



**BARRATT HOMES, BLOOR HOMES NORTH WEST, JOHN RAYMOND JONES AND
THE TRUSTEES OF THE WREXHAM (PAROCHIAL) EDUCATION FOUNDATION**

PROPOSED DEVELOPMENT AT LAND SOUTH OF HOLT ROAD, WREXHAM

PRIOR EXTRACTION ASSESSMENT

DECEMBER 2018

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TRUSTEES OF THE WREXHAM (PAROCHIAL) EDUCATION FOUNDATION**

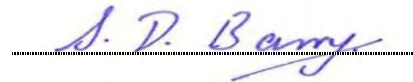
PROPOSED DEVELOPMENT AT LAND SOUTH OF HOLT ROAD, WREXHAM

PRIOR EXTRACTION ASSESSMENT

**PREPARED &
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EXECUTIVE SUMMARY

This report has been prepared to support a planning application by Barratt Homes, Bloor Homes North West, John Raymond Jones and the Trustees of the Wrexham (Parochial) Education Foundation (“the Applicants”) for a proposed development on land to the south of Holt Road, Wrexham. The proposed development site is in an area which has been designated as a mineral safeguarding area for sand and gravel resources. The Mineral Planning Authority has asked the developer to submit a “Prior extraction assessment” with the planning application in order to determine whether the proposed development would be compatible with the relevant mineral safeguarding policies.

The published geological plans for the area show the site to be underlain by glacial sand and gravel deposits. The deposits in this area are variable and generally comprise a coarse grained Upper Layer and a fine grained Lower Layer. A programme of site investigation has been undertaken which shows that the superficial deposits are in fact predominantly sand rather than sand and gravel, indicating that the coarse Upper Layer is absent. The lack of a significant proportion of gravel in the deposits means that it is not a commercially viable mineral resource. This is because a viable sand and gravel resource needs to contain at least 25-30% gravel to reach even the lowest threshold of viability, since the primary use of the mineral is to manufacture concrete which requires a significant proportion of gravel.

The adopted mineral safeguarding planning policy contains a criterion which allows non-minerals development in a mineral safeguarding area if a resource assessment provides evidence that “no exploitable reserves exist within the development site”. This report provides that evidence.

The emerging mineral safeguarding policy contains a criterion which allows non-minerals development in a mineral safeguarding area if the mineral does not merit extraction. This report shows that the mineral is predominantly sand with insufficient gravel to be commercially viable. The deposit therefore does not merit extraction.

In the light of this evidence, the application is shown to meet the criteria in the adopted and emerging safeguarding policies for the development to be acceptable in a Mineral Safeguarding Area.

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1 INTRODUCTION

- 1.1 This report has been prepared in accordance with instructions from Barratt Homes and Bloor Homes North West, to prepare a “Prior Extraction Assessment” report in support of a planning application for a proposed residential development on land south of Holt Road, Wrexham. We understand that the site is currently in agricultural use. The site is shown edged red on the drawing attached at **Appendix 1**.
- 1.2 The site is located to the north east of Wrexham. It is bounded by Holt Road (A534) to the north, Bryn Estyn Road to the south and existing residential development to the west. Wrexham Golf Club is located beyond Holt Road to the north of the site.
- 1.3 The site is located within a Mineral Safeguarding Area identified by Wrexham County Borough Council, which is the mineral planning authority (MPA) for the area. The MPA has requested, through pre-application discussions, that the applicant should submit a Prior Extraction Assessment to accompany its planning application, which is a requirement of Policy MW1 in the Deposit Version of the Wrexham Local Development Plan in cases of development of 4 ha or more in a safeguarded Category 1 sand and gravel deposit.

2 SITE GEOLOGY

- 2.1 Geologically, a distinction is made between “superficial deposits” and “solid geology”. Superficial deposits such as sand and gravel are found at, or close to, the surface. The solid bedrock beneath the superficial deposits is called the “solid geology.”

Superficial deposits

- 2.2 An inspection of the British Geological Survey (BGS) 1:50,000 online geological plan shows that the superficial deposits on the site are glaciofluvial sand and gravel. The deposits in this area are variable and generally comprise a coarse grained Upper Layer and a fine grained Lower Layer. The online geological plan contains the log of a borehole located in the centre of the site. An extract of the log is attached at **Appendix 2** and it shows the presence of 0.3 metres of soil above 1.5 metres of clayey sand at the surface, followed by 23.2 metres of sand to the end of the borehole at 25 metres. The borehole log shows that the deposit is 91% sand, 2% gravel and 7% fines. This indicates that the coarse Upper Layer is absent on this site.
- 2.3 A preliminary site investigation was undertaken by the applicant’s contractor between 30 and 31 March 2017, comprising 12 windowless sample boreholes. The boreholes were drilled to 5m depth or refusal. A borehole location plan and the borehole logs are attached at **Appendix 3**.
- 2.4 The ground conditions encountered in the boreholes generally confirmed the published mapping and comprised topsoil to a depth of between 0.28m – 0.40m overlying generally loose to medium dense, slightly silty, slightly gravelly sands. The site investigation also reported that there are some areas of looser sand where the material contains more silt and clay. Water was encountered in three locations towards the south west corner of the site at depths of between 1m and 2m.
- 2.5 Glacial deposits of sand and gravel vary greatly both laterally and vertically. It can be of commercial interest in some circumstances, providing that it has a high proportion of gravel, with a low proportion of silt. This is because the mineral is used to manufacture concrete, and the process requires approximately twice as much gravel as sand. The gravel content is therefore of critical importance in determining whether a deposit is commercially viable. The deposit on this site contains only 2% gravel so it is not commercially viable as a mineral resource and it is therefore not a commercially “exploitable reserve”, which the adopted Minerals Local Plan seeks to safeguard.

- 2.6 The requirement for a ratio of 2 gravel to 1 sand for manufacturing concrete means that many sand and gravel pits have a surplus of sand, as the demand for gravel is greater than the demand for sand. The consequence of this is that sand and gravel pits do not usually import sand from other sites, so it would not be feasible to prior-extract sand from this site, because there is no demand for it.
- 2.7 Sand and gravel is worked locally at Borrass quarry which is located approximately 1km to the north of the site. The BGS has published the logs of several boreholes that have been drilled in Borrass quarry which show the sand and gravel deposit there contains a high proportion of gravel. Some of those borehole logs are attached at **Appendix 4** and they all show an average gravel content in excess of 40% and in many cases much higher.
- 2.8 Further evidence is contained in a Wrexham County Borough Council report to the Planning Committee dated 5th December 2005 (attached at **Appendix 5**) in relation to a planning application for mineral extraction at Borrass quarry. On page 5 of the document, the Chief Planning Officer acknowledges that fine sands are too fine grained to be used for the manufacture of high quality aggregate products and require blending with coarser sands and gravels. It states that without the coarser materials, the working of fine sands is unlikely to be economic.

Site investigation results

- 2.9 In October 2018, the applicant excavated 7 soakaway pits at locations shown on the plan attached at **Appendix 8**. Samples of sand and gravel were taken from the pits at depths of up to 4m for analysis. The laboratory analysis is shown in 16 Particle Size Distribution graphs which are attached at **Appendix 8**. The graphs show a line representing the proportion of particles that pass through a series of progressively finer sieves. The line on most of the graphs is nearly vertical indicating that the material is very fine sand. In most cases the sand particles are smaller than 0.5mm diameter and in most cases the sample contained little or no gravel. This site investigation and analysis confirmed the findings of the desk study. The superficial deposit that is mapped as sand and gravel is actually a very fine sand. It is of no commercial use in its natural state.

Solid geology

- 2.10 The solid geology of the site beneath the superficial deposits is shown on the BGS geological plans as being interbedded mudstones, sandstones and conglomerate of the Salop Formation, of Permian age. These beds are not of commercial interest and are not safeguarded.

3 MINERAL PLANNING POLICY

- 3.1 The adopted Development Plan for the area is the Wrexham Unitary Development Plan (UDP) 1996 - 2011, which was adopted in February 2005. That Plan will be replaced by the emerging “Wrexham Local Development Plan 2013-2028”.

Adopted mineral safeguarding planning policy

- 3.2 The adopted Wrexham UDP 1996-2011 states at Policy MW9:

“Protection of Mineral Resources: Policy MW9

Resources of sand and gravel, and clay, will be safeguarded from non-mineral development in order to prevent the sterilisation of unworked mineral deposits. The identification of mineral resource areas gives no presumption in favour of the working of any deposits. Within such areas, non-mineral development will be strongly resisted unless a resource assessment (or other information) is provided to demonstrate that no exploitable reserves exist within the development site. Where non-mineral development which materially prejudices mineral resources is granted planning permission on land holding mineral deposits, provision should be made for the prior removal of mineral deposits.”

- 3.3 The site is located within a sand and gravel mineral safeguarding area identified by Wrexham County Borough Council. The mineral safeguarding areas are based on small scale mineral resource mapping published by the British Geological Survey (BGS). However, this report provides more detailed data from extensive intrusive investigations on the site which show that the deposit contains very little gravel and is therefore of no commercial use or value. This demonstrates that ‘no exploitable reserves exist within the development site’ because the mineral deposit is of no commercial interest due to its lack of gravel. We therefore consider that the proposed development at this site does not conflict with adopted Policy MW9.

Emerging mineral safeguarding planning policy

- 3.4 The Wrexham Local Development Plan 2013-2028 Deposit Version was published in March 2018. The Plan’s “Policy SP3 Key Strategic Housing Sites” relates to an allocated site identified as “Land East of Cefn Road”, the northern part of which is the subject of this report. The text accompanying the policy states that “In order to minimise the loss of mineral, a Prior Extraction Assessment will be sought in accordance with Policy MW1 as it is considered that any opportunities to recover mineral prior to housing development should be sought.”

3.5 A copy of emerging policy MW1 is attached at **Appendix 6**. In summary, the policy states that non-mineral development will only be permitted in a Mineral Safeguarding Area where it can be shown that:

- i. the mineral does not merit extraction; or
- ii. there is an overriding need for the incompatible development; or
- iii. prior extraction can be undertaken satisfactorily; or
- iv. the development is temporary; or
- v. essential mineral industry infrastructure would not be compromised.

Compliance with emerging mineral safeguarding policy

3.6 In order to be commercially viable, a sand and gravel pit needs to have an average gravel content of at least 25-30%. The deposit in this site has only 2% so the absence of a reasonably acceptable gravel content is a clear indication that the deposit does not merit extraction and therefore meets criterion (i) of the emerging policy MW1 above.

3.7 The Mineral Planning Authority has received and reviewed our previous report on mineral safeguarding entitled “Mineral Resource Assessment”, issued in May 2017. The MPA made two suggestions in its review to which we would respond as follows.

3.8 One comment was that our May 2017 report “ignores the possibility of the sand being blended with other material to make concrete or the possibility that the sand could be extracted for other uses...”. The only “other material” that could be used to make concrete would be crushed rock aggregate such as limestone. However, that makes inferior quality concrete, is more expensive to mix and would not be commercially viable because it would incur the cost of buying and hauling aggregate to the site, or the cost of exporting the sand to a remote processing plant and double handling the material. Neither of these options would be financially viable because an operational commercial sand and gravel pit has both the requisite raw materials on site with none of those additional costs.

3.9 The other comment was that the sand could be used for “other uses”. In practice, the only “other use” would be pipe bedding or building sand. However, building sand is only worked in very small quantities because it is used for mortar, so prior extraction would not be feasible. Historically there was a building sand quarry on the eastern

side of the site but it is no longer operational, perhaps because the sand was unsuitable or the quarry may have been out-competed by Borrass quarry.

- 3.10 The Mineral Planning Authority has reviewed the PSD data which is attached at **Appendix 8**. The MPA considers that the sand could be blended with coarser materials to make a sand which could potentially be used as the fine aggregate component in making concrete. However, that would entail a significant cost to excavate, load, haul and double handle the fine sand as well as the cost of sourcing and transporting a source of coarser sand to mix with it. This operation would clearly be significantly more expensive than the operations at a conventional sand and gravel pit. In most gravel pits, the mineral comprises a mixture of gravel and a naturally occurring concreting sand which has the requisite PSD characteristics without the need to source and blend fine aggregates from several sources. In any event, the sand on this site has a negligible gravel content so it cannot provide the essential coarse aggregate (gravel) component which is necessary to make concrete.

4 FEASIBILITY OF PRIOR EXTRACTION

- 4.1 The prior extraction of a sand and gravel deposit is subject to many practical and commercial considerations and is not a simple project. On the practical side, there is only a limited low-value market for as-dug sand, so the sand would have to be processed by screening and washing, and then placed in a stockpile to await customers. Since the demand for this material is low, the unit costs per tonne would be very high. Prior extraction would require an excavator, a dump truck, a loading shovel, screening and washing plant, site operatives and an administration function to run what would in effect be a small business. It is not realistic to consider that this could be supported by a sand deposit alone with no gravel. Furthermore, the applicant is a housebuilder so it does not have the expertise to run such an operation. It would therefore have to engage a contractor to run the operation on its behalf, which would entail a significant cost. There is also the problem of what to do with the sand stockpiles if, as is likely, there is no significant market for it.
- 4.2 The sand would have to be processed to be useable. Given that the applicant is a housebuilder, it cannot reasonably be expected to undertake the extraction and marketing of sand itself, so the sand would have to be excavated and sent off site for processing. The cost of doing that would exceed the normal profit margin on the mineral. The nearest gravel pit is Borrás quarry to the north of the site. The quarry operator has been contacted in respect of prior extraction and has not expressed any interest in it. The imposition of a condition requiring prior extraction could place the developer in an impossible position because it cannot process and sell the mineral itself and it cannot compel a third party such as the operator of Borrás quarry to process the mineral on its behalf. There is no reason why the quarry operator would want to take sand with no gravel content, because it is not a saleable mineral resource. The imposition of a requirement for prior extraction therefore has the potential to frustrate or prevent the delivery of the housing development.
- 4.3 The imposition of a requirement for prior extraction could place the whole development in a ransom position. If the development cannot go ahead without prior extraction, and there is only one place where the prior-extracted material could practicably be processed, then the operator of that processing site holds the key to the development, rather than the site's landowner or the developer.

- 4.4 The County Borough has prepared Background Paper 11 (Minerals) to support the Deposit Local Development Plan. It shows how potential allocations have been examined to assess their impact on mineral deposits. Paragraph 3.1.10 of BP11 (attached at **Appendix 5**) acknowledges that a requirement for prior extraction could have a potentially significant impact in terms of delivery. It states that it is essential that other problems are not created by lowering the land such as drainage and flood risk. It speculates that some importation of inert waste might help achieve an appropriate platform but then advises that the availability of waste fluctuates and in any event it is very limited in quantity. It therefore appears that in the Council's opinion, infilling after prior extraction is unlikely to be a practicable exercise.

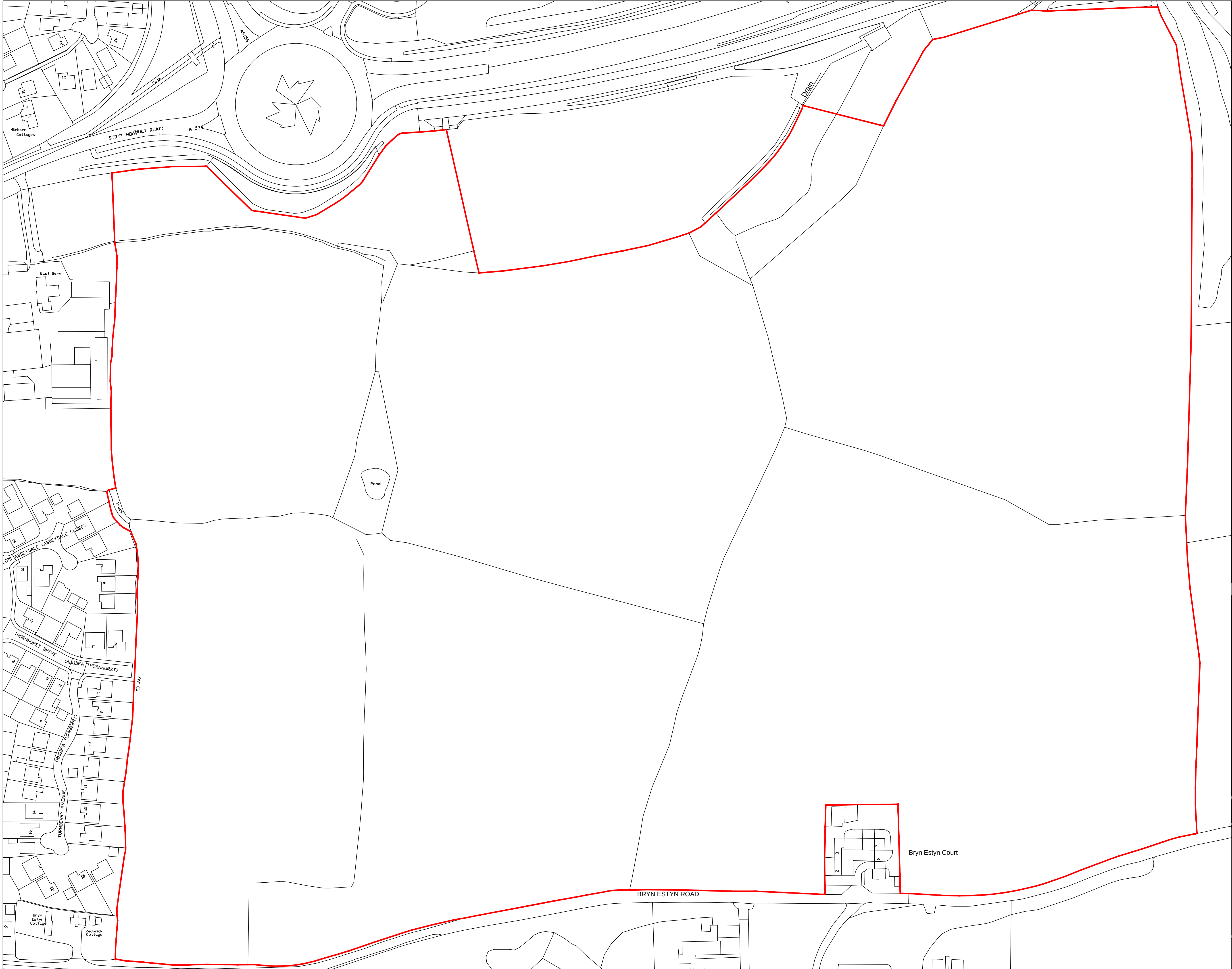
5 CONCLUSION

- 5.1 This report shows that the safeguarded mineral resource on the site is actually just sand with almost no gravel. A commercially viable resource of sand and gravel must contain at least 25% gravel content to even be considered as a commercial proposition, and most gravel pits have average gravel contents in the range 40% to 60%.
- 5.2 This report has demonstrated that no exploitable reserves exist within the development site because the mineral is primarily sand with almost no gravel content and therefore is not suitable for commercial use.
- 5.3 If the 'mineral resource' was excavated it would create a void which would be unusable for the proposed housing development and there is no practicable means of infilling that void. It would not make sense to infill with virgin or secondary aggregates and there is not sufficient site-derived material to infill up to an acceptable elevation. Infilling with inert waste would not be practicable because it would not provide adequate stability to support buildings and underground utilities.
- 5.4 Prior extraction of the sand would be commercially impractical. As a house builder, the developer could not do this itself, so it would need to be done by a third party. The mineral itself is only sand rather than sand and gravel so the market for it is very small. In addition to that, Borrás quarry already serves the local market so there is no un-met demand for sand in the foreseeable future. A requirement for prior extraction would introduce substantial uncertainty regarding start dates for housing because the start date would be solely dependent on the local demand for sand, which is completely beyond the developer's control. On careful consideration of the practicalities of prior extraction, it is clear that whilst it may be superficially desirable in principle, in practice it has the potential to seriously stall the delivery of housing.
- 5.5 We therefore consider that the proposed development at this site would not conflict with the MPA's mineral safeguarding policy and we would respectfully suggest that the MPA should not raise any objections to the proposed development on the grounds of mineral safeguarding, nor should any grant of planning permission be conditional upon prior extraction taking place.

Appendix 1

Site boundary plan

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28.37 HECTARES

REVISIONS		

JOB
HOLT ROAD
WREXHAM

DRAWING
TITLE PLAN

DATE: 06.02.2017 | DRAWN: QJB | SCALE: 1:1000

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DRAWING No: WREX-HR-TITLE

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Appendix 2

Log of BGS borehole SJ35SE-26

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SJ 35 SE 26

3622 5156

North of Bryn Estyn, Bieston 1st no. 121

Block B

Surface level (+73.2 m) +240 ft

Water not struck

Shell and auger 8-in (203 mm) diameter

February 1977

Overburden 1.8 m

Mineral 23.2 m +

LOG

Geological classification	Lithology	Thickness m	Depth m
Glacial Sand and Gravel	Soil, slightly sandy with pebbles	0.3	0.3
	Clay, reddish brown, silty and sandy with occasional fine quartzite pebbles	1.5	1.8
	Sand, pebbly in parts Sand: buff-brown, medium and fine with a trace of coarse, subangular to subrounded. Fines with depth, with pebbles of quartzite, sandstone, volcanics, quartz, coal and limestone at the top	23.2+	25.0

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				1-16	+16-4	+4-1	+1-4	+4-16	+16-64	+64-100
7	91	2	1.8-2.8	8	27	57	3	3	2	0
			2.8-3.8	2	19	62	6	6	5	0
			3.8-4.8	5	15	63	5	6	6	0
			4.8-5.8	3	15	79	2	1	0	0
			5.8-6.8	2	11	79	7	1	0	0
			6.8-7.8	1	18	75	5	1	0	0
			7.8-8.8	2	36	53	1	1	0	7
			8.8-9.8	2	28	70	0	0	0	0
			9.8-10.8	2	36	61	1	0	0	0
			10.8-11.8	24	48	28	0	0	0	0
			11.8-12.8	4	40	56	0	0	0	0
			12.8-13.8	4	47	49	0	0	0	0
			13.8-14.8	2	36	62	0	0	0	0
			14.8-16.8	6	35	58	0	1	0	0
			16.8-18.8	6	53	41	0	0	0	0
			18.8-21.8	15	74	11	0	0	0	0
			21.8-25.0	13	69	18	0	0	0	0
			Mean	7	43	47	1	1	1	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 mm fraction						
	Quartz	Quartzite	Sandstone	Limestone	Other sediments	Igneous	Chert, flint
1.8-3.8	3	60	17	5	2	9	4
3.8-5.8	2	71	1	Trace	6	18	1
5.8-7.8	6	36	13		2	33	10
8.8-16.8	1	92	Trace	1	Trace	3	3

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Appendix 3

Site investigation logs

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Project Id: ST16134
Project Title: Holt Road, Wrexham
Location: Holt Road, Wrexham
Client: Bloor Homes North West

Title: Site Plan
Scale: 1:3000
Engineer: M Heys
Contractor: Exploration Ltd



- Legend Key
- Locations By Type - Empty
 - Locations By Type - WLS
 - Project Bounds - Project Bounds



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Borehole Log

Borehole No.

WS101

Sheet 1 of 1

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 335959.01 - 351479.32

Hole Type
WLS

Location: Holt Road, Wrexham

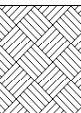
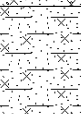
Level: 75.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.37	74.63		TOPSOIL: Grass over soft dark brown organic silty sandy CLAY with rootlets. Sand is fine to medium.	1
								Loose yellowish brown slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is fine to medium angular to sub-rounded of sandstone and mudstone.	
		1.00		N=9 (4,3/3,2,2,2)			<u>Water encountered from 1.0m depth (2nd run).</u>		2
					1.60	73.40		Light orangish brown to yellowish brown mottled grey slightly silty very clayey SAND. Sand is medium.	
		2.00		N=5 (4,2/1,1,2,1)	2.00	73.00		Very loose light brown silty SAND. Sand is fine to coarse with rare black coarse sand of coal.	
					2.80	72.20		Medium dense becoming dense light yellowish to orangish brown slightly silty SAND. Sand is fine to coarse.	
		3.00		N=22 (3,4/4,5,7,6)					3
		4.00		N=50 (11,11/12,12,13,13)					
		4.35		N=48 (11,12/14,10,11,13)					4
					4.80	70.20	End of borehole at 4.80 m		5

Remarks

Terminated at 4.8m depth due to sample refusal.
Water encountered from 1.0m depth.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS102

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 335896.93 - 351583.64

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 74.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.40	73.60		TOPSOIL: Dark brown slightly clayey silty gravelly SAND. Sand is medium. Gravel is fine to medium sub-angular to sub-rounded of mudstone and sandstone.	1
								Orangish brown mottled black slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is fine to medium sub-angular to sub-rounded of sandstone, coal and mudstone.	
		1.20		N=14 (2,3/4,3,3,4)	1.26	72.74		Brown mottled orange and black clayey slightly silty sandy GRAVEL. Sand is fine to medium. Gravel is fine to coarse sub-angular to sub-rounded of sandstone and mudstone.	
					1.36	72.64		Medium dense light orangish brown slightly silty slightly gravelly SAND with low cobble content. Sand is medium. Gravel is fine to coarse angular to sub-rounded of sandstone and coal. Cobble is sub-rounded of sandstone.	2
					1.76	72.24		Coal fragments between 1.7m and 1.76m depth.	
		2.00		N=21 (3,3/4,8,5,4)				Medium dense orangish light brown slightly silty sand. Sand is medium to coarse.	
					2.24	71.76		Medium dense orangish brown mottled black slightly silty gravelly SAND. Sand is medium. Gravel is fine to coarse sub-angular to sub-rounded of sandstone and mudstone.	3
					2.56	71.44		Medium dense becoming dense orangish brown becoming light brown slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is fine to medium sub-angular to sub-rounded of sandstone.	
		3.00		N=22 (5,6/6,5,6,5)				Becoming pale brown with increasing gravel coarseness between 2.8m and 5.45m depth.	
									4
		4.00		N=19 (3,4/4,4,5,6)					
								Coal fragments between 4.3m and 4.37m depth.	
									5
		5.00		N=34 (9,9/8,8,9,9)					

Continued on next sheet

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS102

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 335896.93 - 351583.64

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 74.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	68.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS103

Sheet 1 of 1

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 335892.40 - 351351.97

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 78.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.40	77.60		TOPSOIL: Dark brown slightly clayey slightly silty gravelly SAND. Sand is medium. Gravel is fine to medium angular to sub-rounded of sandstone and mudstone.	1
		1.00		N=10 (2,1/2,2,3,3)	1.60	76.40		Loose yellowish brown slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is fine sub-angular to sub-rounded of quartzite and sandstone.	
		2.00		N=3 (2,1/1,0,1,1)	2.50	75.50		Soft with occasional firm pockets light brown mottled grey, orange and black silty sandy CLAY. Sand is fine to medium. Feels damp throughout.	2
		3.00		N=29 (4,3/4,6,8,11)				Increased sand content between 2.0m and 2.5m depth.	
		3.50		50 (20,10 for 10mm/18,14,13,5 for 15mm)	3.95	74.05		Medium dense becoming very dense yellowish brown slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is fine sub-angular to sub-rounded of quartzite and sandstone	3
								End of borehole at 3.95 m	4
									5

Remarks

Terminated at 3.95m depth due to sample refusal.
Water encountered from 2.0m depth.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS104

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336098.28 - 351581.67

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 73.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.45 - 0.65	ES		0.35	72.65		TOPSOIL: Grass over dark brown clayey silty slightly gravelly SAND. Sand is fine to medium. Gravel is angular to sub-rounded of sandstone and mudstone.	1
		1.20		N=11 (4,3/3,2,3,3)	1.50	71.50		Medium dense light orangish brown mottled black slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-rounded of sandstone.	
		2.00		N=6 (1,2/1,1,2,2)	1.64	71.36		Medium dense light orangish brown mottled black slightly clayey slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-rounded of sandstone. Loose light orangish brown mottled black slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-rounded of sandstone. <i>Slightly damp from 1.65m depth.</i>	2
		3.00		N=4 (1,1/1,1,1,1)				<i>Increased gravel content between 3.5m and 3.75m depth.</i>	3
		4.00		N=12 (2,2/3,3,3,3)	3.75	69.25		Medium dense becoming loose light orangish brown slightly silty SAND. Sand is fine to coarse.	4
		5.00		N=8 (0,1/2,1,2,3)					5

Continued on next sheet

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS104

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336098.28 - 351581.67

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 73.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	67.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS105

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336062.95 - 351359.74

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 79.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.40	78.60		TOPSOIL: Grass over dark brown clayey silty slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone.	1
								Loose orangish brown mottled reddish brown slightly clayey slightly silty gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to sub-rounded of sandstone, mudstone, quartzite and clayey sand nodules.	
		1.20		N=7 (1,2/1,2,2,2)	1.57	77.43		Loose orangish brown slightly silty SAND. Sand is fine to medium.	
								Loose orangish brown mottled black and reddish brown slightly clayey slightly silty gravelly SAND. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone, mudstone and clayey sand nodules.	2
		2.00		N=10 (2,2/1,3,3,3)	2.00	77.00		Medium dense orangish brown mottled black slightly silty SAND. Sand is fine to medium.	
					2.32	76.68			3
		3.00		N=13 (2,2/3,2,4,4)					
									4
		4.00		N=28 (5,6/7,6,7,8)	4.00	75.00		Medium dense light greyish brown slightly silty gravelly SAND. Sand is fine to medium. Gravel is fine to medium angular to sub-rounded of sandstone and mudstone.	
					4.56	74.44		Medium dense light brown slightly silty SAND. Sand is medium to coarse.	5
		5.00		N=22 (5,4/5,5,6,6)					

Continued on next sheet

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS105

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336062.95 - 351359.74

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 79.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	73.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS106

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336265.29 - 351593.80

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 74.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.30	73.70		TOPSOIL: Grass over dark brown slightly clayey slightly silty slightly gravelly SAND with rootlets. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone. Loose to medium dense orangish light brown slightly clayey slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is medium sub-angular to sub-rounded of quartzite, sandstone and nodules of clayey sands.	
		1.00		N=18 (4,4/4,4,5,5)					1
		2.00		N=11 (3,3/2,3,3,3)					2
		3.00		N=23 (4,5/6,5,6,6)				Inclusions of reddish brown clayey sand nodules between 2.46m and 2.65m depth.	3
		4.00		N=8 (2,3/2,2,2,2)					4
		5.00		N=11 (2,3/3,2,3,3)				Continued on next sheet	5

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS106

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336265.29 - 351593.80

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 74.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	68.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS107

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336223.51 - 351372.66

Hole Type
WLS

Location: Holt Road, Wrexham

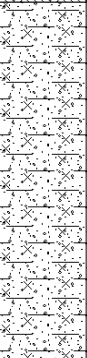
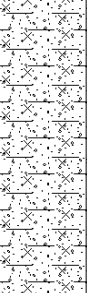
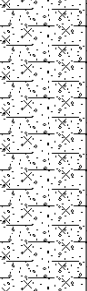
Level: 78.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.20		N=6 (2,2/1,1,2,2)	0.30	77.70		TOPSOIL: Dark brown clayey silty gravelly SAND. Sand is medium. Gravel is fine to coarse angular to sub-rounded of mudstone, sandstone and quartzite.	1
								Loose to medium dense light orangish brown slightly clayey slightly silty slightly gravelly SAND. Sand is fine to medium. Gravel is fine to coarse sub-angular to sub-rounded of sandstone, mudstone, coal fragments and nodules of clayey sand.	
		2.00		N=11 (2,3/2,3,3,3)				<i>Increased gravel size between 1.5m and 2.0m depth.</i>	2
								<i>Reddish brown clayey sand nodules between 2.45m and 2.95m depth.</i>	
		3.00		N=9 (2,2/3,2,2,2)				<i>Sand becoming finer between 3.46m and 4.55m depth.</i>	3
									
		4.00		N=10 (3,2/3,2,2,3)					4
5.00		N=18 (1,1/4,4,5,5)					5		
								Continued on next sheet	

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS107

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336223.51 - 351372.66

Hole Type
WLS

Location: Holt Road, Wrexham

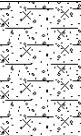
Level: 78.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	72.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS108

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336375.86 - 351742.99

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 71.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.28	70.72		TOPSOIL: Brown slightly clayey silty gravelly SAND. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone.	
		1.00		N=8 (2,2/2,2,2,2)				Loose orangish light brown slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is medium to coarse sub-angular to sub-rounded of sandstone, mudstone and quartzite. <i>Becoming paler with depth. Damp throughout.</i>	1
		2.00		N=8 (2,1/2,2,2,2)					2
		3.00		N=8 (3,2/2,2,2,2)					3
		4.00		N=8 (1,2/3,2,2,1)					4
		5.00		N=10 (3,3/3,2,2,3)				<i>Increased gravel content between 4.5m and 4.6m depth.</i> <i>Increased sand coarseness between 4.6m and 5.0m depth.</i>	5

Continued on next sheet

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS108

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336375.86 - 351742.99

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 71.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	65.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS109

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336394.99 - 351558.36

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 74.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.30	ES		0.30	73.70		TOPSOIL: Grass over dark brown slightly clayey silty slightly gravelly SAND with rootlets. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone. Loose to medium dense orangey light brown slightly silty slightly gravelly SAND. Sand is medium to coarse. Gravel is fine to coarse angular to sub-rounded of sandstone. <i>Becoming paler between 0.3m and 5.45m depth.</i>	
		1.00		N=14 (2,3/3,3,4,4)					1
		2.00		N=9 (2,3/2,2,3,2)					2
		3.00		N=5 (2,1/1,2,1,1)					3
		4.00		N=5 (0,0/0,2,1,2)					4
		5.00		N=11 (1,1/2,3,3,3)				<i>Increased gravel content from 4.7m and 5.0m depth. Also damp.</i>	5

Continued on next sheet

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS109

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336394.99 - 351558.36

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 74.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	68.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS110

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336391.54 - 351352.50

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 75.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.40	74.60		TOPSOIL: Grass on top dark brown clayey silty gravelly SAND. Sand is medium. Gravel is fine to coarse angular to sub-rounded of mudstone, sandstone and quartzite.	
					0.60	74.40		Light orangish brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub-angular to sub-rounded of sandstone and mudstone.	
		1.00		N=14 (4,3/4,3,3,4)	1.50	73.50		Medium dense light orangish brown slightly silty gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse sub-angular to sub-rounded of sandstone and mudstone.	1
								Light orangish brown slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone.	
		2.00		N=18 (6,5/4,5,4,5)	2.00	73.00		Medium dense light orangish brown slightly silty sandy GRAVEL. Sand is medium. Gravel is fine to coarse angular to sub-rounded of sandstone, mudstone and quartzite.	2
					2.47	72.53		Loose to medium dense light orangish brown slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone.	
		3.00		N=11 (3,2/3,2,3,3)					3
								Increased gravel content with reddish brown mottling between 3.53m and 3.71m depth.	
		4.00		N=7 (2,2/2,1,2,2)					4
								Sand becoming predominately fine to medium with black to brown mottling from 4.52m to 5.0m depth.	
		5.00		N=19 (2,3/4,4,5,6)					5

Continued on next sheet

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS110

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336391.54 - 351352.50

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 75.00

Scale
1:25

Client: Bloor Homes North West

Dates: 30/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	69.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water not encountered.
Backfilled with arisings upon completion.





Borehole Log

Borehole No.

WS111

Sheet 1 of 1

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 336182.00 - 351473.00

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 77.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.35	76.65		TOPSOIL: Dark brown silty clayey gravelly SAND. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone.	1
								Medium dense light orangish brown mottled reddish brown slightly clayey slightly silty slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone, mudstone and nodules of clayey sand.	
		1.20		N=11 (3,3/3,3,2,3)	1.60	75.40		Brown mottled orange, grey and black clayey slightly silty SAND. Sand is fine to coarse.	2
					1.76	75.24		Firm brown to orangish brown silty very sandy CLAY. Sand is medium.	
		2.00		N=32 (6,7/7,7,9,9)	2.00	75.00		Dense light orangish brown slightly silty SAND. Sand is fine to coarse.	3
		3.00		N=45 (4,4/5,6,17,17)					
		4.00		50 (9,9/8,10,15,17 for 70mm)					4
					4.45	72.55		End of borehole at 4.45 m	5

Remarks

Terminated at 4.45 due to sample refusal.
Water not encountered.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS112

Sheet 1 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 335903.00 - 351241.00

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 76.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.30	75.70		TOPSOIL: Dark brown slightly clayey silty slightly gravelly SAND with rootlets. Sand is fine to medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone.	1
								Orangish brown slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone.	
		1.20		N=12 (3,2/3,3,3,3)	1.16	74.84		Soft to firm light yellowish brown mottled grey silty sandy CLAY. Sand is medium.	
					1.38	74.62		Medium dense light brown slightly silty gravelly SAND. Sand is fine to medium. Gravel is fine to coarse angular to sub-angular of mudstone, sandstone and coal.	2
					1.65	74.35		Medium dense light orangish brown slightly silty slightly gravelly SAND. Sand is medium. Gravel is fine to medium sub-angular to sub-rounded of sandstone and coal.	
		2.00		N=11 (2,3/2,3,3,3)					
					2.60	73.40		Light orangish brown slightly silty gravelly SAND with low cobble content. Sand is medium to coarse. Gravel is fine to coarse angular to sub-rounded of sandstone and mudstone. Cobble is sub-rounded sandstone.	3
		3.00		N=12 (2,4/3,3,3,3)	2.82	73.18		Medium dense orangish brown slightly silty SAND. Sand is fine to coarse.	
								Becoming paler and coarser from 3.59m to 5.45m depth.	
		4.00		N=19 (3,4/4,4,5,6)				Increased gravel content including coal between 4.51m and 4.63m depth.	4
		5.00		N=20 (3,5/5,5,5,5)					5

Continued on next sheet

Remarks

Target depth achieved.
Water encountered at 1.16m depth.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.

AGS



Borehole Log

Borehole No.

WS112

Sheet 2 of 2

Project Name: Holt Road, Wrexham

Project No.
ST16134

Co-ords: 335903.00 - 351241.00

Hole Type
WLS

Location: Holt Road, Wrexham

Level: 76.00

Scale
1:25

Client: Bloor Homes North West

Dates: 31/03/2017 -

Logged By
G Usher

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					5.45	70.55		End of borehole at 5.45 m	
									6
									7
									8
									9
									10

Remarks

Target depth achieved.
Water encountered at 1.16m depth.
1.2m hand dug service pit prior to sampling.
Backfilled with arisings upon completion.



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Appendix 4

BGS borehole logs

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BGS ID: 154714 : BGS Reference: SJ35SE98
 British National Grid (27700) : 336430,352720
[Report an issue with this borehole](#)

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BOREHOLE LOG

Company: TARMAC QPL(NW)LTD

Site: BORRAS QUARRY

Page 1 of 2.

Borehole No. BR96-09

Logged by: H.LISTER

Date: 15/05/96

Elevation mAOOD 73.78

Easting: 336433

Northings: 352721

Drilling Rig\Method HE 90 CONTINUOUS FLIGHT AUGER

Testing Laboratory: BORRAS ETC.

SJ 35 SE

98

Legend	CLASS	FIND DESCRIPTION	From m	To m	AS DUG SAND		GRAVEL		FRACTIONS												
					75 u	150 u	212 u	300 u	600 u	1.18 mm	2.36 mm	5.00 mm	Fine % 020	Gr % 050	6.3 mm	16.0 mm	20.0 mm	37.5 mm	Fines %	Sand %	Grav %
	DARK GREYISH BROWN CLAYEY SILT	Dark Greyish Brown Mainly Fine Sand. Clayey Silt. 44% Fine to Coarse. Sub-Angular to Sub-Rounded Gravel with sand. Occ. Coal up to 3mm. Topsoil?	0.00	1.50	2	4	7	13	29	39	47	56			60	71	89	100	2.1	53.9	44.0
	MEDIUM COARSE SAND AND GRAVEL	Buff Slightly Orangeish Brown. Occ Silty Clay. Medium Coarse Grained. Sand. 50% Fine to Coarse Grained. Sub-Angular to Sub Rounded. Gravel. Occ. Cobbles up to 80mm. Occ. Coal up to 5mm.	1.50	3.00	4	5	7	9	25	32	36	42			46	57	77	91	3.0	38.5	57.7
	MEDIUM FINE SAND		3.00	4.50	2	7	19	41	70	78	80	82			83	86	92	100	2.3	79.7	18.0
	FINE TO FINE MEDIUM SAND	Buff/Orange/Brown. Medium Fine Grained. Sand. 10% Fine to Coarse. Traces of Gravel. Traces of Coal.																			
	MEDIUM FINE SAND	Greyish Buff Brown. Fine to Fine Medium Grained. Sand Traces. Medium to Coarse. Sub-Rounded. Gravel. Trs Coal-Sub mm to 5mm. NOT SAMPLED?	7.50	9.00	1	2	5	15	38	44	48	60			65	79	95	97	1.4	58.5	40.1
	MEDIUM COARSE SAND AND GRAVEL	Buff Brown. Traces of Silty Clay. Medium Fine Grained. Sand. 10% Traces. Fine to Medium. Sub-Angular to Sub Rounded. Gravel. Traces of Sub mm Coal.	9.00	10.00	3	5	10	26	68	76	78	81			82	85	91	100	2.3	78.2	19.3
	MEDIUM COARSE SAND	Buff Brown. Medium Coarse Grained. Sand. 40% Fine to Coarse. Sub Rounded and Sub Angular. Gravel.	10.00	12.00	2	2	5	16	74	91	93	94			95	95	96	100	1.5	92.8	5.7
	MEDIUM TO COARSE SAND AND GRAVEL	Greyish Buff Brown. Medium Coarse Grained. Sand. 10% Fine to Coarse. Sub-Rounded and Sub-Angular. Gravel. Traces of Coal.	12.00	15.00	2	4	6	12	33	41	46	52			59	71	87	100	2.5	49.1	48.4
	MEDIUM TO COARSE SAND AND GRAVEL	Buff, Slightly Orangeish Brown. Medium Coarse Grained. Sand. 64% Traces. Coarse, and occ. medium. Sub-Rounded and Sub-Angular. Gravel.	15.00	18.00	2	3	6	13	31	38	42	50			55	67	92	97	2.0	47.9	50.1
	SILTY CLAY	Greyish Buff Brown. Medium to Coarse Grained. Sand. 40% Fine to Coarse. Sub-Rounded and Sub-Angular. Gravel. Occ Tabular Gravel.																			
	FINE SAND	Greyish Buff Brown. Medium to Coarse Grained. Sand. 50% Fine to Coarse. Sub-Rounded and																			

Additional Comments :

TARMAC ROADSTONE LTD - Geological Department, Halesowen

SCALE: 1:100



BGS ID: 154714 : BGS Reference: SJ35SE98
British National Grid (27700) : 336430,352720

[Report an issue with this borehole](#)

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BOREHOLE LOG		Company: TARMAC QPL(NW)LTD	Site: BORRAS QUARRY		Page 2 of 2.																
Borehole No. BR96-09		Logged by: H.LISTER		Date: 15/05/96		SJ 35SE 98															
Elevation mAOD 73.78		Easting: 336433		Northings: 352721																	
Drilling Rig\Method HE 90 CONTINUOUS FLIGHT AUGER				Testing Laboratory: BORRAS ETC.																	
		AS DUG SAND										GRAVEL				FRACTIONS					
Legend	CLASS.	FINAL DESCRIPTION	From m	To m	75 u	150 u	212 u	300 u	600 u	1.18 mm	2.36 mm	5.00 mm	Fine % 920	Grav % 950	6.3 mm	10.0 mm	20.0 mm	37.5 mm	Fines %	Sand %	Grav %
	WITH SILT.	Sub-Angular. Gravel. Occ Tabular Gravel.	19.50	21.00	10	24	55	82	92	93	93	94			94	97	100	100	9.6	84.5	5.9
	PINE SAND WITH SILT.	Reddish Brown. Firm. Silty Clay. NOT SAMPLED.																			
		Buff Slightly Orangeish Brown. With Silty. Fine Grained. Sand. 64 Fine to Coarse Sub-Rounded. Gravel. Traces of Coal Sub mm	21.00	24.00	18	57	82	93	96	97	97	98			98	99	100	100	18.4	79.2	2.4
	PINE TO MEDIUM SAND WITH SILT.	Buff Orangeish Brown. Traces of Silty Clay. Fine Grained. Sand. 24 Fine to Coarse. Sub-Rounded. Gravel. Slight Coarsening Downwards.	24.00	27.00	16	38	64	79	85	87	87	88			92	95	97	100	16.2	72.1	11.7
	PINE TO PINE MEDIUM SAND WITH SILT.	Buff Slightly Orangeish Brown. Traces of Silty Clay. Fine to Fine Medium Grained. Sand. 124 Fine to Coarse. Sub-Rounded and Sub-Angular. Gravel. Occ.Flattened.	27.00	30.00	5	15	40	75	95	96	96	96			98	99	99	100	5.4	90.9	3.7
	PINE MEDIUM SAND WITH SILT.	Buff Greyish Brown. Traces/Occ Silty Clay. Fine Medium Grained. Sand. 104 Fine to Coarse. Mainly Sub-Rounded. Gravel. Traces Coal Sub mm to 5mm. Damp/wet.	30.00	33.00	14	26	47	71	88	89	90	90			92	95	99	100	13.9	75.9	10.2
	PINE MEDIUM SAND WITH SILT.	Buff Greyish Brown. Occ. Silty Clay. Fine Medium Grained. Sand. 104 Fine to Medium. Sub-Rounded. Gravel. Traces of Coal Sub mm to 5mm. NOT	33.00	34.00	21	43	61	77	88	89	89	90			93	95	98	100	21.4	68.3	10.3
	SILTY CLAY	Grey Brown. Firm Occ.Soft. Silty Clay. NOT SAMPLED.																			
	End of hole at 36.00 metres.																				
Additional Comments :																					
TARMAC ROADSTONE LTD - Geological Department, Halesowen												SCALE: 1:100									



BGS ID: 154717 : BGS Reference: SJ35SE101

British National Grid (27700) : 336720,352530

[Report an issue with this borehole](#)

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BOREHOLE LOG		Company:	TARMAC QPL(NW)LTD		Site:	BORRAS QUARRY		Page 1 of 1.													
Borehole No. BR96-13			Logged by: PCJ			Date: 08.05.96															
Elevation mAOD 72.32			Easting: 336717		Northing: 352528		SJ 35SE 101														
Drilling Rig/Method HE 90 CONTINUOUS FLIGHT AUGER					Testing Laboratory: BORRAS.ETC																
			AS BGS SAND										GRAVEL			FRACTIONS					
Legend	CLASS.	FIELD DESCRIPTION	From m	To m	75 %	150 %	212 %	300 %	600 %	1.18 mm	2.36 mm	5.00 mm	Fine % 020	Grav % 050	6.3 mm	10.0 mm	20.0 mm	37.5 mm	Fines %	Sand %	Grav %
	GRAVEL WITH SAND	Dark Brown Traces Clay Medium Sand 44 Fine to Coarse Sub Rounded to Rounded Gravel Lignite Staining	0.30	1.50	3	4	4	7	21	25	29	36			42	55	78	100	3.3	33.1	63.6
	SAND AND GRAVEL	Brown Traces Clay Medium Sand 47 Fine to Coarse Gravel Disseminated lignite	1.50	1.90	3	4	5	9	30	37	43	53			58	70	87	100	3.2	49.4	47.4
	SAND WITH GRAVEL	Light Brown Medium Coarse Sand 27 Fine to Coarse Sub Rounded to Rounded Gravel	1.90	2.90	2	3	4	14	55	64	68	73			74	77	84	90	2.2	76.5	27.3
	COARSE SAND	Brown Coarse Sand	2.90	4.50	2	4	4	8	30	45	52	60			64	75	92	100	2.4	57.2	40.4
	SAND AND GRAVEL	Brown Medium to Coarse with Grit Sizes Sand 434 Fine to Coarse Rounded to Sub Rounded Gravel Disseminated Lignite	4.50	5.20	5	6	7	10	23	31	37	45			51	64	82	100	3.5	39.3	55.2
	SAND AND GRAVEL	Dark Brown Medium, Coarse and F. Coarse Sand 55 Fine to Coarse and occ. Cobbles Sub Rounded to Rounded Gravel Cobbles up to 60mm	5.20	5.80	12	20	28	32	40	47	58	73			81	92	99	100	12.2	60.6	27.2
	FINE BROWN CLAY	Brown Firm 27 Fine Rounded and Sub Rounded Gravel Dissem Lignite in fine and occ. coarse grains. Very coarse sand to top of unit	5.80	7.00	9	16	21	24	34	41	48	61			70	84	98	100	9.5	51.5	39.0
	SILT CLAY	Orange and Brown firm Clay dominance Clay Not Sampled																			
	BROWN SILT WITH GRAVEL	Brown with clay Silt 39 Medium to Fine Gravel																			
	STIFF BROWN CLAY	Brown Stiff Mainly Clay Clay Not sampled																			
	STIFF BROWN CLAY	Brown Stiff Mainly Clay Clay Not sampled																			
	SILT CLAY WITH GRAVEL	Dark Brown with Silt and Fine Sand Clay 22 Fine to Coarse Sub Rounded Gravel Not																			
	SILT CLAY WITH GRAVEL	Brown With Silt Fine Sand 46 Buff Medium Fine Sand 25 Gravel (Query 25% Gravel)																			
	MEDIUM FINE SAND	Dark Brown Stiff with silt Clay Clay 7 occ. large cobbles																			
	CLAY WITH SILT																				
	End of hole at 15.00 metres.																				
Additional Comments :																					
TARMAC ROADSTONE LTD - Geological Department, Halesowen											SCALE: 1:100										



BGS ID: 154735 : BGS Reference: SJ35SE119
British National Grid (27700) : 336540,352620

[Report an issue with this borehole](#)

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BOREHOLE LOG		Company: TARMAC QPL(NW)LTD		Site: BORRAS QUARRY		Page 1 of 2.															
Borehole No. BR96-34		Logged by: P.C.JOEL		Date: 05/06/96																	
Elevation MAOD 77.355		Easting: 336539		Northings: 352616		SJ 35 SE 119															
Drilling Rig\Method HE90 CONTINUOUS FLIGHT AUGER				Testing Laboratory: BORRAS ETC.																	
				ANALYSIS																	
				GRAVEL																	
				FRACTIONS																	
Legend	CLASS	FIELD DESCRIPTION	From m	To m	75 u	150 u	212 u	300 u	600 u	1.18 mm	2.36 mm	5.00 mm	Fine A 120	Gr A 63	10.0 mm	20.0 mm	37.5 mm	Fines %	Sand %	Grav %	
	MEDIUM COARSE SAND AND GRAVEL.	Dark Brownish. Traces of Silty Clay. Medium Coarse Grained Sand. and Fine to Coarse Sub-Angular and Plattish Gravel.																			
	MEDIUM COARSE SAND AND GRAVEL.	Dark Brownish. Traces of Silty Clay. Medium Coarse Grained Sand. and Fine to Coarse Sub-Angular and Plattish Gravel. Traces of Coal.Fine Gravel Sined.	0.00	4.50	1	2	7	4	18	33	44	51			55	62	79	97	0.8	50.4	48.8
	MEDIUM COARSE TO MEDIUM FINE SAND & GRAVEL.	Dark Brownish With Silty Clay. Medium Coarse to Medium Fine Gr. Sand. and Fine to Coarse Sub-Rounded and Plattish Gravel.																			
	SILTY CLAY	Dark Brownish With Silty Clay. Medium Coarse to Medium Fine Gr. Sand. and Fine to Coarse Sub-Rounded and Plattish Gravel.	4.50	7.50	2	12	29	61	89	94	97	98			98	99	100	100	3.4	95.4	2.2
	SILTY CLAY	Red Brown Soft to Firm Silty Clay.																			
	MEDIUM SAND.	Red Brown Soft to Firm Silty Clay. Damp.	7.50	9.00	3	6	16	47	74	80	84	87			88	91	95	100	1.8	85.1	13.1
	MEDIUM FINE TO FINE SAND.	Buff Brown Traces of Silty Clay Medium Grained Sand Traces Medium Gravel.																			
	MEDIUM FINE TO FINE SAND.	Buff Brown to Orangey Traces of Silty Clay Medium Fine to Fine Grained Sand.	9.00	12.00	7	25	46	76	94	96	98	99			99	99	99	100	7.3	91.8	0.9
	MEDIUM SAND	Buff Brown Clean Medium Grained Sand.	12.00	15.00	7	15	34	66	98	100	99	100			100	100	100	100	7.3	92.6	0.1
	MEDIUM FINE TO MEDIUM COARSE SAND & GRAVEL.	Dark Brownish Medium Fine to Medium Coarse Sand. and Fine to Coarse Sub-Angular to Elongated Gravel. Traces of Cobbles up to 75mm. Traces of Fine Gravel Sined Coal.	15.00	18.00	5	11	20	35	57	61	65	69			71	77	89	96	5.2	63.8	31.0
	MEDIUM FINE TO MEDIUM COARSE SAND & GRAVEL.	Brownish Medium Fine to Medium Coarse Grd. Sand. and Fine to Coarse Sub-Rounded Gravel. With Medium Gravel Sined Coal.	18.00	21.00	3	7	13	21	37	42	46	52			57	67	88	96	3.5	48.9	47.6
Additional Comments :																					
TARMAC ROADSTONE LTD - Geological Department, Halesowen											SCALE: 1:100										



BGS ID: 154735 : BGS Reference: SJ35SE119

British National Grid (27700) : 336540,352620

[Report an issue with this borehole](#)

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BOREHOLE LOG			Company: TARMAC QPL(NW)LTD			Site: BORRAS QUARRY			Page 2 of 2.													
Borehole No. BR96-34			Logged by: P.C.JOEL			Date: 05/06/96																
Elevation MAOD 77.355			Easting: 336539			Northing: 352616			SJ 35SE 119													
Drilling Rig/Method HE90 CONTINUOUS FLIGHT AUGER						Testing Laboratory: BORRAS ETC.																
			AS DUG SAND										GRAVEL				FRACTIONS					
Legend	CLASS.	FIELD DESCRIPTION	From m	To m	75 u	150 u	212 u	300 u	600 u	1.18 mm	2.36 mm	5.00 mm	Fin % 020	Gr % 050	4.3 mm	10.0 mm	20.0 mm	37.5 mm	Fines %	Sand %	Grav %	
	GRAVEL.																					
	MEDIUM SAND WITH GRAVELS.	Brownish Medium Grained Sand. 17% With Fine to Coarse Sub-Angular to Sub-Rounded Gravel.	21.00	24.00	5	10	20	36	71	79	81	83			84	88	95	100	4.8	78.0	17.2	
		British Geological Survey																				
	SILTY CLAY WITH FINE SAND	Red to Buff Brown Soft to Firm Silty Clay With Fine Grained Sand.	24.00	26.00	44	75	86	90	96	97	97	98			98	99	100	100	44.1	54.2	1.7	
		British Geological Survey																				
	FINE SAND	Orangey Red Fine Grained Sand. Traces Medium Sub-Rounded with Some Soft Clasts Gravel.	26.00	27.00	19	47	65	76	86	87	88	91			92	94	96	100	18.6	72.3	9.1	
	SAND?	Sample Lost Due to Back Rotation Easy Drilling-Suspected Sand.																				
	SILTY CLAY?	Sample Lost Due to Back Rotation Difficult Drilling-Suspected Clay.																				
	End of hole at 30.00 metres.																					
Additional Comments :																						
TARMAC ROADSTONE LTD - Geological Department, Halesowen										SCALE: 1:100												

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Appendix 5

Extract from Officer's report on Borrás quarry planning application

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REPORT TO:	Planning Committee
REPORT NO.	CPLO/79/05
DATE:	5 December 2005
REPORTING OFFICER:	Chief Planning Officer
CONTACT OFFICER:	Bob Dewey (Ext 2470)
SUBJECT:	Borras Quarry
WARD:	Holt and Gresford (East and West)

PURPOSE OF THE REPORT

To consider the report of the Chief Planning Officer in respect of a proposal to extend Borras Quarry.

INFORMATION

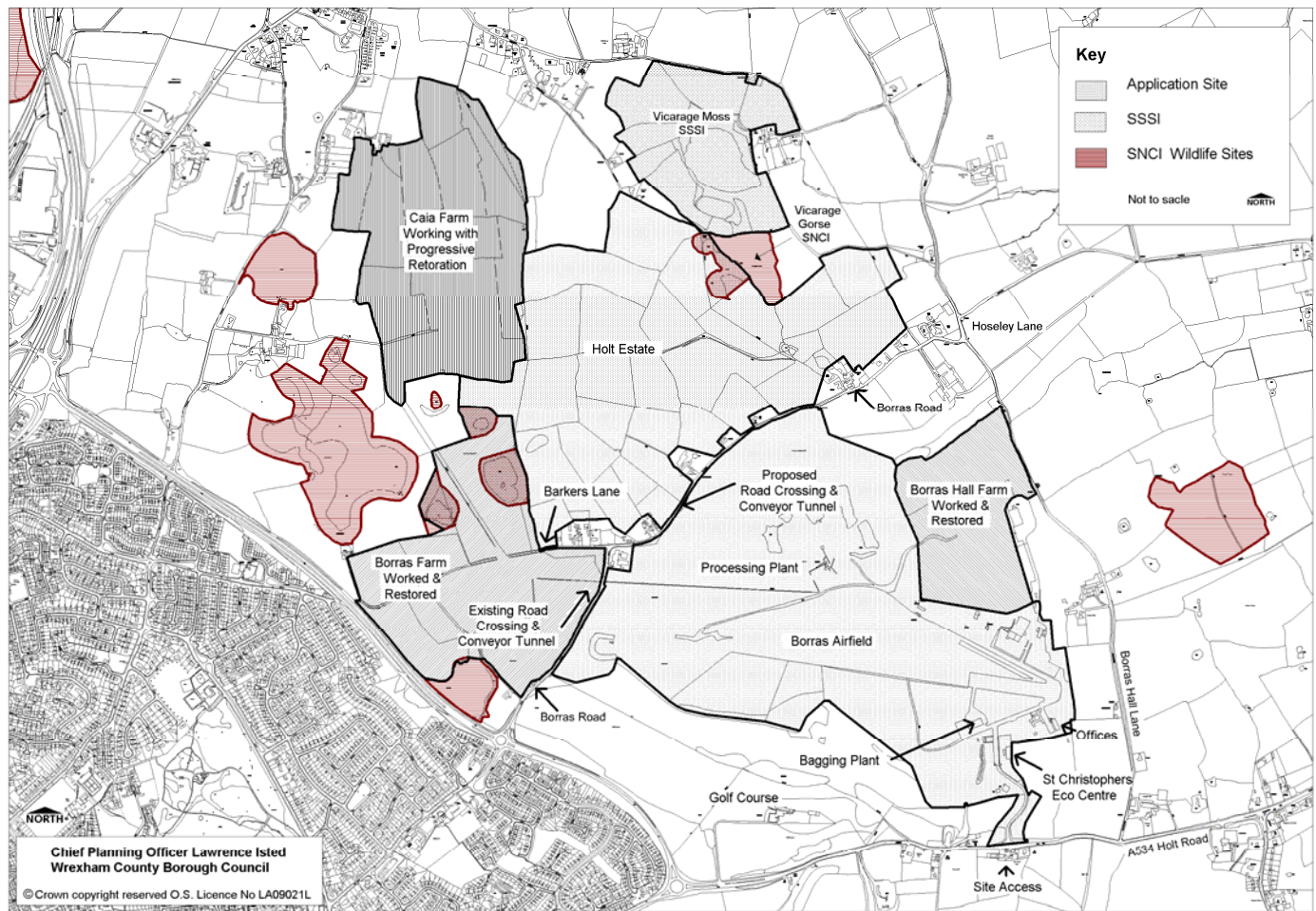
Contained in the report which follows (see attached).

RECOMMENDATION

To determine the planning application in accordance with the recommendation.

BACKGROUND PAPERS

Planning File P/2003/0579.



Plan No 2 Application Site

PROPOSAL

The proposal as submitted in 2003 sought permission to continue extraction at Borras Quarry in two ways:

- By selective deepening of the permitted sand and gravel workings at Borras Airfield, which currently has an extraction depth limit of 62m AOD (above Ordnance Datum) down to 43 metres AOD at its deepest
- A lateral extension of the Quarry onto land at the Holt Estate, which would be worked in 6 phases

An Environmental Statement (ES) was submitted with the Application, following a comprehensive Environmental Impact Assessment (EIA) of the proposed development.

After submission of the application further consultations took place, which led to a number of issues being raised about the proposed development. Careful consideration was given to these issues and, as a result, amendments have been made to the proposed development. A Supplementary Statement was submitted to the Council in August 2005, detailing the amendments and providing additional information. The

main changes that have been made to the proposed development are:

- A significant reduction in the extraction boundaries at the Holt Estate, including the removal of extraction Phase H6
- A reduction in the proposed working hours at the Holt Estate
- Major improvements to the main Quarry access
- Greater stand-offs to residential properties along Barkers Lane and Borrass Road

As a result of these changes the extraction area has been reduced from 58.3 has to 43.4 has and a revised scheme of working and restoration phases submitted.

The deposits of sand and gravel in the area generally consist of a coarse grained upper layer, referred to as the Upper Sands and Gravels and a finer lower layer, referred to as the Lower Sands. The aggregate products manufactured by Tarmac depend on the correct balance of coarse and fine materials being supplied to the processing plant. Most of the Upper Sands and Gravel layer within the Airfield has now been worked out. The reserves of mineral within the Airfield are mostly of the finer material in the Lower Sand layer. **The mineral within the Lower Sands layer is generally too fine grained to be used on its own for the manufacture of high quality aggregate products and requires blending with coarser sands and gravels. Without the coarser materials the working of the Lower Sands reserves is unlikely to be economic.**

The original application proposed a comprehensive scheme for the working and blending of 22.8 million tonnes of sand and gravel from Borrass Quarry and the Holt Estate. This comprised both planned (6.8 million tonnes) and unplanned (16.0 million tonnes) sand and gravel (planned is with permission and unplanned is without permission). As of 1st January 2003 the planned reserves at Borrass Quarry were 6.8 million tonnes. 1.2 million tonnes have been worked in the intervening 2 years, leaving 5.6 million tonnes of planned sand and gravel as of 1st January 2005. The unplanned sand and gravel within the Application Site comprised 2 million tonnes in Borrass Airfield (below 62m AOD) and 14 million tonnes in the Holt Estate. The reduction in the extraction boundaries now being proposed within the Holt Estate has reduced the sand and gravel resource from 14 million tonnes to 9.8 million tonnes, resulting in an overall reduction within the application site from 16 million tonnes to 11.8 million tonnes. The amended Application now proposes a total extractable reserve (both planned and unplanned) of 17.7 million tonnes, compared with the 22.8 million tonnes stated in the original Application.

The existing planning permissions contain additional reserves of about 1.8 million tonnes, which would be relinquished if permission for the extension were to be granted. The reasons for relinquishment of these reserves are that some would require working to take place below the local water table and some would require removal of substantial amounts of overburden materials. The reserve figures are based on information gathered in January 2003 and allowance will need to be made for depletion as reserves are worked at a rate of over 600,000 tonnes per year. The permitted reserves are within Caia Farm, which is likely to be worked out in late 2005, and within the Airfield. At current rates of output the coarse material at the Airfield is likely to be exhausted by 2009.

The proposed development envisages that current production levels at between 600,000 and 700,000 tonnes per year would be maintained until 2011. At that time, owing to closure of Tarmac quarries in Cheshire, production at Borrass Quarry is expected to rise to 900,000 tonnes per year. The additional tonnage would be made

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Appendix 6

Emerging planning policy MW1

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Wrexham Local Development Plan 2013 - 2028

KSD04

housing

open space

employment

community

transport

education



Deposit Plan (March 2018)

Minerals, Waste and Renewable Energy

Policy MW1: Minerals Safeguarding

Non-mineral development within Mineral Safeguarding Areas as defined on the proposals map will only be permitted where it can be demonstrated that:

- i. The mineral underlying the site does not merit extraction, or
- ii. The need for the non-mineral development outweighs the need to protect the resource, or
- iii. The mineral can be satisfactorily extracted prior to the non-mineral development, or
- iv. The development is of a temporary nature or can be removed within the timescales within which the mineral is likely to be needed, and
- v. Essential infrastructure that supports the supply of minerals would not be compromised or would be provided elsewhere.

All applications for development in these areas shall be supported by a Mineral Safeguarding Assessment.

Proposals for non-mineral development on allocated sites of 4ha or more and which are underlain by surface coal or Category 1 sand and gravel shall be supported by a Prior Extraction Assessment.

This policy expands on policy SP17, protecting potential resources from development and accords with national planning policy contained in PPW which requires Mineral Planning Authorities to safeguard access to mineral deposits which society may need.

Wrexham is underlain by a wealth of minerals which society may need, now or in the future. Minerals are a finite resource and can only be worked where they occur whereas there is often choice regarding the location of non-mineral development. In order to prevent the unnecessary sterilisation of minerals this policy safeguards undeveloped land underlain by mineral from unnecessary sterilisation. The mineral resources safeguarded include sand and gravel, limestone, primary and secondary coal, and clay. Rail heads are also safeguarded under the above policy and are identified under the Mineral Safeguarding Areas on the proposals map.

Due to the extent and distribution of mineral within the County Borough and the need for non-mineral development such as housing, it is inevitable that some sterilisation will occur and this is accepted and established through the allocation of sites underlain by mineral in the LDP. Where mineral is confirmed as being of economic importance it will be expected that the potential for extraction of the mineral prior to the non-mineral development will be explored, this is defined as 'prior extraction'. Any loss should be minimised through prior extraction where feasible. Although the policy includes provision for prior extraction, even where prior extraction is required it is likely that there will still be some sterilisation of mineral since there will be a need

to ensure that development can occur over a reasonable timescale and without prejudicing the viability of the non-mineral development.

The Mineral Safeguarding Assessment should contain sufficient information to enable the Local Planning Authority to establish whether the proposed development meets any of the criteria identified within the policy above. The information used to establish Mineral Safeguarding Areas was produced at a strategic level and there may be instances where mineral underlying a site does not merit safeguarding. Mineral produced as a result of prior extraction will be considered to be a windfall and need for the mineral concerned does not need to be demonstrated against regional needs.

The need for mineral underneath sites which are allocated for non-mineral development has already been considered through the development of the LDP and the need for the non-mineral development is considered to outweigh the need to protect the resource in its entirety. Nevertheless, prior extraction should be undertaken where possible and applications for non-mineral development should be supported by a Prior Extraction Assessment. The level of prior extraction which can be undertaken will depend upon the nature of mineral concerned, the size of the site, the phasing, timing, design and delivery of the non-mineral development. The allocated sites which are considered to offer the greatest potential for prior extraction are those which are at least 4ha in size and applications on these sites should be supported by a Prior Extraction Assessment. Prior extraction on smaller sites is considered much less likely to be feasible or desirable. Nevertheless, an advisory will be included on any pre-application advice issued in respect of such sites confirming the likelihood of the site being underlain by mineral of economic importance and the potential benefits of prior extraction.

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Appendix 7

Extract from Background Paper 11

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Wrexham Local Development Plan 2013 - 2028

BP 11

housing

open space

employment

community

transport

education



Minerals (January 2018)

Limestone: Other	155ha	0	0
Primary Coal	343ha	20.95	6%
Secondary Coal	1,874ha	68.24	3.6%

3.1.10. Requiring prior extraction on a site the size of Land East of Cefn Road could have a potentially significant impact in terms of delivery. It is essential that the non-mineral development itself is acceptable in landscape terms and that other problems are not created by any lowering of the land such as drainage and flood risk. Some importation of inert material could help achieve an appropriate development platform, however, the availability of inert waste fluctuates over time and actual waste disposed of in inert landfill sites in North Wales is actually very limited in terms of the overall tonnage produced¹¹. It is therefore recommended that the potential for prior extraction is considered at an early stage so that it can be incorporated into the overall development.

3.1.11. The loss of sand and gravel as a proportion of the overall sand and gravel within the County Borough is relatively small and would be less than 3% of the total resource available outside settlements and sites constrained by national and international designations. Sand and gravel is not identified as a nationally scarce mineral, however, because of its distribution it is increasingly being sterilised by non-mineral development. Sand and gravel distribution across the region is more limited elsewhere, though there are deposits of potentially commercial significance within the west of Gwynedd and Flintshire. Cheshire also has significant deposits and is an important supplier of sand and gravel to the North West, though historically smaller tonnages have been exported to North Wales with exports from Wrexham being of more significance.

3.1.12. The assessment carried out cannot take into account factors such as depth, level of overburden, quality (for example, commercial sand and gravel extraction is composed of particles that are rich in silica, e.g. quartz, quartzite and flint) and particle size (i.e. how much fine sand, coarse sand and gravel there is). This means that the estimates of available mineral are likely to significantly overstate what is actually commercially viable mineral, particularly when the requirement for buffer zones and compensation land are taken into account. Whilst it is accepted that there will be a loss of mineral as a result of the delivery of allocations in the LDP this increases the importance of protecting mineral resources outside existing and allocated sites.

3.2 Identifying Areas which should be safeguarded:

3.1.13. Wrexham is underlain by a variety of different minerals of economic importance including sand and gravels, limestones, sandstone, clay, salt, peat, clay, dolerite intrusions, other igneous rocks, and metalliferous minerals. Safeguarding all mineral which underlies Wrexham would result in vast areas of the County Borough being safeguarded and is considered unnecessary and potentially counterproductive. Table 2 identifies the rationale for the safeguarding of different minerals.

¹¹ North Wales Waste Planning Monitoring Report April 2017

Appendix 8

Particle Size Distribution graphs

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NOTES

DO NOT SCALE

THIS DRAWING SHOWS THE INDICATIVE LOCATION OF EXPLORATORY HOLES UNDERTAKEN BY BETTS GEO LTD IN 2018.

THE PLAN OVERLAYS THE TOPOGRAPHICAL SURVEY.

KEY

TP

INDICATIVE TRIAL HOLE LOCATION

SA

INDICATIVE SOAK-AWAY LOCATION

WS

INDICATIVE WINDOW SAMPLE LOCATION

BH

INDICATIVE CABLE PERCUSSIVE BOREHOLE LOCATION

INDICATIVE LOCATION OF POND

INDICATIVE LOCATION OF WATER MAIN – 300mm

INDICATIVE LOCATION OF BADGER SETT

REV	DATE	BY	DESCRIPTION	CHK
DRAWING STATUS: DRAFT				
BETTS ASSOCIATES GEO ENVIRONMENTAL Old Marsh Farm Borne, Welsh Road, Sealand, Flintshire, CH5 2LY Tel: 01244 288178 Fax: 01244 288179 enquiries@betts-associates.co.uk				
PROJECT: BLOOR HOMES				
TITLE: HOLT ROAD, WREXHAM				
PROPOSED EXPLORATORY HOLE LOCATION PLAN				
DATE: 22.10.18	SCALE & SIZE: 1:1250 @ A1	DRAWN: PH	CHECKED: BL	
PROJECT No: 18BLH002	DRAWING No: EXP 101	REV: -		

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STRUCTURAL SOILS LTD
TEST REPORT



Report No. 783504 R1

Date 09-November-2018 Contract 18/08978

Client Envirolab Ltd
Address Units 7 & 8 Sandpits Business Park
Mottram Road
Hyde
SK14 3AR

For the Attention of Iain Haslock

Samples submitted by client 29/10/2018
Testing Started 30/10/2018
Testing Completed 09/11/2018

Client Reference 18/08978
Client Order No. P0739410
Instruction Type Written

UKAS Accredited Tests Undertaken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2 (superseded)**
Liquid Limit (definitive method) BS1377:Part 2:1990,clause 4.3
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4
Particle Size Distribution wet sieve method BS1377:Part 2:1990,clause 9.2

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

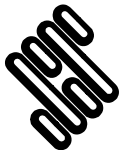
Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail mark.athorne@soils.co.uk

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
TP08	18/08978/3	D	0.80	9.9	26	15	11	98	Brown sandy slightly gravelly CLAY
TP09	18/08978/4	D	1.30	13	26	15	11	95	Brown sandy slightly gravelly CLAY
TP13	18/08978/6	D	2.00	26	28	16	12	99	Brown slightly sandy CLAY
TP14	18/08978/8	D	2.20	23	28	21	7	100	Brown silty CLAY
TP20	18/08978/9	D	1.80	16	36	21	15	99	Brown slightly sandy slightly gravelly CLAY
TP21	18/08978/11	D	2.50	29	34	21	13	100	Brown slightly sandy CLAY
TP23	18/08978/12	D	1.20	9.0	32	23	9	83	Brown slightly sandy slightly gravelly CLAY
TP23	18/08978/13	D	1.80	10	25	16	9	91	Brown sandy slightly gravelly CLAY



**STRUCTURAL
SOILS LTD**

Contract:

18/08978

Contract Ref:

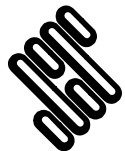
783504



SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
TP25	18/08978/21	D	3.00	24	26	23	3	96	Brown sandy slightly gravelly CLAY
TP33	18/08978/18	D	1.20	20	29	17	12	86	Brown slightly gravelly CLAY
TP37	18/08978/15	D	1.60	22	29	21	8	100	Brown slightly silty CLAY



STRUCTURAL
SOILS LTD

Contract:

18/08978

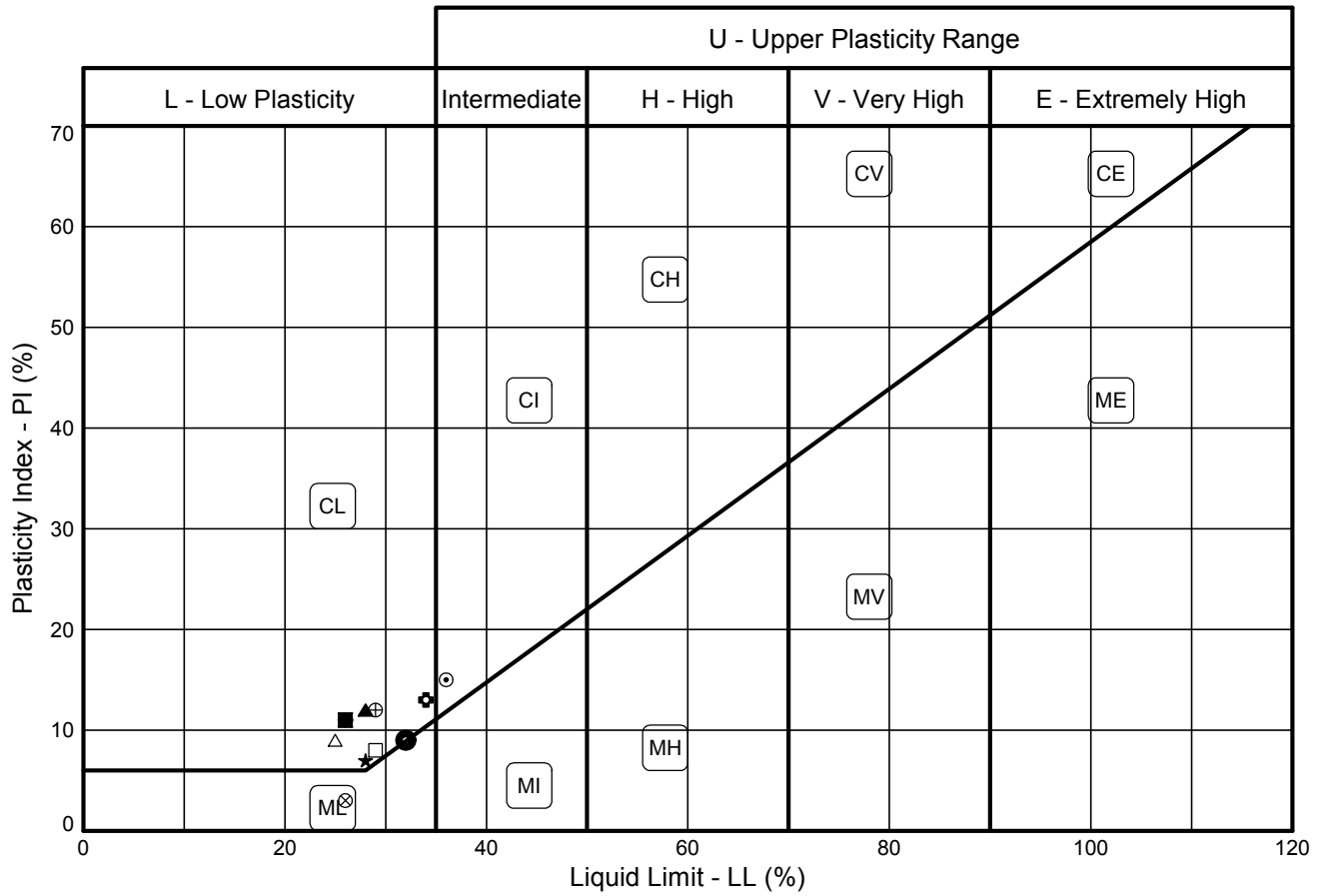
Contract Ref:

783504



PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location
Exploratory Position ID	Sample	Depth (m)									
●	TP08	18/08978/3D	0.80	3.2/4.3/5.3/5.4	4.2.4	9.9	26	15	11	98	C
⊠	TP09	18/08978/4D	1.30	3.2/4.3/5.3/5.4	4.2.4	13	26	15	11	95	C
▲	TP13	18/08978/6D	2.00	3.2/4.3/5.3/5.4	4.2.4	26	28	16	12	99	C
★	TP14	18/08978/8D	2.20	3.2/4.3/5.3/5.4	4.2.3	23	28	21	7	100	C
⊙	TP20	18/08978/9D	1.80	3.2/4.3/5.3/5.4	4.2.4	16	36	21	15	99	C
⊕	TP21	18/08978/11D	2.50	3.2/4.3/5.3/5.4	4.2.4	29	34	21	13	100	C
⊗	TP23	18/08978/12D	1.20	3.2/4.3/5.3/5.4	4.2.4	9.0	32	23	9	83	C
△	TP23	18/08978/13D	1.80	3.2/4.3/5.3/5.4	4.2.4	10	25	16	9	91	C
⊗	TP25	18/08978/21D	3.00	3.2/4.3/5.3/5.4	4.2.4	24	26	23	3	96	C
⊕	TP33	18/08978/18D	1.20	3.2/4.3/5.3/5.4	4.2.4	20	29	17	12	86	C
□	TP37	18/08978/15D	1.60	3.2/4.3/5.3/5.4	4.2.3	22	29	21	8	100	C

Tested in accordance with the following clauses of BS1377-2:1990.

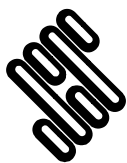
3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

Sarah Mundy

Date

SARAH MUNDY

09/11/18

Contract

18/08978

Contract Ref:

783504



PARTICLE SIZE DISTRIBUTION TEST

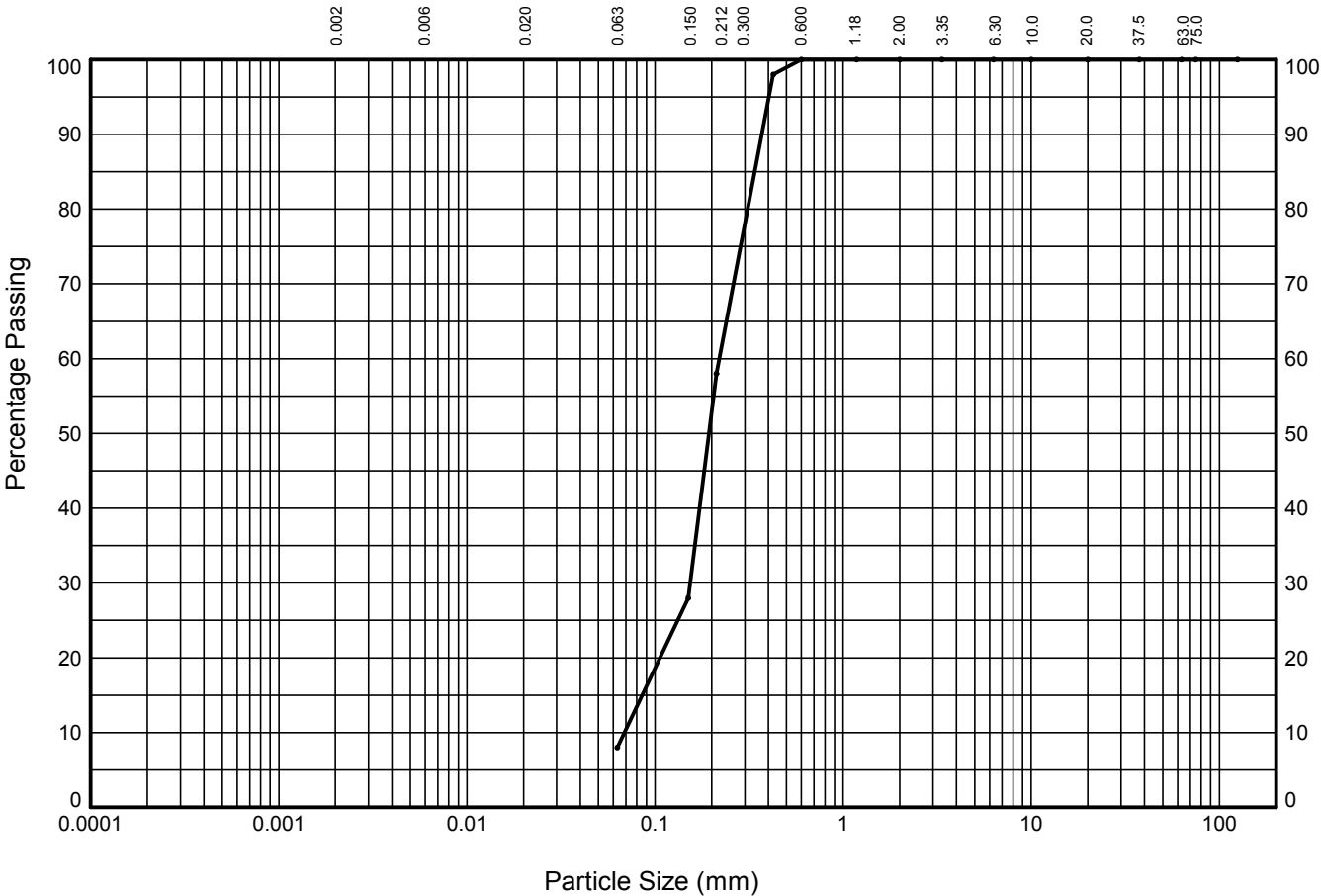
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH4**

Sample Ref: **18/08978/24**

Sample Type: **D**

Depth (m): **4.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

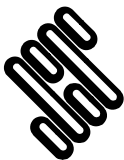
Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	98
0.212	58
0.150	28
0.063	8

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	0
SAND	92
SILT/CLAY	8

Soil Description:

Brown clayey SAND



STRUCTURAL SOILS
The Potteries
Pottery Street
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W. Yorkshire WF10 1NJ

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783504



PARTICLE SIZE DISTRIBUTION TEST

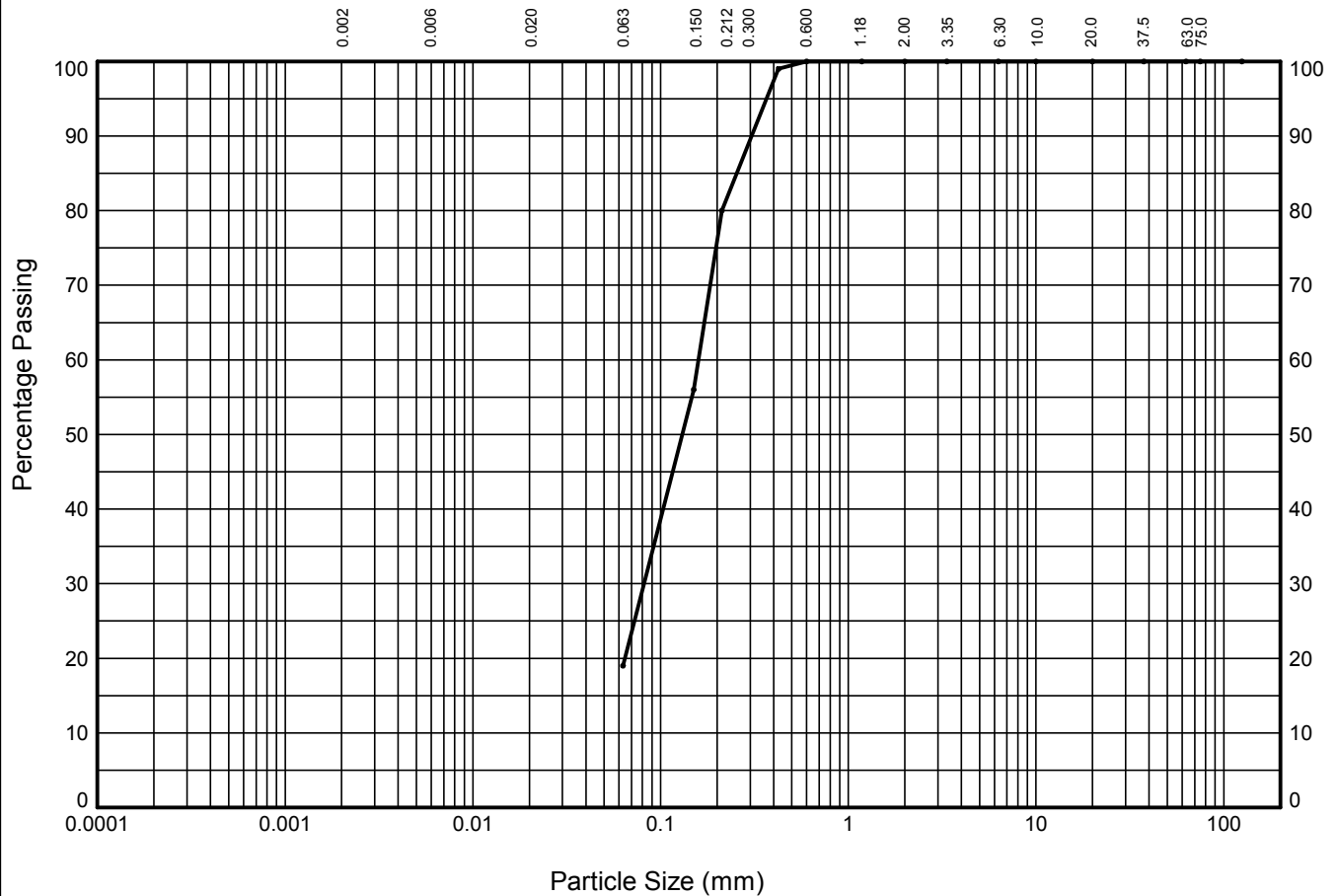
In accordance with clauses 9.2 of BS1377:Part 2:1990

Borehole: **BH4**

Sample Ref: **18/08978/25**

Sample Type: **D**

Depth (m): **7.00**



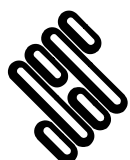
CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	99
0.212	80
0.150	56
0.063	19

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	0
SAND	81
SILT/CLAY	19

Soil Description:
Brown clayey SAND



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

Sarah Mundy

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09/11/18

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18/08978

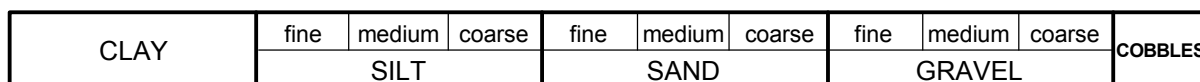
Contract Ref:

783504



In accordance with clauses 9.2 of BS1377:Part 2:1990

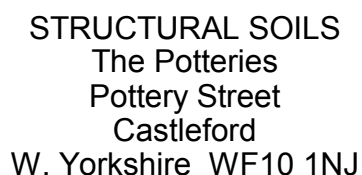
Depth (m): **0.60**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	44
SAND	52
SILT/CLAY	4

Brown slightly clayey very gravelly SAND



Date _____

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09/11/18

Contract Ref:

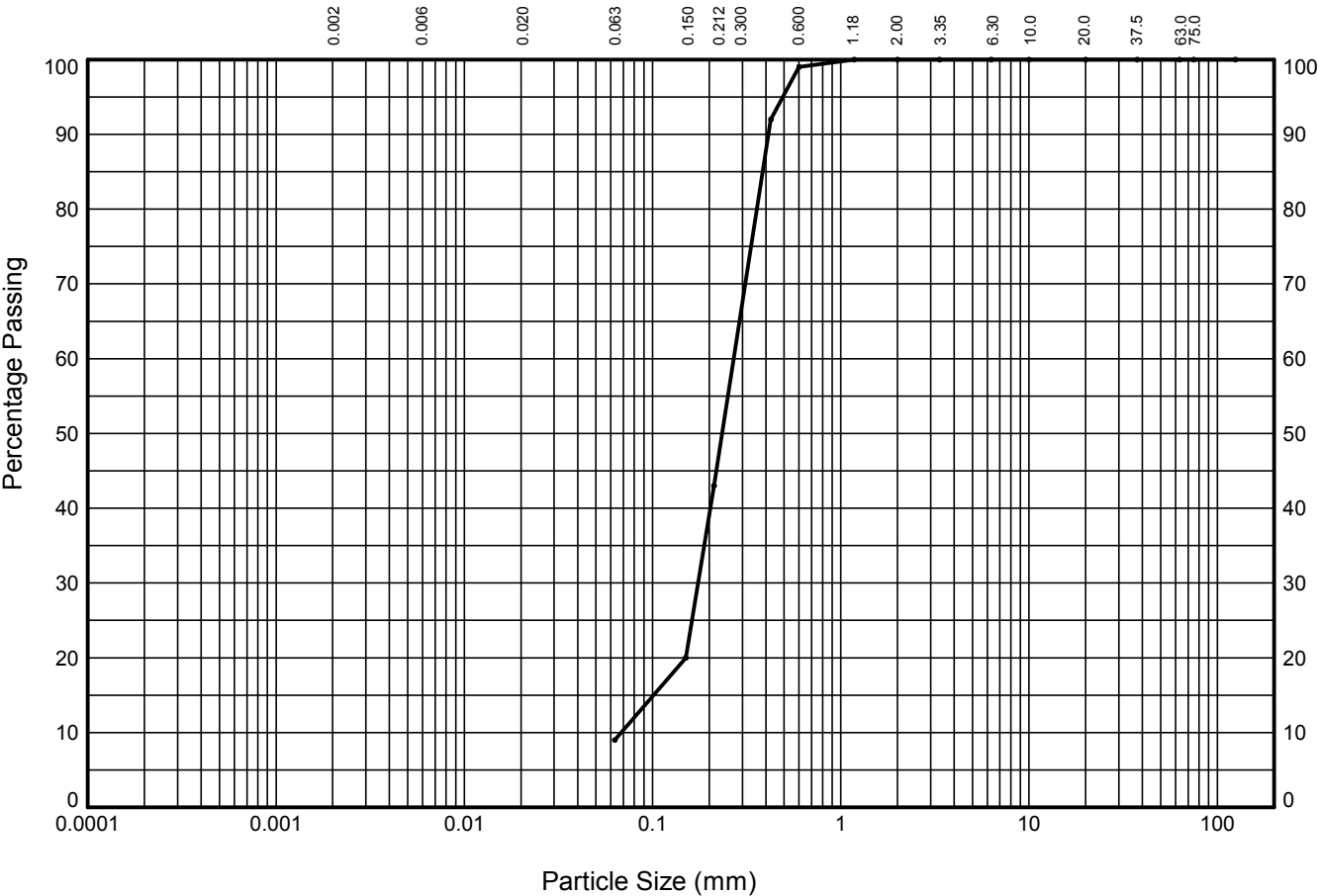
783504



PARTICLE SIZE DISTRIBUTION TEST

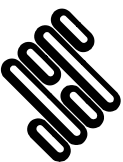
In accordance with clauses 9.2 of BS1377:Part 2:1990

Position ID: **SA2** Sample Ref: **18/08978/17** Sample Type: **D** Depth (m): **1.40**



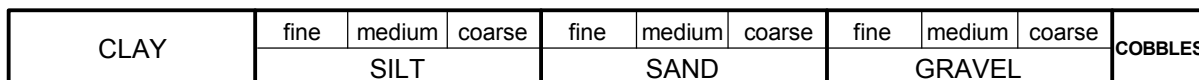
CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)	Particle Diameter (mm)	Percent Passing (%)	Soil Fraction	Sieve Percentage (%)
125.0	100			GRAVEL	0
75.0	100			SAND	91
63.0	100			SILT/CLAY	9
37.5	100				
20.0	100				
10.0	100				
6.30	100				
3.35	100				
2.00	100				
1.18	100				
0.600	99				
0.425	92				
0.212	43				
0.150	20				
0.063	9				
Sedimentation sample was not pre-treated					
Soil Description: Brown clayey SAND					

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date
	<i>Sarah Mundy</i>		09/11/18
	Contract	Contract Ref:	
	18/08978	783504	

In accordance with clauses 9.2 of BS1377:Part 2:1990

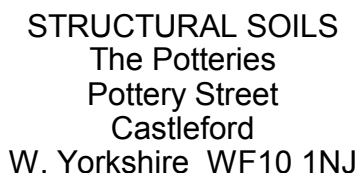
Depth (m): **0.80**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	9
SAND	84
SILT/CLAY	7

Soil Description:
Brown clayey gravelly SAND



Date _____

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09/11/18

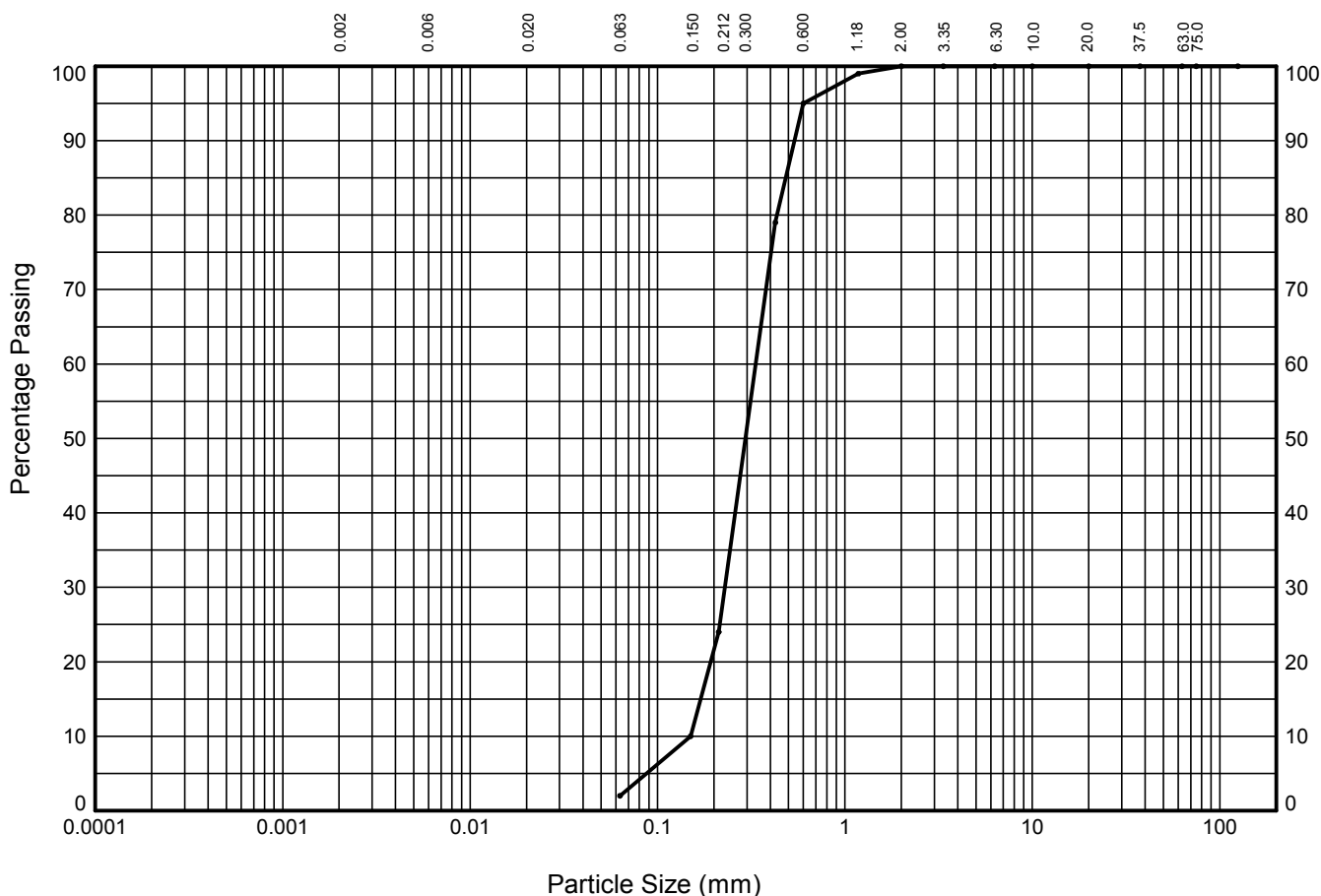
Contract Ref:

783504



In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **0.80**



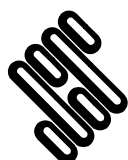
CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	99
0.600	95
0.425	79
0.212	24
0.150	10
0.063	2

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	0
SAND	98
SILT/CLAY	2

Soil Description:
Brown slightly clayey SAND



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

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SARAH MUNDY

Contract

18/08978

Contract Ref:

783504

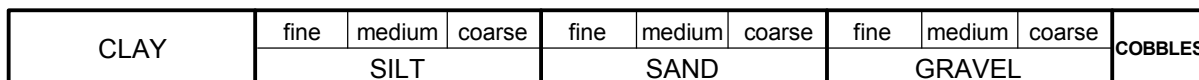
Date _____

09/11/18



In accordance with clauses 9.2 of BS1377:Part 2:1990

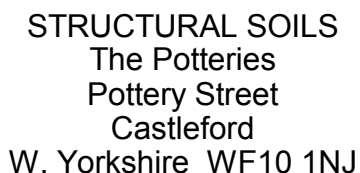
Depth (m): **0.50**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	1
SAND	98
SILT/CLAY	1

Brown slightly clayey slightly gravelly SAND



Date _____

SARAH MUNDY

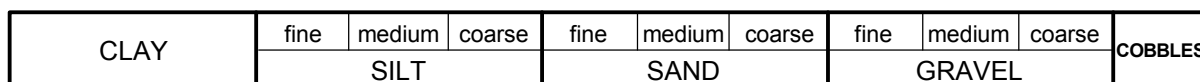
09/11/18

Contract Ref:

783504



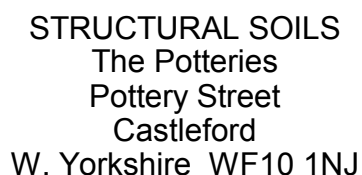
In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **1.00**

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	14
SAND	83
SILT/CLAY	3

Brown slightly clayey gravelly SAND



Date _____

SARAH MUNDY

09/11/18

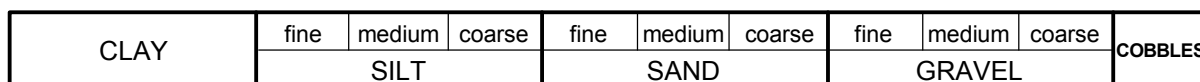
Contract Ref:

783504



In accordance with clauses 9.2 of BS1377:Part 2:1990

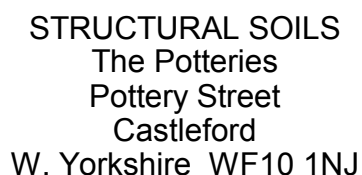
Depth (m): **1.60**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	34
SAND	63
SILT/CLAY	3

Brown slightly clayey very gravelly SAND



Date _____

SARAH MUNDY

09/11/18

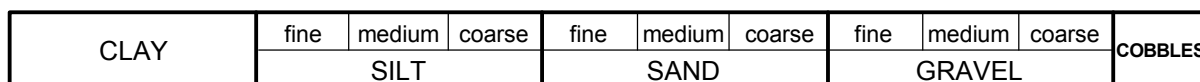
Contract Ref:

783504



In accordance with clauses 9.2 of BS1377:Part 2:1990

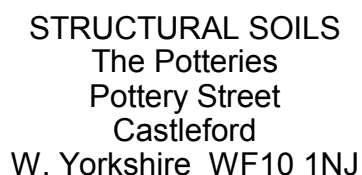
Depth (m): **1.40**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	5
SAND	92
SILT/CLAY	3

Brown slightly clayey gravelly SAND



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09/11/18

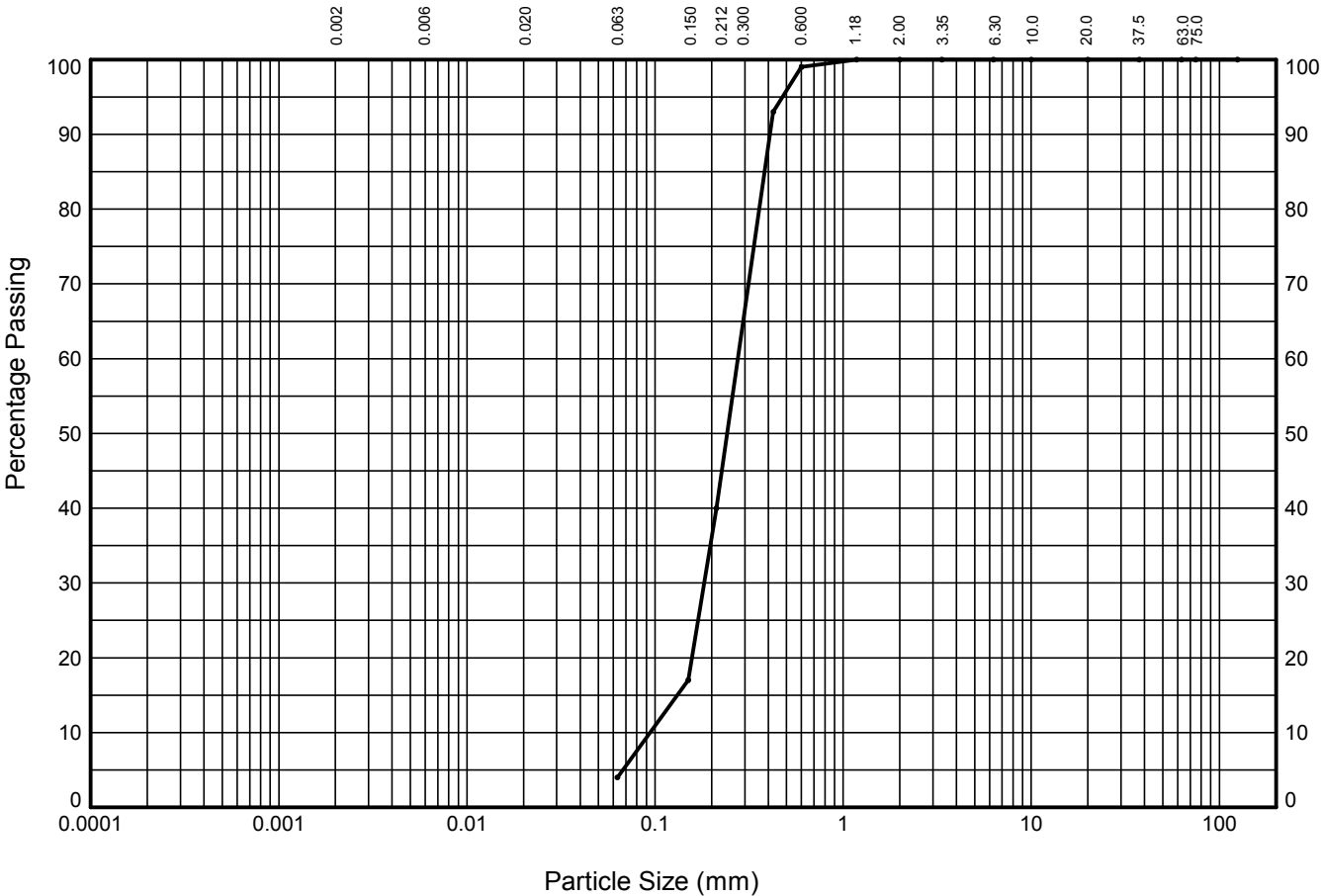
783504



PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2 of BS1377:Part 2:1990

Trial Pit: **TP11** Sample Ref: **18/08978/5** Sample Type: **D** Depth (m): **2.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	99
0.425	93
0.212	40
0.150	17
0.063	4

Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

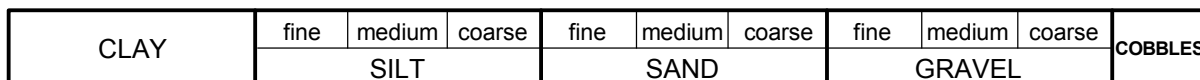
Soil Fraction	Sieve Percentage (%)
GRAVEL	0
SAND	96
SILT/CLAY	4

Soil Description: Brown slightly clayey SAND
--

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date
	<i>Sarah Mundy</i>		09/11/18
	Contract	Contract Ref:	
	18/08978	783504	

In accordance with clauses 9.2 of BS1377:Part 2:1990

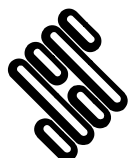
Depth (m): **2.50**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	0
SAND	23
SILT/CLAY	77

Soil Description:
Brown slightly sandy CLAY



Compiled By

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SARAH MUNDY

Date

09/11/18

Contract

18/08978

Contract Ref:

783504



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STOKE-ON-TRENT

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Tel: +44 (0)178 227 6700

BIRMINGHAM

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Longbridge Technology Park
Longbridge
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