

**Environmental
Geotechnical
Specialists**



GEOTECHNICAL REPORT

job number C2491/22/E/4020	date 01.06.22
site address 48 & 50 Wilton Road Crumpsall Manchester M8 4EL	
written by R.A. Palmer	checked by C.E. Mason
issued by R.A. Palmer	

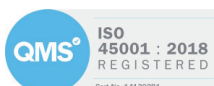
Rogers Geotechnical Services Ltd

Telephone 0843 50 666 87 **Fax** 0843 51 599 30

Email enquiries@rogersgeotech.co.uk

www.rogersgeotech.co.uk

Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,
Huddersfield, West Yorkshire HD8 8LU.



GEOTECHNICAL
ENVIRONMENTAL



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Report on a Geotechnical Investigation

Location: 48 & 50 Wilton Road
Crumpsall, Manchester M8 4EL

For: Mr Zaheer Aslam

Report No. C2491/22/E/4020

Report date: June 2022

For and on behalf of **Rogers Geotechnical Services Ltd**

Rob Palmer MSc FGS ACIEH
Senior Geo-environmental Engineer

Charlotte Mason BSc FGS
Geo-environmental Engineer

Report Summary¹

Item	Comments	Section
Development	Extension to the rear and side of the existing property to form additional living accommodation.	1.
Geology	Superficial till and glaciofluvial deposits underlain by the Chester Formation.	4.
Strata Conditions	Made ground present in raised areas, underlain by soft cohesive soils and then loose/medium dense silty sand.	5. & 5.1
Groundwater	7.7m rising to 7.5m (WS01). 'Blowing sand' conditions recorded.	5.2
Foundation Design	Piled foundations – discussions to be held with appropriate contractors with regards to pile types and methods of installation.	8.
Ground-floor	Suspended ground-floor slab.	8.
Slope Stability	Slope should remain stable as long as appropriate piles are chosen and upmost care is taken during the construction phase to minimise vibrations.	8.

¹ This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.



1. Introduction

It is understood that the site is to be developed by the construction of an extension to the rear of the property². The property itself is positioned at the crest of a tramway embankment. As such, the local authority has raised a planning condition for a stability assessment to be undertaken to determine the impact the development could possibly have on the stability of the embankment.

Consequently, a site investigation has been undertaken in accordance with the instruction from the client. This work was required in order to determine the nature of the underlying soils, to assess their engineering properties and to assist in the design of safe and economical foundations for the proposed development, such that the stability of the slope would not be detrimentally affected. This report describes the work undertaken, presents the data obtained and discusses the ground conditions in relation to the proposed works.

2. Limitations

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between borehole positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue. It should be appreciated that this report only considers the geotechnical aspects of the site and not environmental or ground gas (carbon dioxide, methane or radon) issues.

3. Fieldworks

The fieldworks were undertaken on the 26th and 27th of April 2022 and included the following:

- One windowless sample boreholes.
- Three hydraulic hand sample boreholes.
- One dynamic probe.

The investigatory locations are shown on the site plan which is presented in Appendix 1 to this report. It should be appreciated that due to the access constraints, hand-held windowless sampling equipment was utilised at the rear of the property, as the drilling rig was unable to reach this location. Nonetheless,

² **Application number:** 129161/FH/2021 - **Proposal:** Erection of part two, part three storey rear and two storey side extension to form additional living accommodation



a borehole was sunk with the drilling rig at a position adjacent to the property, albeit this was at a higher elevation to the remaining boreholes.

3.1 Windowless Sample Boreholes

WS01 was sunk using a drive-in windowless sampler mounted on a Dando Terrier drilling rig. The cores were undertaken in 1m lengths and reduced in diameter from 117mm for the first 1m through 102mm, 87mm and 77mm for subsequent 1m increments. The remaining boreholes, WS02, WS03 and WS04, were sunk using a drive-in sampler attached to a hand-held hydraulic unit. Whilst WS01 was sunk to 8m, the limitations of the equipment utilised at the rear of the property resulted in WS02, WS03 and WS04 reaching a termination depth of 3m.

The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The soils were described in general accordance with BS5930: 2015+A1: 2020, and full descriptions are given on the windowless sample records which are presented in Appendix 2. Also included on these records are the core diameters and percentages of core recovered.

3.2 Standard Penetration Tests

Standard penetration tests (SPT) were undertaken at regular depth increments within windowless sample borehole WS01. The SPT was conducted in accordance with the procedures given in BS EN ISO 22476: Part 3: 2005 +A1: 2011, and the results are summarised on the borehole record. During this work an automatic trip hammer of 63.5kg falling through 750mm was employed to drive either a cone or split barrel sampler assembly into the ground and the recovered barrel samples were retained in air tight plastic containers.

3.3 Dynamic Probes

A dynamic penetration test was undertaken through the base of windowless sample borehole WS01, accordance with the procedure given in BS EN ISO 22476: Part 2: 2005 +A1: 2011, using the super heavy penetrometer (DPSH). This probe consists of a 63.5kg mass falling through 750mm onto an anvil, which drives a 50mm diameter cone into the ground. The number of blows required to drive the cone through successive 100mm increments are recorded as the N_{100} values. The results of the dynamic penetration tests are tabulated and presented as bar charts of N_{100} values versus depth in Appendix 3.



4. Geology

The available published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: Geological Data for the Site			
Strata Type	Strata Name ³	Previous Name ⁴	Description ³
Superficial Geology	Till	Boulder Clay	Variably graded clays, silts, sand and gravels, often present with large particles (cobbles and boulders).
	Glaciofluvial Sheet Deposits	-	Predominantly granular strata (sands and gravels).
Solid Geology	Chester Formation	Chester Pebble Beds	Locally, the formation comprises conglomerates and reddish brown, cross-bedded, pebbly sandstones with subordinate beds of red-brown mudstone. The conglomerates have a reddish brown sandy matrix and consist mainly of pebbles of brown or purple quartzite, with quartz conglomerate and vein quartz.

The majority of the site is underlain by till, although glaciofluvial sheet deposits are shown to be present immediately to the west within the tramway cutting. As such, it is anticipated that glaciofluvial sheet deposits may be present beneath the till underlying the site surface.

5. Strata Conditions

In accordance with the geology of the area, the succession has been shown to include the following:

Table 2: Generalised Strata Profile			
Depth m below ground level to underside of layer	Strata Type	Positions Layer Revealed	Groundwater Strikes m below ground level
0.3 – 2.0	MADE GROUND (Re-worked CLAY)	WS01 & WS02	None
0.7 – 2.7	Organic CLAY (TILL)	All	None
3.2	Silty CLAY (TILL)	WS01	None
+3.0 – +8.0	Silty SAND (GLACIOFLUVIAL SHEET DEPOSITS)	All	7.7 (WS01)

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

³ Sources: British Geological Survey (NERC) Map Sheets 85; Manchester; Solid and Drift Edition, and Geology of Britain Viewer [online resource from www.bgs.ac.uk]

⁴ Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [online resource from www.bgs.ac.uk]



5.1 General Strata

It should be noted that WS01 was positioned at a higher elevation to the remaining boreholes and, as such, around 2m of made ground was observed before encountering natural soils. This fill has seemingly been placed to create the higher elevation/level plateau for the existing driveway.

Beneath the made ground, natural cohesive soils were initially encountered, and these soils are considered to represent glacial till deposits. However, with depth, the soils promptly graded into granular deposits; silty sand was observed to 8m depth in WS01 and to 3m depth in the remaining boreholes. Considering the superficial deposit patterns detailed on the published geological map, it is considered that the granular soils are representative of glaciofluvial sheet deposits and it is most likely that such soils form the tramway embankment.

5.2 Groundwater

It should be appreciated that the normal rate of boring does not permit the recording of an equilibrium water level for any one strike. Moreover, groundwater levels are subject to seasonal variation or changes on local drainage conditions. Notwithstanding this, a water strike was recorded at 7.7m in WS01. Over a period of time, this water level rose to 7.5m but then stabilised at that level. It isn't clear from the information obtained within this investigation whether this sub-artesian water represent the phreatic surface or rather perched water within the sheet deposits.

6. Insitu Testing

6.1 Standard Penetration Tests

The standard penetration tests carried out in WS01 are summarised in the following table:

Table 3: Summary of Standard Penetration Tests				
Strata	Depth Range (m)	SPT 'N' (Blows/300mm)		Comments
		Granular soils	Cohesive soils	
MADE GROUND	1m	-	0	SPT's indicate a very soft in-situ condition.
Organic CLAY	2m	-	0	SPT's indicate a very soft in-situ condition.
Silty SAND	3m to 7m	5 to 20	-	SPT's indicate granular material is in a loose and medium dense in-situ condition.



6.2 Dynamic Penetration Tests

A dynamic penetration test was undertaken through the base of WS01 and a summary of the results is presented below:

Table 4: Summary of Dynamic Penetration Tests					
Position	Blows/100mm			Refusal type (Effective/ Abrupt) ⁵	Comments
	0 - 2	3 - 10	10+		
	Depth to which blow count range was observed (m)				
DP01	8.3 9.6	8.9 10.7	11.1	Effective	Commenced from 8m. Medium dense and dense material recorded from 9.6m (granular stratum assumed based on published data and observed ground conditions). Effective refusal at 11.1m.

7. Laboratory Testing - Geotechnical

The following programme of laboratory testing has been undertaken on samples obtained during this investigation:

- Determination of water content BS EN ISO 17892-1:2014
- Determination of liquid and plastic limits BS EN ISO 17892-12:2018
- Determination of particle size distribution (Dry) BS EN ISO 17892-4:2016: 5.2

The test results are presented in Appendix 4 and are summarised below:

Table 5: Summary of Geotechnical Test Results				
Test type	Number of tests	Range of results		Comments
Moisture content determinations	3	17% to 35%		Clay (Till) – MC very close, or above to the LL.
Index properties (1 Point)	3	LL	28% to 31%	Clay/silt of low plasticity.
		PL	18% to 23%	Consistency index -0.4 to 1.1
		PI	07% to 10%	NHBC Class – Negligible to low.
Particle size distribution (Dry sieve)	6	Gravel	0% to 5%	Silty SAND. Locally slightly gravelly.
		Sand	74% to 98%	Uniformity coefficient 1.6 to 3
		Silt/Clay	02% to 21%	Curvature coefficient 0.91 to 1.3

⁵ Abrupt refusal: obstruction or bedrock encountered. Effective refusal: +25 blows/100mm.



7.1 Geotechnical Properties

The idealised geotechnical properties and estimated effective stress parameters employed in design are summarised below.

Table 6: Summary of Geotechnical Properties

Property	Range of values	Comments	
Volume change potential (NHBC)	Low	Cohesive till deposits.	
Description	Bulk unit weight, γ (kN/m ³)	Angle of friction, ϕ' (°)	Effective cohesion c' (kN/m ²)
Organic silty CLAY (TILL)	18	25	0
Silty SAND (GLACIOFLUVIAL SHEET)	19	27 to 30	0

8. Discussion of Ground Conditions - Geotechnical

It is understood that the site is to be developed by the construction of an extension to the rear of the property. The precise structural details are not currently known, thus the discussion below is of a generalised nature, although it has been confirmed that a piled foundation will be utilised. Indeed, given the close proximity of the development to the crest of the slope, such a foundation solution will enable near surface loads to be transferred to soils at depth, thus reducing the risk of instability of the slope.

For preliminary design purposes it is considered that driven pre-cast concrete piles would represent the most economical foundation solution. However, the use of driven piles should be met with caution at this site as vibrations from this method could cause settlement of the existing structure and possibly disturb the cohesive and granular soils forming the core of the embankment (slope).

As such, consideration could be given to the use of helical cast-in-place piles at this site, such as continuous flight auger (CFA) or helical displacement piles. These systems have the advantage of minimal vibration. With CFA piles, spoil will be produced at the surface which will need to be disposed of and there is a risk of loose soils at the near surface, such as the till deposits, being pulled in laterally, referred to as 'flighting'. Helical displacement piles have the advantage of producing limited spoil and achieving greater levels of skin friction due to the displacement action, minimising on the reliance on end-bearing. However, these piling systems may have greater difficulty penetrating any obstructions, if present, due to the lack of weight from the auger string, but it is unlikely that such features shall be present.

It should be appreciated that with regards to helical cast-in-place piles, the contractor may require further information from depth for a full design. Whilst dynamic probe data has been obtained, samples of the strata upon which the piles would be end bearing have not been obtained, but unfortunately due to the access constraints, it is currently deemed unfeasible for a light cable percussive rig to be positioned close to where the construction will take place. Moreover, at 7.7m depth at position WS01, sub artesian conditions, or 'blowing sands', have also been recorded, which again could cause some issues with the above method.



As alternative to the above, the contractor could consider pre-boring to a depth, prior to installing driven piles, as the suitability of the piles could then be confirmed by re-driving the piles after a set has been reached.

In any event, in order to formulate a suitable design, the advice of specialist piling contractors must be sought. The access constraints shall need to be considered to ensure an efficient method of installation can be achieved. Furthermore, the pile type/design will likely need to be configured from the data obtained thus far.

In addition to the above, and in light of the soft near surface soils which were revealed to depths of up to 3m, it is not recommended that ground bearing ground floor slabs be employed. In this instance it would be necessary to suspend floors between foundation positions, such that the floor loads are transmitted via the foundations to competent soils at depth. Once again, this form of construction shall also reduce further loading at the crest of the slope, which shall again help with regards to the slope stability.

Ultimately, if the above actions are adhered to, it is considered that the slope shall remain stable both during and after construction of the extension, as the loading will be transferred through and below the soils forming the embankment. Upmost care must be taken during the construction phase, however.

It is recommended that a suitably qualified engineer assesses the stability of the slope during the piling phase. It would also be prudent for groundworkers to form a daily visual slope inspection and cease works should any apparent movement be recognised.

9. Further Work

- This report should be forwarded to the relevant authorities as soon as practicable to ensure they have sufficient time to review and discuss any issues.
- Implement appropriate gas protection measures, as per the planning conditions.
- Hold discussions with piling contractors with regards to the appropriate pile types, taking both the slope stability and also access constraints in to account.
- Detailed design of the sub-structure.



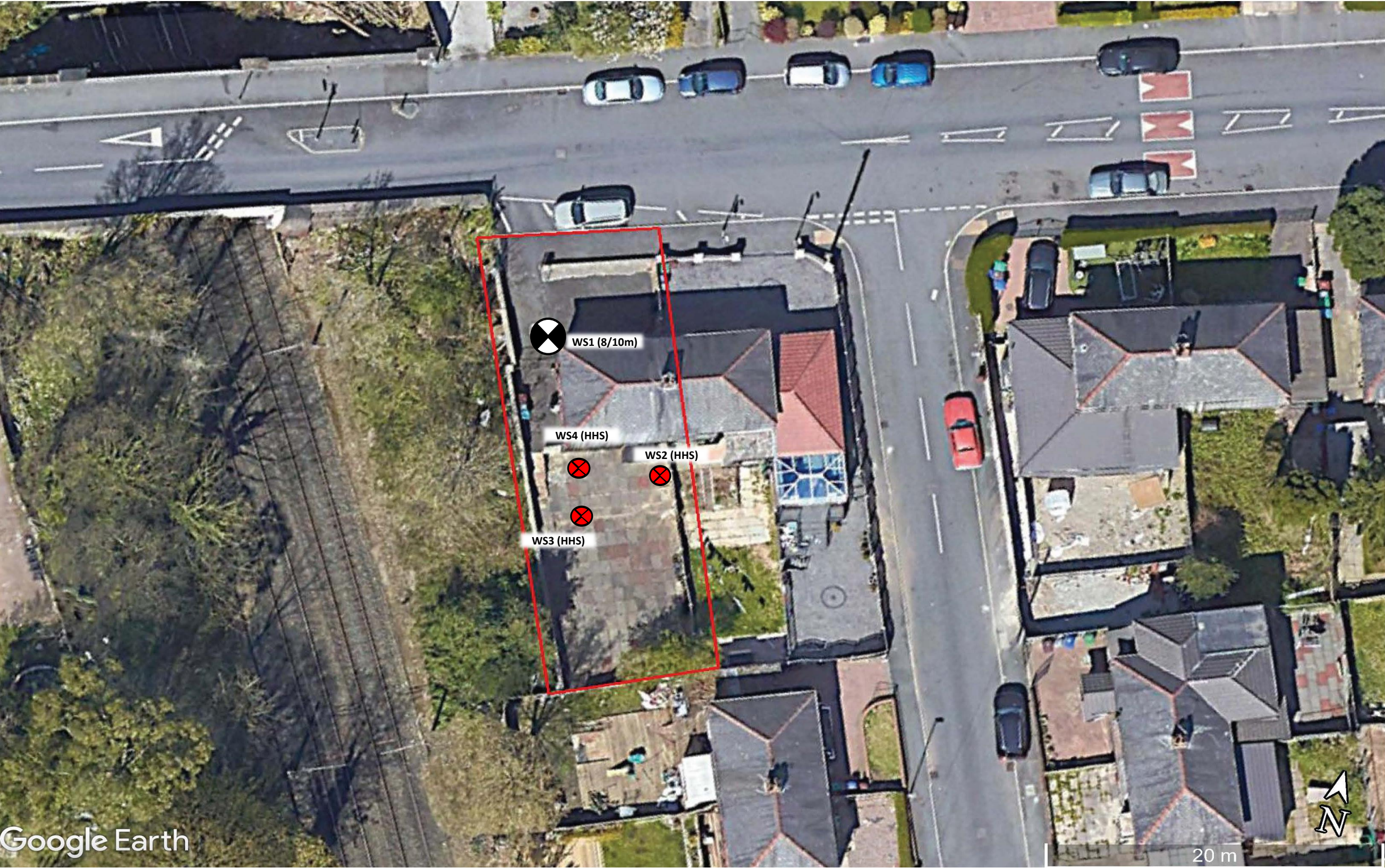
10. References

- British Standards Institution (1990) BS1377: *British standard methods of test for soils for civil engineering purposes*, B.S.I., London.
- British Standards Institution (2015) BS5930: *Code of practice for site investigations*, B.S.I., London.
- British Geological Survey (NERC) (2022), BGS, Keyworth.
 - Geology of Britain Viewer:
(http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html)
 - Lexicon of Named Rock Units:
(<http://www.bgs.ac.uk/lexicon/>)
- NHBC Standards, Chapter 4.2, *Building near trees*



Appendix 1

Site Plan



Notes:
Investigation positions approximated from site operative's notes.



Rogers Geotechnical Services Ltd
Offices 1 & 2, Barncliffe Business Park,
Near Bank, Shelley, Huddersfield, HD8 8LU
Telephone: 0843 50 66 87
www.rogersgeotech.co.uk

Client: Mr Zaheer Aslam	
Job Number: C2491/22/E/4020	
Project Details: Wilton Road, Crumpsall	
Scale:	Not to scale - reference only





Appendix 2

Borehole Records



Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: 48 & 50 Wilton Rd

Project No.
C2491/22/E/4020

Co-ords:

Hole Type
WLS

Location: Crumpsall, Manchester M8 4EL

Level:

Scale
1:50

Client: Mr Zaheer Aslam

Dates: 26/04/2022

Logged By
RAP

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results					
		1.00	SPT			N=0 (1,0/0,0,0,0)	1.20			MADE GROUND (CLAY) (Driller's notes).	1
		1.50	D	117	100					MADE GROUND (Soft brown and greyish brown silty CLAY (Re-worked)).	
		2.00	SPT			N=0 (1,0/0,0,0,0)	2.00			Very soft dark brown organic silty CLAY. Occasional rootlets. [TILL].	2
		2.60	D	102	100		2.70			Soft brown silty CLAY. [TILL].	
		3.00	SPT			N=20 (1,4/5,5,5,5)	3.20			Loose and medium dense thinly laminated brown silty and very silty fine SAND. [GLACIOFLUVIAL].	3
		3.60	D	102	100						
		4.00	SPT			N=5 (1,2/1,2,1,1)					
				87	100					4.5m: 200mm sandy silty CLAY.	
		4.80	D				5.00			Medium dense brown locally silty fine and medium SAND. [GLACIOFLUVIAL].	5
		5.00	SPT			N=14 (2,2/3,4,3,4)					
		5.50	D	77	80						
		6.00	SPT			N=16 (2,2/3,4,4,5)					
				77	80						
		7.00	SPT			N=12 (1,3/3,3,3,3)					
		7.50	D	77	80		8.00			End of Borehole at 8.00m	8
		7.50									
		7.70									
		7.70									

Remarks

Cased borehole to 8m; 119mm casing to 4m and 102mm casing to 8m. Water strike at 7.7m. Drilled to 8m. Running sands then met which rose up the casing. Drilled again to clear the hole but sands rose again to 7.5m. Borehole terminated. Dynamic probe sunk through base of the borehole. It should be noted that this position is at a higher elevation than the location of the proposed extension.





Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: 48 & 50 Wilton Rd

Project No.
C2491/22/E/4020

Co-ords:

Hole Type
WLS

Location: Crumpsall, Manchester M8 4EL

Level:

Scale
1:50

Client: Mr Zaheer Aslam

Dates: 27/04/2022

Logged By
RAP

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results					
		0.80	D	67	100		0.30				
		1.80	D	57	100		1.05				1
				46	100		3.00			End of Borehole at 3.00m	3
											4
											5
											6
											7
											8
											9
											10

Remarks

Hand-held windowless sampling equipment. Unable to progress equipment beyond 3m.





Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: 48 & 50 Wilton Rd

Project No.
C2491/22/E/4020

Co-ords:

Hole Type
WLS

Location: Crumpsall, Manchester M8 4EL

Level:

Scale
1:50

Client: Mr Zaheer Aslam

Dates: 27/04/2022

Logged By
RAP

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results					
		2.80	D	67	100		0.80			Soft brown organic silty CLAY. [TILL].	
				57	100					Loose and medium dense thinly laminated brown silty and very silty fine SAND. [GLACIOFLUVIAL].	1
				46	100		2.10			Medium dense brown silty fine and medium SAND. [GLACIOFLUVIAL].	2
							3.00			End of Borehole at 3.00m	3
											4
											5
											6
											7
											8
											9
											10

Remarks

Hand-held windowless sampling equipment. Unable to progress equipment beyond 3m.





Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: 48 & 50 Wilton Rd

Project No.
C2491/22/E/4020

Co-ords:

Hole Type
WLS

Location: Crumpsall, Manchester M8 4EL

Level:

Scale
1:50

Client: Mr Zaheer Aslam

Dates: 27/04/2022

Logged By
RAP

Well	Water Strikes	Samples and In Situ Testing					Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Dia. (mm)	TCR (%)	Results					
				67	100		0.70			Soft brown organic silty CLAY. [TILL].	
				57	100		2.00			Loose and medium dense thinly laminated brown silty and very silty fine SAND. [GLACIOFLUVIAL].	1
				47	100		3.00			Medium dense brown silty fine and medium SAND. [GLACIOFLUVIAL].	2
										End of Borehole at 3.00m	3
											4
											5
											6
											7
											8
											9
											10

Remarks

Hand-held windowless sampling equipment. Unable to progress equipment beyond 3m.





Appendix 3

Dynamic Probe Results



Probe Log

Probe No.

DP01

Sheet 1 of 2

Project Name: 48 & 50 Wilton Rd

Project No.
C2491/22/E/4020

Co-ords:

Hole Type
DCP

Location: Crumpsall, Manchester M8 4EL

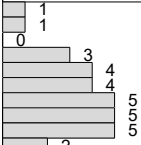
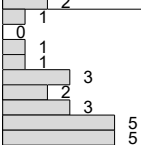
Level:

Scale
1:50

Client: Mr Zaheer Aslam

Dates: 26/04/2022

Logged By
RMC

Depth (m)	Blows/100mm					Torque (Nm)
	0	10	20	30	40	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Remarks:
Commenced from base of WS01 (8m depth).

Fall Height 750mm

Cone Base Diameter 50.5mm

Hammer Wt 63.5kg

Final Depth 11.1m

Probe Type DPSH-B





Probe Log

Probe No.

DP01

Sheet 2 of 2

Project Name: 48 & 50 Wilton Rd

Project No.
C2491/22/E/4020

Co-ords:

Hole Type
DCP

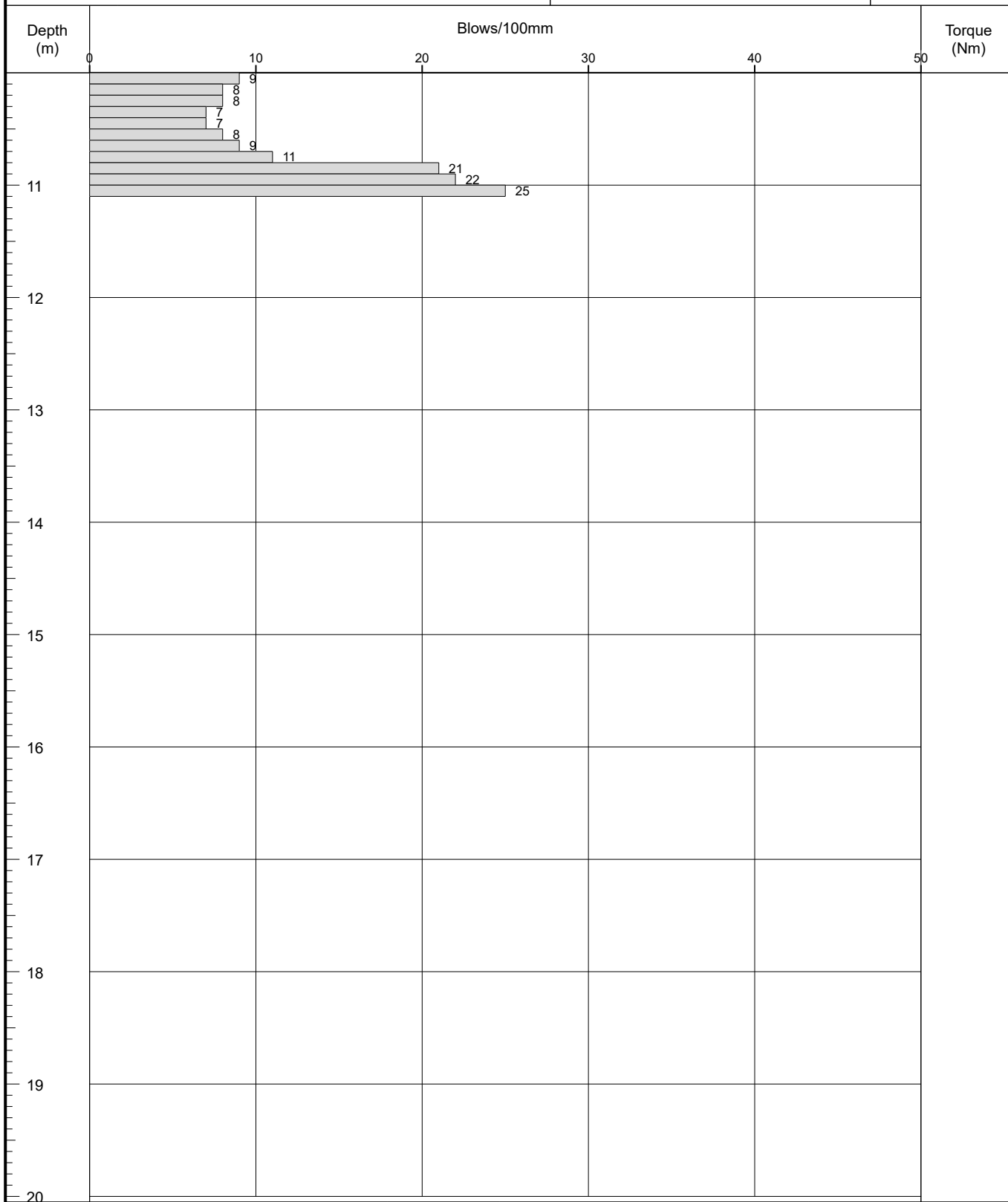
Location: Crumpsall, Manchester M8 4EL

Level:

Scale
1:50

Client: Mr Zaheer Aslam

Dates: 26/04/2022

Logged By
RMCRemarks:
Commenced from base of WS01 (8m depth).

Fall Height 750mm

Cone Base Diameter 50.5mm

Hammer Wt 63.5kg

Final Depth 11.1m

Probe Type DPSH-B





Appendix 4

Laboratory Testing - Geotechnical

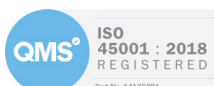
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LABORATORY REPORT

job number C/2491/22/E/4020	client ref
site address 48 & 50 Wilton Road, Crumpsall, Manchester, Greater Manchester, M8 4EL	client address Mr Zaheer Aslam 48 & 50 Wilton Road, Crumpsall, Manchester, M8 4EL
consultant	
date scheduled 08/05/2022	date issued 24/05/2022
issued by H J Letch	job title Technical Manager
checked by T Merry	

Rogers Geotechnical Services Ltd Telephone 01484 607 977
Email enquiries@rogersgeotech.co.uk www.rogersgeotech.co.uk
Unit 4, Barncliffe Business Park, Near Bank, Shelley, Huddersfield, West Yorkshire HD8 8LU.





8948

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Schedule of UKAS Accredited Laboratory Tests

1. CLASSIFICATION OF SOIL	BS 1377-2:1990	BS EN ISO 17892	Accredited (A)	Unaccredited (U)
1.1 Moisture / Water content determination				
i. Oven drying	Pt 2 : 3.2	Pt 1 : 2014	A	
ii. Saturation m/c of chalk	Pt 2 : 3.3			U
1.2 Index Properties				
i. Liquid limit – cone penetrometer	Pt 2 : 4.3	Pt 12 : 2018 : 5.3 / 5.5	A	
ii. Plastic limit	Pt 2 : 5.3		A	
iii. Shrinkage limit	Pt 2 : 6.3			U
iv. Linear shrinkage	Pt 2 : 6.5		A	
1.3 Particle Density				
i. Gas jar	Pt 2 : 8.2			U
ii. Large pycnometer	Pt 2 : 8.3			U
iii. Small pycnometer	Pt 2 : 8.4	Pt 3 : 2015 : 5.1		U
1.4 Density Tests				
i. Linear measurement	Pt 2 : 7.2	Pt 2 : 2014 : 5.1	A	
ii. Immersion in water	Pt 2 : 7.3	Pt 2 : 2014 : 5.2		U
iii. Fluid / Water displacement	Pt 2 : 7.4	Pt 2 : 2014 : 5.3		U
iv. Sand replacement	Pt 9 : 2.1, 2.2			U
v. Core cutter	Pt 9 : 2.4			U
1.5 Particle Size Distribution				
i. Dry Sieve	Pt 2 : 9.2	Pt 4 : 2016 : 5.2	A	
ii. Wet Sieve	Pt 2 : 9.3	Pt 4 : 2016 : 5.2	A	
iii. Sedimentation by pipette	Pt 2 : 9.4	Pt 4 : 2016 : 5.3 / 5.4	A	
iv. Sedimentation by hydrometer	Pt 2 : 9.5			U
2. CHEMICAL TESTS	BS 1377-3:2018			
ii. Mass loss on ignition	Pt 3 : 4			U
3. COMPACTION RELATED TESTS	BS 1377-4:1990			
3.1 Dry density/moisture relationship				
i. 2.5kg rammer – 1 litre mould	Pt 4 : 3			U
- CBR mould	Pt 4 : 3			U
ii. 4.5kg rammer – 1 litre mould	Pt 4 : 3			U
- CBR mould	Pt 4 : 3			U
3.2 Moisture Condition Value				
i. Single point test	Pt 4 : 5.4			U
ii. MCV/moisture content relationship	Pt 4 : 5.5			U
3.3 California Bearing Ratio				
i. Undisturbed sample	Pt 5 : 7			U
ii. Recompacted sample	Pt 5 : 7			U
iii. Soaked, inc measurement of swell	Pt 5 : 7			U
4. COMPRESSIBILITY OF SOIL	BS 1377-5:1990			
i. One dimensional consolidation	Pt 5 : 3			U
ii. Swelling pressure test	Pt 5 : 3			U
5. SHEAR STRENGTH OF SOIL	BS 1377-7:1990			
i. Hand shear vane	Makers instructions			U
ii. Shear box (100mm square sample)	BS 1377 : Pt 7 : 4			U
iii. Triaxial – quick undrained	BS 1377 : Pt 7 : 8, 9			U
6. PERMEABILITY				
i. Falling head	K. H. Head Vol 2			U
ii. Constant head	BS 1377 : Pt 6 : 6			U
iii Triaxial cell	BS 1377 : Pt 6 : 6			U
7. ROCK TESTS				
7.1 Classification Tests				
i. Natural moisture content	-			U
ii. Saturated moisture content	-			U
iii. Natural density	-			U
iv. Porosity	-			U
7.2 Strength Tests				
i. Point load index	ISRM '85			U
ii. Uniaxial compression test	ISRM '81			U



GEOTECHNICAL LAB RESULTS

GEOTECHNICAL
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Disclaimer

The results reported herein relate only to the material supplied to the laboratory.

GEOTECHNICAL
ENVIRONMENTAL



Project No.

Project Name	
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C2491/22/E/4020

48 & 50 Wilton Rd

All tests performed in accordance with BS EN ISO 17892 unless specified otherwise

Page 5 of 13



Rogers Geotechnical Services Ltd.
Offices 1&2,
Barncliffe Business Park,
Near Bank, Shelley,
Huddersfield,
HD8 8LU

Classification of Index Properties

C2491/22/E/4020

Project Name: 48 & 50 Wilton Rd

BS EN ISO: 17892: Parts 1, 12

Fig. 2
Sheet. 1

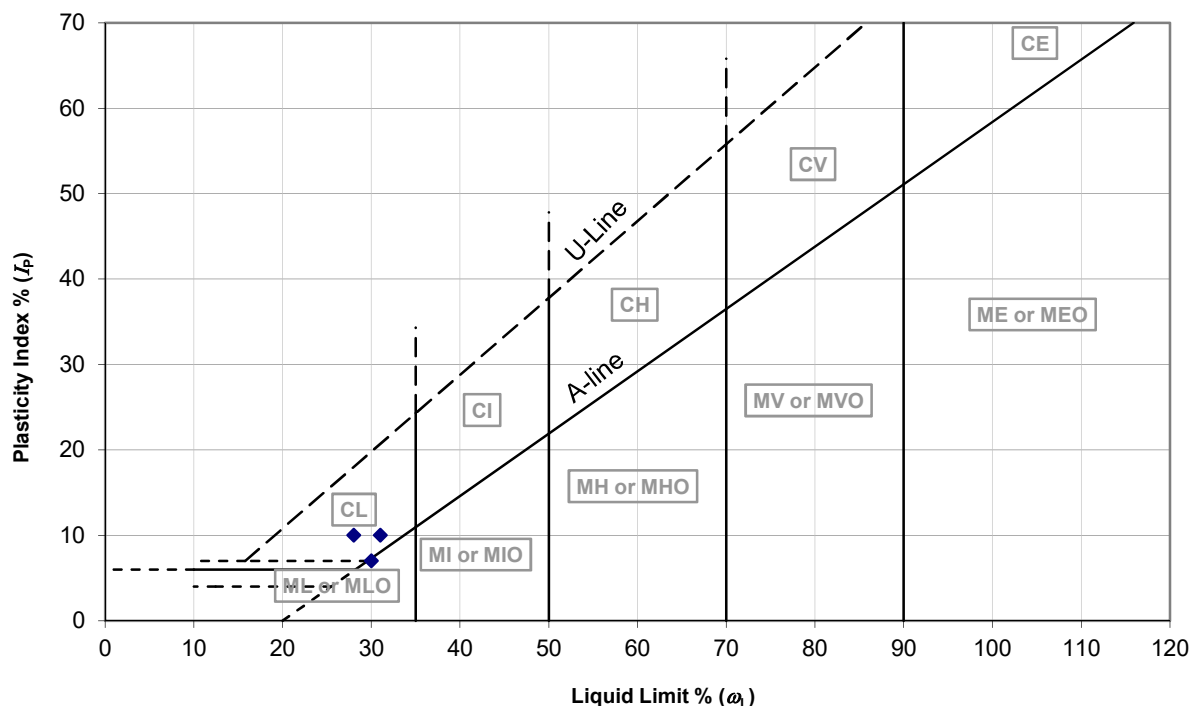
Location:

Input By: Harry

Client: Mr Zaheer Aslam

Check By: Harry

Location	Depth (m)	Moisture Content (w) (%)	Liquid Limit (wL) (%)	Plastic Limit (wP) (%)	Plasticity Index (IP) (%)	Retained by 0.425mm (%)	Modified (w) (w') (%)	Modified (IP) (IP') (%)	Liquidity/ Consistency		Casagrande Class	N.H.B.C Class (%)
									(IL) (%)	(IC) (%)		
WS01	1.50	16.8	28	18	10	0	17	10	-0.1	1.1	C L	LOW
WS01	2.60	30.4	30	23	7	5	32	7	1.1	-0.1	M L	*
WS02	0.80	35.3	31	21	10	3	36	10	1.4	-0.4	C L	*





PARTICLE SIZE DISTRIBUTION

Job Ref C2491/22/E/4020

Borehole/Pit No. WS01

Site Name 48 & 50 Wilton Rd

Sample No. 3

Soil Description Brown silty SAND.

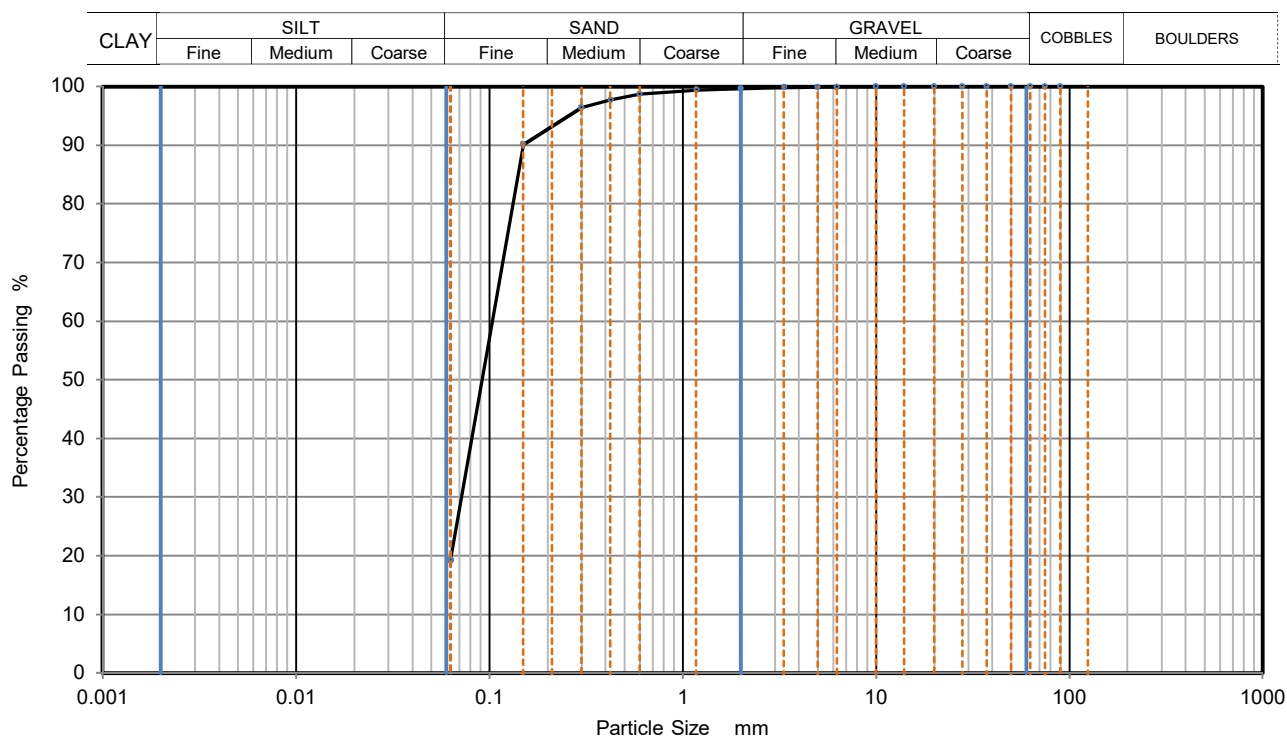
Depth, m 3.60

Specimen Reference 3 Specimen Depth 3.6 m

Sample Type D

Test Method ISO 17892 -4, by sieving on pre-dried or dry sample

KeyLAB ID RGS_202205092



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
	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	98		
0.3	96		
0.15	90		
0.063	19		

Dry Mass of sample, g 1300

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	81
Fines <0.063mm	19

Grading Analysis		
D100	mm	10
D60	mm	0.104
D30	mm	0.0719
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS EN ISO 17892 - 4, unless noted below

Test performance date: 11/05/2022

Operator	Checked	Approved	Sheet printed	Fig 3
Harry	Harry	Harry	24/05/2022	Sheet 1



PARTICLE SIZE DISTRIBUTION

Job Ref C2491/22/E/4020

Borehole/Pit No. WS01

Site Name 48 & 50 Wilton Rd

Sample No. 4

Soil Description Brown very silty SAND.

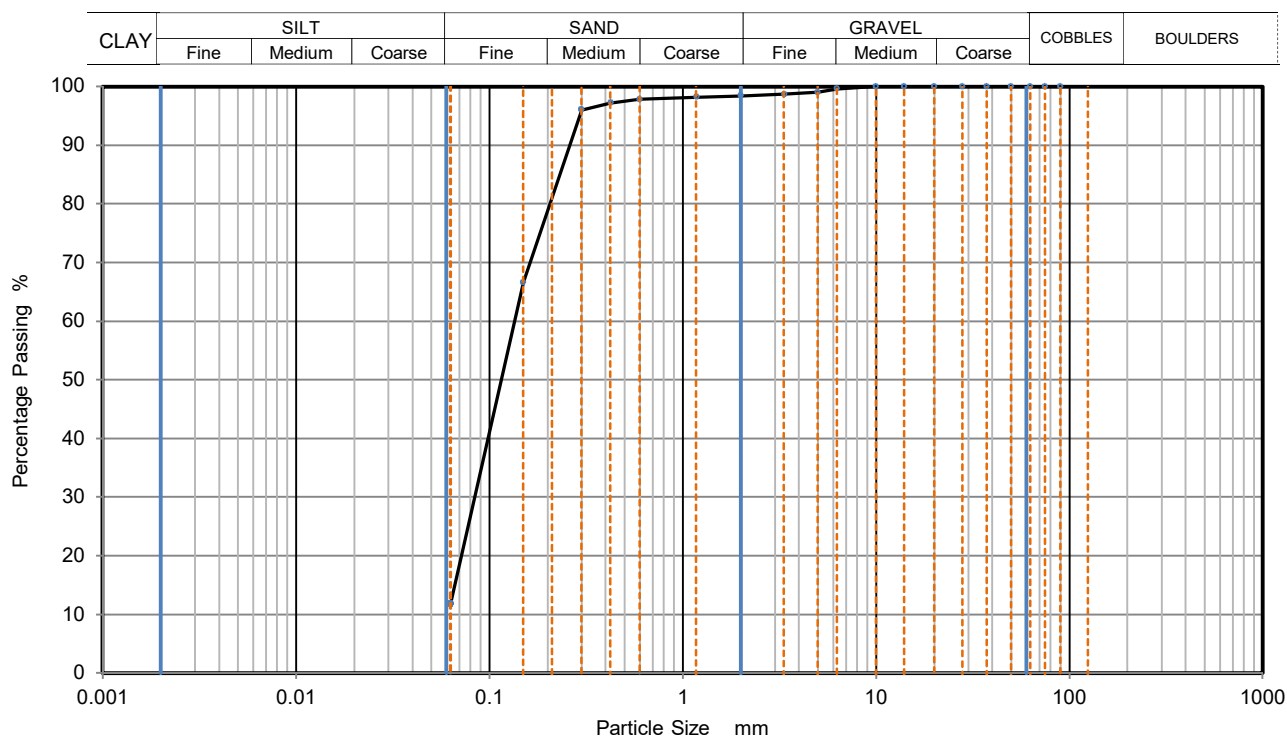
Depth, m 4.80

Specimen Reference 4 Specimen Depth 4.8 m

Sample Type D

Test Method ISO 17892 -4, by sieving on pre-dried or dry sample

KeyLAB ID RGS_202205093



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	98		
0.6	98		
0.425	97		
0.3	96		
0.15	67		
0.063	12		

Dry Mass of sample, g 1165

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	86
Fines <0.063mm	12

Grading Analysis		
D100	mm	10
D60	mm	0.135
D30	mm	0.0841
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS EN ISO 17892 - 4, unless noted below

Test performance date: 11/05/2022

Operator	Checked	Approved	Sheet printed	Fig 3
Mark Tuck	Harry	Harry	24/05/2022	2



PARTICLE SIZE DISTRIBUTION

Job Ref

C2491/22/E/4020

Borehole/Pit No.

WS01

Site Name

48 & 50 Wilton Rd

Sample No.

6

Soil Description

Brown silty SAND.

Depth, m

7.50

Specimen Reference

6

Specimen Depth

7.5

m

Sample Type

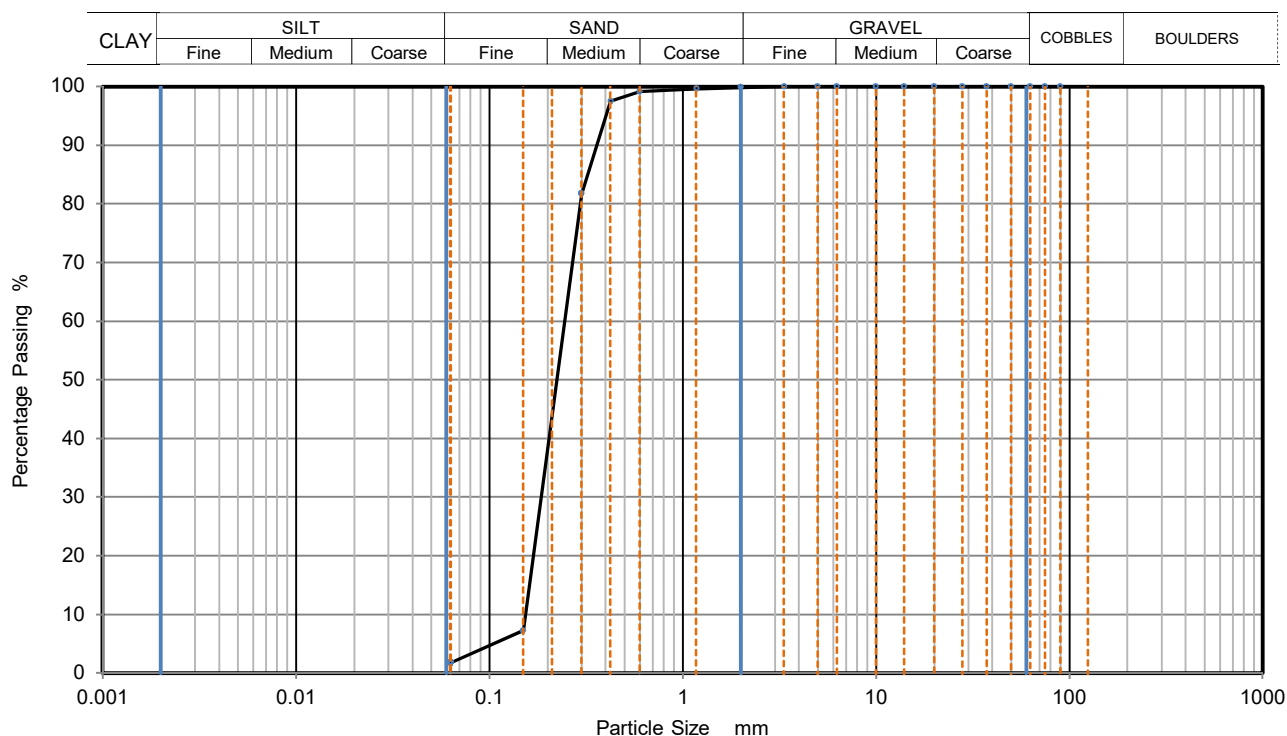
D

Test Method

ISO 17892 -4, by sieving on pre-dried or dry sample

KeyLAB ID

RGS_202205095





PARTICLE SIZE DISTRIBUTION

Job Ref

C2491/22/E/4020

Borehole/Pit No.

WS02

Site Name

48 & 50 Wilton Rd

Sample No.

2

Soil Description

Brown silty SAND.

Depth, m

1.80

Specimen Reference

2

Specimen Depth

1.8

m

Sample Type

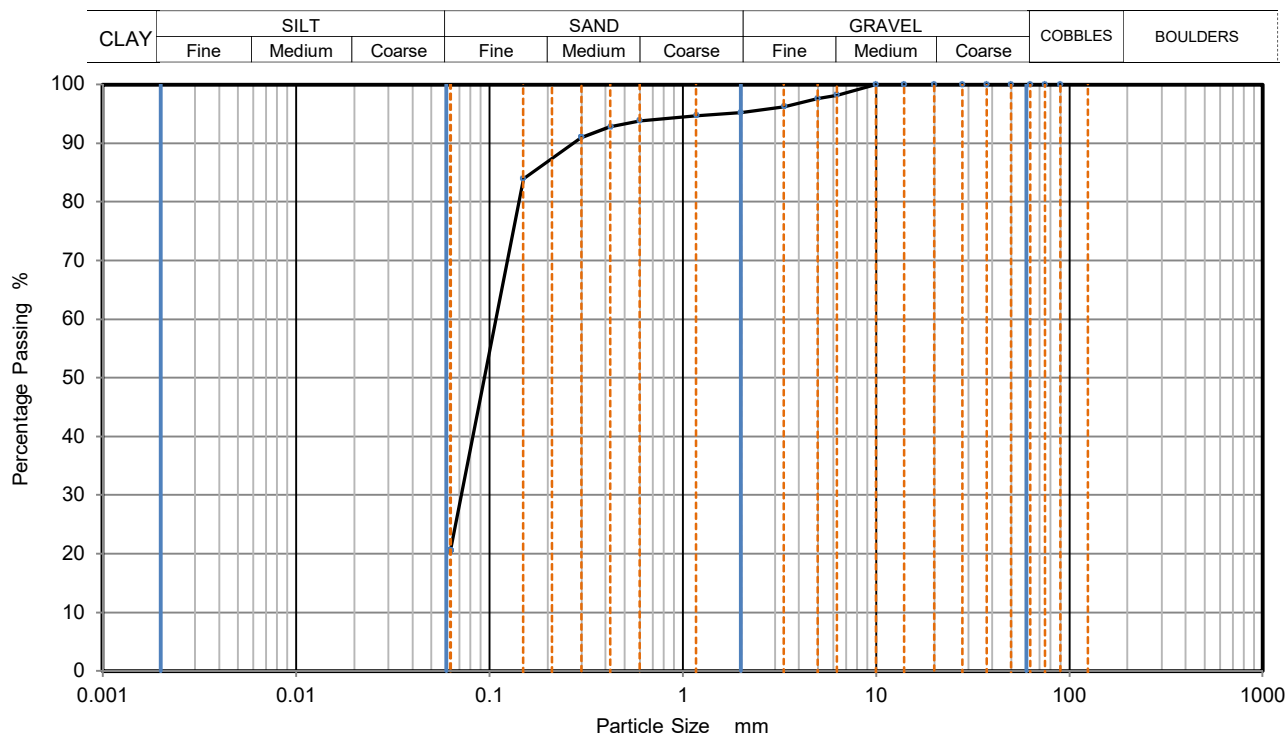
D

Test Method

ISO 17892 -4, by sieving on pre-dried or dry sample

KeyLAB ID

RGS_202205097



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	98		
5	98		
3.35	96		
2	95		
1.18	95		
0.6	94		
0.425	93		
0.3	91		
0.15	84		
0.063	21		

Dry Mass of sample, g

827

Sample Proportions	% dry mass
Very coarse	0
Gravel	5
Sand	74
Fines <0.063mm	21

Grading Analysis		
D100	mm	10
D60	mm	0.108
D30	mm	0.0717
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS EN ISO 17892 - 4, unless noted below

Test performance date: 11/05/2022

Operator

Checked

Approved

Sheet printed

Fig 3

Harry

Harry

24/05/2022

Sheet 5



End of Report

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