

Our Ref C2187/21/E/3364
5th of November 2021

**Environmental
Geotechnical
Specialists**



Capewell Construction & Developments,
11 Long Moor Lane,
Huddersfield
HD8 8LY

For the attention of Shaun Joyce.

Dear Shaun,

Ref: Proposed Development at Land off Stoney Bank Lane, New Mill.

Introduction

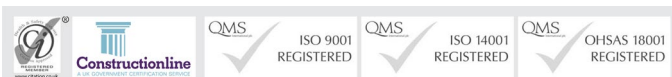
Thank you for your request to undertake ground investigation at the above-mentioned site. It is understood that concerns have been raised by the local authority with regards to the current stability of the temporary access route which has recently be created for plant and vehicles. Development plans suggest that an alternative access point shall be situated elsewhere on site for the final development. However, in order to provide suitable access for plant and vehicles during the groundworks and construction phase, a temporary road has been created and can be accessed from Stoney Bank Lane.

Given that a cut and fill operation is underway in order to create the desired profile for the property, a surplus volume of material shall need to be removed from site. As such, it is understood that ~20 tonne grab lorries shall be accessing the site, thus a temporary road comprising a reinforced 150 to 200mm concrete capping, underlain by what appears to be type 1 hardcore, has been installed.

As per the attached site plan, the temporary access route runs parallel with the rear gardens of certain properties on Old Mill Lane. Indeed, it should be appreciated that the site is situated on a slope, such that the properties on Old Mill Lane are situated at a lower elevation. It would appear that during the construction of those properties, a cut and fill exercise was undertaken in to the slope, whereby the southern boundaries of these properties (i.e. rear gardens) incorporated a retaining structure. Publically available historical street view images, in addition to recent observations from Stoney Bank Lane, suggest these retaining features comprise a series of sandstone boulders, which are now predominantly covered by vegetation. The temporary access route for the development is up and beyond these retaining features. With reference to the attached site plan, it can be seen that a safety buffer has been put in place to keep the roadway away from the edge and top of the wall.

Notwithstanding the above, concerns have been raised that the presence of relatively heavy vehicles, which will likely result in vibrations upon this track, could lead to instability of the ground retained by the walls. Consequently, desk-based research has been carried out to assess the geology beneath the site, in addition to a site visit which been undertaken in order to assess the actual ground conditions beneath the site. This letter report presents the findings of these assessments and provides comments on the stability of the temporary access route.

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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 ¹	Previous Name ²	Description ³
Superficial Geology	None recorded	-	No superficial or mass movement (i.e. landslide) deposits recorded beneath the site.
Solid Geology	Rough Rock	-	A cross-bedded, coarse-grained feldspathic sandstone. A named sandstone member of the Rossendale Formation.

It should be appreciated that no superficial deposits are shown to be present beneath the site. Markers within the same faulted block on the geological map suggest that the solid geology (Rough Rock) generally dips at about 8° to the north.

Site Visit

A site visit was undertaken on the 1st of November 2021, whereupon trialpits were excavated on the temporary access route with a tracked excavator in order to reveal the nature of the near surface soils; approximate positions are annotated on the attached plan. Suitable samples 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 trialpit records which are appended to this letter. However, to summarise, beneath the capping of concrete and sub-base, sub-angular and tabular gravels, cobbles and boulders of medium- to coarse-grained sandstone were revealed to be present in a silty, very sandy matrix.

It should be noted that upon arriving at the site, a large excavation had been undertaken to the south (rear) of the site. Whilst positioned slightly away from the access route, the excavation presented an opportunity to analyse a cross-section and vertical face of the sandstone (Rough Rock) which is now known to underlie the site. Whilst it was not possible to enter the excavation at the time of the site visit, it was evident that the rock was generally dipping at shallow angles of between 5° and 10° to the north/north-west. Moreover, it was evident that there was a limited thickness of the weathered fraction above the rock. As such, it is fair to consider that the top of the rock head caused refusal within the trialpits; refusal at 0.85m in TP01 and at 1.05m in TP02.

Laboratory Testing

In order to classify the material overlying the rockhead, a particle size distribution (dry sieve) was undertaken on the finer fraction of the material (gravels, sands and silts). The test result sheets are appended to this letter.

Discussion

The desk-based research suggests that the Rough Rock is present beneath the entirety of the site, and most notably below the temporary access route which is the focus of this report.

¹ Sources: British Geological Survey (NERC) Map Sheets 86; Glossop; Solid and Drift Edition, and Geology of Britain Viewer [online resource from www.bgs.ac.uk]

² Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [online resource from www.bgs.ac.uk]

The geological maps indicate that such strata would likely dip at about 8°. From the evidence collected from the trialpits, and from observations of the excavation where the rock is exposed, it would appear that the ground conditions correlate well with the published geological data.

With reference to the retaining feature to the rear of the properties on Old Mill Lane, given the make-up of the wall, it is considered that this construction type has allowed water to move freely i.e. free-draining. Indeed, no groundwater strikes were observed within the weathered fraction of the rock. Moreover, no groundwater was noted within the excavation to the rear of the site. As such, it is unlikely that there is currently a build-up of water behind the wall. It should be noted that the site visit was undertaken during and also after a prolonged period of heavy rainfall.

A precise measurement of the wall was not undertaken during the site visit, but it is estimated to be around 3m in height. Given the depth of refusal within TP02, it is therefore anticipated that this wall is retaining a face comprising of around 1m of soil and 2m of rock.

In view of nature of the Rough Rock, both from analyses on site and from the published geological descriptions, it is anticipated that such strata possess a friction angle³ of 30°. This friction angle exceeds the dip of the rock, therefore it has been determined that the rock is highly unlikely to slip along any bedding planes and should remain stable both in the short term and long term.

In addition to the above, the weathered fraction of the Rough Rock was revealed to be granular in composition, with minimal fines present, albeit a minor percentage of silt. Indeed, the particles appeared to increase in size with depth. Given the composition of this material, it is unlikely that shear failure will occur with the increase in load i.e. presence of heavy vehicles. Furthermore, the apparent free-draining conditions of the wall have allowed the soils to drain, thus resulting in relatively dry ground conditions.

The wall will be offering resistance to the active forces exerted by the weathered fraction. Moreover, the combination of free-draining conditions, the granular nature of the weathered fraction and the inclusion of coarse particles is favourable as this shall result in the soil exhibiting a relatively high phi (Φ) angle. In addition, taking into consideration the presence of the reinforced concrete and hardcore sub-base which has been put in place to distribute loads, it is not anticipated that the introduction of vehicles to the temporary access route shall result in the instability of the ground beneath this section of the site, and ultimately is unlikely to cause instability of the adjacent wall. Clearly should evidence of such movement be observed, then activities should be immediately stopped and the mode of failure assessed.

We trust that this information is of interest and should you have any other requirements do not hesitate to contact us.

For Rogers Geotechnical Services Ltd,
Yours Faithfully



Rob Palmer MSc, FGS, ACIEH
Senior Geo-environmental Engineer

³ Hoek, E., Bray, J. and Institution of Mining And Metallurgy (1974). *Rock Slope Engineering*. London: Published For The Institution Of Mining And Metallurgy By Taylor & Francis.



Only figured dimensions should be used.
 Scaled dimensions should be checked with the Architect.
 This drawing together with the design, is the property and copyright of the Architect and must not be reproduced without written permission
 DO NOT SCALE OFF THIS DRAWING

- LEGEND**
- Tree root protection barrier installed in accordance with arboricultural method statement.
 - 1m high safety fencing to delineate edge of gravel track.
 - Locking site security gates fitted with relevant safety signage for operations on site.
 - Proposed site office cabin sited on temporary support to be offloaded by HIAB.
 - Proposed site canteen/ welfare unit.
 - Portaloo.
 - Crushed gravel temporary site surfacing.
 - Crushed gravel temporary site surfacing. To be laid in accordance with tree root protection method statement using a 'no dig' solution.

CONSTRUCTION MANAGEMENT PLAN

rev	description	drawn	auth	date



acumenarchitects.co.uk 01484 546000
 Headrow House, Old Leeds Road, Huddersfield, HD1 1SG

Client: **ACUMEN**

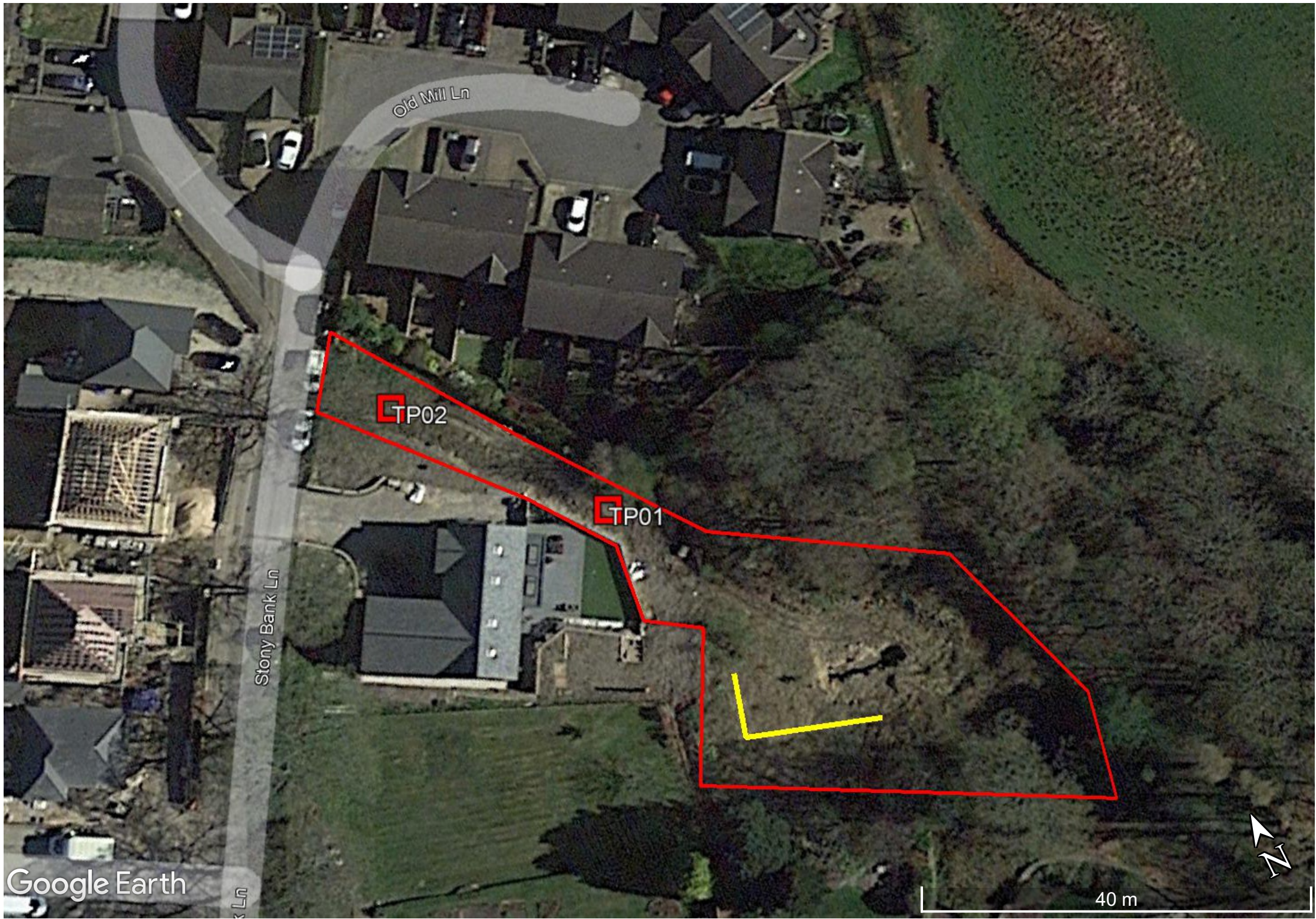
Project: **HAZELDENE HOUSE
 STONEY BANK LANE, THONGSBRIDGE**

Project No	Drawing No	Rev
2628	L(100)10	/

Description: **PROPOSED CONSTRUCTION MANAGEMENT PLAN**

Scale	Date Drawn	Drawn By	Authorised By
1:200@A1	SPE'21	JF	JC

Purpose of Issue: Building Regs Tender Comment Approval Construction



Old Mill Ln

TP02

TP01

Stony Bank Ln

Google Earth

40 m





Trial Pit Log

Trialpit No

TP01

Sheet 1 of 1

Project Name: Land off Stoney Bank

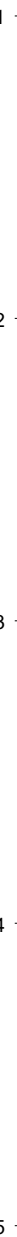
Project No.
C2187/21/E/3364Co-ords: -
Level:Date
01/11/2021

Location: New Mill, Holmfirth HD9 7LS

Dimensions (m):
Depth 0.85
1.4
Scale
1:25
Logged
RAP

Client: Capewell Construction & Developments

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40 - 0.80	B		0.20 0.30			MADE GROUND (Hardcore).
							Dark brown and brown slightly organic silty very gravelly fine and medium SAND. Occasional rootlets.
							Brown silty very sandy angular and tabular fine to coarse GRAVEL of coarse-grained sandstone. Low to medium cobble content. Low boulder content [Weathered Rough Rock].
				0.85			Excavator refusal; rock [Rough Rock]. End of pit at 0.85 m



Remarks: Pits undertaken between concrete sections.

Stability:





Trial Pit Log

Trialpit No

TP02

Sheet 1 of 1

Project Name: Land off Stoney Bank

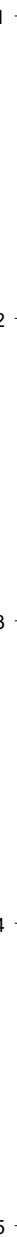
Project No.
C2187/21/E/3364Co-ords: -
Level:Date
01/11/2021

Location: New Mill, Holmfirth HD9 7LS

Dimensions (m):
1.4
0.9
1.00Scale
1:25
Logged
RAP

Client: Capewell Construction & Developments

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			MADE GROUND (Hardcore).
				0.30			Dark brown and brown slightly organic silty very gravelly fine and medium SAND. Occasional rootlets.
							Brown silty very sandy angular and tabular fine to coarse GRAVEL of coarse-grained sandstone. Low to medium cobble content. Low boulder content [Weathered Rough Rock].
				1.00			Excavator refusal; rock [Rough Rock]. End of pit at 1.00 m



Remarks: Pits undertaken between concrete sections.

Stability:









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LABORATORY REPORT

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job number C/2187/21/E/3364	client ref
site address Stoney Bank Lane, New Mill, Holmfirth, West Yorkshire, HD9 7LS	client address Capewell Construction 11 Long Moor Lane, Huddersfield, West Yorkshire, HD8 8LY
date scheduled 02/11/2021	date issued 05/11/2021
issued by H.J.Letch	job title Asst. Lab Manager
checked by	

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Schedule of UKAS Accredited Laboratory Tests

1. CLASSIFICATION OF SOIL	BS 1377-2:1990	BS EN 150 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				
ii. Mass loss on ignition	Pt 3 : 4			U
3. COMPACTION RELATED TESTS				
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. Recompact sample	Pt 5 : 7			U
iii. Soaked, inc measurement of swell	Pt 5 : 7			U
4. COMPRESSIBILITY OF SOIL				
ii. Swelling pressure test	Pt 5 : 3			U
5. SHEAR STRENGTH OF SOIL				
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



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GEOTECHNICAL LAB RESULTS

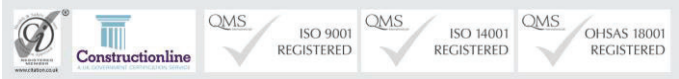
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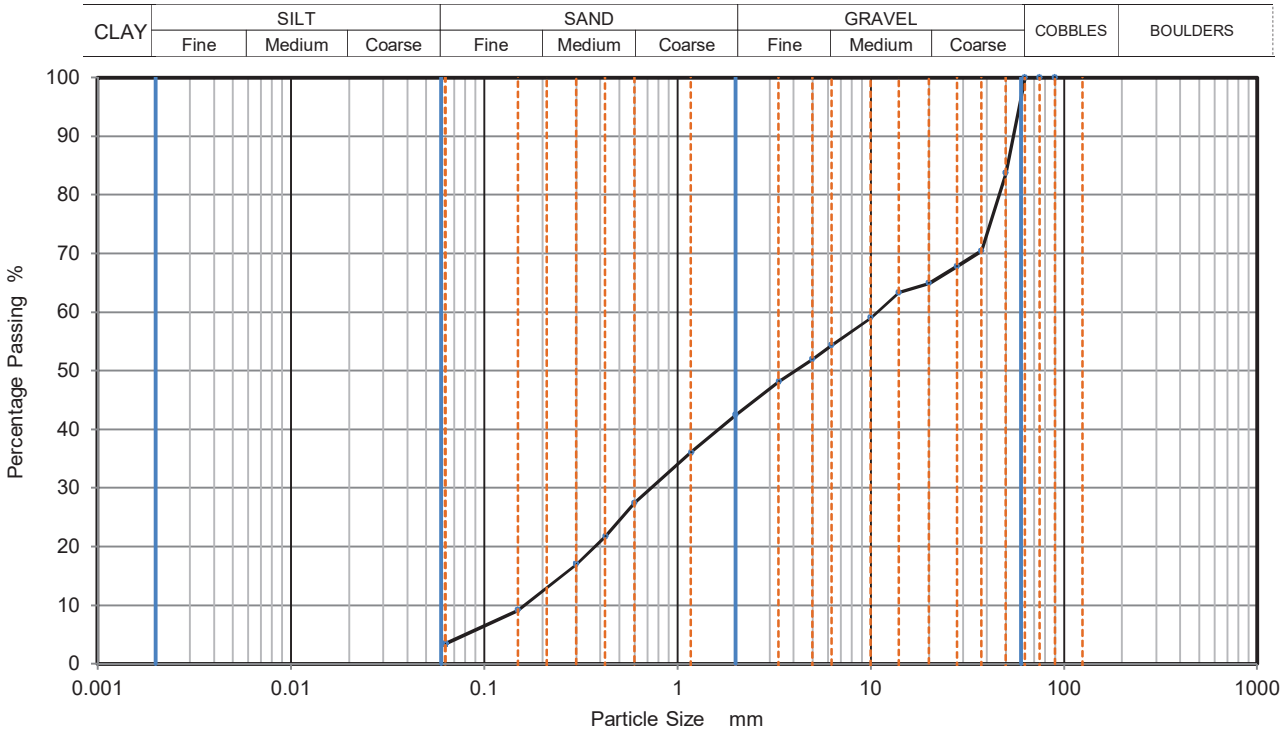
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PARTICLE SIZE DISTRIBUTION

Job Ref	C2187/21/E/3364
Borehole/Pit No.	TP01

Site Name	Land off Stoney Bank	Sample No.	1	
Soil Description	Brown silty very sandy GRAVEL. Low cobble content.	Depth, m	0.40	
Specimen Reference	D1	Specimen Depth	0.4 - 0.8 m	
Test Method	ISO 17892 -4, by sieving on pre-dried or dry sample		KeyLAB ID	RGS_202111030



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
	100		
90	100		
75	100		
63	100		
50	84		
37.5	70		
28	68		
20	65		
14	63		
10	59		
6.3	54		
5	52		
3.35	48		
2	42		
1.18	36		
0.6	27		
0.425	22		
0.3	17		
0.15	9		
0.063	3		

Dry Mass of sample, g	7140
Sample Proportions	% dry mass
Very coarse	0
Gravel	58
Sand	39
Fines <0.063mm	3
Grading Analysis	
D ₁₀₀ mm	63
D ₆₀ mm	10.8
D ₃₀ mm	0.735
D ₁₀ mm	0.162
Uniformity Coefficient	67
Curvature Coefficient	0.31

Remarks

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

Operator	Checked	Approved	Sheet printed	Fig 1
Tobias	Tobias	Harry	05/11/2021	Sheet 1

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End of Report

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