
				60					
8.00 - 9.50	79	70	20	50 80 181		<i>NO RECOVERY - 8.00-8.31mbgl</i> <i>NON-INTACT, RECOVERED AS GRAVEL - 9.11-9.18mbgl</i> <i>NO RECOVERY - 9.50-9.91mbgl</i>	8		
				68					
TCR SCR RQD Fracture Water			Continued next sheet						
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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour set up of falling head permeability test 1 hour carrying out falling head permeability test Permeability test carried out at 2.50mbgl
Chiselling					Installation				Water Strikes
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)
				0.00	1.50	PLAIN			
				1.50	3.00	SLOTTED			
									Sealed (m)
									Time (mins)
									Rose to (m)
									Remarks
									0
									Borehole dry
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com									

	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Borehole ID: BH04					
	Contract Number: CCG-C-18-10614	Date Started: 18-01-2019	Logged By: DO	Checked By: CB	Status: FINAL	Sheet 2 of 3						
Rotary Core Drilling Log	Easting: 384930.1	Northing: 392430.7	Ground Level: 34.93mAOD	Plant Used: Dando 150 S/A Rig	Rig Crew: AH/LN DB/AH	Scale: 1:50						
Weather:		Termination:			SPT Hammer: CCG6 Energy Ratio: 68%							
Samples & In Situ Testing						Strata Details			Groundwater			
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation	
9.50 - 11.00	73	35	0	50					NON-INTACT, RECOVERED AS GRAVEL - 9.91-10.07mbgl	10		
				50								
				50								
				54								
				31								
11.00 - 12.50	97	31	14	90					NON-INTACT, RECOVERED AS SANDY GRAVEL - 10.35-10.54mbgl	11		
12.50 - 14.00	98	69	33	60					NON-INTACT, RECOVERED AS SANDY GRAVEL - 10.668-10.89mbgl	12		
14.00 - 15.50	91	13	0	21					NON-INTACT, RECOVERED AS SANDY GRAVEL - 11.15-11.30mbgl	13		
15.50 - 17.00	92	71	45	59					NON-INTACT, RECOVERED AS SANDY GRAVEL - 11.39-12.11mbgl	14		
				111								
				290								
				66								
				60								
17.00 - 18.50	96	67	41	33					NON-INTACT, RECOVERED AS SANDY GRAVEL - 12.39-12.57	15		
				77								
				155								
				41								
				108								
18.50 - 20.00	96	71	56	107					NON-INTACT, RECOVERED AS SANDY GRAVEL - 13.14-13.23mbgl	16		
				156								
				216								
				70								
						(15.00)			NON-INTACT, RECOVERED AS SANDY GRAVEL - 13.53-14.00mbgl	17		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 14.00-14.14mbgl	18		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 14.14-14.80mbgl	19		
									NON-INTACT, RECOVERED AS GRAVEL - 14.89-15.40mbgl	20		
									NON-INTACT, RECOVERED AS GRAVEL - 15.46-15.85mbgl	21		
									NON-INTACT, RECOVERED AS GRAVEL - 15.82-20.00mbgl	22		
									NON-INTACT, RECOVERED AS GRAVEL - 15.82-15.66mbgl	23		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 16.55-16.61mbgl	24		
									NON-INTACT, RECOVERED AS GRAVEL - 16.83-17.00mbgl	25		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 17.06-17.14mbgl	26		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 17.28-17.34mbgl	27		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 17.80-17.85mbgl	28		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 18.71-19.02mbgl	29		
									NON-INTACT, RECOVERED AS SLIGHTLY SANDY GRAVEL - 19.65-19.75mbgl	30		
									NON-INTACT, RECOVERED AS SANDY GRAVEL - 19.82-20.00mbgl	31		
									Continued next sheet	32		
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)	1 hour hand excavating 1.20mbgl service avoidance pit			
									1 hour set up of falling head permeability test			
									1 hour carrying out falling head permeability test			
									Permeability test carried out at 2.50mbgl			
										Water Strikes		
										Strike (m)	Casing (m)	
										Sealed (m)	Time (mins)	
										0	Rose to (m)	
											Remarks	
											Borehole dry	
Flush Information						Installation						
Top (m)	Base (m)	Flush Type	Return	Flush Colour	Top (m)	Base (m)	Type	Dia (mm)				
					0.00	1.50	PLAIN					
					1.50	3.00	SLOTTED					
									Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in %			
									CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com			

	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Borehole ID: BH04				
	Contract Number: CCG-C-18-10614	Date Started: 18-01-2019	Logged By: DO	Checked By: CB	Status: FINAL		Sheet 3 of 3				
Rotary Core Drilling Log	Easting: 384930.1	Northing: 392430.7	Ground Level: 34.93mAOD	Plant Used: Dando 150 S/A Rig	Rig Crew: AH/LN DB/AH	Scale: 1:50					
Weather:		Termination:			SPT Hammer: CCG6 Energy Ratio: 68%						
Samples & In Situ Testing						Strata Details			Groundwater		
Depth	TCR	SCR	RQD	Fracture Spacing	Water Added	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation
						14.93	20.00		Very weak reddish brown fine to medium grained thickly laminated SANDSTONE. Moderately weathered. Recovered locally as sandy gravel. Discontinuities are very close to medium spaced, horizontal, clean, rough and tight to wide End of Borehole at 20.00m	20	
										21	
										22	
										23	
										24	
										25	
										26	
										27	
										28	
										29	
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)	1 hour hand excavating 1.20mbgl service avoidance pit 1 hour set up of falling head permeability test 1 hour carrying out falling head permeability test Permeability test carried out at 2.50mbgl	
										Water Strikes Strike (m) Casing (m) Sealed (m) Time (mins) Rose to (m) Remarks 0 Borehole dry	
Flush Information						Installation					
Top (m)	Base (m)	Flush Type	Return	Flush Colour		Top (m)	Base (m)	Type	Dia (mm)		
						0.00	1.50	PLAIN			
						1.50	3.00	SLOTTED			
Fracture spacing reported in mm as min, Average and Max values. TCR, SCR and RQD reported in %											
CCGEOTECHNICAL LTD 0151 545 2750 www.ccgteotechnical.com											

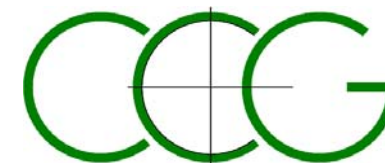
Weather: Dry					Termination:		SPT Hammer: N/R, Energy Ratio: N/R						
Samples & In Situ Testing					Strata Details						Groundwater		
Depth	Sample ID	Test Result	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation		
0.00 - 1.00	U	HVP=50 SPT(S)N=10 (1,1/2,3,3,2) HVP=50	35.08			Light brown sandy GRAVEL. Gravel is fine to coarse sub-angular limestone (MADE GROUND)				1			
0.20	ES			(0.30)									
0.50	B			0.30		Dark brown slightly silty slightly gravelly fine to medium grained SAND. Gravel is fine to coarse sub-angular to sub-rounded sandstone							
0.50	ES			(0.70)									
1.00 - 2.00	U	SPT(S)N=50 (8,7/50 for 225mm)	34.38	1.00		Firm brownish grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium sub-rounded sandstone				2			
				(0.40)									
				1.40		Brown slightly silty slightly gravelly fine to medium grained SAND. Gravel is fine to coarse sub-angular sandstone							
				(1.00)									
2.00 - 2.40	U		32.98	2.40		End of Borehole at 2.40m				3			
										4			
										5			
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)	1 hour hand excavating 1.20mbgl service avoidance pit				
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
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com													



Notes:

Recovered undisturbed soils from WS01.

Service pit carried out within upper meter.



CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
INTERSERVE CONSTRUCTION LTD

Project:
The Christie, Manchester

Title:
Recovered soils from WS01

Scale:
N/A

Issue:
1

Drawn by:
DO

Date:
01/04/19

Project No.
CCG-C-18-10614

Plate No.
WS01-1

CC GEOTECHNICAL LIMITED

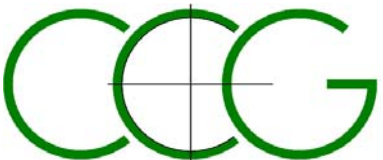


APPENDIX C

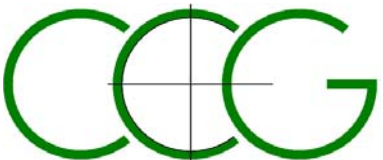
TRIAL PIT LOGS

	Contract Name: The Christie, Manchester		Client: Interserve Construction Ltd			Trial Pit ID: TP01																			
	Contract Number: CCG-C-18-10614	Date Started: 17-01-2019	Logged By: DE	Checked By: CB	Status: FINAL	Sheet 1 of 1																			
Trial Pit Log	Easting: 384948.1	Northing: 392529.5	Ground Level: 35.12mAOD	Plant Used: Tracked Excavator	Date Printed: 03-03-2019	Scale: 1:25																			
	Weather: Dry		Hole Termination: Terminated on Sandstone		Stability:																				
Samples & In Situ Testing			Strata Details				Water	Backfill																	
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description																			
0.30 0.50 0.50 1.00 1.00 1.50 2.00 2.50	ES		35.02	0.10		Topsoil	1																		
	B ES			(0.50)		Brown very sandy slightly silty GRAVEL with frequent rootlets. Gravels are fine to coarse sub-angular brick, concrete and mortar (MADE GROUND).																			
			34.52	0.60		Brown gravelly slightly clayey slightly silty fine to coarse SAND with occasional rootlets. Gravels are fine to coarse sub-angular brick (MADE GROUND).																			
				(0.70)																					
		B ES		33.82	1.30				Brown very clayey slightly gravelly slightly silty fine to medium grained SAND. Gravels are fine to coarse sub-rounded quartz and sandstone.																
				(0.60)																					
		B		33.22	1.90				Red slightly gravelly slightly silty fine to medium grained SAND. Gravels are fine to coarse sub-angular sandstone.																
				(0.70)																					
		B		32.52	2.60				Red weathered SANDSTONE.																
				32.42	2.70				End of Trial Pit at 2.70m																
Dimensions:				General Remarks:																					
Final Depth: 2.70m																									
← Length (m) → 1.80m ↑ Width (m) ↓ 0.30m Orientation: ° ←																									
Inclination: °				<table><tr><th colspan="6">Water Strikes</th></tr><tr><th>Strike (m)</th><th>Casing (m)</th><th>Sealed (m)</th><th>Time (mins)</th><th>Rose to (m)</th><th>Remarks</th></tr><tr><td></td><td></td><td></td><td>0</td><td></td><td>Trial pit dry</td></tr></table>				Water Strikes						Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks				0		Trial pit dry
Water Strikes																									
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks																				
			0		Trial pit dry																				
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com																									



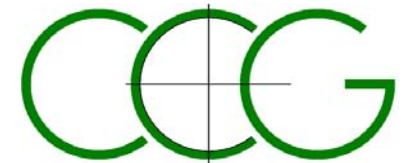
Notes:	
 CC GEOTECHNICAL LIMITED UNIT 1 DELTIC WAY KNOWSLEY INDUSTRIAL ESTATE LIVERPOOL L33 7BA 0151 545 2750	
Client: INTERSERVE CONSTRUCTION LTD	
Project: The Christie, Manchester	
Title: Trial Pit Excavations - TP1	
Scale: N/A	Issue: 1
Drawn by: DO	Date: 01/04/19
Project No. CCG-C-18-10614	Plate No. TP1-1
CC GEOTECHNICAL LIMITED	



Notes:	
 CC GEOTECHNICAL LIMITED UNIT 1 DELTIC WAY KNOWSLEY INDUSTRIAL ESTATE LIVERPOOL L33 7BA 0151 545 2750	
Client: INTERSERVE CONSTRUCTION LTD	
Project: The Christie, Manchester	
Title: Trial Pit Excavations - TP1	
Scale: N/A	Issue: 1
Drawn by: DO	Date: 01/04/19
Project No. CCG-C-18-10614	Plate No. TP1-2
CC GEOTECHNICAL LIMITED	



Notes:



CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
INTERSERVE CONSTRUCTION LTD

Project:
The Christie, Manchester

Title:
Trial Pit Excavations - TP1

Scale:
N/A

Issue:
1

Drawn by:
DO

Date:
01/04/19

Project No.
CCG-C-18-10614

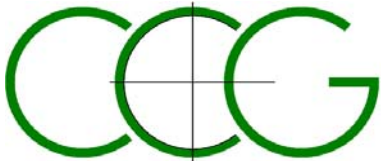
Plate No.
TP1-3

CC GEOTECHNICAL LIMITED

	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Trial Pit ID: TP02																			
	Contract Number: CCG-C-18-10614	Date Started: 17-01-2019	Logged By: DE	Checked By: CB	Status: FINAL	Sheet 1 of 1																				
Trial Pit Log	Easting: 384946.6	Northing: 392505.6	Ground Level: 34.79mAOD	Plant Used: Tracked Excavator	Date Printed: 03-03-2019	Scale: 1:25																				
	Weather: Dry		Hole Termination:		Stability:																					
Samples & In Situ Testing			Strata Details				Water	Backfill																		
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description																				
0.30	ES	HVP=60kPa	34.69	0.10		Topsoil	1																			
0.50	B		(0.70)	33.99	0.80				Brown sandy slightly silty GRAVEL with frequent rootlets. Gravels are fine to coarse sub-angular brick, concrete and mortar (MADE GROUND).																	
0.50	ES																									
1.00	B	HVP=90kPa	33.39	1.40		Brown gravelly slightly silty fine to medium grained SAND with occasional rootlets. Gravels are fine to coarse sub-angular to sub-rounded brick and concrete (MADE GROUND).	2																			
1.00	ES																									
1.50	B	(1.35)	32.04	2.75		Firm brown slightly sandy slightly gravelly silty CLAY with frequent laminations of sand. Gravel is fine to medium sub-rounded sandstone	3																			
2.00	B																									
2.80	B																									
			31.89	2.90		Red slightly clayey slightly gravelly slightly silty fine to medium grained SAND. Gravels are fine to coarse sub-angular sandstone																				
							End of Trial Pit at 2.90m																			
Dimensions:																										
Final Depth: 2.90m																										
← Length (m) → 1.80m ↑ Width (m) ↓ 0.30m Orientation: ° ←																										
General Remarks:																										
<table><tr><td colspan="6">Water Strikes</td></tr><tr><td>Strike (m)</td><td>Casing (m)</td><td>Sealed (m)</td><td>Time (mins)</td><td>Rose to (m)</td><td>Remarks</td></tr><tr><td></td><td></td><td></td><td>0</td><td></td><td>Trial pit dry</td></tr></table>									Water Strikes						Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks				0		Trial pit dry
Water Strikes																										
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks																					
			0		Trial pit dry																					
Inclination: °																										
CC GEOTECHNICAL LTD 0151 545 2750 www.ccgeotechnical.com																										



Notes:



CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
INTERSERVE CONSTRUCTION LTD

Project:
The Christie, Manchester

Title:
Trial Pit Excavations - TP2

Scale:
N/A

Issue:
1

Drawn by:
DO

Date:
01/04/19

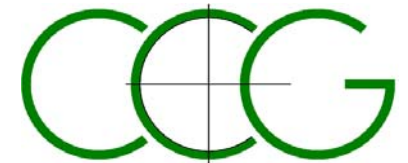
Project No.
CCG-C-18-10614

Plate No.
TP2-1

CC GEOTECHNICAL LIMITED



Notes:



CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
INTERSERVE CONSTRUCTION LTD

Project:
The Christie, Manchester

Title:
Trial Pit Excavations - TP2

Scale:
N/A

Issue:
1

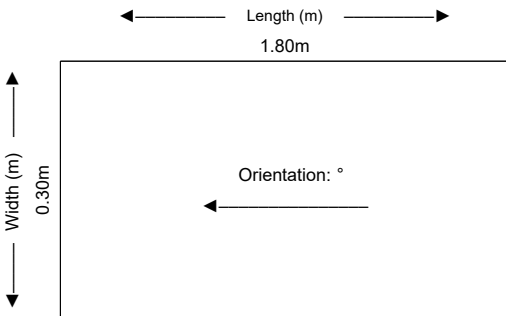
Drawn by:
DO

Date:
01/04/19

Project No.
CCG-C-18-10614

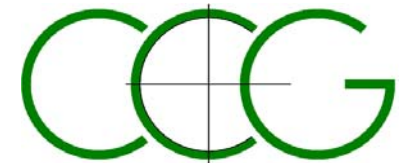
Plate No.
TP2-2

CC GEOTECHNICAL LIMITED

	Contract Name: The Christie, Manchester			Client: Interserve Construction Ltd			Trial Pit ID: TP03										
	Contract Number: CCG-C-18-10614	Date Started: 17-01-2019	Logged By: DE	Checked By: CB	Status: FINAL	Sheet 1 of 1											
Trial Pit Log	Easting: 384936.3	Northing: 392444.6	Ground Level: 34.64mAOD	Plant Used: Tracked Excavator	Date Printed: 03-03-2019	Scale: 1:25											
	Weather: Dry		Hole Termination:		Stability:												
Samples & In Situ Testing			Strata Details				Water	Backfill									
Depths	Sample ID	Test Result	Reduced Level	Depth (m) (Thickness)	Legend	Strata Description											
0.30	ES		34.53	0.10		Topsoil	1										
0.50	B		(1.30)						Brown very sandy slightly silty GRAVEL. Gravels are fine to coarse sub-angular brick and concrete (MADE GROUND).								
0.50	ES																
1.00	B	HVP=60kPa	33.24	1.40		Firm becoming stiff brown slightly gravelly slightly sandy silty CLAY, with occasional sand laminations. Gravel is fine to medium sub-rounded sandstone.	2										
1.00	ES																
1.50	B																
2.00	B	HVP=110kPa		(1.50)			3										
2.80	B																
			31.74	2.90		End of Trial Pit at 2.90m											
Dimensions:									General Remarks:								
Final Depth: 2.90m																	
																	
Inclination: °																	
Water Strikes																	
Strike (m)			Casing (m)			Sealed (m)			Time (mins)			Rose to (m)			Remarks		
									0						Trial pit dry		
CC GEOTECHNICAL LTD 0151 545 2750 www.cogeotechnical.com																	



Notes:



CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
INTERSERVE CONSTRUCTION LTD

Project:
The Christie, Manchester

Title:
Trial Pit Excavations - TP3

Scale: N/A	Issue: 1
---------------	-------------

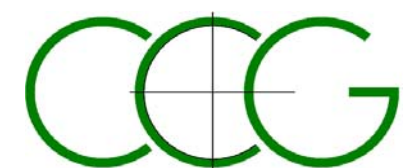
Drawn by: DO	Date: 01/04/19
-----------------	-------------------

Project No. CCG-C-18-10614	Plate No. TP3-1
-------------------------------	--------------------

CC GEOTECHNICAL LIMITED



Notes:



CC GEOTECHNICAL LIMITED
UNIT 1 DELTIC WAY
KNOWSLEY INDUSTRIAL ESTATE
LIVERPOOL
L33 7BA
0151 545 2750

Client:
INTERSERVE CONSTRUCTION LTD

Project:
The Christie, Manchester

Title:
Trial Pit Excavations - TP3

Scale:
N/A

Issue:
1

Drawn by:
DO

Date:
01/04/19

Project No.
CCG-C-18-10614

Plate No.
TP3-2

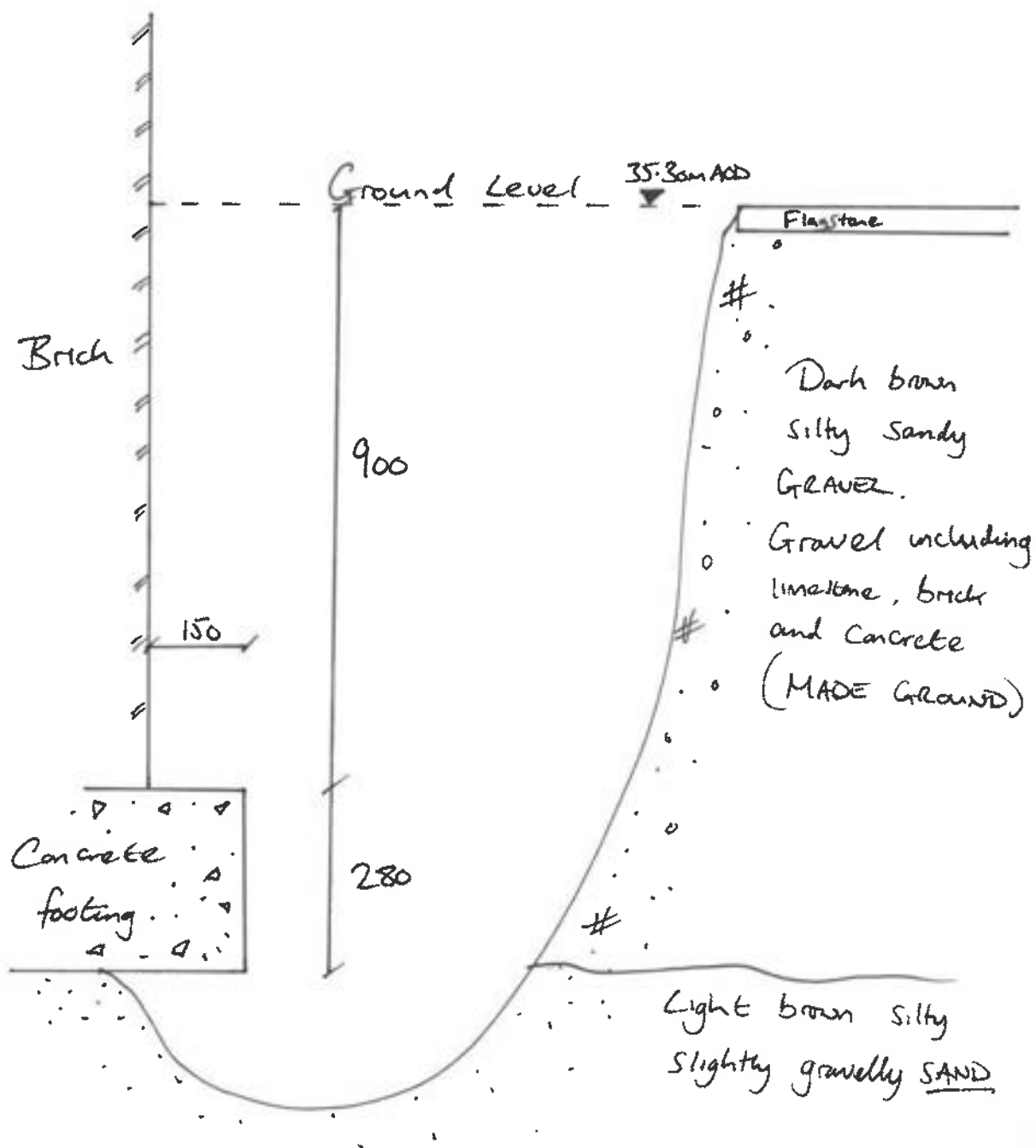
CC GEOTECHNICAL LIMITED



APPENDIX D

FOUNDATION INSPECTION PIT SKETCHES

OP01



Notes - Dimensions = mm
- Pit dry
- Scale 1:100



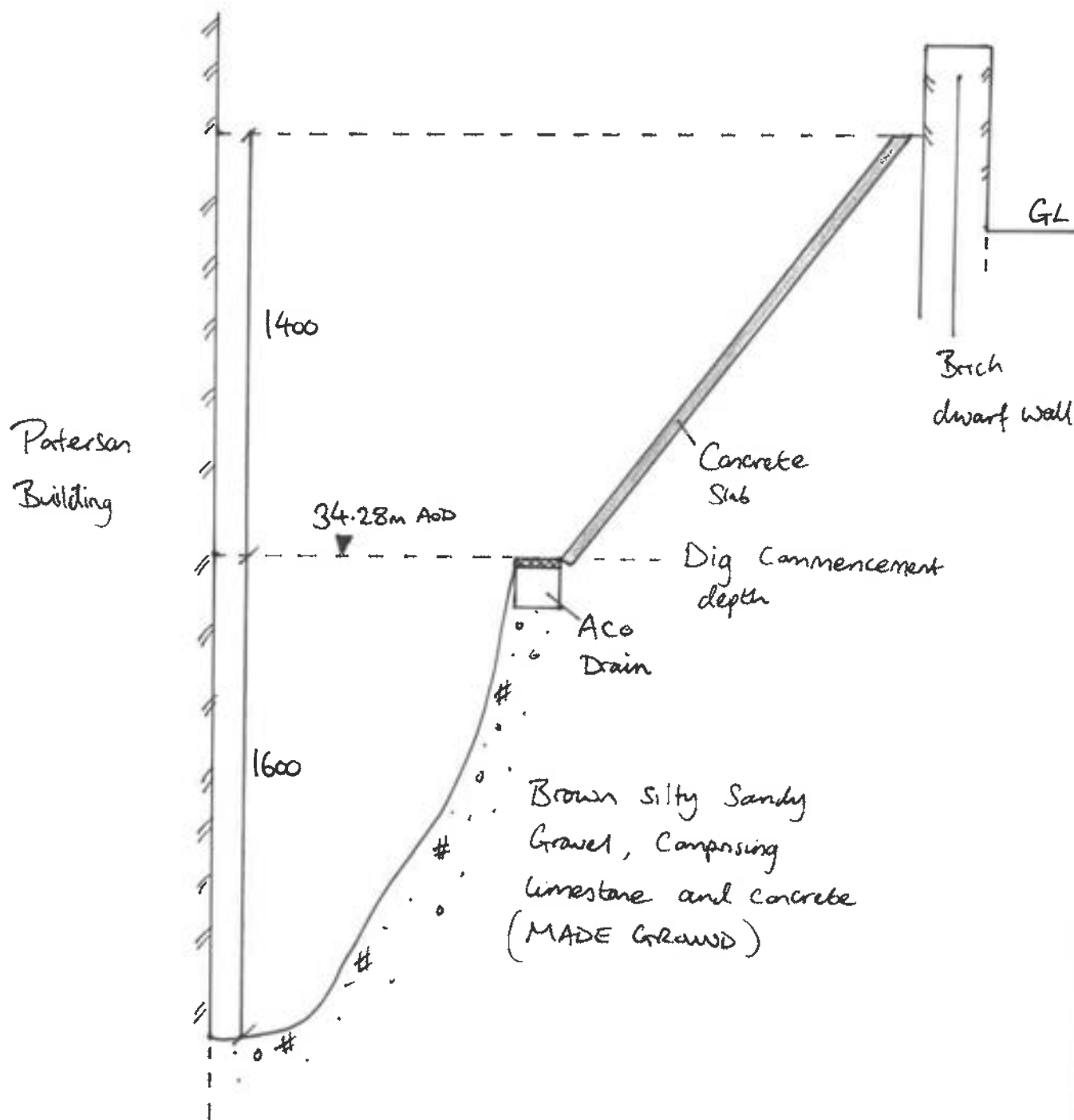
CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

OP02



Notes - Dimensions = mm
- Pit dry
- Scale 1:200



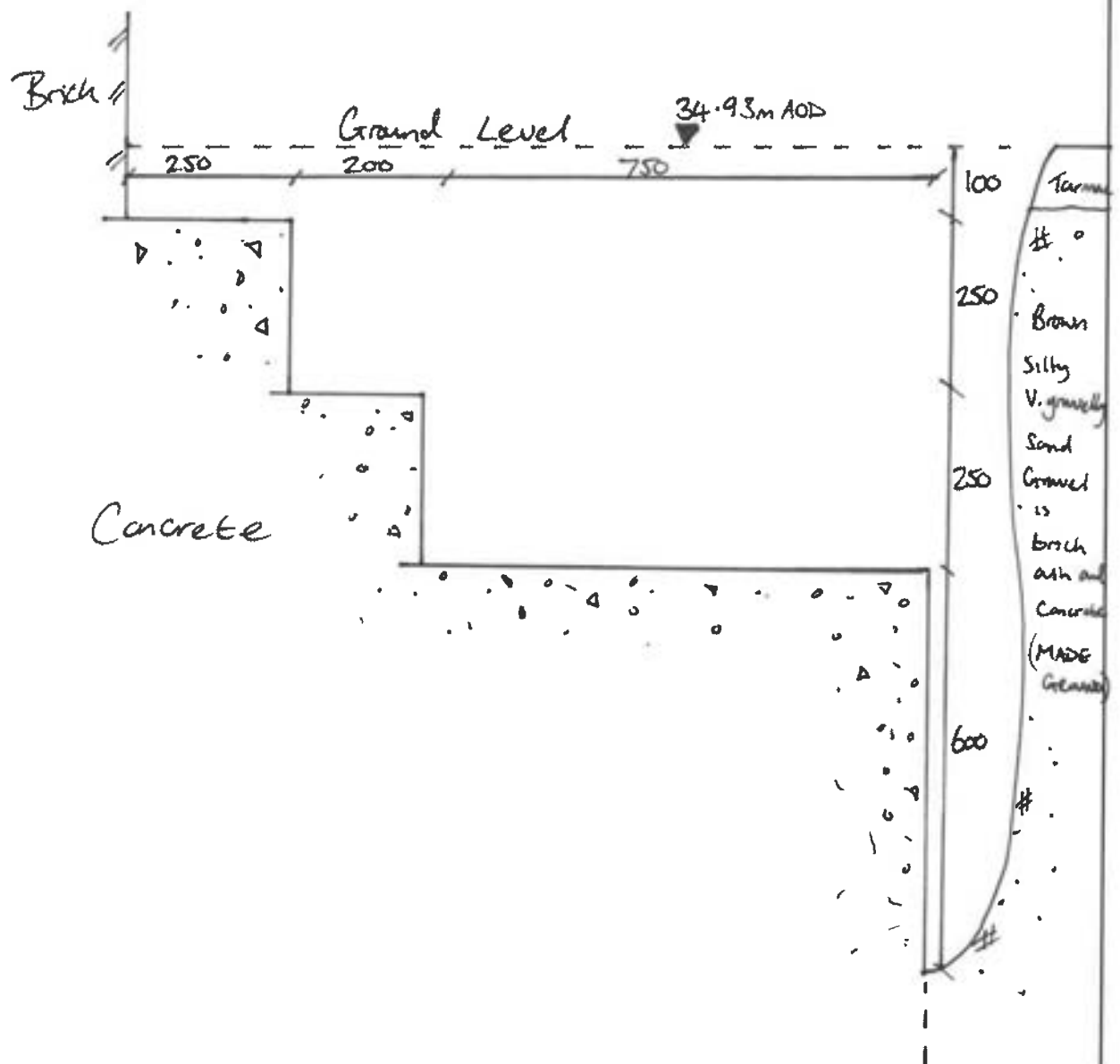
CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

OP.03



- Notes
- Dimensions = mm
 - Pit dry
 - Unable to extend pit due to services
 - Scale 1:100



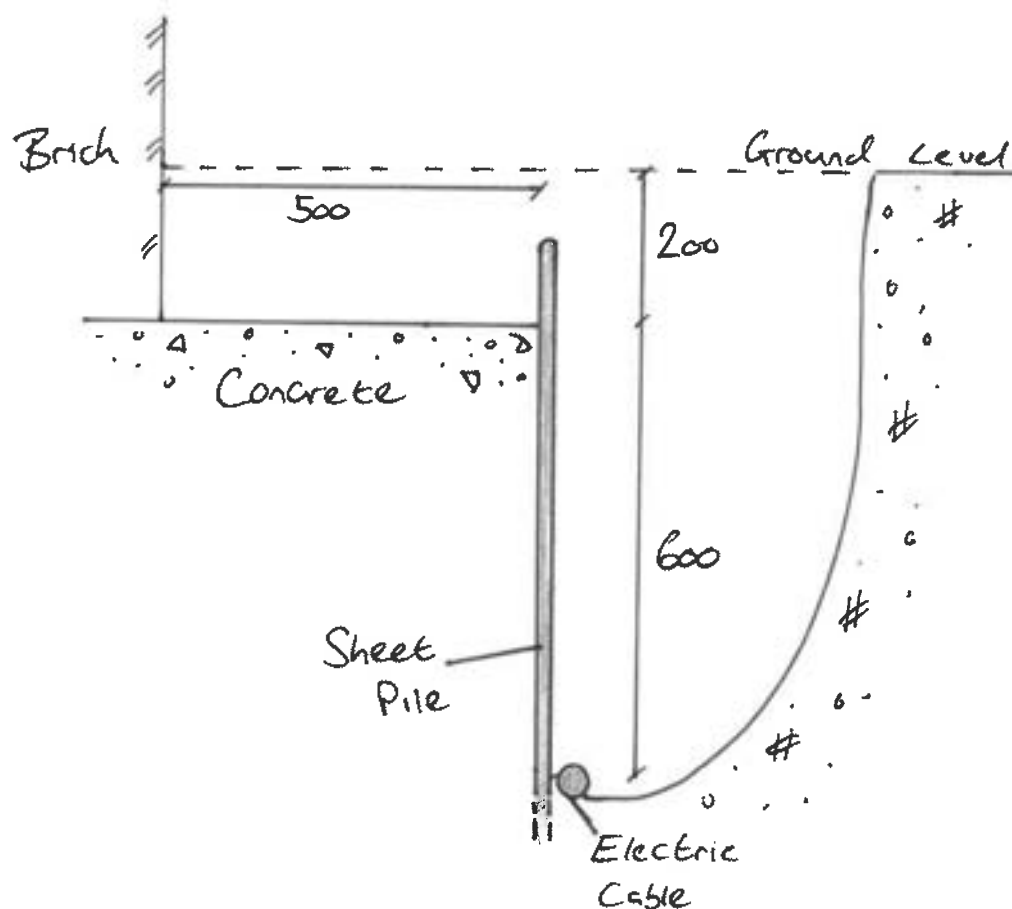
CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

Opos



- Notes
- Dimensions in mm
 - Pit dry
 - Unable to advance due to sheet pile & services.
 - Scale 1:100

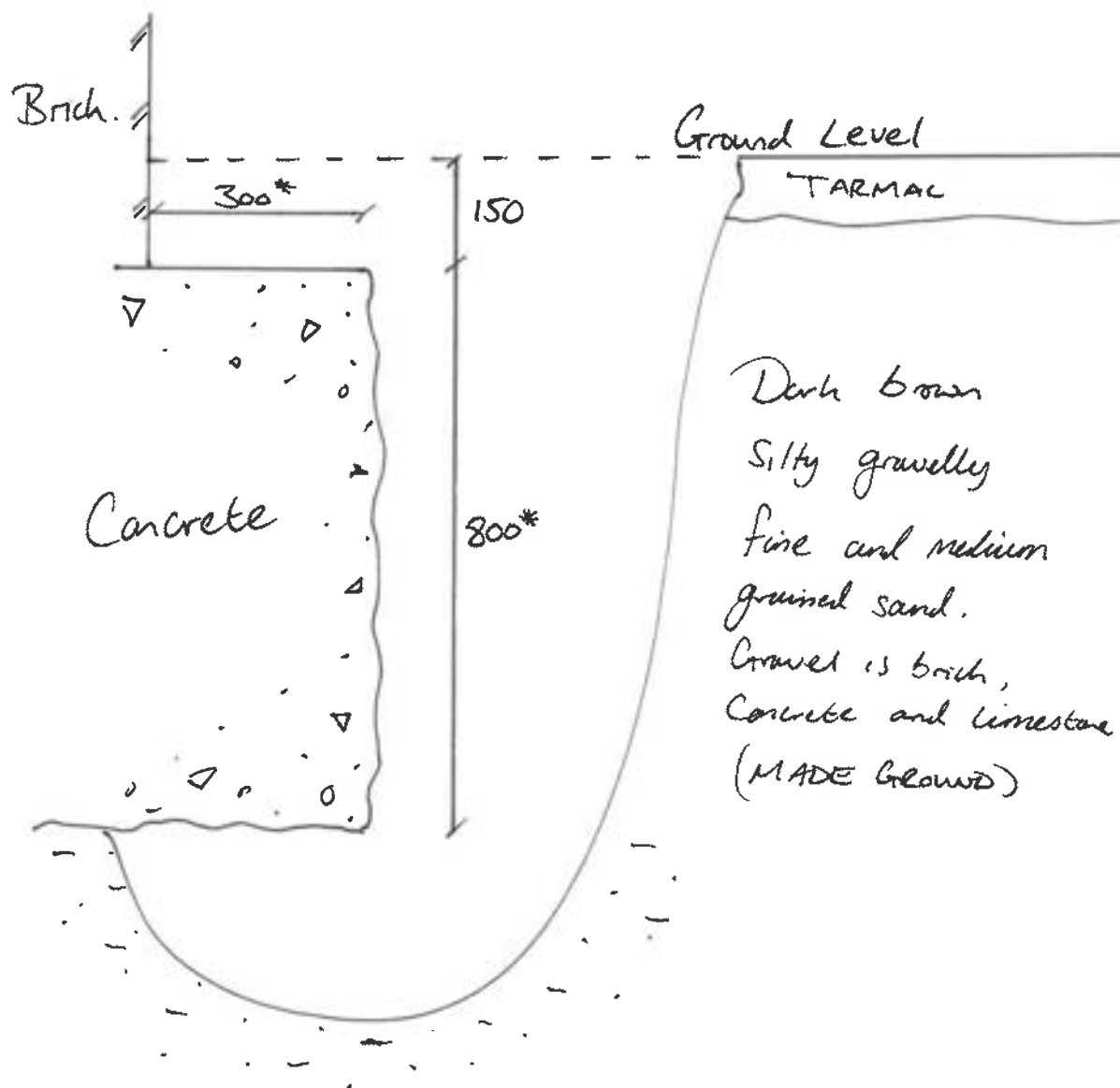


CC GEOTECHNICAL LTD
Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

OP06



- Notes - Dimensions = mm
- Pit dry
 - Foundation projection varies from 200mm - 600mm across dig.
 - Foundation thickness varies from 700mm - 900mm across dig.
 - Scale 1:100



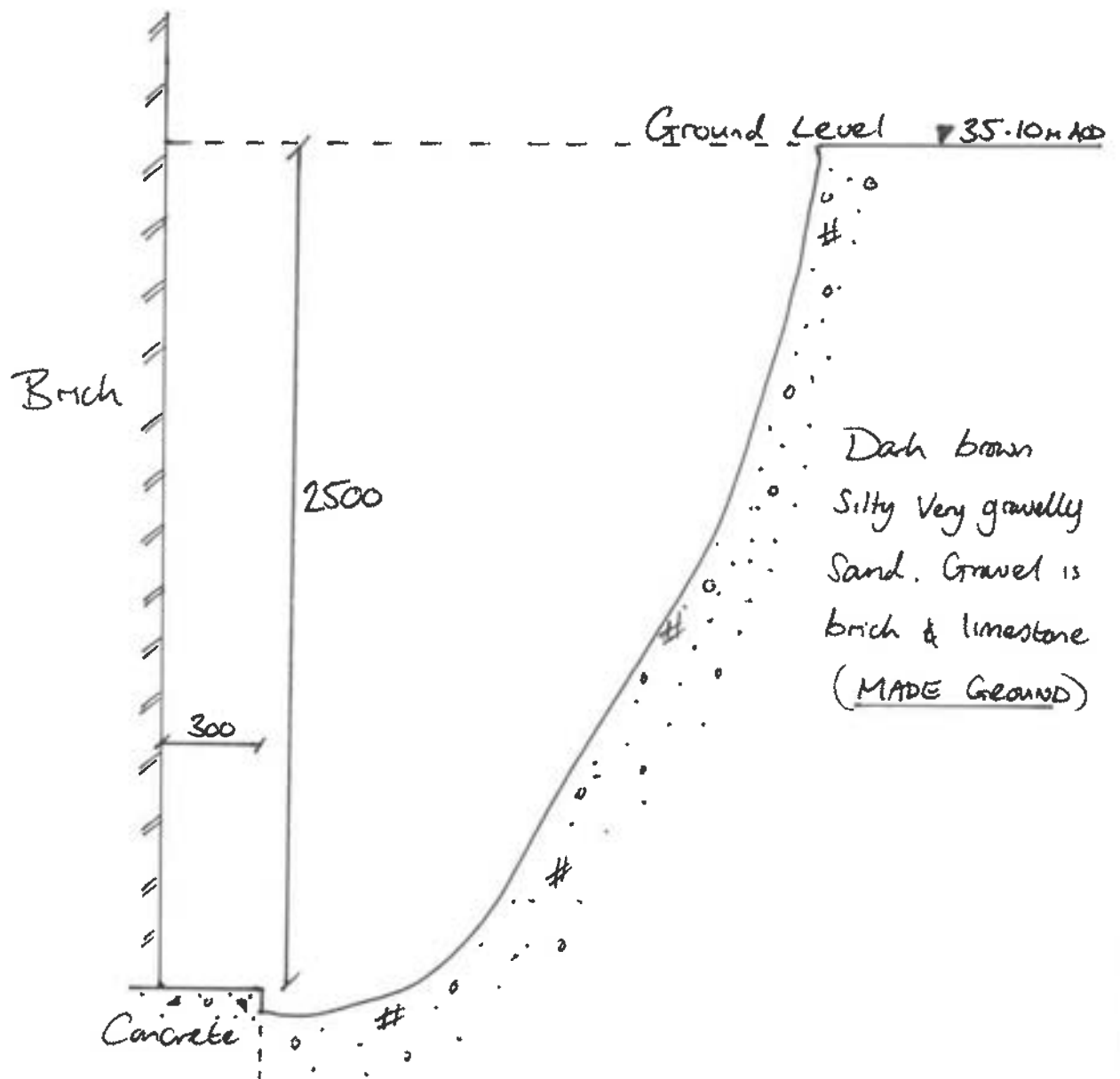
CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

OP07



- Notes
- Dimensions = mm
 - Pit dry
 - Unable to prove foundation thickness
 - Scale 1:200



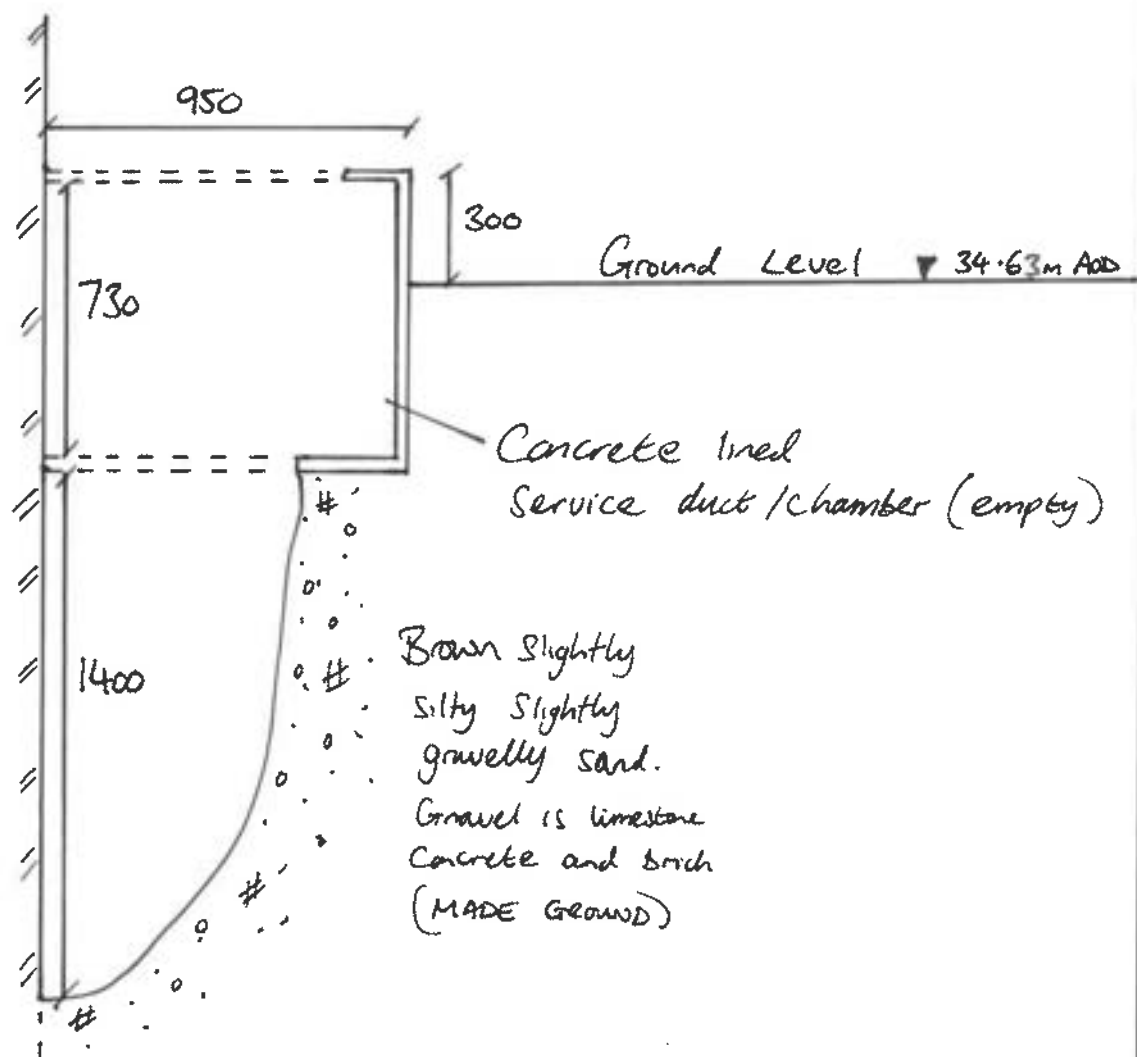
CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

OP08



- Notes - Dimensions = mm
- Pit dry
 - Foundation not encountered
 - Scale 1:200



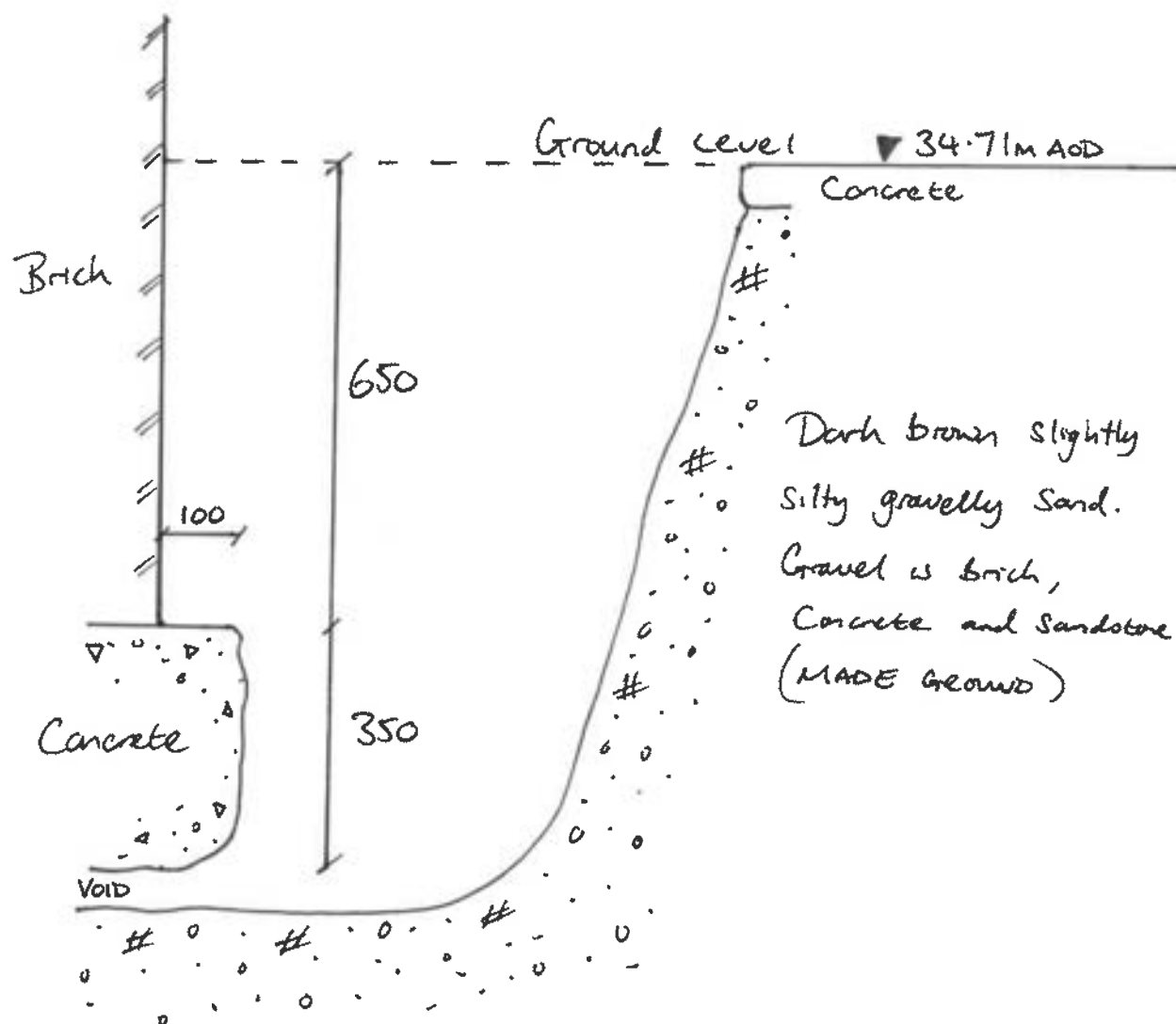
CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614

OP09



- Notes - Dimensions = mm
- Pit Dry
 - Small Void noted under foundation
 - Scale 1:100



CC GEOTECHNICAL LTD

Consulting Geotechnical and
Geoenvironmental Engineers

Tel: (0151) 545 2750 Fax: (0151) 548 7892

Project	PATERSON REDEVELOPMENT PROJECT		
Drawing	FOUNDATION OBSERVATION PIT		
Scale	AS SHOWN		
Date	Mar-19	Number	19/10614



APPENDIX E

INSITU SOIL PERMEABILITY TESTS

CCG-C-18-10614
Christie Hospital: BH01

FALLING HEAD TEST



Details of test Section	Situation B - BS5930	Ground Level (mAOD)	
Height of standpipe	N/A	Filter Length	N/A
Depth below top of standpipe to response zone	N/A	Casing Elevation (mAOD)	N/A
Initial depth to water (mbgl)	0.200	Borehole Diameter (m)	0.150
Depth of Casing (mbgl)	2.000	Standpipe Diameter:	N/A
		Casing Diameter	150mm

Ref: BS5930:1999

Strata:
0.40: Grey sandy GRAVEL (SUBBASE)
1.40: Brown very gravelly very silty CLAY. Gravel is brick and sandstone - MADE GROUND
2.20: Firm to stiff brown very silty very sandy CLAY

Time Elapsed t (mins)	Depth at Time t From top of casing (m)	Head at Time t	Head Ratio (H/Ho)
0	0.200	1.800	1.000
1	0.210	1.790	0.994
2	0.220	1.780	0.989
3	0.220	1.780	0.989
4	0.220	1.780	0.989
5	0.220	1.780	0.989
10	0.220	1.780	0.989
15	0.230	1.770	0.983
20	0.230	1.770	0.983
30	0.230	1.770	0.983
40	0.230	1.770	0.983
50	0.240	1.760	0.978
60	0.240	1.760	0.978

Permeability:

$K = A/FT$

$K = \underline{1.97E-07} \text{ m/s}$

Where:

A= Cross sectional area of BH (m²)
0.018

F= Intake Factor (m) see BS5930
0.4125

T= Basic time Lag (s)
222000 (by extrapolation)

Notes:

Test carried out under Test B of Section 4 - BS 5930:1999+A2:2010

Calcs by: DO Checked by: CB Job Number: 18-10614

CCG-C-18-10614
Christie Hospital: BH02

FALLING HEAD TEST



Details of test Section	Situation B - BS5930	Ground Level (mAOD)	
Height of standpipe	N/A	Filter Length	N/A
Depth below top of standpipe to response zone	N/A	Casing Elevation (mAOD)	N/A
Initial depth to water (mbgl)	0.130	Borehole Diameter (m)	0.150
Depth of Casing (mbgl)	3.300	Standpipe Diameter:	N/A
		Casing Diameter	150mm

Ref: BS5930:1999

Strata:

- 0.70: Brown very gravelly very silty CLAY. Gravel is brick and sandstone - MADE GROUND
- 1.40: Brown fine to coarse SAND, with frequent clay lenses
- 2.20: Stiff brown very sandy silty CLAY
- 3.50: Weathered SANDSTONE (continuing)

Time Elapsed t (mins)	Depth at Time t From top of casing (m)	Head at Time t	Head Ratio (H/Ho)
0	0.130	3.170	1.000
1	0.140	3.160	0.997
2	0.140	3.160	0.997
3	0.140	3.160	0.997
4	0.140	3.160	0.997
5	0.150	3.150	0.994
10	0.150	3.150	0.994
15	0.160	3.140	0.991
20	0.160	3.140	0.991
30	0.160	3.140	0.991
40	0.160	3.140	0.991
50	0.160	3.140	0.991
60	0.170	3.130	0.987

Permeability:

$K = A/FT$

$K = \underline{7.38E-08} \text{ m/s}$

Where:

A= Cross sectional area of BH (m²)
0.018

F= Intake Factor (m) see BS5930
0.4125

T= Basic time Lag (s)
591600 (by extrapolation)

Notes:

Test carried out under Test B of Section 4 - BS 5930:1999+A2:2010

Calcs by: DO Checked by: CB Job Number: 18-10614

CCG-C-18-10614
Christie Hospital: BH04

FALLING HEAD TEST



Details of test Section	Situation B - BS5930	Ground Level (mAOD)	
Height of standpipe	N/A	Filter Length	N/A
Depth below top of standpipe to response zone	N/A	Casing Elevation (mAOD)	N/A
Initial depth to water (mbgl)	0.340	Borehole Diameter (m)	0.150
Depth of Casing (mbgl)	2.500	Standpipe Diameter:	N/A
		Casing Diameter	150mm

Ref: BS5930:1999

Strata: 1.30: Brown very gravelly very silty CLAY. Gravel is brick and sandstone - MADE GROUND
 3.50: Stiff brown very sandy silty CLAY
 5.00: Weathered SANDSTONE (continuing)

Time Elapsed t (mins)	Depth at Time t From top of casing (m)	Head at Time t	Head Ratio (H/Ho)
0	0.340	2.160	1.000
1	0.346	2.154	0.997
2	0.347	2.153	0.997
3	0.348	2.152	0.996
4	0.349	2.151	0.996
5	0.350	2.150	0.995
10	0.351	2.149	0.995
15	0.352	2.148	0.994
20	0.355	2.145	0.993
30	0.360	2.140	0.991
40	0.365	2.135	0.988
50	0.370	2.130	0.986
60	0.375	2.125	0.984

Permeability:

$K = A/FT$

$K = \underline{2.68E-07} \text{ m/s}$

Where:

A= Cross sectional area of BH (m²)
 0.018

F= Intake Factor (m) see BS5930
 0.4125

T= Basic time Lag (s)
 162600 (by extrapolation)

Notes:

Test carried out under Test B of Section 4 - BS 5930:1999+A2:2010

Calcs by: DO Checked by: CB Job Number: 18-10614

CCG-C-18-10614:
The Chrisite, Manchester:
BH02

VARIABLE HEAD TEST



Test Scenario	Situation D - BS5930	Depth to top of test section	3.50mbgl
Type of Test	Rising Head	Standing water level	3.58mbgl
		Drawdown level	4.72mbgl
Diameter of test section (m)	0.09	Soil / rock description	Weathered Sandstone
Length of test section (m)	1.50		

Ref:
BS 22282:2012
BS 5930:1999

Time Elapsed t (mins)	Depth of groundwater (mbgl)	Head at Time (t)	Head Ratio (H/Ho)
0.0	4.720	1.140	1.000
0.5	4.490	0.910	0.798
1.0	4.320	0.740	0.649
1.5	4.110	0.530	0.465
1.5	3.980	0.400	0.351
2.5	3.880	0.300	0.263
3.0	3.820	0.240	0.211

Permeability:

$K = A/FT$

$K = 7.45E-06 \text{ m/s}$

Where:

A= Cross sectional area of BH (m²)
0.002

F= Intake Factor (m) see BS5930
2.685

T= Basic time Lag (s)
100

Notes:

Test carried out under Test D of Section 4 - BS 5930:1999

Client: Interserve Construction Ltd

Calcs by: DO Checked by: CB Job Number: 18/10614



APPENDIX F

ROCK CORE PHOTOGRAPHS

CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH1 3.5-6.5mbgl



3.5

5.0

5.0

6.5



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH1 6.5-9.5mbgl



6.5

8.0

8.0

9.5

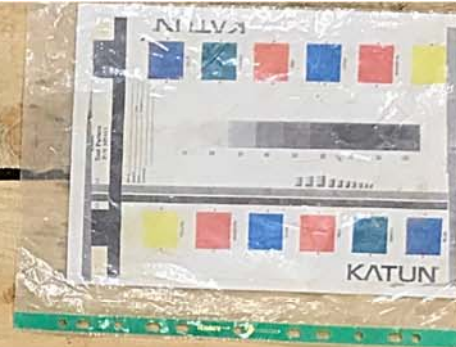


CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH1 9.5-12.5mbgl



9.5

11.0

11.0

12.5

CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH1 12.5-15.5mbgl



12.5

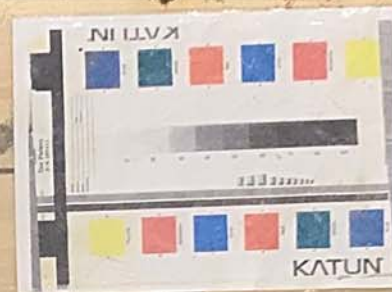
14.0

14.0

15.5



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH1 15.5-18.5mbgl



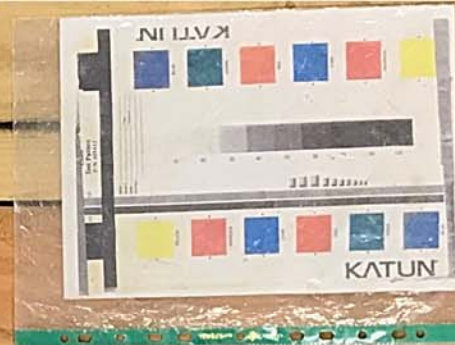
15.5

17.0

17.0

18.5

CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH1 18.5-20.0mbgl



18.5

20.0



CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH2 5.0-8.0mbgl



5.0

6.5

6.5

8.0



CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH2 8.0-11.0mbgl



8.0

9.5

9.5

11.0



CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE
BH2 11.0-14.0mbgl



11.0

12.5

12.5

14.0



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH2 14.0-17.0mbgl



14.0

15.5

15.5

17.0



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH2 17.0-20.0mbgl



17.0

18.5

18.5

20.0



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH3 4.5-7.5mbgl



4.5

6.0

6.0

7.5



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH3 7.5-10.5mbgl



7.5

9.0

9.0

10.5

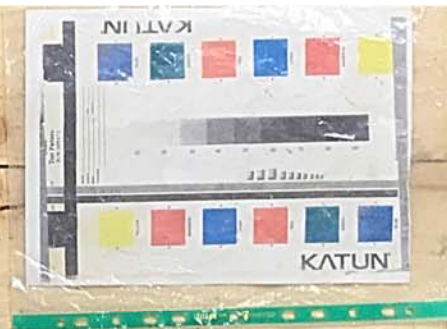


CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH3 10.5-13.5mbgl



10.5

12.0

12.0

13.5

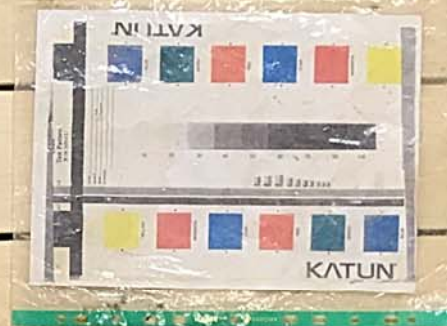


CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH3 13.5-16.5mbgl



13.5

15.0

15.0

16.5

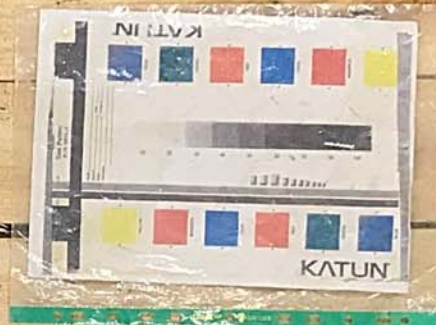


CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH3 20.0-22.5mbgl



20.0

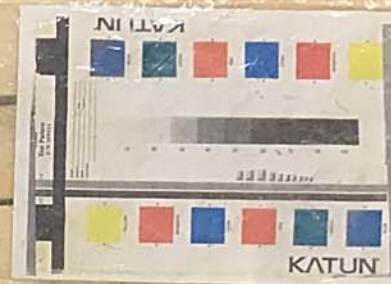
21.0

21.0

22.5



CCG REF: CCG-C-18-10614
SITE: THE CHRISTIE,
MANCHESTER
CLIENT: INTERSERVE
BH3 22.5-25.0mbgl



22.5

24.0

24.0

25.0

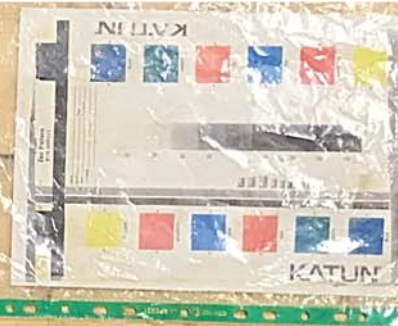


CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH4 5.0-8.0mbgl



5.0

6.5

6.5

8.0



CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH4 8.0-11.0mbgl



8.0

9.5

9.5

11.0

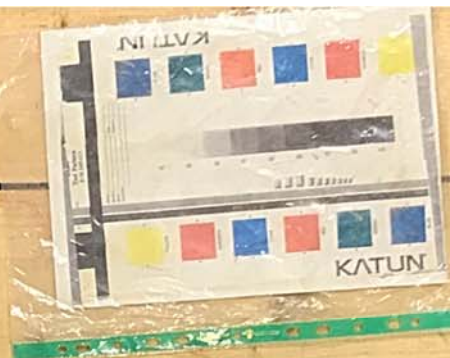


CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH4 11.0-14.0mbgl



11.0

12.5

12.5

14.0



CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH4 14.0-17.0mbgl



14.0

15.5

15.5

17.0



CCG REF: CCG-C-18-10614

SITE: THE CHRISTIE,
MANCHESTER

CLIENT: INTERSERVE

BH4 17.0-20.0mbgl



17.0

18.5

18.5

20.0





APPENDIX G

SOIL & ROCK ENGINEERING TEST RESULTS

Units 1 & 2
Deltic Place
Deltic Way
Knowsley Industrial Estate
Liverpool
L33 7BU

Telephone: (0151) 545 2750
Fax: (0151) 548 7892
Email: enquiries@ccgeotechnical.com
www.ccgeotechnical.com



LABORATORY REPORT

CONTRACT NUMBER: CCG-C-18-10614

CONTRACT TITLE: THE CHRISTIE, MANCHESTER

CLIENT: INTERSERVE

DATE RECEIVED: 22/01/19
DATE COMMENCED: 22/01/19
DATE COMPLETED: 12/04/19
REPORT DATE: 12/04/19

Test Description	Qty
Determination of Moisture Content BS 1377-2:1990 (a)	8
Particle Size Distribution BS 1377-2:1990 (a)	4
Sedimentation by Pipette BS 1377-2:1990 (#)	4
Determination of Liquid & Plastic Limits BS 1377-2:1990 (a)	8
Uniaxial Compressive Strength ISRM Vol 16 No 2, pp 135-140 (2007) (s)	3
Point Load test ISRM 1985: Suggested Method	24
Consolidated undrained triaxial compression test BS 1377-8:1990 (s)	1
Deformability in uniaxial compression ISRM 1985: Suggested Method	3

Notes: Observations and interpretations are not accredited by UKAS

denotes non-accredited test

a denotes UKAS accredited test

s denotes test undertaken by approved subcontractor

This report is issued in accordance with the requirements of the United Kingdom Accreditation Services and EN ISO/IEC 17025:2005. The results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories: Chris Bolan (Managing Director) – Daniel Kerfoot (Laboratory Manager)

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425m m (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH01	BD	1.50	1.50	19	-	-	-	28	13	15	67	CL	Y	Brown clayey silty gravelly fine to coarse grained SAND. Gravel is fine to medium subangular to subrounded sandstone. (BS1377Pt2:3.2,4.4,5.9.2,9.4)

SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
CLIENT: INTERSERVE

DATE: 11.02.19

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



10614 RES BH01.xls

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425m m (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH02	BD	2.50	2.50	29	-	-	-	-	-	-	97	NP	Y	Brown silty fine to medium grained SAND. (BS1377Pt2:3.2,4.4,5,9.2,9.4)

SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
 CLIENT: INTERSERVE

DATE: 11.02.19

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



10614 RES BH02.xls

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH03	BD	2.50	2.50	11	-	-	-	-	-	-	97	NP	Y	Brown silty fine to medium grained SAND. (BS1377Pt2:3.2,4.4,5)
BH03	BD	3.50	3.50	34	-	-	-	-	-	-	99	NP	Y	Brown silty slightly clayey fine to medium grained SAND. (BS1377Pt2:3.2,4.4,5,9.2,9.4)

SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
 CLIENT: INTERSERVE

DATE: 11.02.19

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



10614 RES BH03.xls

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
BH04	U100	2.00	2.45	27	-	-	-	51	20	31	91	CH	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular to subrounded sandstone. (BS1377Pt2:3,2,4,4,5,9,2,9,4)

SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
CLIENT: INTERSERVE

DATE: 11.02.19

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



10614 RES BH04.xls

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
TP02	BD	2.00	2.00	12	-	-	-	28	14	14	93	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)
TP03	BD	2.00	2.00	34	-	-	-	29	14	15	95	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)

SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
 CLIENT: INTERSERVE

DATE: 11.02.19

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



10614 RES TP.xls

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425m m (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
WS01	U80	1.00	1.40	12	-	-	-	20	13	7	95	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subrounded sandstone. (BS1377Pt2:3.2,4.4,5)

SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
CLIENT: INTERSERVE

DATE: 11.02.19

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

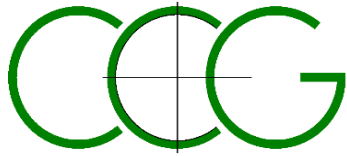
CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



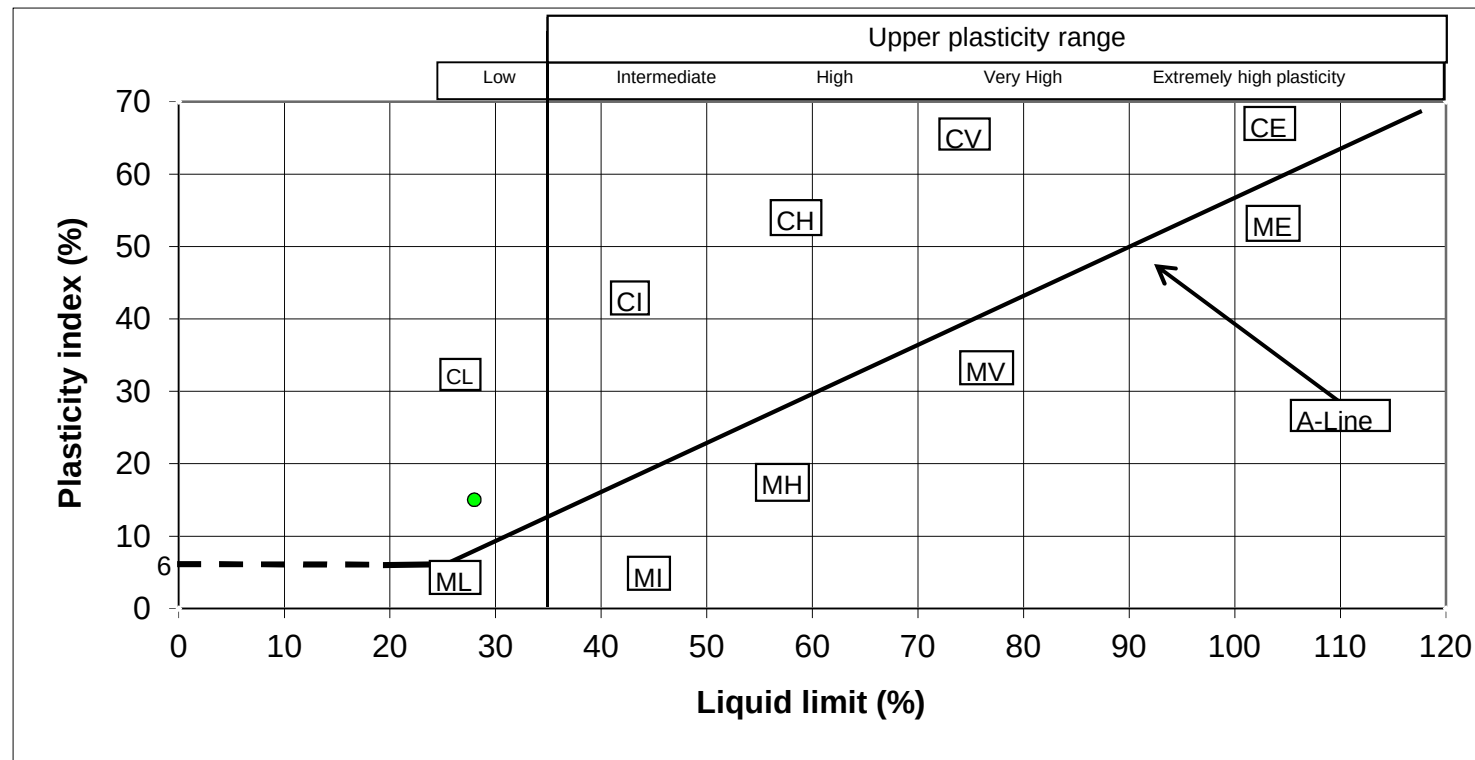
10614 RES WS.xls



ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.

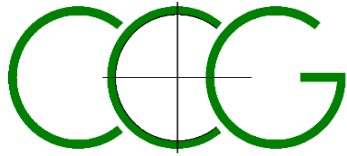


BH	Sample Depth	Liquid limit	Plasticity index
BH01	1.50	28.0	15.0



APPROVED BY	DK
-------------	----

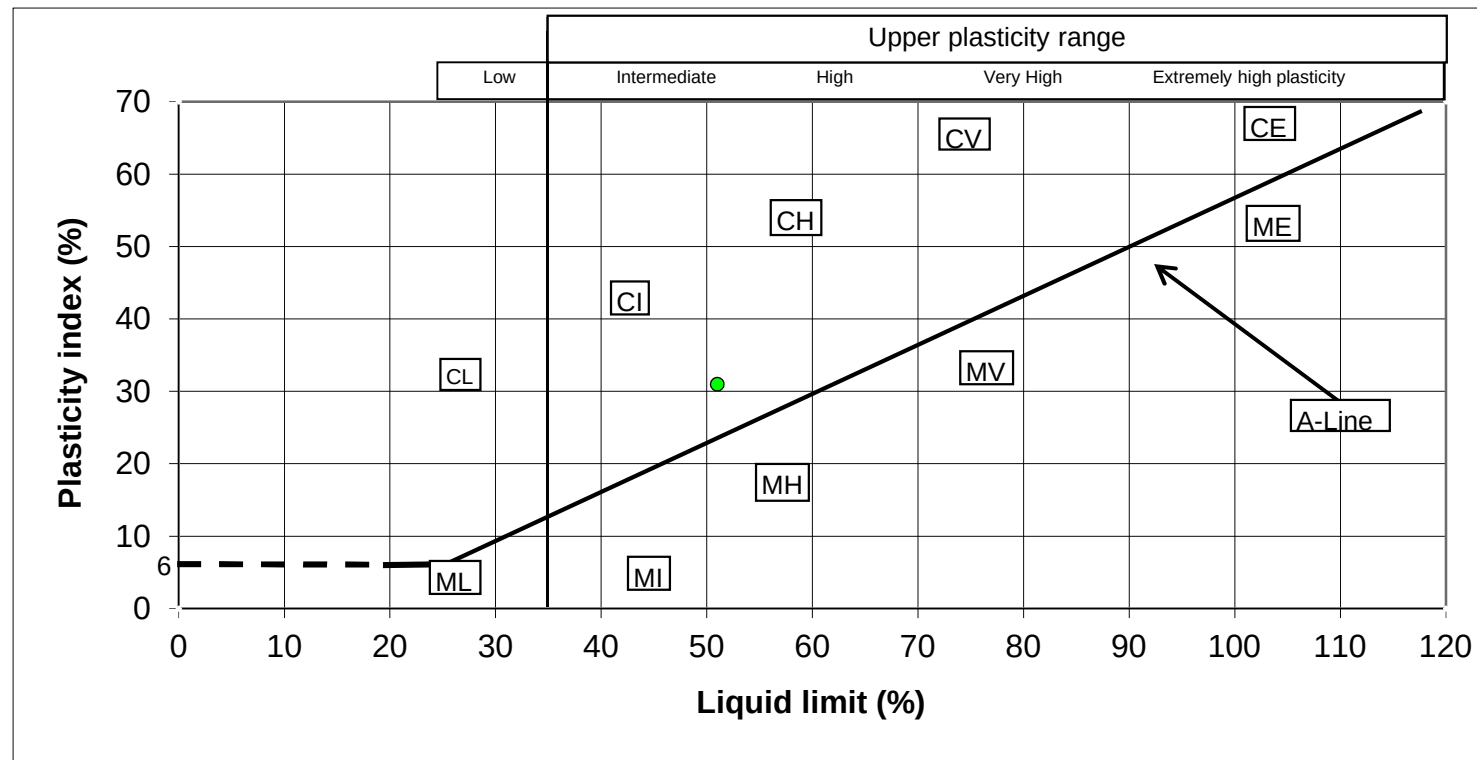
CLIENT: INTERSERVE	SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
--------------------	---



ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.

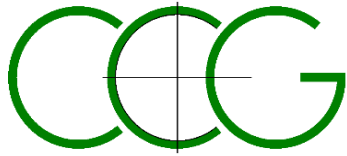


BH	Sample Depth	Liquid limit	Plasticity index
BH04	2.0-2.45	51.0	31.0



APPROVED BY	DK
-------------	----

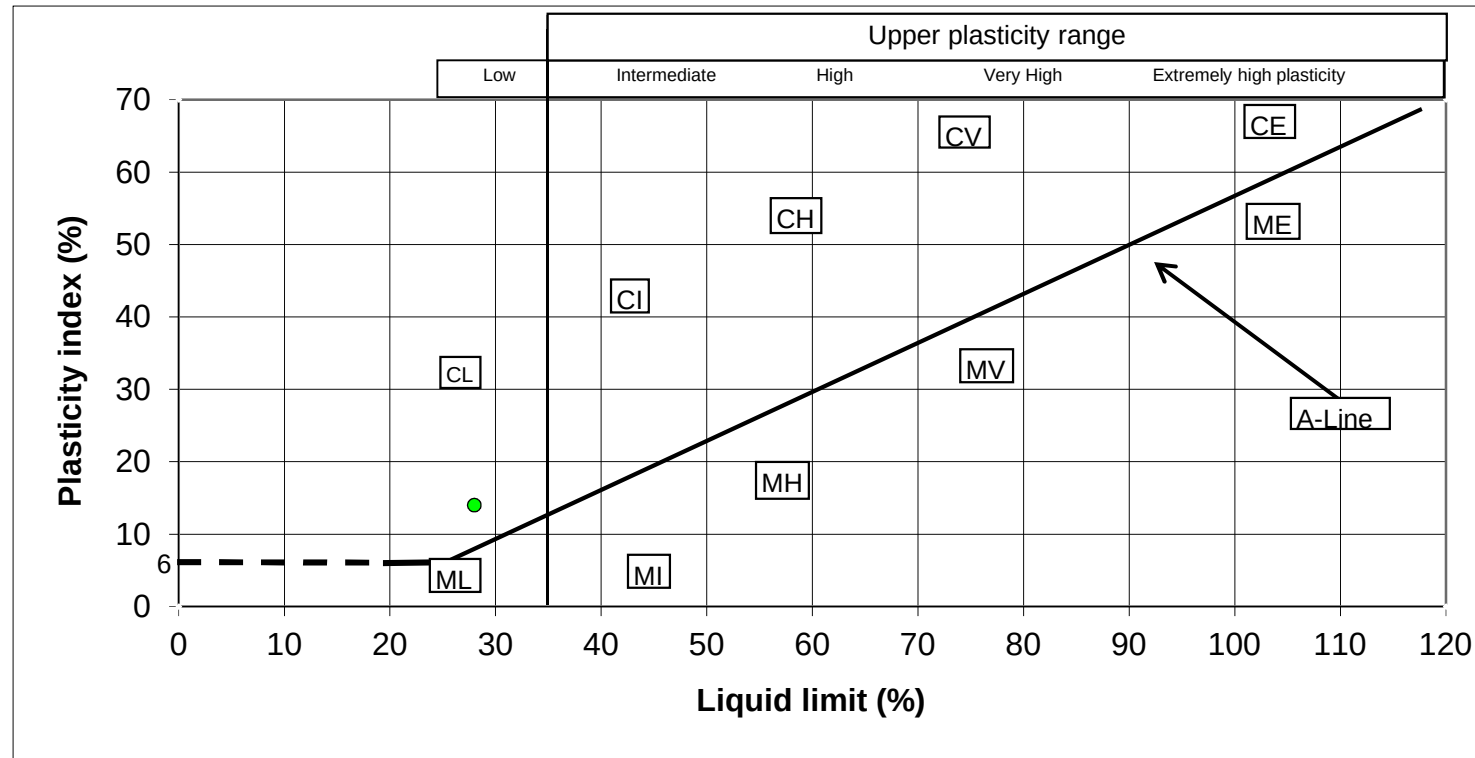
CLIENT: INTERSERVE	SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
--------------------	---



ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.

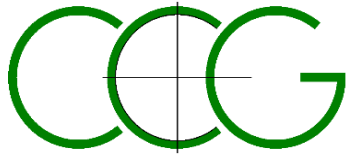


BH	Sample Depth	Liquid limit	Plasticity index
TP02	2.00	28.0	14.0



APPROVED BY	DK
-------------	----

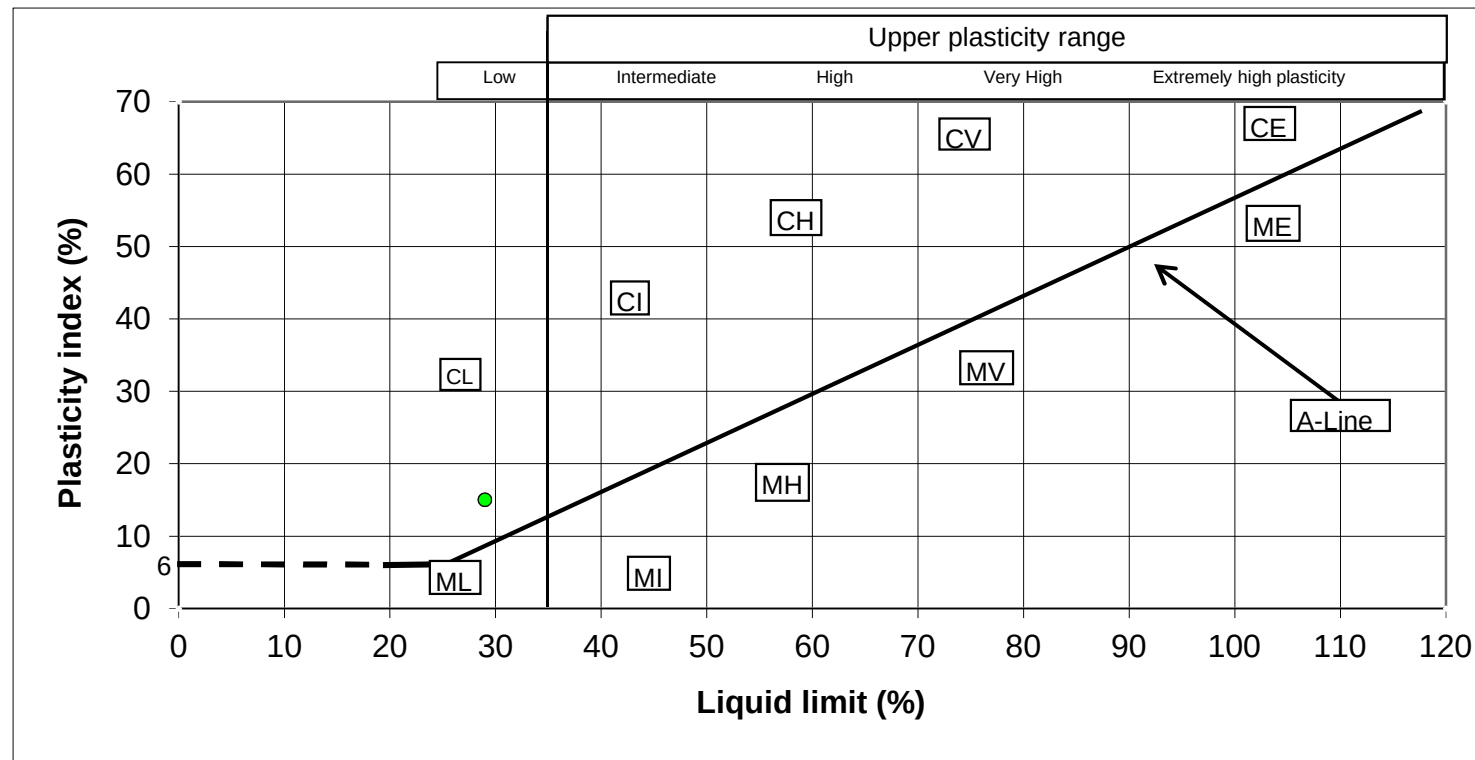
CLIENT: INTERSERVE	SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
--------------------	---



ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.

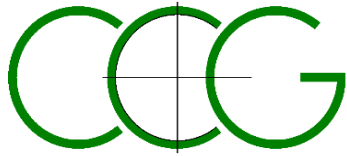


BH	Sample Depth	Liquid limit	Plasticity index
TP03	2.00	29.0	15.0



APPROVED BY	DK
-------------	----

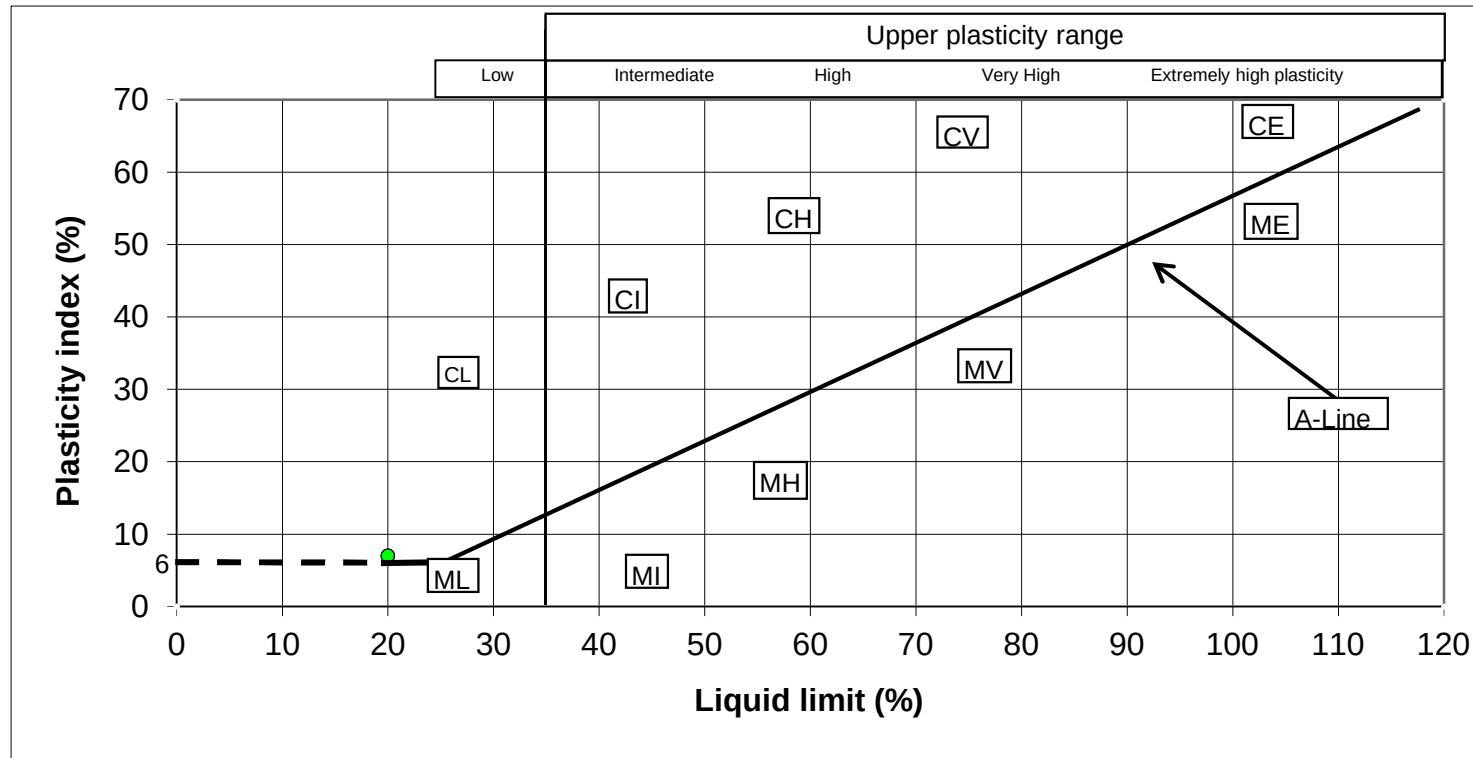
CLIENT: INTERSERVE	SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
--------------------	---



ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
WS01	1.0-2.0	20.0	7.0



APPROVED BY	DK
-------------	----

CLIENT: INTERSERVE	SITE: THE CHRISTIE, MANCHESTER (CCG-C-18-10614)
--------------------	---



CC Geotechnical Ltd
Tel: 0151 545 2750
e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-18-10614

Borehole/Pit No.

BH01

Site Name

THE CHRISTIE, MANCHESTER

Sample No.

3

Specimen Description

Brown clayey silty gravelly fine to coarse grained SAND. Gravel is fine to medium subangular to subrounded sandstone

Depth, m

1.50

Specimen Reference

Specimen Depth

m

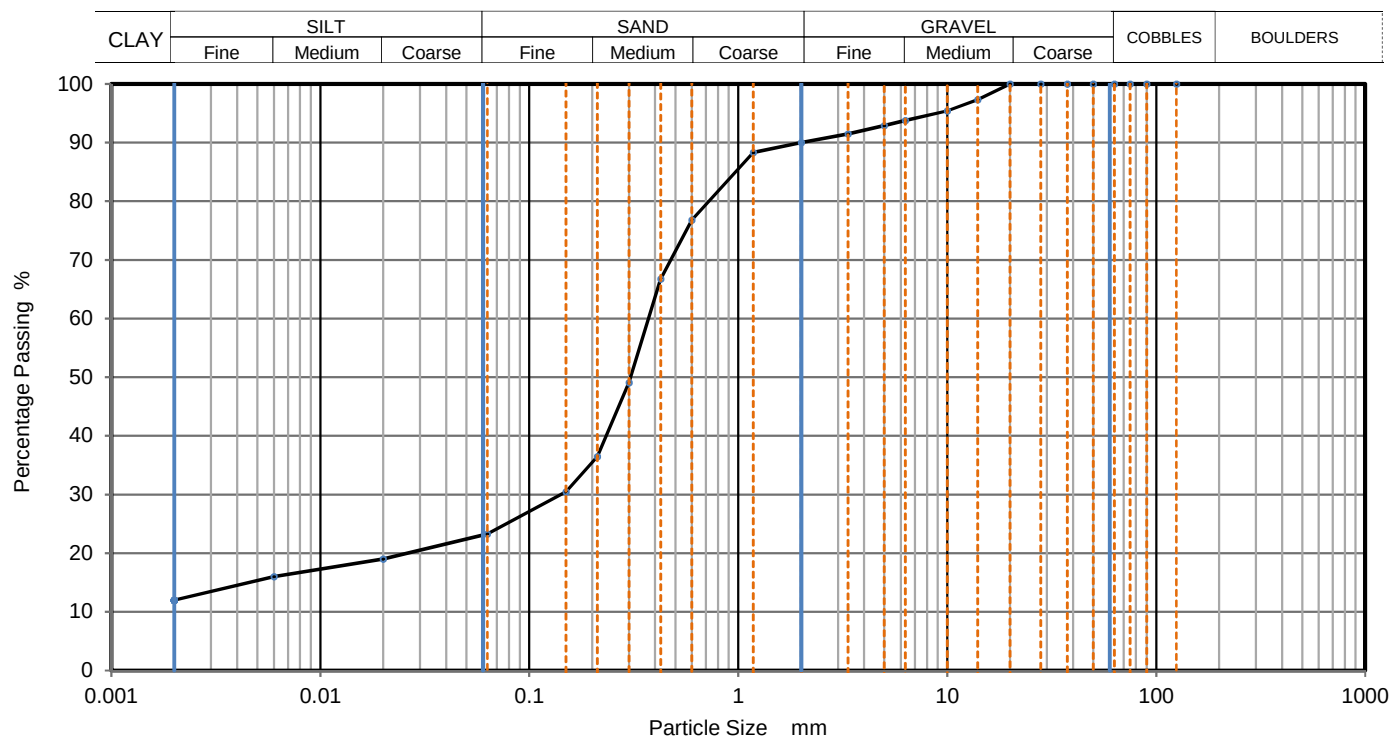
Sample Type

B

Test Method

WET SIEVE & PIPETTE

KeyLAB ID



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	19
90	100	0.0060	16
75	100	0.0020	12
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	95		
6.3	94		
5	93		
3.35	91		
2	90		
1.18	88		
0.6	77		
0.425	67		
0.3	49		
0.212	36		
0.15	30		
0.063	23		

Dry Mass of sample, g

1611

Sample Proportions	% dry mass
Very coarse	0
Gravel	10
Sand	67
Silt	11
Clay	12

Grading Analysis	
D ₁₀₀	mm
D ₆₀	mm
D ₃₀	mm
D ₁₀	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig
MH	DK	DK	11/02/2019 10:29	Sheet



CC Geotechnical Ltd
Tel: 0151 545 2750
e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-18-10614

Borehole/Pit No.

BH02

Site Name

THE CHRISTIE, MANCHESTER

Sample No.

5

Specimen
Description

Brown silty fine to medium grained SAND

Depth, m

2.50

Specimen
Reference

Specimen
Depth

m

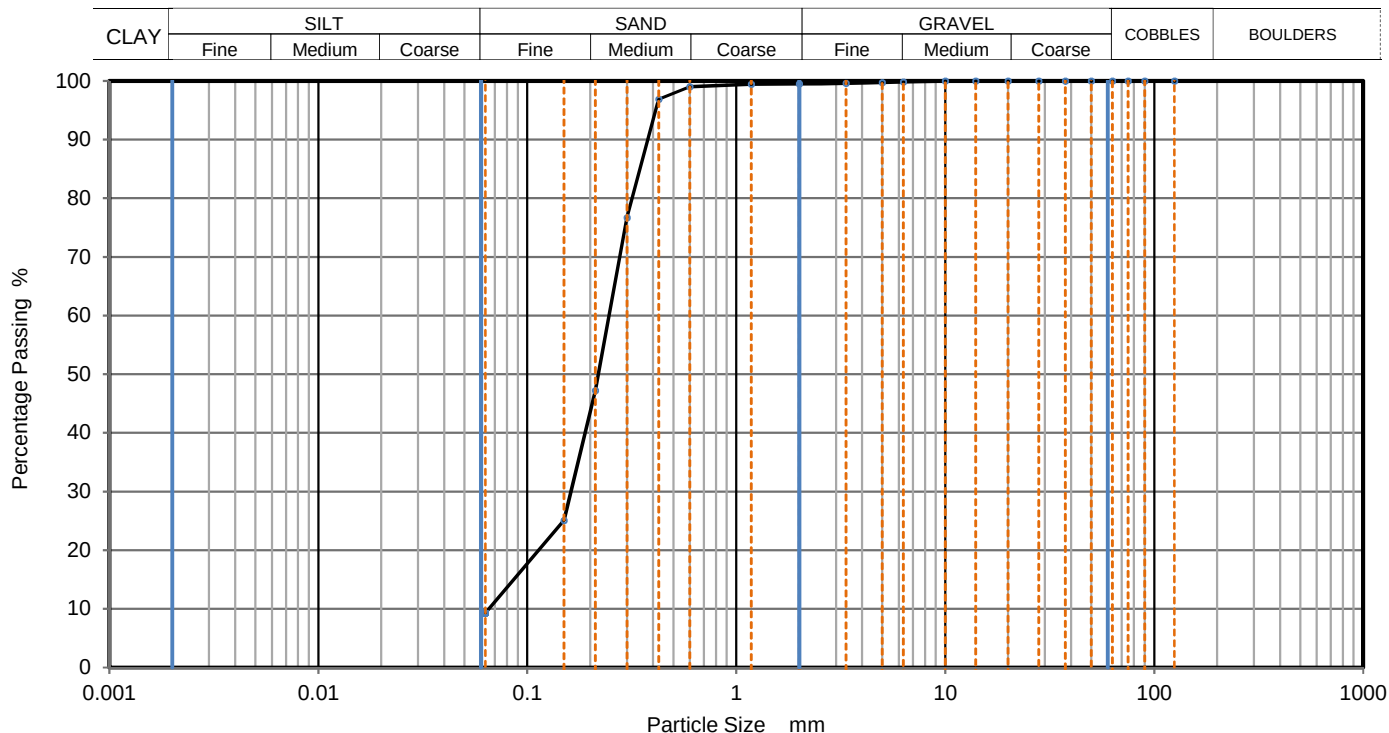
Sample Type

B

Test Method

WET SIEVE

KeyLAB ID



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	99		
0.425	97		
0.3	77		
0.212	47		
0.15	25		
0.063	9		

Dry Mass of sample, g

728

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	91
Fines <0.063mm	9

Grading Analysis	
D ₁₀₀	mm
D ₆₀	mm
D ₃₀	mm
D ₁₀	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig
MH	DK	DK	11/02/2019 10:35	Sheet



CC Geotechnical Ltd
Tel: 0151 545 2750
e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-18-10614

Borehole/Pit No.

BH03

Site Name

THE CHRISTIE, MANCHESTER

Sample No.

7

Specimen
Description

Brown silty slightly clayey fine to medium grained SAND

Depth, m

3.50

Specimen
Reference

Specimen
Depth

m

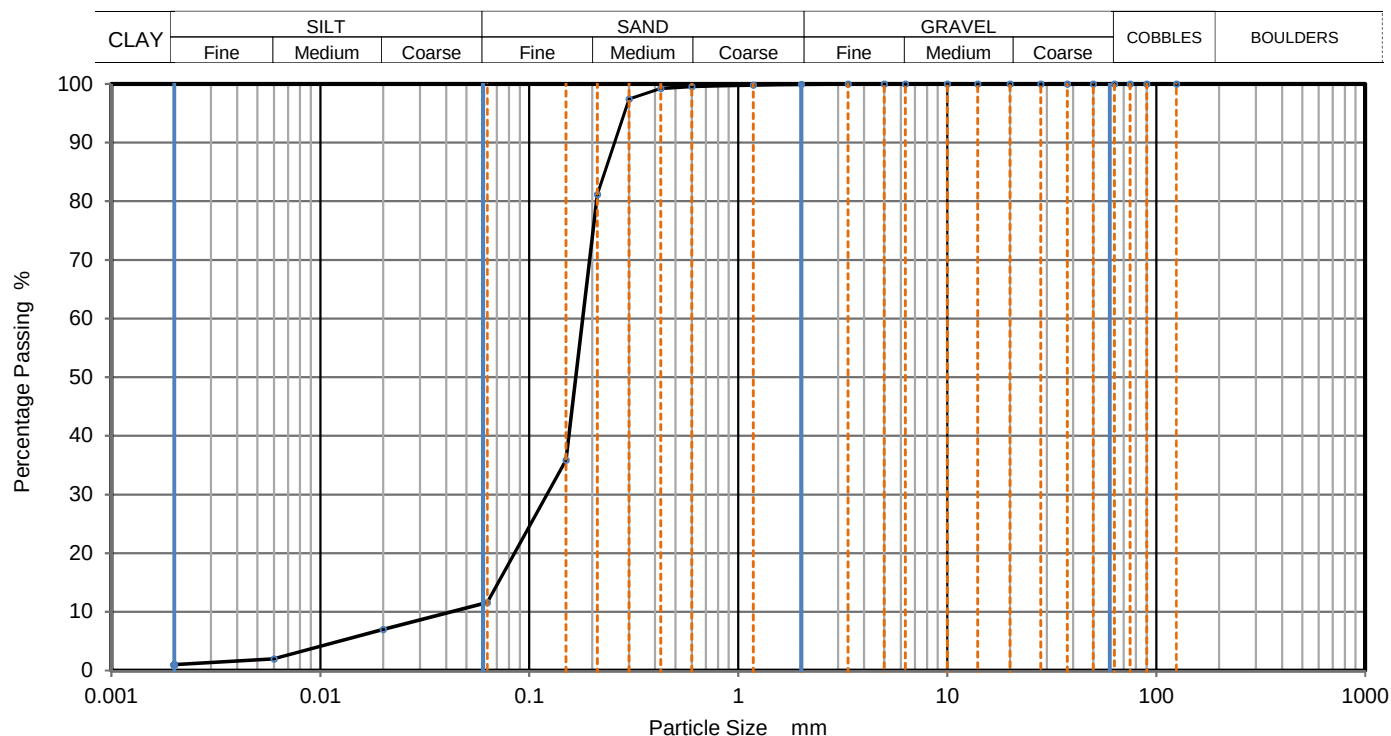
Sample Type

B

Test Method

WET SIEVE & PIPETTE

KeyLAB ID



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	2
75	100	0.0020	1
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	97		
0.212	81		
0.15	36		
0.063	12		

Dry Mass of sample, g

885

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	88
Silt	11
Clay	1

Grading Analysis	
D ₁₀₀	mm
D ₆₀	mm
D ₃₀	mm
D ₁₀	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig
MH	DK	DK	11/02/2019 10:46	Sheet



CC Geotechnical Ltd
Tel: 0151 545 2750
e: lab@ccgeotechnical.com

PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-18-10614

Borehole/Pit No.

BH04

Site Name

THE CHRISTIE, MANCHESTER

Sample No.

4

Specimen
Description

Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse subrounded to subangular sandstone

Depth, m

2.00-2.45

Specimen
Reference

Specimen
Depth

m

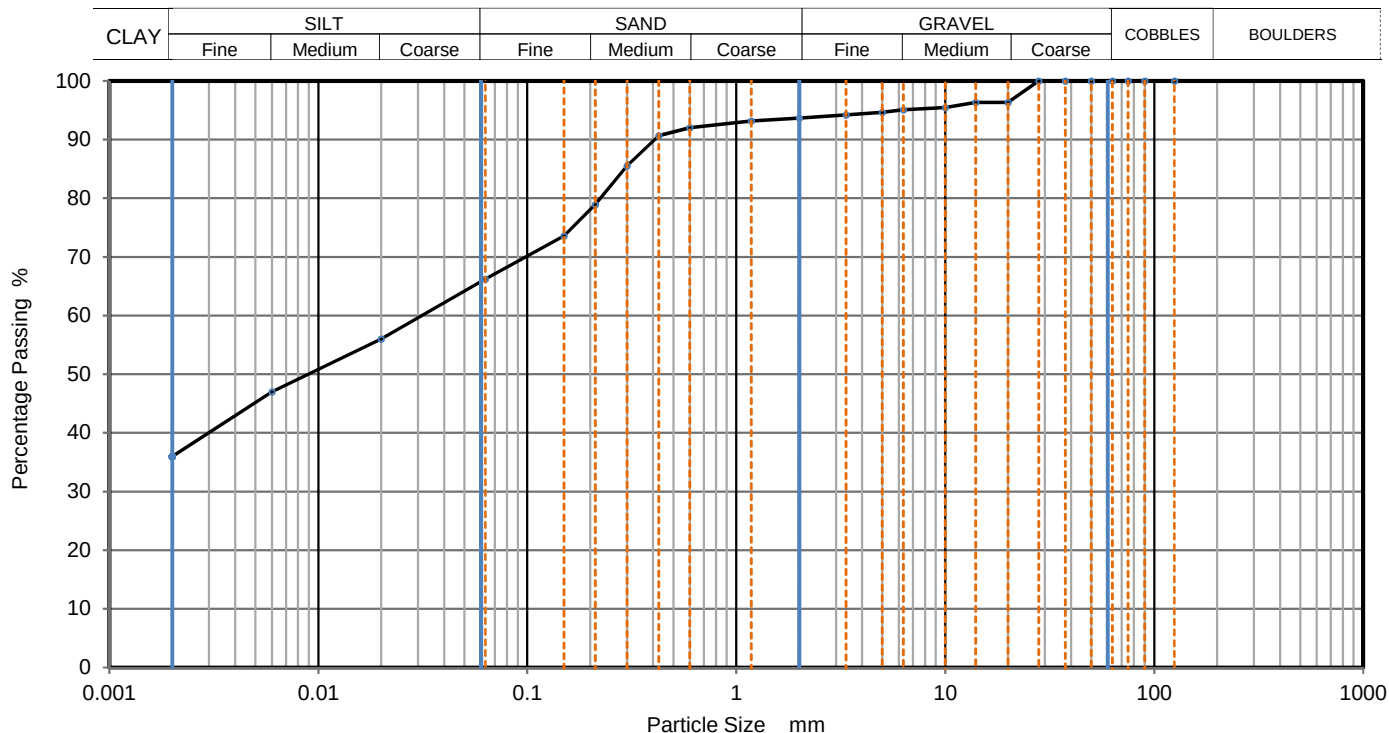
Sample Type

B

Test Method

WET SIEVE & PIPETTE

KeyLAB ID



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	56
90	100	0.0060	47
75	100	0.0020	36
63	100		
50	100		
37.5	100		
28	100		
20	96		
14	96		
10	95		
6.3	95		
5	95		
3.35	94		
2	94		
1.18	93		
0.6	92		
0.425	91		
0.3	86		
0.212	79		
0.15	74		
0.063	66		

Dry Mass of sample, g

1481

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	28
Silt	30
Clay	36

Grading Analysis	
D ₁₀₀	mm
D ₆₀	mm
D ₃₀	mm
D ₁₀	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	Fig
MH	DK	DK	11/02/2019 10:55	Sheet

POINT LOAD TEST RESULTS

ISRM 1985: Suggested Method

PROJECT No.:- CCG-C-18-10614 SITE:- TH E CHRISTIE, MANCHESTER

DATE: 21.02.19

[illegible]

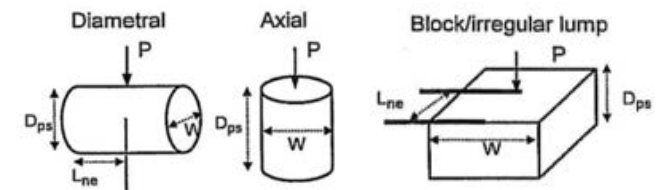
*NOTE- a = axial ; d = diametral ; i = irregular lump or block (see diagrams, right, for details)

p = perpendicular; l = parallel, u = unknown

DIA. KEY- P = load ; Dps = platen separation ;

W = width of shortest dimension perpendicular to load ;

Lne = length from platens to nearest free end



TESTED BY: JE

APPROVED BY: DK

POINT LOAD TEST RESULTS

ISRM 1985: Suggested Method

PROJECT No.:- CCG-C-18-10614 SITE:- THE CHRISTIE, MANCHESTER

DATE: 21.02.19

[illegible]

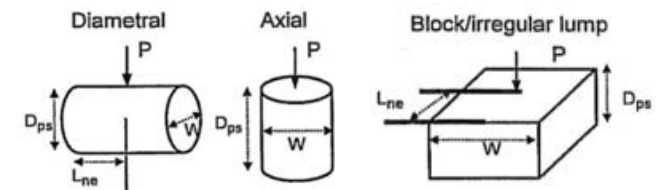
*NOTE- a = axial ; d = diametral ; i = irregular lump or block (see diagrams, right, for details)

p = perpendicular; l = parallel, u = unknown

DIA. KEY- P = load ; Dps = platen separation ;

W = width of shortest dimension perpendicular to load ;

Lne = length from platens to nearest free end



TESTED BY: JE

APPROVED BY: DK

POINT LOAD TEST RESULTS

ISRM 1985: Suggested Method

PROJECT No.:- CCG-C-18-10614 SITE:- THE CHRISTIE, MANCHESTER

DATE: 21.02.19

[illegible]

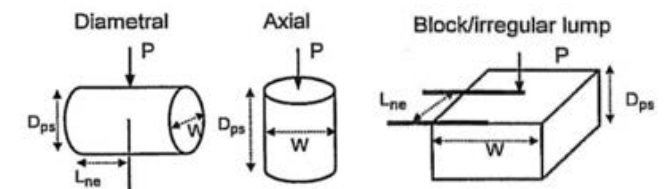
*NOTE- a = axial ; d = diametral ; i = irregular lump or block (see diagrams, right, for details)

p = perpendicular; l = parallel, u = unknown

DIA. KEY- P = load ; Dps = platen seperation ;

W = width of shortest dimension perpendicular to load ;

Lne = length from platens to nearest free end



TESTED BY: JE

APPROVED BY: DK

POINT LOAD TEST RESULTS

ISRM 1985: Suggested Method

PROJECT No.:- CCG-C-18-10614 SITE:- TH E CHRISTIE, MANCHESTER

DATE: 21.02.19

[illegible]

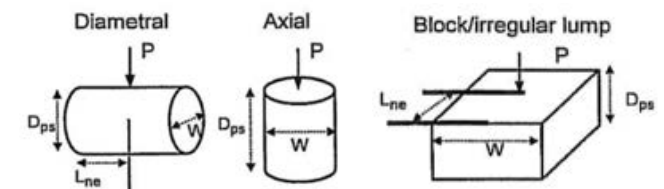
*NOTE- a = axial ; d = diametral ; i = irregular lump or block (see diagrams, right, for details)

p = perpendicular; l = parallel, u = unknown

DIA. KEY- P = load ; Dps = platen seperation ;

W = width of shortest dimension perpendicular to load ;

Lne = length from platens to nearest free end



TESTED BY: JE

APPROVED BY: DK

TEST REPORT



UNIAXIAL COMPRESSIVE STRENGTH

In accordance with ISRM Vol 16 No 2, pp 135-140 (1979)

PROJECT: THE CHRISTIE, MANCHESTER
CLIENT: INTERSERVE
CCG REF: CCG-C-18-10614

Sample ref: BH01 19.80mbgl
Date of coring: 24.01.19
Sampled by: DB/AH
Sample description: SANDSTONE

TEST DATA

Specimen Height (mm): 170
Specimen Diameter (mm): 85
L/D ratio: 2:1
Mode of failure: AXIAL CLEAVAGE
Test duration: 4m 31s

Maximum load at failure (kN): 21.5
Compressive strength (N/mm²): **3.8**

Test date: 25.02.19
Tested by: JE
Report prepared by: DK
Report approved by: DK

Issued by	Soil Engineering Geoservices Limited, Parkside Lane, Dewsbury Road, Leeds LS11 5SX. Tel: 0113 2711111 Fax: 0113 2760472 Email: enquiries@soil-engineering.co.uk	Authorised signatory	P. Rodgers (Technical Manager) K. A. Walker (Laboratory Manager) S. Harper ✓ (Laboratory Production Manager)
-----------	--	----------------------	--

Customer name CC Geotechnical Limited
Address Units 1 & 2 Deltic Place
Knowsley Industrial Estate
Liverpool
Merseyside
L33 7BU

Contract name The Christie, Manchester
Your reference 18/10614

Dates of receipt of samples 30/01/2019

Dates of testing 26/02/2019 to 20/03/2019

Sampling was not performed by the Laboratory of Soil Engineering.

Testing was performed on 6 number of samples received in good condition.

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

Results reported relate only to the samples tested.

Tests marked 'Not UKAS' in this report are not included in the UKAS accreditation schedule for our laboratory. These results will appear in italics on any summary of tests.

Samples will be retained for 28 days from date of issue of this report and then be disposed of, unless we receive written instruction to the contrary

Key to Laboratory Summary Sheets

Common to all summaries

Sample Type	U	Undisturbed sample	D	Small disturbed sample
	P	Piston sample	B	Bulk disturbed sample
	TW	Thin walled sample	BLK	Block sample
	L	Liner sample	C	Rock core
	AMAL	Amalgamated sample		
Test status	Any result in <i>italics</i> indicates a test that is not within the scope of the UKAS accreditation for this laboratory.			

Summary of Laboratory Soil Tests: Index / Classification Tests

Particle density	p	Small pyknometer method	g	Gas jar method
Plastic index	N/P	Non plastic, although liquid limit will have been determined if requested		
Particle size (PSD)	¹	Following value in silt column denotes combined clay and silt fraction		
	p	Following value in clay column denotes sedimentation by pipette, else sedimentation is by hydrometer.		

Summary of Laboratory Soil Tests: Strength and Permeability Tests

Triaxial	UU	Single stage unconsolidated quick undrained	UUM	Multi stage unconsolidated quick undrained
	UU3	Set of 3 unconsolidated quick undrained	CU	Single stage consolidated undrained
	CUM	Multi stage consolidated undrained	CU3	Set of 3 consolidated undrained
	CD	Single stage consolidated drained	CDM	Multi stage consolidated drained
	CD3	Set of 3 consolidated drained		
	Note that single stage tests are reported assuming $f = 0$ for total stress and $c' = 0$ for effective stress			
Consol	Oed	One-dimensional oedometer	Hyd	Hydraulic cell consolidation
	m_v	coefficient of compressibility quoted for p_0 to $p_0 + 100\text{kPa}$, where determined		
Permeability	C	Constant head permeability	T	Triaxial permeability
Shearbox	SSB	Small shear box	LSB	Large shear box
	p	Peak value	r	Residual value
	RS	Ring shear		

Summary of Laboratory Soil Re-Use Test

MCV	s	MCV value at natural or specified moisture content	int	Intercept of calibration line in MCV calibration
-----	---	--	-----	--

Summary of Laboratory Rock Strength Tests

Point Load	Type	D	Diametral	A	Axial
(Combination of)		I	Irregular lump	B	Block
		L	Test performed parallel to planes of weakness		
		P	Test performed perpendicular to planes of weakness		
		X	Invalid failure of point load (not broken between points of load application)		

Summary of Laboratory Rock Materials Tests

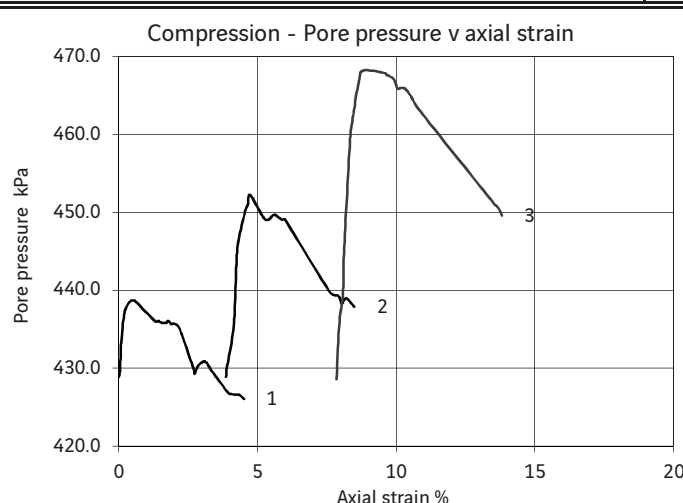
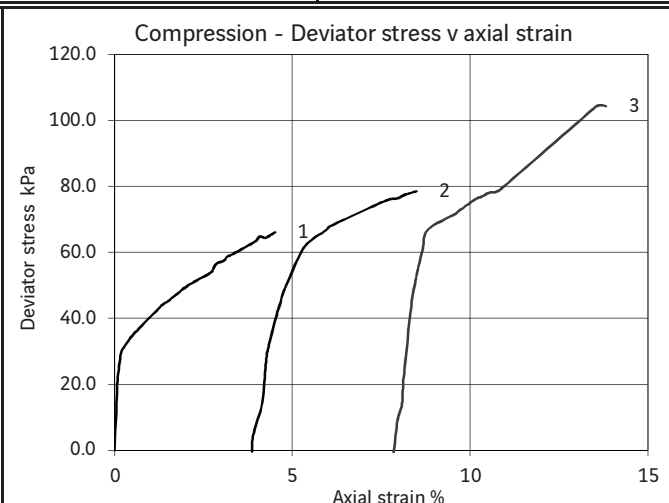
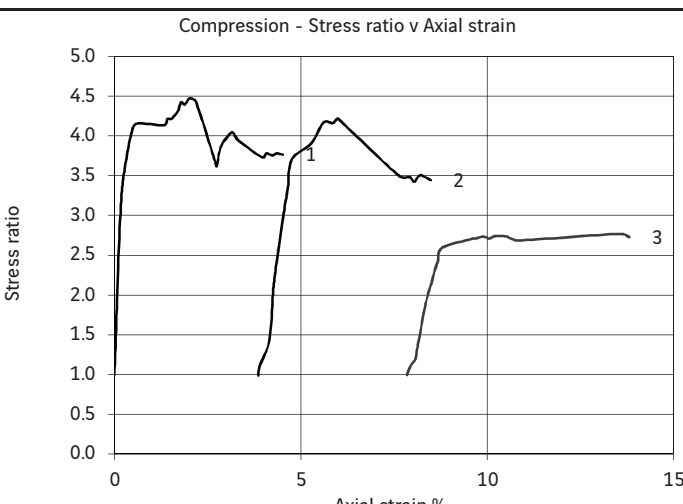
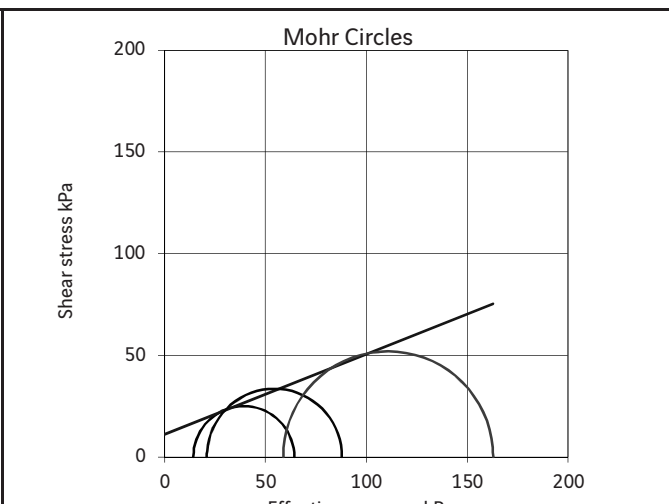
Ten% fines	w	Soaked test	d	Dry test
------------	---	-------------	---	----------

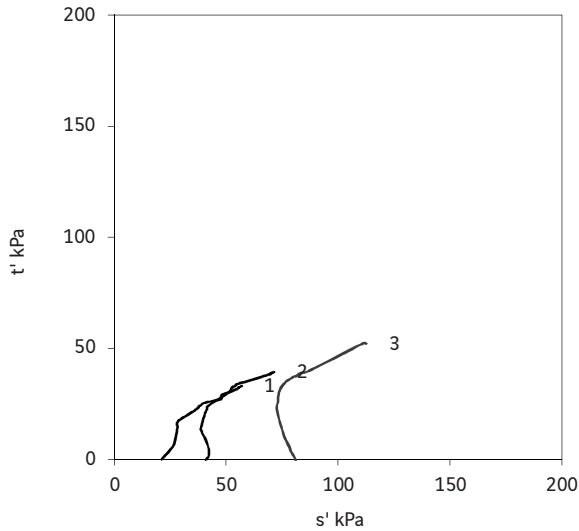
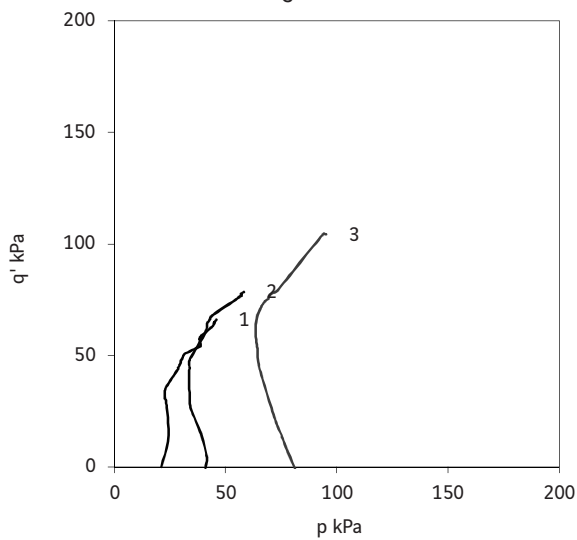
Point Load Index Result

Point Load	Type	D	Diametral	A	Axial
(Combination of)		I	Irregular lump	B	Block
		L	Parallel to planes of weakness	P	Perpendicular to planes of weakness
		X	Invalid failure of point load (not broken between points of load application)		
Dimensions		W	Diameter of core or average smallest width perpendicular to axis of loading in a block or irregular lump		
		D	Distance between platens when just in contact with specimen		
		D'	Distance between platens at point of failure		
		De	Equivalent core diameter	Is	P/De^2
		Is(50)	$F \times Is$	F	$(De/50)^{0.45}$
		Is(50) point load strength index corrected for a diametral test of core diameter 50mm			
		For Axial/Lump tests $De^2 = (4/\pi) \times (W \times D')$		For Diametral tests $De^2 = D \times D'$	

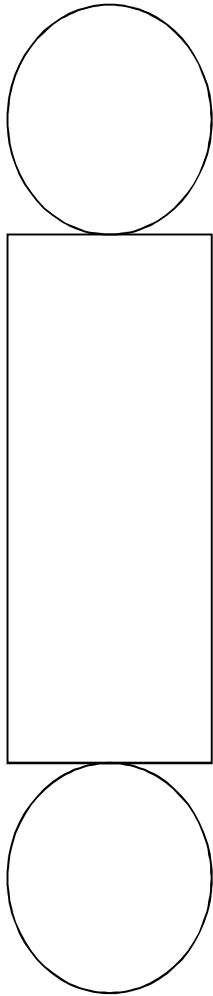
Important note: summary sheets are provided for convenience and in no way replace individual test result sheets which shall, without exception, be regarded as the definitive result.

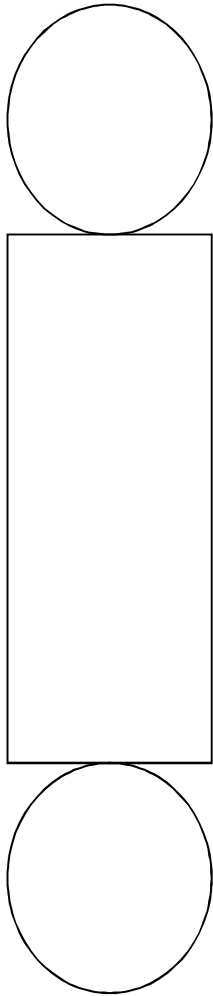
Project Name	The Christie, Manchester		Consolidated Undrained Triaxial Compression With Pore Water Pressure Measurement In-House Method based on K H Head: Manual of Soils Testing, Vol 3	Hole ID	BH04
Project No.	LT1792			Sample Depth	2.00m
Engineer	CCG			Sample Number	
Employer	CC Geotechnical Ltd			Sample Type	U
Description	Reddish brown slightly gravelly CLAY.			Specimen Depth	2.00m
				Specimen Number	1
SPECIMEN INITIAL DIMENSIONS					
Test number		1	2	3	
Specimen diameter	mm	103.97	106.01	108.12	
Specimen length	mm	171.63	164.94	158.15	
Density	Mg/m ³	2.11	2.15	2.16	
Moisture content	%	19	21	21	
Dry density	Mg/m ³	1.78	1.78	1.79	
SATURATION STAGE					
Initial pore water pressure	kPa	0.6			
Saturated pore water pressure	kPa	435.6			
Final cell pressure	kPa	450			
B value		0.98			
CONSOLIDATION STAGE					
Cell pressure	kPa	450	470	510	
Back pressure	kPa	430	430	430	
Effective cell pressure	kPa	20	40	80	
Initial pore water pressure	kPa	0	438.4	463.8	
Final pore water pressure	kPa	428.4	428.2	428.6	
Pore pressure dissipation	%	99.6	121.4	104.1	
c _{vi}	m ² /year	18.12	0.94	1.15	
m _{vi}	m ² /MN	0.00	0.41	0.32	
SPECIMEN AFTER CONSOLIDATION					
Density	Mg/m ³	2.15	2.16	2.17	
Moisture content	%	21	21	20	
Dry density	Mg/m ³	1.78	1.79	1.81	
Remarks:	Specimen orientation Vertical Specimen condition for test Undisturbed Saturation with 50kPa increments with a differential pressure of 10kPa Drainage from both ends				
Approved by:	Leeds Laboratory		 Part of the Bachy Soletanche Group		
Steve Harper					
Revision No.		2.03	Issue Date		21/11/2012

Project Name		The Christie, Manchester		Consolidated Undrained Triaxial Compression With Pore Water Pressure Measurement In-House Method based on K H Head: Manual of Soils Testing, Vol 3		Hole ID BH04					
Project No.		LT1792				Sample Depth 2.00m					
Engineer		CCG				Sample Number					
Employer		CC Geotechnical Ltd				Sample Type U					
Description						Reddish brown slightly gravelly CLAY.		Specimen Depth 2.00m			
COMPRESSION STAGE											
Test number						1		2		3	
Cell pressure				kPa		450		470		510	
Initial pore water pressure				kPa		429		429		429	
Initial effective pressure				kPa		20		40		80	
Failure conditions at						Maximum stress ratio					
Axial strain at failure				%		2.0		6.0		13.5	
Maximum deviator stress				$\sigma_1 - \sigma_3$ kPa		50		67		104	
Pore water pressure at failure				σ kPa		436		449		451	
Effective major principal stress				σ_1' kPa		63.96		88.21		162.87	
Effective minor principal stress				σ_3' kPa		14.30		20.90		58.80	
Effective principal stress ratio						4.47		4.22		2.77	
Membrane correction				kPa		0.20		0.52		0.99	
Filter drain correction not applicable				kPa		0.0		0.0		0.0	
Pore pressure coefficient						0.15		0.31		0.22	
SHEAR STRENGTH PARAMETERS						c' 11 kPa		ϕ' 21.5 °			
Compression - Pore pressure v axial strain 						Compression - Deviator stress v axial strain 					
Compression - Stress ratio v Axial strain 						Mohr Circles 					
Approved by:		Leeds Laboratory				 SOIL engineering Part of the Bachy Soletanche Group					
Steve Harper											
Revision No.		2.03		Issue Date		21/11/2012		Print date 22/03/2019			

Project Name	The Christie, Manchester		Consolidated Undrained Triaxial Compression With Pore Water Pressure Measurement In-House Method based on K H Head: Manual of Soils Testing, Vol 3		Hole ID	BH04
Project No.	LT1792				Sample Depth	2.00m
Engineer	CCG				Sample Number	
Employer	CC Geotechnical Ltd				Sample Type	U
Description	Reddish brown slightly gravelly CLAY.				Specimen Depth	2.00m
					Specimen Number	1
SPECIMEN AFTER TEST						
Test number			1			
Mode of failure			Compound			
						
Final moisture content	%	21	21	20		
Final bulk density	Mg/m ³	2.15	2.16	2.17		
Final dry density	Mg/m ³	1.78	1.79	1.81		
ADDITIONAL SPECIMEN DETAILS						
Rate of strain	%/hour	0.16	0.25	0.25		
Failure criterion	Maximum stress ratio					
MIT Stress field 			Cambridge Stress field 			
REMARKS						
Approved by:		Leeds Laboratory		 SOIL engineering Part of the Bachy Soletanche Group		
Steve Harper						
Revision No.		2.03	Issue Date	21/11/2012	Print date 22/03/2019	

[illegible]

Project Name The Christie, Manchester		Uniaxial Compressive Strength I.S.R.M. Suggested Methods 2007 for Determination of Uniaxial Compressive Strength Part 1		Hole ID BH1
Project No. LT1792				Sample Depth 9.25m
Engineer CC Geotechnical				Sample Number
Employer CC Geotechnical				Sample Type C
Description Thinly laminated brown SANDSTONE.			Specimen Depth 9.25m	
			Specimen Number 2	
Date and method of sampling		Not supplied		
Storage history and environment		Not recorded		
Sample details				Mean
Length	mm	179.94	179.55	179.7
Diameter (top)	mm	86.15	86.25	86.3
Diameter (middle)	mm	86.57	86.34	Length/diameter ratio 2.1
Diameter (base)	mm	86.40	86.20	
Area	mm ²	5849.4	Failure sketch 	
Mass	g	2233.76		
Test details				
Test duration	min	03:49		
Failure load	kN	54.9		
Stress rate	kN/min	14.4		
U.C.S.	MPa	9.39		
Mode of failure		Shear		
Loading axis relative to anisotropy	72 DEG TO BEDDING			
Machine type used in test	Controls 1300 / Automax 5			
Date of test	26/02/2019			
Additional specimen details				
Moisture content	%	13.2		
Bulk density	kg/m ³	2130		
Dry density	kg/m ³	1880		
Test Remarks Tested on specimen with length to diameter ratio outside 2.5-3.0 recommendation.				
Specimen Remarks				
Approved by:		Leeds Laboratory		 soil engineering Part of the Bachy Soletanche Group
Kevin Walker			Print date 09/04/2019	
Revision No. 2.06		Issue Date 20/11/2012		

Project Name The Christie, Manchester		Uniaxial Compressive Strength I.S.R.M. Suggested Methods 2007 for Determination of Uniaxial Compressive Strength Part 1		Hole ID BH4
Project No. LT1792				Sample Depth 16.40m
Engineer CC Geotechnical				Sample Number
Employer CC Geotechnical				Sample Type C
Description Thinly laminated brown SANDSTONE.			Specimen Depth 16.40m	
			Specimen Number 2	
Date and method of sampling		Not supplied		
Storage history and environment		Not recorded		
Sample details				Mean
Length	mm	240.36	240.06	240.2
Diameter (top)	mm	86.42	86.52	86.3
Diameter (middle)	mm	86.05	85.91	Length/diameter ratio
Diameter (base)	mm	86.54	86.11	
Area	mm ²	5849.4	Failure sketch 	
Mass	g	3092.3		
Test details				
Test duration	min	10:17		
Failure load	kN	76.0		
Stress rate	kN/min	7.4		
U.C.S.	MPa	13		
Mode of failure		Irregular		
Loading axis relative to anisotropy				
Machine type used in test		Controls 1300 / Automax 5		
Date of test		26/02/2019		
Additional specimen details				
Moisture content	%	11.7		
Bulk density	kg/m ³	2200		
Dry density	kg/m ³	1970		
Test Remarks				
Specimen Remarks				
Approved by:		Leeds Laboratory		 SOIL engineering Part of the Bachy Soletanche Group
Kevin Walker			Print date 09/04/2019	
Revision No. 2.06		Issue Date 20/11/2012		

Project Name	The Christie, Manchester		Unconfined Compressive Strength With Youngs Modulus And Poissons Ratio I.S.R.M. Suggested methods 1981		Hole ID	BH1				
Project No.	LT1792				Sample Depth	15.80m				
Engineer	CC Geotechnical				Sample Number					
Employer	CC Geotechnical				Sample Type	C				
Description	Thinly laminated brown SANDSTONE.				Specimen Depth	15.80m				
					Specimen Number	1				
Date and method of sampling	Details not supplied									
Storage history and environment	Details not supplied									
Graph of stress strain curves 					Failure sketch 					
Moisture content	%	16.1	Stress rate	MPa/s	0.02	Tangent modulus	Et 280	GPa	50	% stress
Length	mm	194.51	Test duration	min	07:39	Average modulus	Eave 3.74	GPa	0.9-12	% stress
Diameter	mm	85.37	U.C.S.	MPa	9.89	Secant modulus	Esec 15.3	GPa	0-50	% stress
Mass	g	2367.01	Type of machine	Controls 1300 / Automax 5		Poissons ratio	v 0.247 (Determined using Average modulus)			
Bulk density	kg/m3	2130								
Dry density	kg/m3	1830								
Date	26/02/2019									
Test	Loading axis relative to anisotropy: 70deg to bedding									
remarks	Tested on specimen with length to diameter ratio outside 2.5-3.0 recommendation.									
Specimen										
remarks										
Approved by:	Leeds Laboratory					 Part of the Bachy Soletanche Group				
Ian Linton										
Revision No.			2.06		Issue Date		20/11/2012			
					Print date		09/04/2019			

Project Name	The Christie, Manchester			Unconfined Compressive Strength With Youngs Modulus And Poissons Ratio I.S.R.M. Suggested methods 1981	Hole ID	BH3					
Project No.	LT1792				Sample Depth	23.55m					
Engineer	CC Geotechnical				Sample Number						
Employer	CC Geotechnical				Sample Type	C					
Description	Thinly laminated brown SANDSTONE.				Specimen Depth	23.55m					
					Specimen Number	1					
Date and method of sampling	Details not supplied										
Storage history and environment	Details not supplied										
Graph of stress strain curves 					Failure sketch 						
Moisture content	%	14	Stress rate	MPa/s	0.01	Tangent modulus	Et	1.09	GPa	50	% stress
Length	mm	216.65	Test duration	min	01:41	Average modulus	Eave	1.09	GPa	12-93	% stress
Diameter	mm	85.91	U.C.S.	MPa	1.25	Secant modulus	Esec	1.19	GPa	0-50	% stress
Mass	g	2730.40	Type of machine	Controls 1300 / Automax 5		Poissons ratio	v 0.258 (Determined using Average modulus)				
Bulk density	kg/m3	2170									
Dry density	kg/m3	1910									
Date	26/02/2019										
Test remarks	Loading axis relative to anisotropy: 70deg to bedding										
Specimen remarks											
Approved by:	Leeds Laboratory							 Part of the Bachy Soletanche Group			
Ian Linton					Print date	09/04/2019					
Revision No.		2.06		Issue Date		20/11/2012					

Project Name	The Christie, Manchester			Unconfined Compressive Strength With Youngs Modulus And Poissons Ratio I.S.R.M. Suggested methods 1981	Hole ID	BH4					
Project No.	LT1792				Sample Depth	12.40m					
Engineer	CC Geotechnical				Sample Number						
Employer	CC Geotechnical				Sample Type	C					
Description	Thinly laminated brown SANDSTONE.				Specimen Depth	12.40m					
					Specimen Number	1					
Date and method of sampling	Details not supplied										
Storage history and environment	Details not supplied										
Graph of stress strain curves 					Failure sketch 						
Moisture content	%	11.8	Stress rate	MPa/s	0.02	Tangent modulus	Et	4.18	GPa	50	% stress
Length	mm	169.71	Test duration	min	05:50	Average modulus	Eave	0.520	GPa	0-8	% stress
Diameter	mm	83.58	U.C.S.	MPa	5.65	Secant modulus	Esec	2.77	GPa	0-50	% stress
Mass	g	2092.43	Type of machine	Controls 1300 / Automax 5		Poissons ratio	v	0.324	(Determined using Average modulus)		
Bulk density	kg/m3	2250									
Dry density	kg/m3	2010									
Date	26/02/2019										
Test	Loading axis relative to anisotropy: 74deg to bedding										
remarks	Tested on specimen with length to diameter ratio outside 2.5-3.0 recommendation.										
Specimen											
remarks											
Approved by:	Leeds Laboratory										
Ian Linton				Print date 09/04/2019							
Revision No. 2.06			Issue Date 20/11/2012			Part of the Bachy Soletanche Group					



APPENDIX H

CHEMICAL TEST CERTIFICATES



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-21453

Issue: 1

Date of Issue: 29/01/2019

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside
L33 7BA

Quotation No: Q14-00045

Order No: Not Supplied

Customer Reference: CCG-C-18-10614

Date Received: 21/01/2019

Date Approved: 29/01/2019

Details: The Christie Hospital, Manchester

Approved by: 

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 19-21453

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
163214	TP1 0.30	17/01/2019	23/01/2019	Silty loam	
163215	TP1 0.50	17/01/2019	23/01/2019		
163216	TP1 1.00	17/01/2019	23/01/2019	Sandy silty loam	
163217	TP2 0.30	17/01/2019	23/01/2019	Sandy silty loam	
163218	TP2 0.50	17/01/2019	23/01/2019	Sandy silty loam	
163219	TP2 1.00	17/01/2019	23/01/2019		
163220	TP3 0.30	17/01/2019	23/01/2019		
163221	TP3 0.50	17/01/2019	23/01/2019	Sandy silty loam	
163222	TP3 1.00	17/01/2019	23/01/2019	Sandy silty loam	

Results Summary

Report No.: 19-21453

ELAB Reference				163214	163216	163217	163218	163221	163222
Customer Reference									
Sample ID									
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				TP1	TP1	TP2	TP2	TP3	TP3
Sample Depth (m)				0.30	1.00	0.30	0.50	0.50	1.00
Sampling Date				17/01/2019	17/01/2019	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Determinand	Codes	Units	LOD						
Metals									
Antimony	N	mg/kg	2.5	n/t	< 2.5	n/t	3.6	< 2.5	n/t
Arsenic	M	mg/kg	1	n/t	7.7	n/t	37.0	18.5	n/t
Beryllium	U	mg/kg	1	n/t	< 1.0	n/t	1.1	1.1	n/t
Cadmium	M	mg/kg	0.5	n/t	< 0.5	n/t	< 0.5	< 0.5	n/t
Chromium	M	mg/kg	5	n/t	16.0	n/t	18.2	20.2	n/t
Copper	M	mg/kg	5	n/t	25.4	n/t	59.9	44.7	n/t
Lead	M	mg/kg	5	n/t	47.6	n/t	181	185	n/t
Mercury	M	mg/kg	0.5	n/t	< 0.5	n/t	0.7	< 0.5	n/t
Nickel	M	mg/kg	5	n/t	15.0	n/t	19.6	22.5	n/t
Selenium	M	mg/kg	1	n/t	< 1.0	n/t	< 1.0	< 1.0	n/t
Vanadium	M	mg/kg	5	n/t	22.1	n/t	27.1	27.1	n/t
Zinc	M	mg/kg	5	n/t	55.7	n/t	138	81.1	n/t
Anions									
Water Soluble Sulphate	M	g/l	0.02	< 0.02	n/t	< 0.02	n/t	n/t	< 0.02
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	n/t	< 0.8	n/t	< 0.8	< 0.8	n/t
Total Cyanide	M	mg/kg	1	n/t	< 1.0	n/t	< 1.0	< 1.0	n/t
Water Soluble Boron	N	mg/kg	0.5	n/t	0.6	n/t	< 0.5	< 0.5	n/t
Miscellaneous									
pH	M	pH units	0.1	7.6	7.9	7.8	7.7	7.9	8.0
Total Organic Carbon	N	%	0.01	n/t	0.74	n/t	1.2	1.6	n/t
Phenols									
Total Phenols	N	mg/kg	6	n/t	< 6	n/t	< 6	< 6	n/t



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary
Report No.: 19-21453

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
163215	0.50	TP1	Brown sandy soil, brick, stones	No asbestos detected	n/t	n/t	n/t	n/t
163219	1.00	TP2	Brown soil, stones, clinker	No asbestos detected	n/t	n/t	n/t	n/t
163220	0.30	TP3	Brown soil, stones, clinker	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 19-21453

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	25/01/2019	110	Colorimetry
pH	M	Air dried sample	28/01/2019	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	25/01/2019	118	ICPMS
Phenols in solids	N	As submitted sample	25/01/2019	121	HPLC
Water soluble anions	M	Air dried sample	25/01/2019	172	Ion Chromatography
Water soluble boron	N	Air dried sample	25/01/2019	202	Colorimetry
Total cyanide	M	As submitted sample	28/01/2019	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	28/01/2019	210	IR
Asbestos identification	U	Air dried sample	28/01/2019	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-21453

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-21472

Issue: 1

Date of Issue: 29/01/2019

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside
L33 7BA

Quotation No: Q14-00045

Order No: Not Supplied

Customer Reference: CCG-C-18-10614

Date Received: 24/01/2019

Date Approved: 29/01/2019

Details: The Christie Hospital, Manchester

Approved by:

John Wilson, Operations

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 19-21472

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
163321	WS1 0.20	17/01/2019	24/01/2019	Sandy silty loam	
163322	WS1 0.50	17/01/2019	24/01/2019		



Results Summary

Report No.: 19-21472

ELAB Reference	163321
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	WS1
Sample Depth (m)	0.20
Sampling Date	17/01/2019

Determinand	Codes	Units	LOD	
Anions				
Water Soluble Sulphate	M	g/l	0.02	0.05
Miscellaneous				
pH	M	pH units	0.1	8.3



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary
Report No.: 19-21472

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
163322	0.50	WS1	Brown sandy soil, stones, concrete,	No asbestos detected	n/t	n/t	n/t	n/t



Method Summary

Report No.: 19-21472

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	28/01/2019	113	Electromeric
Water soluble anions	M	Air dried sample	25/01/2019	172	Ion Chromatography
Asbestos identification	U	Air dried sample	25/01/2019	PMAN	Microscopy

Report Information

Report No.: 19-21472

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-21509

Issue: 2. Replaces Analytical Report number 19-21509; issue no.1

Date of Issue: 30/01/2019

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside
L33 7BA

Quotation No: Q14-00045

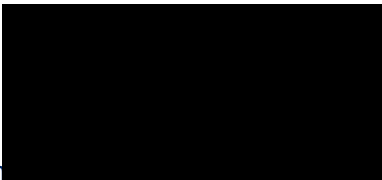
Order No: Not Supplied

Customer Reference: CCG-C-18-10614

Date Received: 28/01/2019

Date Approved: 30/01/2019

Details: The Christie Hospital, Manchester

Approved by: 

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 19-21509

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
163572	BH04 0.50	21/01/2019	28/01/2019		
163573	BH04 1.00	21/01/2019	28/01/2019	Silty loam	
163574	BH04 1.50	21/01/2019	28/01/2019	Silty clayey loam	

Results Summary

Report No.: 19-21509

ELAB Reference	163573	163574
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	BH04	BH04
Sample Depth (m)	1.00	1.50
Sampling Date	21/01/2019	21/01/2019

Determinand	Codes	Units	LOD		
Metals					
Antimony	N	mg/kg	2.5	3.6	n/t
Arsenic	M	mg/kg	1	27.5	n/t
Beryllium	U	mg/kg	1	1.3	n/t
Cadmium	M	mg/kg	0.5	0.9	n/t
Chromium	M	mg/kg	5	49.7	n/t
Copper	M	mg/kg	5	223	n/t
Lead	M	mg/kg	5	224	n/t
Mercury	M	mg/kg	0.5	0.7	n/t
Nickel	M	mg/kg	5	33.5	n/t
Selenium	M	mg/kg	1	< 1.0	n/t
Vanadium	M	mg/kg	5	39.2	n/t
Zinc	M	mg/kg	5	251	n/t
Anions					
Water Soluble Sulphate	M	g/l	0.02	n/t	0.05
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t
Total Cyanide	M	mg/kg	1	< 1.0	n/t
Water Soluble Boron	N	mg/kg	0.5	0.6	n/t
Miscellaneous					
pH	M	pH units	0.1	7.5	7.6
Total Organic Carbon	N	%	0.01	3.1	n/t
Phenols					
Total Phenols	N	mg/kg	6	< 6	n/t



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary
Report No.: 19-21509

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
163572	0.50	BH04	brown sandy soil with stones, clinker and twigs	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 19-21509

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	29/01/2019	110	Colorimetry
pH	M	Air dried sample	29/01/2019	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	29/01/2019	118	ICPMS
Phenols in solids	N	As submitted sample	29/01/2019	121	HPLC
Water soluble anions	M	Air dried sample	29/01/2019	172	Ion Chromatography
Water soluble boron	N	Air dried sample	29/01/2019	202	Colorimetry
Total cyanide	M	As submitted sample	29/01/2019	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	30/01/2019	210	IR
Asbestos identification	U	Air dried sample	29/01/2019	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-21509

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-21557

Issue: 1

Date of Issue: 05/02/2019

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside
L33 7BA

Quotation No: Q14-00045

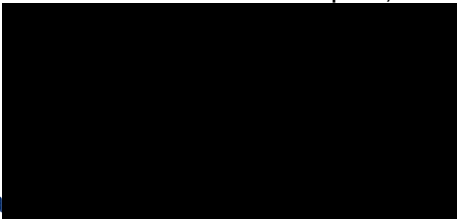
Order No: Not Supplied

Customer Reference: CCG-C-18-10614

Date Received: 30/01/2019

Date Approved: 05/02/2019

Details: The Christie Hospital, Manchester

Approved by: 

Mike Varley, Technical

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 19-21557

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
163810	BH01 0.50	25/01/2019	30/01/2019		
163811	BH01 1.00	25/01/2019	30/01/2019	Sandy silty loam	
163812	BH01 1.50	25/01/2019	30/01/2019	Sandy loam	

Results Summary

Report No.: 19-21557

ELAB Reference	163811	163812
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	BH01	BH01
Sample Depth (m)	1.00	1.50
Sampling Date	25/01/2019	25/01/2019

Determinand	Codes	Units	LOD		
Metals					
Antimony	N	mg/kg	2.5	4.7	n/t
Arsenic	M	mg/kg	1	19.0	n/t
Beryllium	U	mg/kg	1	< 1.0	n/t
Cadmium	M	mg/kg	0.5	1.0	n/t
Chromium	M	mg/kg	5	23.2	n/t
Copper	M	mg/kg	5	50.7	n/t
Lead	M	mg/kg	5	160	n/t
Mercury	M	mg/kg	0.5	0.8	n/t
Nickel	M	mg/kg	5	19.5	n/t
Selenium	M	mg/kg	1	< 1.0	n/t
Vanadium	M	mg/kg	5	28.4	n/t
Zinc	M	mg/kg	5	153	n/t
Anions					
Water Soluble Sulphate	M	g/l	0.02	n/t	0.06
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t
Total Cyanide	M	mg/kg	1	< 1.0	n/t
Water Soluble Boron	N	mg/kg	0.5	< 0.5	n/t
Miscellaneous					
pH	M	pH units	0.1	9.3	8.4
Total Organic Carbon	N	%	0.01	1.9	n/t
Phenols					
Total Phenols	N	mg/kg	6	< 6	n/t



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 19-21557

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
163810	0.50	BH01	Brown sandy soil,stones	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 19-21557

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	01/02/2019	110	Colorimetry
pH	M	Air dried sample	04/02/2019	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	01/02/2019	118	ICPMS
Phenols in solids	N	As submitted sample	31/01/2019	121	HPLC
Water soluble anions	M	Air dried sample	01/02/2019	172	Ion Chromatography
Water soluble boron	N	Air dried sample	01/02/2019	202	Colorimetry
Total cyanide	M	As submitted sample	01/02/2019	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	04/02/2019	210	IR
Asbestos identification	U	Air dried sample	01/02/2019	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-21557

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-21558

Issue: 1

Date of Issue: 05/02/2019

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside
L33 7BA

Quotation No: Q14-00045

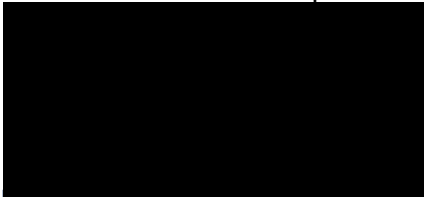
Order No: Not Supplied

Customer Reference: CCG-C-18-10614

Date Received: 30/01/2019

Date Approved: 05/02/2019

Details: The Christie Hospital, Manchester

Approved by: 

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 19-21558

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
163813	BH02 0.50	25/01/2019	30/01/2019		
163814	BH02 1.00	25/01/2019	30/01/2019	Silty loam	
163815	BH02 1.50	25/01/2019	30/01/2019	Sandy silty loam	

Results Summary

Report No.: 19-21558

ELAB Reference	163814	163815
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	BH02	BH02
Sample Depth (m)	1.00	1.50
Sampling Date	25/01/2019	25/01/2019

Determinand	Codes	Units	LOD		
Metals					
Antimony	N	mg/kg	2.5	6.3	n/t
Arsenic	M	mg/kg	1	16.2	n/t
Beryllium	U	mg/kg	1	1.3	n/t
Cadmium	M	mg/kg	0.5	< 0.5	n/t
Chromium	M	mg/kg	5	29.3	n/t
Copper	M	mg/kg	5	56.0	n/t
Lead	M	mg/kg	5	201	n/t
Mercury	M	mg/kg	0.5	0.5	n/t
Nickel	M	mg/kg	5	19.9	n/t
Selenium	M	mg/kg	1	< 1.0	n/t
Vanadium	M	mg/kg	5	34.4	n/t
Zinc	M	mg/kg	5	89.3	n/t
Anions					
Water Soluble Sulphate	M	g/l	0.02	n/t	< 0.02
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t
Total Cyanide	M	mg/kg	1	< 1.0	n/t
Water Soluble Boron	N	mg/kg	0.5	< 0.5	n/t
Miscellaneous					
pH	M	pH units	0.1	7.8	7.5
Total Organic Carbon	N	%	0.01	2.5	n/t
Phenols					
Total Phenols	N	mg/kg	6	< 6	n/t



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary
Report No.: 19-21558

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
163813	0.50	BH02	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 19-21558

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	01/02/2019	110	Colorimetry
pH	M	Air dried sample	04/02/2019	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	01/02/2019	118	ICPMS
Phenols in solids	N	As submitted sample	31/01/2019	121	HPLC
Water soluble anions	M	Air dried sample	01/02/2019	172	Ion Chromatography
Water soluble boron	N	Air dried sample	01/02/2019	202	Colorimetry
Total cyanide	M	As submitted sample	01/02/2019	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	04/02/2019	210	IR
Asbestos identification	U	Air dried sample	01/02/2019	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-21558

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 19-21559

Issue: 1

Date of Issue: 05/02/2019

Contact: Daniel O'Regan

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside
L33 7BA

Quotation No: Q14-00045

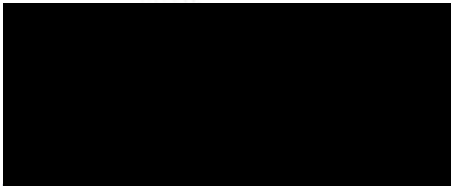
Order No: Not Supplied

Customer Reference: CCG-C-18-10614

Date Received: 30/01/2019

Date Approved: 05/02/2019

Details: The Christie Hospital, Manchester

Approved by: 

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 19-21559

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
163816	BH03 0.50	25/01/2019	30/01/2019		
163817	BH03 1.00	25/01/2019	30/01/2019	Silty loam	
163818	BH03 1.50	25/01/2019	30/01/2019		
163819	BH03 2.50	25/01/2019	30/01/2019	Sandy loam	

Results Summary

Report No.: 19-21559

ELAB Reference	163817	163819
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	BH03	BH03
Sample Depth (m)	1.00	2.50
Sampling Date	25/01/2019	25/01/2019

Determinand	Codes	Units	LOD		
Metals					
Antimony	N	mg/kg	2.5	< 2.5	n/t
Arsenic	M	mg/kg	1	16.9	n/t
Beryllium	U	mg/kg	1	< 1.0	n/t
Cadmium	M	mg/kg	0.5	0.9	n/t
Chromium	M	mg/kg	5	26.7	n/t
Copper	M	mg/kg	5	65.0	n/t
Lead	M	mg/kg	5	200	n/t
Mercury	M	mg/kg	0.5	< 0.5	n/t
Nickel	M	mg/kg	5	22.5	n/t
Selenium	M	mg/kg	1	< 1.0	n/t
Vanadium	M	mg/kg	5	29.3	n/t
Zinc	M	mg/kg	5	195	n/t
Anions					
Water Soluble Sulphate	M	g/l	0.02	n/t	0.14
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	n/t
Total Cyanide	M	mg/kg	1	< 1.0	n/t
Water Soluble Boron	N	mg/kg	0.5	0.7	n/t
Miscellaneous					
pH	M	pH units	0.1	8.6	8.0
Total Organic Carbon	N	%	0.01	2.3	n/t
Phenols					
Total Phenols	N	mg/kg	6	< 6	n/t



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary
Report No.: 19-21559

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #)
in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
163816	0.50	BH03	Brown sandy soil,Stones,brick	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 19-21559

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	01/02/2019	110	Colorimetry
pH	M	Air dried sample	04/02/2019	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	01/02/2019	118	ICPMS
Phenols in solids	N	As submitted sample	31/01/2019	121	HPLC
Water soluble anions	M	Air dried sample	01/02/2019	172	Ion Chromatography
Water soluble boron	N	Air dried sample	01/02/2019	202	Colorimetry
Total cyanide	M	As submitted sample	01/02/2019	204	Colorimetry
Total organic carbon/Total sulphur	N	Air dried sample	04/02/2019	210	IR
Asbestos identification	U	Air dried sample	01/02/2019	PMAN	Microscopy

Tests marked N are not UKAS accredited

Report Information

Report No.: 19-21559

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



APPENDIX I

GAS / GROUNDWATER MONITORING RESULTS & CALIBRATION CERTIFICATES

GAS AND WATER MONITORING RESULTS

[illegible]

TEST DATE AND CONDITIONS			
Date	20/06/2018		
Atmospheric Pressure	1000	mB	
Ambient Temperature	23.4	°C	
Envionics Serial No.	5089		

**GFM436 Final Inspection & Calibration
Check Certificate**

GAS DATA LTD

Unit 4, Fairfield Court

Seven Stars Estate

Wheler Rd

Coventry

CV3 4LJ

Tel 02476303311

Fax 02476307711



Customer	CC Geotechnical
Certificate Number	120242
Order Number	319979

Serial Number	12220
Software Version	G436-00.0027/0009

Recalibration DUE Date
20/06/2019

Instrument Checks					
Keyboard	✓		Display Contrast	✓	
Pump Flow In	450	Accept ± 200 cc/min	Pump Flow @ -200mB	250	Accept ± 200 cc/min
Clock Set / Running	✓		Labels Fitted	✓	

Gas Checks						
Sensor	CH ₄		CO ₂		O ₂	
	Instrument Gas	True Gas Value %	Instrument Gas	True Gas Value %	Instrument Gas	True Gas Value %
	Readings %		Readings %		Readings %	
	60.1	60	40.3	40	20.9	20.9
	Accept ± 1.0		Accept ± 1.0		Accept ± 0.5	
	4.9	5	5	5	6	6
	Accept ± 0.3		Accept ± 0.3		Accept ± 0.3	
Zero Reading 100% N2	0	0	0	0	0	0
	Accept ± 0.0		Accept ± 0.0		Accept ± 0.1	

Optional Gas Checks						
Applied Gas & Range		Concentration Tested @ (ppm)	Instrument Readings (ppm)			
Gas Type	Range (ppm)		Zero Reading		Instrument Gas Reading	
H2S	5000	1500	0	Accept ± 0.0	1500	Accept ± 5.0
CO	2000	1000	0	Accept ± 0.0	1003	Accept ± 5.0
				Accept ± 0.0		Accept ± 5.0
				Accept ± 0.0		Accept ± 5.0
Hexane	2.0%	2.0%	0	Accept ± 0.0	1.99	Accept ± 0.0

Cross Gas Effects									
Applied Gas (ppm)		Instrument Readings (ppm)							
Gas Type	Concentration	Toxic 1:	H2S	Toxic 2:	CO	Toxic 3:			
H2S	1500	1500		0					
CO	1000	90		1003					
Hexane	2.0%	0		0					

Pressure Checks			
Atmospheric Pressure [AP] (mB)			
Current Atmospheric Pressure (mB)		Instrument Atmospheric Pressure Reading (mB)	
AP Open Ports		1000	Accept ± 2.0
AP Port (Internal)	+800 mB	800	Accept ± 5.0
	+1200 mB	1200	Accept ± 5.0

Flow Checks					
Borehole Flow			Differential Pressure		
Applied Reading (l/h)	Instrument Reading (l/h)		Applied Pressure (Pa)	Instrument Reading (Pa)	
-30	-30.9	Accept ± 3.0	-452	-482	Accept ± 50
-3	-3.1	Accept ± 1.0	-19	-22	Accept ± 6.0
0	0	Accept ± 0.0	0	0	Accept ± 0.5
3	3	Accept ± 0.5	16	17	Accept ± 3.0
30	30.9	Accept ± 1.0	339	359	Accept ± 50
60	61.3	Accept ± 6.0	1023	1070	Accept ± 130
90	91.1	Accept ± 9.0	1998	0/R	Accept ± 250

Temperature Checks		
Calibration Temperature	Instrument Temperature Reading $^{\circ}\text{C}$	
Applied Temperature $^{\circ}\text{C}$		
-10	-10	Accept ± 2.0
0	0	Accept ± 1.0
30	30	Accept ± 1.0
60	60	Accept ± 1.0
100	100.5	Accept ± 1.0

Technician:	Date Tested:
Les Treece	20/06/19

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.



APPENDIX J

NOTES ON LIMITATIONS

Notes on Limitations For Geoenvironmental and Geotechnical Consultancy Services

General

This document has been prepared by CC GEOTECHNICAL LTD within the terms of the contract, scope of work, and resources agreed in writing with the client. The limitations of liability of CC GEOTECHNICAL LTD for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

This document is intended for the sole use of the client indicated above and CC GEOTECHNICAL LTD accepts no responsibility of whatever nature to third parties to whom this document or any part of this document is made known. Any such party relies upon that information at their own risk.

The findings and opinions provided in this document are made in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined in this document.

The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date. In particular, seasonal groundwater levels, with the effects of precipitation, may affect the conditions found during the investigation. The report should be read in conjunction with the further Notes on Limitations included in Appendix A.

Where opinions expressed in this report are based on current available guidance and legislation, no liability can be accepted by CC GEOTECHNICAL LTD for the effects of any future changes to such guidelines and legislation. Additional information, improved practices, new guidance, changes in legislation, or amendments to design proposals, may necessitate this report having to be reviewed in whole or in part after that date. Opinions and interpretations are not accredited by UKAS.

Factual data contained in this report may have been obtained from enquiries with reputable third parties, the results of which are relied on unless indicated to be inaccurate by contradictory information.

CC GEOTECHNICAL LTD possesses a non-exclusive and non-transferable Ordnance Survey Licence, but does not possess any right to sub-license any of the rights granted by this licence to any party. Under the terms of CC GEOTECHNICAL LTD's Ordnance Survey Licence, copying of figures containing Ordnance Survey data or using figures for any purpose other than as part of this report is not permitted.

CC GEOTECHNICAL LTD has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from CC GEOTECHNICAL and a charge may be levied against such approval.

CC GEOTECHNICAL LTD accepts no responsibility or liability for:

1. the consequences of this document being used for any purpose or project other than for which it was commissioned and/or
2. the consequences of use of this document by any party with whom an agreement has not been executed.

Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, CC GEOTECHNICAL LTD reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by the timescale available, and the locations of the exploratory holes may have been restricted to areas unoccupied by the building(s) on the site, and further restricted by the existence of buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out to provide sufficient information within the agreed scope of the investigation, under the general headings of type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to provide a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

F. Contaminated Land Risk Assessment Methodology

The following classification published by the NHBC, EA, and CIEH [15] has been developed from *DOE Guide to Risk Assessment and Risk Management for Environmental Protection and the Statutory Guidance on Contaminated Land* (Defra September 2006). The methodology differs from that presented in *Contaminated Land Risk Assessment, A Guide to Good Practice* (CIRIA C552, 2001), particularly in terms of the definitions of classification of consequence, which include a consideration of immediacy of hazards.

The key to the classification is that the designation of risk is based upon the consideration of both:

the magnitude of the potential consequence (i.e. severity).

[takes into account both the potential severity of the hazard and the sensitivity of the receptor]

the magnitude of probability (i.e. likelihood).

[takes into account both the presence of the hazard and receptor and the integrity of the pathway]

The potential consequences of contamination risks occurring at this Site are classified in accordance with Table F.1 below:

Table F.1: Classification of Consequence

Classification	Definition of Consequence
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.
Mild	Exposure to human health unlikely to lead to "significant harm". Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce.

Classification	Definition of Consequence
	Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.
	Minor damage to crops, buildings or property.
Minor	No measurable effect on humans.
	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.
	Repairable effects of damage to buildings, structures and services.

Source: R&D 66:2008

The probability of contamination risks occurring at this Site will be classified in accordance with Table F.2 below from the CIRIA guidance. Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage then there is no potential risk. If there is no pollution linkage then there is no need to apply tests for probability and consequence

Table F.2: Classification of Probability

Classification	Definition of Probability
High Likelihood	There is pollutant linkage and an event would appear 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 pollutant 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 pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Source: R&D 66:2008

For each possible pollution linkage (source-pathway-receptor) identified, the potential risk can be evaluated based upon the following probability x consequence matrix shown in Table F.3.

Table F.3: Overall Contamination Risk Matrix

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	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

Source: R&D 66:2008

R&D 66 [15] presents definitions of the risk categories, together with the investigatory and remedial actions that are likely to be necessary in each case. These definitions are reproduced

in Table F.4. These risk categories apply to each pollutant linkage, not simply to each hazard or receptor.

Table F.4: Definition of Risk Categories and Likely Actions Required

Risk Category	Definition and likely actions required
Very high	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	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, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.
No potential risk	There is no potential risk if no pollution linkage has been established.

Source: R&D 66:2008

G. Tabulated Soil Chemical Analysis Screening

G.1 Soil Screening

The Christie CT
Redevelopment
Soil Laboratory Screening

Soil Laboratory Screening		GSV Commercial 6% SOM	BH101	BH102	BH103	BH103A	BH104
			1.00	0.30	0.70	0.10	0.30
			11/03/2024	11/03/2024	27/02/2024	27/02/2024	27/02/2024
			MG	MG	MG	MG	MG
Determinant Name	Units						
Metals							
Antimony	mg/kg	7400	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5
Arsenic	mg/kg	640	< 10	18	10	11	28
Barium	mg/kg	22000	77	240	110	290	560
Beryllium	mg/kg	12	0.4	1	0.6	1.1	1.3
Boron, Water Soluble	mg/kg	240000	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Cadmium	mg/kg	190	0.8	0.7	0.5	0.7	1.1
Chromium III	mg/kg	8600	8.6	6	6.4	11	6.5
Chromium (Total)	mg/kg	-	9.6	7	7.4	12	7.5
Chromium (Hexavalent)	mg/kg	33	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	mg/kg	68000	35	48	29	46	120
Iron	mg/kg	-	31000	31000	16000	28000	39000
Lead	mg/kg	2300	50	130	110	56	2100
Manganese	mg/kg	-	810	660	300	490	650
Mercury	mg/kg	58	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Mercury (Total, Low Level)	mg/kg	-	0.1	0.1	< 0.1	0.1	1.1
Molybdenum	mg/kg	18000	< 2.0	< 2.0	< 2.0	2.4	3.1
Nickel	mg/kg	980	23	17	14	33	24
Selenium	mg/kg	12000	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Vanadium	mg/kg	9000	25	27	19	35	31
Zinc	mg/kg	730000	55	59	50	55	250
Inorganics							
pH	pH	-	7.5	7.9	8.3	9	8.5
Cyanide, Free	mg/kg	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fraction of Organic Carbon	-	-	0.016	0.038	0.022	0.07	0.051
SOM (MM Calculated)	%	-	2.76	6.55	3.79	12.07	8.79
Sulphate Aqueous Extract as SO4	mg/l	-	11	10	14	61	34
Sulphur as S, Total	%	-	0.03	0.02	0.02	0.2	0.06
Petroleum Hydrocarbons							
Aliphatic C5-C6	mg/kg	12000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic C6-C8	mg/kg	40000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic C8-C10	mg/kg	11000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic C10-C12	mg/kg	47000	< 10	< 10	< 10	< 10	< 10
Aliphatic C12-C16	mg/kg	90000	< 10	< 10	< 10	< 10	< 10
Aliphatic C16-C21	mg/kg	1800000	< 10	< 10	< 10	41	< 10
Aliphatic C21-C35	mg/kg	1800000	< 20	< 20	38	610	< 20
Aliphatic C35-C44	mg/kg	1800000	< 15	< 15	68	320	< 15
Aromatic C5-C7	mg/kg	86000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	mg/kg	180000	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Aromatic C8-C10	mg/kg	17000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aromatic C10-C12	mg/kg	34000	< 10	< 10	< 10	< 10	< 10
Aromatic C12-C16	mg/kg	38000	< 10	< 10	< 10	12	< 10
Aromatic C16-C21	mg/kg	28000	< 10	< 10	< 10	81	< 10
Aromatic C21-C35	mg/kg	28000	< 20	< 20	64	1200	31
Aromatic C35-C44	mg/kg	28000	< 15	< 15	100	930	< 15

The Christie CT
Redevelopment
Soil Laboratory Screening

Determinant Name	Units	GSV Commercial 6% SOM	BH101	BH102	BH103	BH103A	BH104
			1.00	0.30	0.70	0.10	0.30
			11/03/2024	11/03/2024	27/02/2024	27/02/2024	27/02/2024
			MG	MG	MG	MG	MG
Total Ali/Aro C5-C35	mg/kg	-	< 50	< 50	100	1900	< 50
Benzene	mg/kg	90	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	180000	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Ethylbenzene	mg/kg	25000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m&p Xylene	mg/kg	43000	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
o-Xylene	mg/kg	33000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	mg/kg	22000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Acenaphthene	mg/kg	100000	< 0.02	< 0.02	0.03	< 0.20	< 0.02
Acenaphthylene	mg/kg	100000	< 0.02	< 0.02	0.11	0.96	< 0.02
Anthracene	mg/kg	540000	0.03	< 0.02	0.33	1.1	0.05
Benzo(a)anthracene	mg/kg	180	0.14	0.04	0.95	2.7	0.04
Benzo(a)pyrene	mg/kg	36	0.16	0.03	0.88	4.4	0.05
Benzo(b)fluoranthene	mg/kg	45	0.27	0.06	1.1	5.2	0.07
Benzo(g,h,i)perylene	mg/kg	4000	0.13	0.03	0.49	4.9	0.06
Benzo(k)fluoranthene	mg/kg	1200	0.08	< 0.02	0.43	1.9	0.03
Chrysene	mg/kg	350	0.16	0.05	1	2.9	0.05
Dibenzo(a,h)anthracene	mg/kg	3.6	0.02	< 0.02	0.1	0.63	< 0.02
Fluoranthene	mg/kg	23000	0.2	0.07	2.2	4.7	0.07
Fluorene	mg/kg	71000	< 0.02	< 0.02	0.04	< 0.20	< 0.02
Indeno(1,2,3-c,d)pyrene	mg/kg	510	0.18	0.04	0.52	4.5	0.06
Naphthalene	mg/kg	1100	< 0.02	< 0.02	0.02	< 0.20	< 0.02
Phenanthrene	mg/kg	23000	0.12	0.03	1.2	1.2	0.05
Pyrene	mg/kg	54000	0.23	0.07	2.2	4.7	0.07
PAH Total	mg/kg	-	1.8	0.6	12	40	0.71
Phenols							
Phenol	mg/kg	1300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cresols	mg/kg	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Xylenols	mg/kg	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Trimethyl Phenols	mg/kg	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Total Phenols (via HPLC)	mg/kg	-	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
VOCs							
1,1,1,2-tetrachloroethane	mg/kg	560	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-Trichloroethane	mg/kg	3000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	1100	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-Trichloroethane	mg/kg	3000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-Dichloroethane	mg/kg	24	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-Dichloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-Dichloropropene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-Trichlorobenzene	mg/kg	590	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,3-Trichloropropane	mg/kg	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
1,2,4-Trichlorobenzene	mg/kg	1300	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-trimethylbenzene	mg/kg	210	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-Dibromo-3-chloropropane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dibromoethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

The Christie CT
Redevelopment
Soil Laboratory Screening

Determinant Name	Units	GSV Commercial 6% SOM	BH101	BH102	BH103	BH103A	BH104
			1.00	0.30	0.70	0.10	0.30
			11/03/2024	11/03/2024	27/02/2024	27/02/2024	27/02/2024
			MG	MG	MG	MG	MG
1,2-Dichlorobenzene	mg/kg	11000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	mg/kg	1.7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
1,2-Dichloropropane	mg/kg	11	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-Trimethylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-Dichlorobenzene	mg/kg	170	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-Dichloropropane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-Dichlorobenzene	mg/kg	21000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-Dichloropropane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-Isopropyltoluene (P-Cymene)	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	mg/kg	90	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	mg/kg	490	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromodichloromethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	mg/kg	3000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromomethane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Carbon Tetrachloride	mg/kg	14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	mg/kg	290	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorodibromomethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	mg/kg	350	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloromethane	mg/kg	1.5	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
cis-1,2,-dichloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,2-dichloropropylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	mg/kg	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Dichlorodifluoromethane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dichloromethane	mg/kg	530	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Ethylbenzene	mg/kg	27000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	mg/kg	120	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Isopropylbenzene	mg/kg	7300	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m&p Xylene	mg/kg	30000	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
MTBE	mg/kg	22000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	mg/kg	1100	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
n-Butylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-Propylbenzene	mg/kg	20000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	mg/kg	33000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-Butylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	mg/kg	11000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
tert-butylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	180000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,2,-dichloroethylene	mg/kg	76	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	BH101	BH102	BH103	BH103A	BH104
			1.00	0.30	0.70	0.10	0.30
			11/03/2024	11/03/2024	27/02/2024	27/02/2024	27/02/2024
Determinant Name	Units		MG	MG	MG	MG	MG
Trichloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichlorofluoromethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Vinyl Chloride	mg/kg	0.12	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	BH101	BH102	BH103	BH103A	BH104
			1.00	0.30	0.70	0.10	0.30
			11/03/2024	11/03/2024	27/02/2024	27/02/2024	27/02/2024
Determinant Name	Units		MG	MG	MG	MG	MG
Asbestos & Misc							
Asbestos	-	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	TP101	TP104	TP105	TP106	TP107
			0.40	0.30	0.50	0.40	0.40
			27/02/2024	11/03/2024	17/03/2024	27/02/2024	27/02/2024
Determinant Name	Units		MG	MG	MG	MG	MG
Metals							
Antimony	mg/kg	7400	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5
Arsenic	mg/kg	640	14	13	26	< 10	78
Barium	mg/kg	22000	110	950	120	100	280
Beryllium	mg/kg	12	0.8	0.8	0.7	0.5	1.2
Boron, Water Soluble	mg/kg	240000	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Cadmium	mg/kg	190	0.7	0.9	0.7	0.5	1.2
Chromium III	mg/kg	8600	6.9	12	5.4	5	8.2
Chromium (Total)	mg/kg	-	7.9	13	6.4	6	9.2
Chromium (Hexavalent)	mg/kg	33	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	mg/kg	68000	49	90	63	32	210
Iron	mg/kg	-	21000	29000	34000	17000	33000
Lead	mg/kg	2300	92	210	450	330	590
Manganese	mg/kg	-	380	320	590	240	880
Mercury	mg/kg	58	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Mercury (Total, Low Level)	mg/kg	-	< 0.1	< 0.1	0.2	< 0.1	0.5
Molybdenum	mg/kg	18000	< 2.0	< 2.0	2.8	< 2.0	< 2.0
Nickel	mg/kg	980	14	23	21	13	27
Selenium	mg/kg	12000	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Vanadium	mg/kg	9000	26	33	32	21	31
Zinc	mg/kg	730000	52	370	73	66	360
Inorganics							
pH	pH	-	7.3	7.9	7.8	8.5	7.9
Cyanide, Free	mg/kg	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fraction of Organic Carbon	-	-	0.033	0.036	0.038	0.011	0.036
SOM (MM Calculated)	%	-	5.69	6.21	6.55	1.90	6.21
Sulphate Aqueous Extract as SO4	mg/l	-	< 10	< 10	29	< 10	< 10
Sulphur as S, Total	%	-	0.02	0.02	0.01	0.02	0.01
Petroleum Hydrocarbons							
Aliphatic C5-C6	mg/kg	12000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic C6-C8	mg/kg	40000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic C8-C10	mg/kg	11000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aliphatic C10-C12	mg/kg	47000	< 10	< 10	< 10	< 10	< 10
Aliphatic C12-C16	mg/kg	90000	< 10	< 10	< 10	< 10	< 10
Aliphatic C16-C21	mg/kg	1800000	< 10	< 10	< 10	< 10	< 10
Aliphatic C21-C35	mg/kg	1800000	31	< 20	< 20	< 20	< 20
Aliphatic C35-C44	mg/kg	1800000	27	< 15	< 15	< 15	< 15
Aromatic C5-C7	mg/kg	86000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	mg/kg	180000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	mg/kg	17000	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Aromatic C10-C12	mg/kg	34000	< 10	< 10	< 10	< 10	< 10
Aromatic C12-C16	mg/kg	38000	< 10	< 10	< 10	< 10	< 10
Aromatic C16-C21	mg/kg	28000	< 10	< 10	< 10	< 10	< 10
Aromatic C21-C35	mg/kg	28000	61	< 20	< 20	< 20	< 20
Aromatic C35-C44	mg/kg	28000	75	< 15	< 15	< 15	< 15

The Christie CT
Redevelopment
Soil Laboratory Screening

Determinant Name	Units	GSV Commercial 6% SOM	TP101	TP104	TP105	TP106	TP107
			0.40	0.30	0.50	0.40	0.40
			27/02/2024	11/03/2024	17/03/2024	27/02/2024	27/02/2024
			MG	MG	MG	MG	MG
Total Ali/Aro C5-C35	mg/kg	-	92	< 50	< 50	< 50	< 50
Benzene	mg/kg	90	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	180000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	mg/kg	25000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m&p Xylene	mg/kg	43000	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
o-Xylene	mg/kg	33000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	mg/kg	22000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Acenaphthene	mg/kg	100000	< 0.02	< 0.02	< 0.02	0.02	0.04
Acenaphthylene	mg/kg	100000	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Anthracene	mg/kg	540000	< 0.02	0.03	< 0.02	0.06	0.06
Benzo(a)anthracene	mg/kg	180	0.07	0.11	< 0.02	0.28	0.24
Benzo(a)pyrene	mg/kg	36	0.07	0.1	< 0.02	0.3	0.25
Benzo(b)fluoranthene	mg/kg	45	0.12	0.12	< 0.02	0.34	0.3
Benzo(g,h,i)perylene	mg/kg	4000	0.06	0.08	< 0.02	0.2	0.17
Benzo(k)fluoranthene	mg/kg	1200	0.03	0.03	< 0.02	0.12	0.1
Chrysene	mg/kg	350	0.1	0.12	< 0.02	0.38	0.37
Dibenzo(a,h)anthracene	mg/kg	3.6	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Fluoranthene	mg/kg	23000	0.14	0.19	< 0.02	0.62	0.58
Fluorene	mg/kg	71000	< 0.02	< 0.02	< 0.02	< 0.02	0.03
Indeno(1,2,3-c,d)pyrene	mg/kg	510	0.07	0.12	< 0.02	0.17	0.15
Naphthalene	mg/kg	1100	< 0.02	< 0.02	< 0.02	0.04	0.11
Phenanthrene	mg/kg	23000	0.07	0.12	< 0.02	0.43	0.46
Pyrene	mg/kg	54000	0.15	0.18	< 0.02	0.63	0.6
PAH Total	mg/kg	-	1	1.3	< 0.32	3.7	3.5
Phenols							
Phenol	mg/kg	1300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Cresols	mg/kg	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Xylenols	mg/kg	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Trimethyl Phenols	mg/kg	-	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Total Phenols (via HPLC)	mg/kg	-	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
VOCs							
1,1,1,2-tetrachloroethane	mg/kg	560	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-Trichloroethane	mg/kg	3000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	1100	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-Trichloroethane	mg/kg	3000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-Dichloroethane	mg/kg	24	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-Dichloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-Dichloropropene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-Trichlorobenzene	mg/kg	590	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,3-Trichloropropane	mg/kg	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
1,2,4-Trichlorobenzene	mg/kg	1300	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2,4-trimethylbenzene	mg/kg	210	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-Dibromo-3-chloropropane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2-Dibromoethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	TP101	TP104	TP105	TP106	TP107
			0.40	0.30	0.50	0.40	0.40
			27/02/2024	11/03/2024	17/03/2024	27/02/2024	27/02/2024
			MG	MG	MG	MG	MG
Determinant Name	Units						
1,2-Dichlorobenzene	mg/kg	11000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	mg/kg	1.7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
1,2-Dichloropropane	mg/kg	11	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-Trimethylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-Dichlorobenzene	mg/kg	170	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-Dichloropropane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-Dichlorobenzene	mg/kg	21000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-Dichloropropane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-Isopropyltoluene (P-Cymene)	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	mg/kg	90	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	mg/kg	490	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromodichloromethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	mg/kg	3000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bromomethane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Carbon Tetrachloride	mg/kg	14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	mg/kg	290	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorodibromomethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	mg/kg	350	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloromethane	mg/kg	1.5	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
cis--1,2,-dichloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,2-dichloropropylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	mg/kg	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Dichlorodifluoromethane	mg/kg	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dichloromethane	mg/kg	530	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Ethylbenzene	mg/kg	27000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	mg/kg	120	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Isopropylbenzene	mg/kg	7300	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m&p Xylene	mg/kg	30000	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
MTBE	mg/kg	22000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	mg/kg	1100	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
n-Butylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-Propylbenzene	mg/kg	20000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	mg/kg	33000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-Butylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	mg/kg	11000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
tert-butylbenzene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	180000	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,2,-dichloroethylene	mg/kg	76	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	TP101	TP104	TP105	TP106	TP107
			0.40	0.30	0.50	0.40	0.40
			27/02/2024	11/03/2024	17/03/2024	27/02/2024	27/02/2024
Determinant Name	Units		MG	MG	MG	MG	MG
Trichloroethylene	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichlorofluoromethane	mg/kg	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Vinyl Chloride	mg/kg	0.12	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02

The Christie CT
 Redevelopment
 Soil Laboratory Screening

		GSV Commercial 6% SOM	TP101	TP104	TP105	TP106	TP107
			0.40	0.30	0.50	0.40	0.40
			27/02/2024	11/03/2024	17/03/2024	27/02/2024	27/02/2024
Determinant Name	Units		MG	MG	MG	MG	MG
Asbestos & Misc							
Asbestos	-	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

The Christie CT
Redevelopment
Soil Laboratory Screening

Determinant Name	Units	GSV Commercial 6% SOM	WS101	WS102
			0.80	0.80
			28/04/2024	28/04/2024
			MG	MG
Metals				
Antimony	mg/kg	7400	< 3.5	< 3.5
Arsenic	mg/kg	640	13	290
Barium	mg/kg	22000	170	140
Beryllium	mg/kg	12	0.7	< 4.0
Boron, Water Soluble	mg/kg	240000	< 2.5	< 2.5
Cadmium	mg/kg	190	0.6	0.5
Chromium III	mg/kg	8600	7.5	2.7
Chromium (Total)	mg/kg	-	8.5	3.7
Chromium (Hexavalent)	mg/kg	33	< 1.0	< 1.0
Copper	mg/kg	68000	46	41
Iron	mg/kg	-	25000	18000
Lead	mg/kg	2300	56	190
Manganese	mg/kg	-	580	390
Mercury	mg/kg	58	< 2.5	< 2.5
Mercury (Total, Low Level)	mg/kg	-	< 0.1	0.2
Molybdenum	mg/kg	18000	< 2.0	< 40.0
Nickel	mg/kg	980	18	12
Selenium	mg/kg	12000	< 8.0	< 8.0
Vanadium	mg/kg	9000	8.4	11
Zinc	mg/kg	730000	56	61
Inorganics				
pH	pH	-	7.6	8.1
Cyanide, Free	mg/kg	-	< 1.0	< 1.0
Fraction of Organic Carbon	-	-	0.027	0.019
SOM (MM Calculated)	%	-	4.66	3.28
Sulphate Aqueous Extract as SO ₄	mg/l	-	< 10	63
Sulphur as S, Total	%	-	< 0.01	0.02
Petroleum Hydrocarbons				
Aliphatic C5-C6	mg/kg	12000	< 0.06	< 0.06
Aliphatic C6-C8	mg/kg	40000	< 0.06	< 0.06
Aliphatic C8-C10	mg/kg	11000	< 0.06	< 0.06
Aliphatic C10-C12	mg/kg	47000	< 10	< 10
Aliphatic C12-C16	mg/kg	90000	< 10	< 10
Aliphatic C16-C21	mg/kg	1800000	< 10	< 10
Aliphatic C21-C35	mg/kg	1800000	< 20	< 20
Aliphatic C35-C44	mg/kg	1800000	23	< 15
Aromatic C5-C7	mg/kg	86000	< 0.01	< 0.01
Aromatic C7-C8	mg/kg	180000	< 0.01	< 0.01
Aromatic C8-C10	mg/kg	17000	< 0.06	< 0.06
Aromatic C10-C12	mg/kg	34000	< 10	< 10
Aromatic C12-C16	mg/kg	38000	< 10	< 10
Aromatic C16-C21	mg/kg	28000	< 10	28
Aromatic C21-C35	mg/kg	28000	49	80
Aromatic C35-C44	mg/kg	28000	95	57

The Christie CT
Redevelopment
Soil Laboratory Screening

Determinant Name	Units	GSV Commercial 6% SOM	WS101	WS102
			0.80	0.80
			28/04/2024	28/04/2024
			MG	MG
Total Ali/Aro C5-C35	mg/kg	-	< 50	110
Benzene	mg/kg	90	< 0.01	< 0.01
Toluene	mg/kg	180000	< 0.01	< 0.01
Ethylbenzene	mg/kg	25000	< 0.01	< 0.01
m&p Xylene	mg/kg	43000	< 0.02	< 0.02
o-Xylene	mg/kg	33000	< 0.01	< 0.01
MTBE	mg/kg	22000	< 0.01	< 0.01
PAHs				
Acenaphthene	mg/kg	100000	< 0.02	0.87
Acenaphthylene	mg/kg	100000	< 0.02	< 0.02
Anthracene	mg/kg	540000	< 0.02	1.1
Benzo(a)anthracene	mg/kg	180	< 0.02	4.4
Benzo(a)pyrene	mg/kg	36	< 0.02	2.8
Benzo(b)fluoranthene	mg/kg	45	< 0.02	3.2
Benzo(g,h,i)perylene	mg/kg	4000	< 0.02	1.5
Benzo(k)fluoranthene	mg/kg	1200	< 0.02	1.3
Chrysene	mg/kg	350	< 0.02	4.2
Dibenzo(a,h)anthracene	mg/kg	3.6	< 0.02	0.29
Fluoranthene	mg/kg	23000	< 0.02	13
Fluorene	mg/kg	71000	< 0.02	0.6
Indeno(1,2,3-c,d)pyrene	mg/kg	510	< 0.02	1.1
Naphthalene	mg/kg	1100	< 0.02	0.53
Phenanthrene	mg/kg	23000	< 0.02	8.5
Pyrene	mg/kg	54000	< 0.02	12
PAH Total	mg/kg	-	< 0.32	56
Phenols				
Phenol	mg/kg	1300	< 0.20	< 0.20
Cresols	mg/kg	-	< 0.20	< 0.20
Xylenols	mg/kg	-	< 0.20	< 0.20
Trimethyl Phenols	mg/kg	-	< 0.20	< 0.20
Total Phenols (via HPLC)	mg/kg	-	< 0.80	< 0.80
VOCs				
1,1,1,2-tetrachloroethane	mg/kg	560	< 0.01	< 0.01
1,1,1-Trichloroethane	mg/kg	3000	< 0.01	< 0.01
1,1,2,2-Tetrachloroethane	mg/kg	1100	< 0.01	< 0.01
1,1,2-Trichloroethane	mg/kg	3000	< 0.01	< 0.01
1,1-Dichloroethane	mg/kg	24	< 0.01	< 0.01
1,1-Dichloroethylene	mg/kg	-	< 0.01	< 0.01
1,1-Dichloropropene	mg/kg	-	< 0.01	< 0.01
1,2,3-Trichlorobenzene	mg/kg	590	< 0.05	< 0.05
1,2,3-Trichloropropane	mg/kg	-	< 0.02	< 0.02
1,2,4-Trichlorobenzene	mg/kg	1300	< 0.05	< 0.05
1,2,4-trimethylbenzene	mg/kg	210	< 0.01	< 0.01
1,2-Dibromo-3-chloropropane	mg/kg	-	< 0.05	< 0.05
1,2-Dibromoethane	mg/kg	-	0.13	0.11

The Christie CT
Redevelopment
Soil Laboratory Screening

Determinant Name	Units	GSV Commercial 6% SOM	WS101	WS102
			0.80	0.80
			28/04/2024	28/04/2024
			MG	MG
1,2-Dichlorobenzene	mg/kg	11000	< 0.01	< 0.01
1,2-dichloroethane	mg/kg	1.7	< 0.02	< 0.02
1,2-Dichloropropane	mg/kg	11	< 0.01	< 0.01
1,3,5-Trimethylbenzene	mg/kg	-	< 0.01	< 0.01
1,3-Dichlorobenzene	mg/kg	170	< 0.01	< 0.01
1,3-Dichloropropane	mg/kg	-	< 0.01	< 0.01
1,4-Dichlorobenzene	mg/kg	21000	< 0.01	< 0.01
2,2-Dichloropropane	mg/kg	-	< 0.01	< 0.01
2-chlorotoluene	mg/kg	-	< 0.01	< 0.01
4-chlorotoluene	mg/kg	-	< 0.01	< 0.01
4-Isopropyltoluene (P-Cymene)	mg/kg	-	< 0.01	< 0.01
Benzene	mg/kg	90	< 0.01	< 0.01
Bromobenzene	mg/kg	490	< 0.01	< 0.01
Bromochloromethane	mg/kg	-	< 0.05	< 0.05
Bromodichloromethane	mg/kg	-	< 0.01	< 0.01
Bromoform	mg/kg	3000	< 0.05	< 0.05
Bromomethane	mg/kg	-	< 0.05	< 0.05
Carbon Tetrachloride	mg/kg	14	< 0.01	< 0.01
Chlorobenzene	mg/kg	290	< 0.01	< 0.01
Chlorodibromomethane	mg/kg	-	< 0.01	< 0.01
Chloroethane	mg/kg	-	< 0.01	< 0.01
Chloroform	mg/kg	350	< 0.01	< 0.01
Chloromethane	mg/kg	1.5	< 0.02	< 0.02
cis--1,2,-dichloroethylene	mg/kg	-	< 0.01	< 0.01
cis-1,2-dichloropropylene	mg/kg	-	< 0.01	< 0.01
Dibromomethane	mg/kg	-	< 0.02	< 0.02
Dichlorodifluoromethane	mg/kg	-	< 0.05	< 0.05
Dichloromethane	mg/kg	530	< 0.10	< 0.10
Ethylbenzene	mg/kg	27000	< 0.01	< 0.01
Hexachlorobutadiene	mg/kg	120	< 0.05	< 0.05
Isopropylbenzene	mg/kg	7300	< 0.01	< 0.01
m&p Xylene	mg/kg	30000	< 0.02	< 0.02
MTBE	mg/kg	22000	< 0.01	< 0.01
Naphthalene	mg/kg	1100	< 0.05	< 0.05
n-Butylbenzene	mg/kg	-	< 0.01	< 0.01
n-Propylbenzene	mg/kg	20000	< 0.01	< 0.01
o-Xylene	mg/kg	33000	< 0.01	< 0.01
sec-Butylbenzene	mg/kg	-	< 0.01	< 0.01
Styrene	mg/kg	11000	< 0.01	< 0.01
tert-butylbenzene	mg/kg	-	< 0.01	< 0.01
Tetrachloroethylene	mg/kg	-	< 0.01	< 0.01
Toluene	mg/kg	180000	< 0.01	< 0.01
trans-1,2,-dichloroethylene	mg/kg	76	< 0.01	< 0.01
trans-1,3-dichloropropylene	mg/kg	-	< 0.01	< 0.01

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	WS101	WS102
			0.80	0.80
			28/04/2024	28/04/2024
Determinant Name	Units		MG	MG
Trichloroethylene	mg/kg	-	< 0.01	< 0.01
Trichlorofluoromethane	mg/kg	-	< 0.01	0.05
Vinyl Chloride	mg/kg	0.12	< 0.02	< 0.02

The Christie CT
Redevelopment
Soil Laboratory Screening

		GSV Commercial 6% SOM	WS101	WS102
			0.80	0.80
			28/04/2024	28/04/2024
Determinant Name	Units		MG	MG
Asbestos & Misc				
Asbestos	-	-	No asbestos detected	No asbestos detected

G.2 Soil Leachate Screening

The Christie CT Redevelopment
Soil Leachate Screening

Test		Units	UK DWS	WHO	BH102	BH103	BH104	TP101
					0.30	1.40	1.50	0.40
					11/03/2024	27/02/2024	27/02/2024	27/02/2024
					MG	MG	MG	MG
Metals								
Antimony, Dissolved	µg/l	5	20	< 2.5	< 2.5	< 2.5	3.3	
Arsenic, Dissolved	µg/l	5	10	< 3	3	< 3	< 3	
Barium, Dissolved	µg/l	1000	1300	16	< 5	28	26	
Beryllium, Dissolved	µg/l	-	12	< 1	< 1	< 1	< 1	
Boron, Dissolved	µg/l	1000	2400	5	29	22	6	
Cadmium, Dissolved	µg/l	5	3	< 0.25	< 0.25	< 0.25	< 0.25	
Calcium, Dissolved	µg/l	250000	-	< 0.25	< 0.25	< 0.25	< 0.25	
Chromium	µg/l	-	-	< 3	< 3	< 3	< 3	
Chromium, Hexavalent	µg/l	-	-	<20	<20	<20	<20	
Chromium III, Dissolved	µg/l	50	50	< 20	< 20	< 20	< 20	
Copper, Dissolved	µg/l	2000	2000	< 1	< 1	< 1	3	
Iron, Total	µg/l	200	-	1200	< 0.010	< 0.010	380	
Lead, Dissolved	µg/l	10	10	< 5	< 5	< 5	< 5	
Magnesium, Dissolved	µg/l	50000	-	1600	68	790	870	
Manganese, Dissolved	µg/l	50	400	20	< 5	21	< 5	
Mercury, Dissolved	µg/l	1	6	< 0.20	< 0.20	< 0.20	< 0.20	
Molybdenum, Dissolved	µg/l	-	70	< 2.5	5.7	4.4	14	
Nickel, Dissolved	µg/l	20	70	< 3	< 3	< 3	< 3	
Selenium, Dissolved	µg/l	10	40	< 1	< 1	< 1	< 1	
Vanadium, Dissolved	µg/l	-	-	20.2	30.5	< 2.50	49	
Zinc, Dissolved	µg/l	5000	-	< 5	< 5	120	< 5	
Inorganics								
pH	pH	-	-	7.9	11	7.9	7.8	
Cyanide, Complex	mg/l	-	-	< 0.5	< 0.5	< 0.5	< 0.5	
Cyanide, Free	mg/l	-	-	< 0.5	< 0.5	< 0.5	< 0.5	
Cyanide, Total	mg/l	0.05	0.07	< 0.5	< 0.5	< 0.5	< 0.5	
Ammoniacal Nitrogen as N	mg/l	-	-	< 0.02	< 0.02	< 0.02	0.39	
Chloride	mg/l	250	-	1.6	30	0.72	2.4	
Fluoride	mg/l	1.5	1.5	0.61	0.5	0.13	0.47	
Sulphate as SO4	mg/l	250	250	< 10	39	< 10	< 10	
Phenols								
Phenol	µg/l	0.5	-	7.42	17	18.3	12.9	
Cresols	µg/l	-	-	< 0.20	0.81	0.91	0.34	
Xylenols	µg/l	-	-	< 0.20	< 0.20	< 0.20	< 0.20	
Trimethyl Phenols	µg/l	-	-	< 0.50	< 0.50	< 0.50	< 0.50	
Phenols (Total)	µg/l	-	-	7.55	18	19.4	13.2	

The Christie CT Redevelopment
Soil Leachate Screening

Test		Units	UK DWS	WHO	WS101
					0.80
					28/04/2024
					MG
Metals					
Antimony, Dissolved	µg/l	5		20	< 2.5
Arsenic, Dissolved	µg/l	5		10	4
Barium, Dissolved	µg/l	1000		1300	120
Beryllium, Dissolved	µg/l	-		12	< 1
Boron, Dissolved	µg/l	1000		2400	15
Cadmium, Dissolved	µg/l	5		3	0.83
Calcium, Dissolved	µg/l	250000		-	11
Chromium	µg/l	-		-	19
Chromium, Hexavalent	µg/l	-		-	20
Chromium III, Dissolved	µg/l	50		50	<20
Copper, Dissolved	µg/l	2000		2000	8
Iron, Total	µg/l	200		-	12000
Lead, Dissolved	µg/l	10		10	41
Magnesium, Dissolved	µg/l	50000		-	2300
Manganese, Dissolved	µg/l	50		400	210
Mercury, Dissolved	µg/l	1		6	<0.20
Molybdenum, Dissolved	µg/l	-		70	<2.5
Nickel, Dissolved	µg/l	20		70	<3
Selenium, Dissolved	µg/l	10		40	<1
Vanadium, Dissolved	µg/l	-		-	57.4
Zinc, Dissolved	µg/l	5000		-	27
Inorganics					
pH	pH	-		-	8.1
Cyanide, Complex	mg/l	-		-	< 0.5
Cyanide, Free	mg/l	-		-	< 0.5
Cyanide, Total	mg/l	0.05		0.07	< 0.5
Ammoniacal Nitrogen as N	mg/l	-		-	<0.02
Chloride	mg/l	250		-	4.9
Fluoride	mg/l	1.5		1.5	0.53
Sulphate as SO4	mg/l	250		250	<10
Phenols					
Phenol	µg/l	0.5		-	8.52
Cresols	µg/l	-		-	0.49
Xylenols	µg/l	-		-	< 0.20
Trimethyl Phenols	µg/l	-		-	< 0.50
Phenols (Total)	µg/l	-		-	9.01