

BARFOOTS

BARFOOTS, PAGHAM ROAD, PAGHAM, WEST SUSSEX, PO20 3PX

GEOTECHNICAL ASSESSMENT REPORT

The Granary
White Hall Farm
Long Itchington
Warwickshire
CV47 9PU

February 2021
Report No. CCL03401.CM91

www.crossfield-consulting.co.uk

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1. INTRODUCTION

It is proposed to develop a site off Pagham Road, Pagham. The site is currently a plot of land associated with agricultural use and includes a yard area and part of a field. The proposed development comprises an extension to the existing barn and a new yard area.

Crossfield Consulting Limited has been commissioned to undertake an investigation of the site to assess the ground conditions and provide an assessment in respect of foundation solutions and potential soakaway drainage. This report provides the relevant assessments together with the supporting factual records as obtained from a desk study and ground investigation. The report also complies with the published guidance relating to the requirements of a Building Control authority. A risk-based assessment of potential contamination is outside the scope of this report (and is understood not to be required by the local planning authority).

2. THE SITE

2.1 Location

The site is located to the west of Pagham Road, approximately 3 km to the north of Pagham village and 4 km northwest of Bognor Regis town centre, as shown on Figure 1. The National Grid Reference for the site is SU 895 008. The existing barn to be extended is present to the north of the development area and agricultural fields lie to the south. Pagham Road borders the eastern part of the site and a large yard area with storage structures lies to the west of the site. The Chichester Flood Relief Channel lies approximately 200 m west of the site.

2.2 Site Description

The following site description is based on observations made at the time of the ground investigations on 10 February 2021.

The site is currently occupied by part of a concrete yard area containing several storage structures, a portable toilet and hose equipment within the northern part of the site. The existing barn, to be extended, is a concrete-panelled structure with a steel frame and corrugated steel cladding. Elsewhere the site largely consists of part of a field which is slightly lower than the yard area. Bushes and trees are present around the southern site perimeter. It is understood that the area has recently been cleared of vegetation including trees.

2.3 Site History

The site history has been researched with reference to online historical mapping sites. The plans and maps indicate that the following development has taken place on and around the site.

From before 1870s, the site was associated with agricultural land. During the 1960s, the northern part of the site had been developed and comprised a yard area associated with surrounding structures. Though most of the site remained part of a field. The existing barn, to be extended, appears to have been constructed by 2012. On the basis of a Google Streetview image from July 2019, it appears that the area of the proposed barn extension was covered with undergrowth and immature trees of up to approximately 8 m height. We understand this was planted post 2011.

3. PUBLISHED GEOLOGY

Geological map data published by the British Geological Survey (BGS) online and in print, on 1:50,000 scale Sheet No. 317/332 (Chichester and Bognor) indicates that the site is underlain by superficial deposits comprising sand and gravel of Raised Beach Deposits. The London Clay Formation, comprising clay, silt and sand, are indicated to be present below the superficial deposits. The boundary with the underlying Lambeth Group strata is shown immediately to the north of the site.

4. DESK STUDY ENQUIRIES

Information available from on-line sources, including DEFRA's MAGIC interactive map and Groundsure's Enviro Data Viewer, have been reviewed as part of this report. A summary is presented below.

There is a record of an historical landfill recorded approximately 20 m of the site. Landfilling operations had ceased by 1960.

The superficial strata beneath the site are designated as a Secondary (A) Aquifer. The bedrock strata have been designated as 'Unproductive'. The site does not lie within a groundwater Source Protection Zone.

Records of a boreholes located to the north of the site have been obtained from the BGS. The records indicate that sand and gravel Raised Beach Deposits are described as clay, sand and sandy clay to a depth of 4.5 m and are underlain by Lambeth Group strata (referred to as the Reading Formation), described as a brown mottled red clay. Groundwater was recorded at depths of between 2.5 m and 3.5 m.

5. GROUND CONDITIONS AND GEOLOGICAL MODEL

5.1 Ground Investigation

Details of the ground investigation and laboratory testing, together with exploratory hole logs and in situ test results, are given in Appendix II. The investigation has identified the presence of the following, below the site.

5.2 Buried Foundations and Services

Old field drains were encountered during the investigation, but buried structures/foundations and services were not encountered. Such features could still be present in the area adjacent to the existing barn and within the yard area.

5.3 Strata Encountered

Topsoil

Topsoil is present across the site to recorded depths of 0.3 m.

Raised Beach Deposits

Raised Beach Deposits have been encountered across the site beneath the topsoil. The strata are variable and comprise horizons of orangish brown, clayey silty sand, slightly gravelly, very clayey sand/slightly gravelly, very sandy clay and a very clayey sand and gravel. The deposits have been proved to a depth of 1.0 m.

London Clay Formation

London Clay Formation strata are present below the Raised Beach Deposits and were encountered within all of the trial pits. The strata encountered typically comprise stiff consistency and high strength, grey mottled orangish brown, slightly sandy, silty clay up to 2.8 m depth (the maximum depth of the investigation). Within the northernmost exploratory hole (TP4) the basal strata are multicoloured which is indicative of Lambeth Group strata.

5.4 Groundwater

Groundwater seepages were recorded within the sandier clay horizons below 2.0 m depth.

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

6. PROPOSED DEVELOPMENT

The proposed development, which is shown on Figure 3, comprises the following:

- An extension to the existing barn building
- New additional yard area

7. ASSESSMENT OF MINING, QUARRYING AND OVERALL GROUND STABILITY

The site is not within an area of recorded underground mining or other such mineral extraction and there is no evidence of quarrying activities at, or in close proximity to, the proposed development property. Therefore, it is considered that the proposed development should not be constrained by issues of ground stability associated with mining or quarrying.

With reference to published information provided by the British Geological Survey, and in the context of the low sensitivity of the proposed structure to very minor background seismic events recorded in the UK, it is considered that the foundation solution should not be constrained by potential ground vibrations from natural sources and that more detailed assessment is not necessary.

8. FOUNDATION RECOMMENDATIONS

8.1 Assessment of Foundation Solutions

With reference to the recorded ground conditions and corresponding Geological Model presented in Section 5, characteristic values relating to the geotechnical properties of the strata within influencing distance of the proposed structures are outlined below. Salient elements of the geotechnical model are outlined below.

It is understood that the proposed development is to comprise an extension of the existing barn structure.

Ground conditions at the site generally comprise a limited thickness of topsoil or Made Ground underlain by a thin horizon of Raised Beach Deposits underlain by stiff consistency and high strength clays of the London Clay Formation/Lambeth Group.

On the basis of the recorded ground conditions, it is considered that pads or strip/trench-fill foundations should be appropriate to support the proposed development as detailed below. Consideration should be given to the provision of suitable precautions due to recent removal of trees from the area.

8.2 Recommended Foundation Design Parameters

On the basis of the foregoing assessment, it is considered that pads or strip/trench fill footings provide the most appropriate foundation solution for the proposed structure. On the basis of the ground conditions and structures described in the report, the recommended parameters for the foundation design are as follows:

<i>Foundation Strata :</i>	Stiff consistency and high strength clays of the London Clay Formation/Lambeth Group
<i>Foundation Depth :</i>	Minimum 0.9 m deepened within influence of trees.
<i>Foundation Width/Size:</i>	Up to 3.0 m max
<i>Nett Allowable Bearing Pressure:</i>	150 kN/m ²

It is considered that total settlement of foundations designed on the above basis should be less than the normal serviceability limit state for this development (i.e. total settlements of 25 mm).

Laboratory testing results indicate the clayey horizons at the site comprise typically medium volume change potential soils, as defined in NHBC Standards (2021). Within the influence zones of existing or recently removed trees, suitable foundation precautions are recommended, as outlined in NHBC Standards (2021).

Based on guidance published within BRE Special Digest 1 (2005), the specified DC Class of concrete for buried structures and foundations should be suitable for an ACEC site classification of AC-1.

8.3 Floor Slab Recommendations

Due to the presence of “medium” volume change potential soils beneath the site and the recent removal of trees and bushes from the footprint of the proposed barn extension, consideration should be given to the removal of all near-surface clay soils with visible roots below the proposed extension and replacement with selected granular fill place to an appropriate specification upon which a ground-bearing floor slab can be placed.

8.4 General Construction Advice

All formations should be cleaned, and subsequently inspected by a suitably qualified engineer prior to placing concrete. Should any soft, compressible or otherwise unsuitable materials be encountered they should be removed and replaced by blinding concrete.

Foundation concrete, or alternatively, a blinding layer of concrete, should be placed immediately after excavation and inspection in order to protect the formation against softening and disturbance.

Generally, all formations should be placed wholly within the same material type, unless specific geotechnical inspection and assessment have been undertaken.

Care should be taken to ensure that any field drains encountered are carefully and satisfactorily blocked to prevent water seeping through the drains and into any excavations.

9. TEMPORARY WORKS

Conventional plant is considered suitable for excavation works at the site. The ground is anticipated to remain stable in the short term. However, instability should be anticipated in all excavations left open for extended periods of time.

Groundwater is unlikely to be encountered in shallow excavations, although perched water may be encountered. If perched water does enter excavations, it should be controlled using conventional sump pumping.

10. ASSESSMENT OF SOAKAWAY DRAINAGE

The recorded ground conditions comprise clays, indicated to be practically impermeable, as defined in CIRIA C750 (2016). In situ soakaway tests were commenced, in compliance with the procedure published in BRE DG365 (2016). Due to the negligible infiltration during the test period (as detailed in Appendix III), it was not feasible to complete the tests. Infiltration values of less than 1×10^{-6} m/s were demonstrated.

In view of the above, it is considered that the use of soakaway drainage is not viable for the proposed development and an alternative method of drainage for the site should be identified.

11. ROAD PAVEMENTS

Based on examination of the soils present on the site, and the guidance of IAN/73 AND TRRL Report LR1132, it is considered that an equilibrium design of CBR value of 3% is appropriate for road pavement design. It would be prudent to consider the Made Ground to be potentially frost susceptible.

12. RECOMMENDED SUPERVISION AND MONITORING

In compliance with the requirements in BS EN 1997-1:2004 and BE EN 1997-2:2007, construction and workmanship of the engineering solutions recommended in this report shall be supervised. In particular, issues listed in Section 8.4 General Construction Advice shall be considered in the implementation of the works and design of any necessary temporary works set out in Section 9.

In relation to the foundation solution and ground floor slab recommendations in Section 8, the following supervision and monitoring is recommended.

- Inspections of formation strata in excavations for strip/trench fill or pad footings

13. SUMMARY

It is proposed to develop a site off Pagham Road, Pagham. The site is currently a plot of land associated with agricultural use and includes a yard area and part of a field. The proposed development comprises an extension to the existing barn and a new yard area.

Ground conditions at the site comprise a layer of Made Ground/topsoil to a maximum identified depth of 0.9 m. Underlying the Made Ground/topsoil, a thin horizon of variable Raised Beach Deposits is present. Stiff consistency and high strength, sandy, silty clay of the London Clay Formation are present beneath the superficial

deposits and has been proven to a depth of at least 2.8 m (the maximum depth of the investigation). Groundwater seepages were recorded at approximately 2.0 m depth during the investigation.

It should be feasible to support the proposed development on either pad or conventional strip and trench fill foundations placed in high strength clay of London Clay Formation strata. Due to recent removal of trees from within the proposed footprint of the extension and the presence of medium volume change potential strata beneath the site, consideration should be given to deepening foundations in accordance with recommendation outlined in NHBC Standards (2021). Within the proposed footprint of the barn extension, it is also recommended that all near-surface desiccated clay strata (clays with visible roots) be removed and replaced with selected granular fill prior to casting a ground bearing floor slab.

Soakaway drainage is indicated not to be viable due to the low permeability of soils recorded at the site.

REFERENCES

BRE (2005) *Special Digest 1 – Concrete in aggressive ground*, CRC Ltd

BRE (2016) *DG365 – Soakaway Design* IHS

BSI (2020) *BS 5930:2015+A1:2020 Code of Practice for Ground Investigations* British Standards Institution

CIRIA (2016) *CIRIA C750 – Groundwater Control – design and practice* Construction Industry Research Association

Highways Agency (2009) *Interim Advice Note 73/06 Revision 1 – Design Guidance for Road Pavements (Draft HD25)* HA

TRRL (1989) *LR1132 – The Design of Bituminous Road Pavements* Transport and Road Research Laboratory

GENERAL NOTES

1. This report is provided in the context of the stated development proposals and should not be used in a different context.
2. The accuracy of map extracts cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
3. Any borehole data from the British Geological Survey sources are included on the following basis: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation.
4. Where any data supplied by the Client or by other external sources, including previous site investigation data, have been used it has been assumed that the information is correct unless otherwise stated. No responsibility can be accepted by Crossfield Consulting Limited for inaccuracies within the data supplied by others.
5. Exploratory hole locations provided in the report are generally established by tape measurement from existing features or boundaries. Hole locations are not accurately surveyed and ground levels at these locations are not obtained unless specifically requested.
6. Any assessments made in this report are based on the ground conditions indicated by the trial pits and/or boreholes, together with the results of any field or laboratory testing undertaken and, where appropriate, other relevant site data which may have been obtained for the site. Variations in ground conditions may occur between exploratory hole locations and there may be special conditions appertaining to the site which have not been revealed by the investigation and which have not been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.
7. The report is provided for the sole use by the Client or its assignees and is confidential to the Client's professional advisers. No responsibility whatsoever for the contents of this report will be accepted to any person other than the Client or its assignees.
8. New information, improved practices and legislation may necessitate an alteration to the report in whole, or in part, after its submission. Therefore with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to Crossfield Consulting Limited for re-assessment and, if necessary, re-appraisal.

FIGURES

FIGURE 1



SITE LOCATION PLAN

Scale 1: 50,000

Reproduced from the 2013 1:50,000 Ordnance Survey map with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright. Licence No.100014660

FIGURE 2

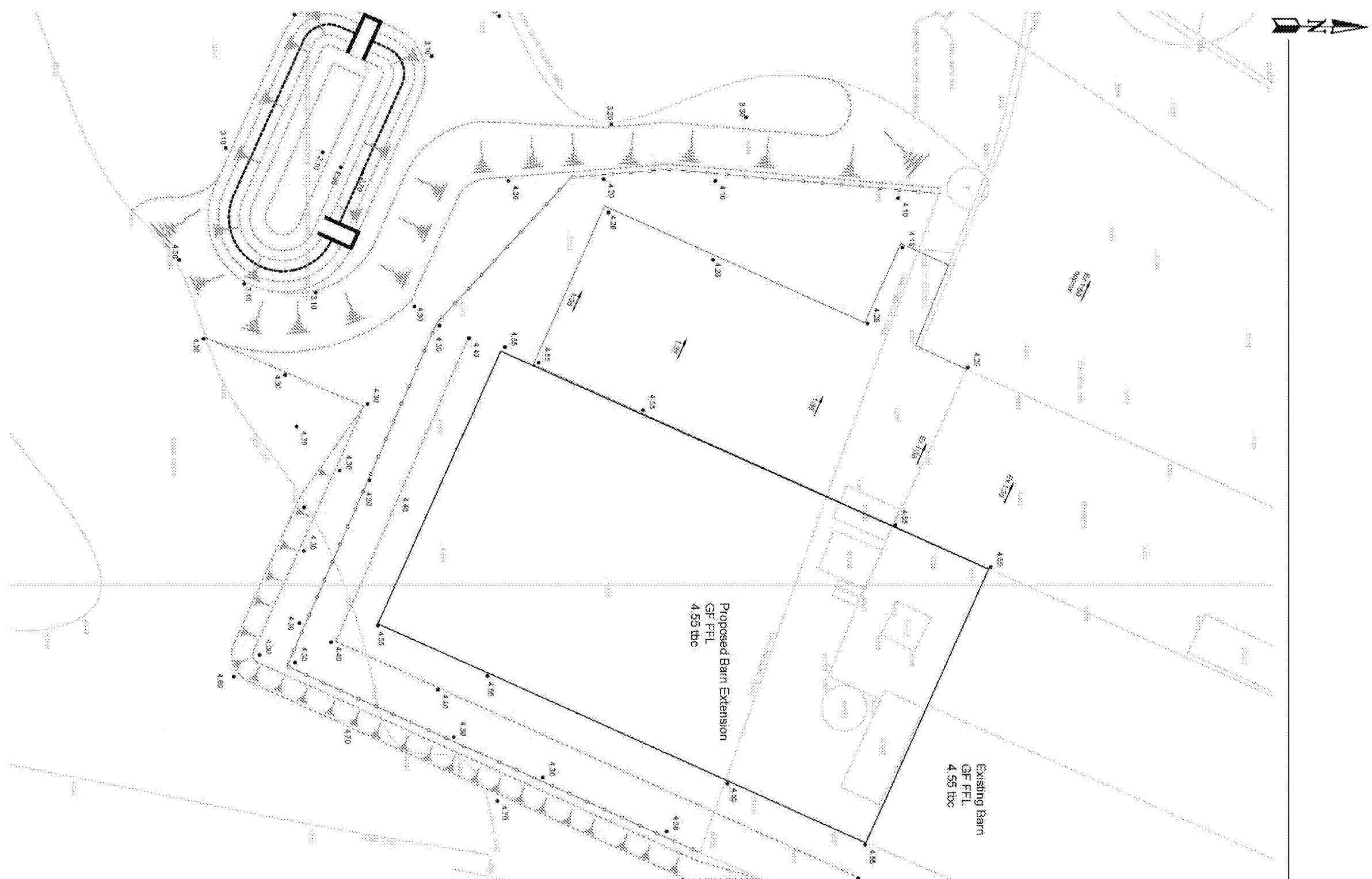


SITE PLAN

Scale 1: 1,250

Reproduced from topographical survey

FIGURE 3



PROPOSED DEVELOPMENT PLAN
Scale 1: 250

Reproduced from ABMH Civils Drawing No. FC2846/02 Rev A.

APPENDIX I

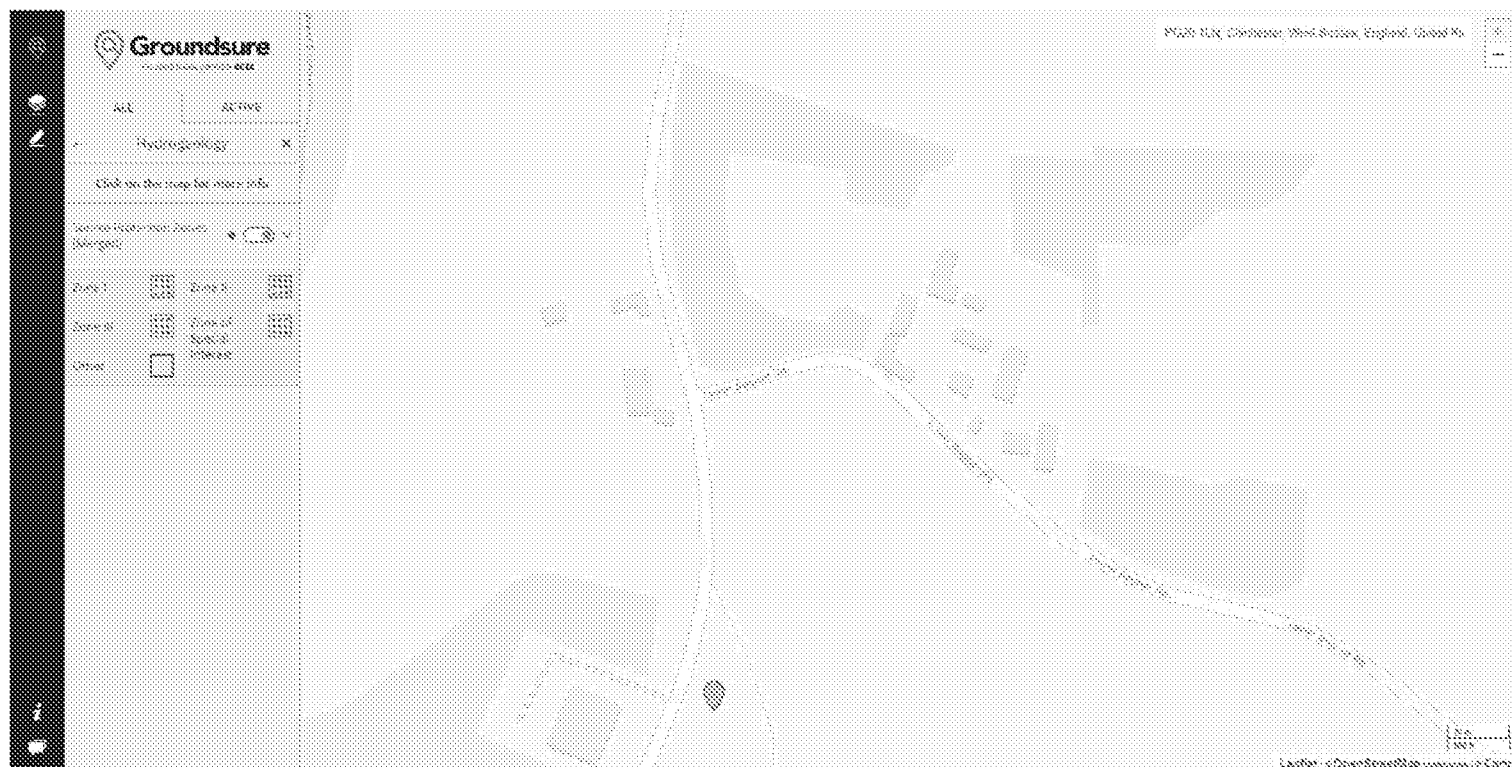
APPENDIX I – DESK STUDY INFORMATION

GroundSure Environmental Data Viewer

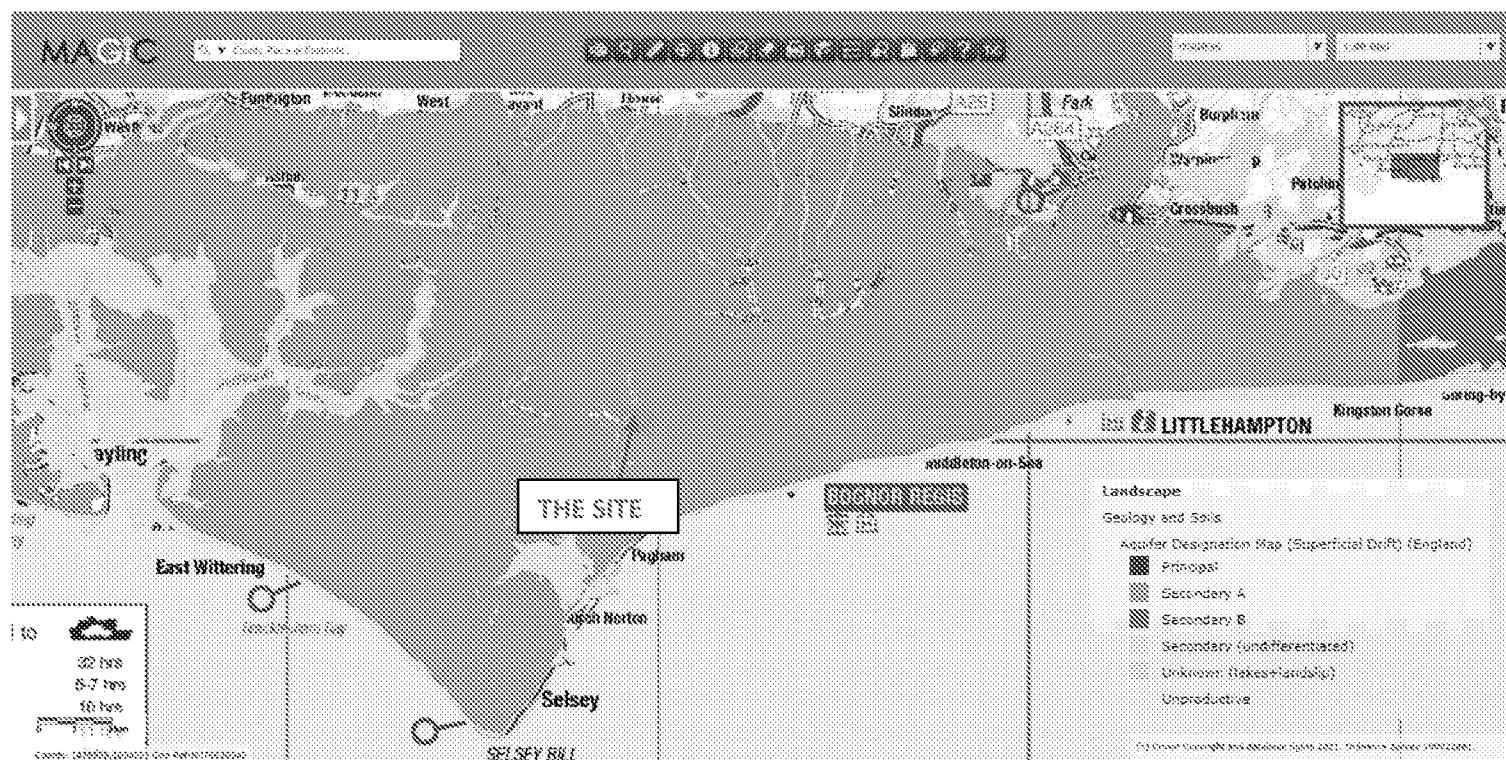
Enquiries were made to the GroundSure Environmental Data Viewer (located at www.groundsure.io) regarding the site and surrounding area. The viewer presents database information, sourced from the Environment Agency and others, covering hydrogeology, landfill and waste. Relevant maps pertinent to the assessment provided in this Report are reproduced in this Appendix.

Defra

Enquiries were made to the Defra Magic website, managed by Natural England, which provides geographic information about the natural environment from various government departments and agencies. The data is provided in map format and extracts of maps displaying relevant database Information are reproduced in this Appendix.



Maps reproduced from www.groundsure.io, an open environmental data viewer.

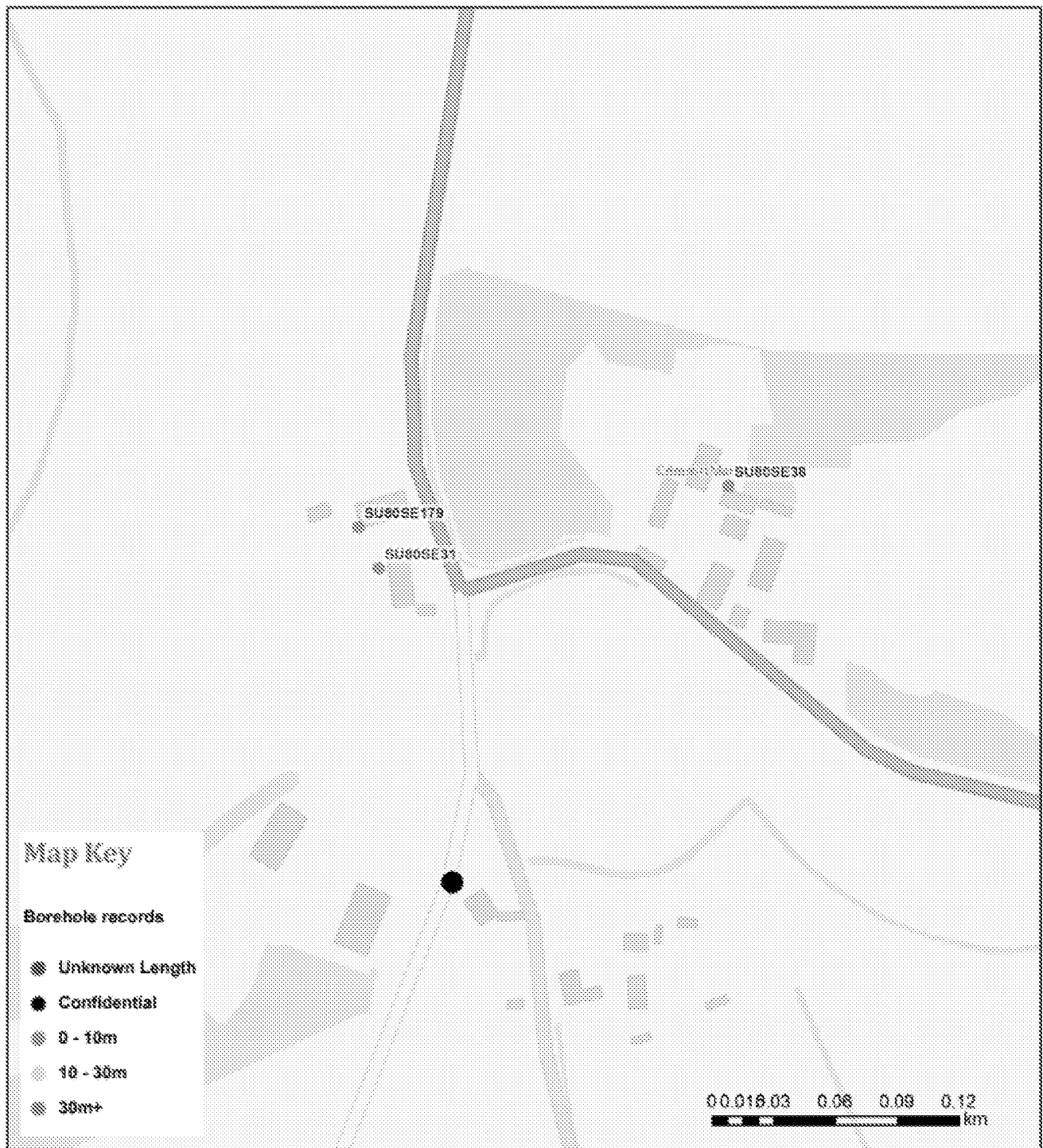


1. The maps contain data reproduced under the Open Government Licence, available for viewing at <http://www.nationalarchives.gov.uk/doc/open-government-licence>.
2. The maps contain Environment Agency information ©Environment Agency



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Contains OS data © Crown Copyright and database right 2020

Contains British Geological Survey Materials, © NERC 2018

Pagham Road, Pagham

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February 2021

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3

EXACT SITE
OF WELL

RECORD OF WELL (SHAFT OR BORE)

For Survey use only
N 1196/B
332/53
SU80/44B
Licence No.

At The Royal Oak PH
SU8951 0098
Town or Village Lagness W. Blacketer
County MT. Limerick Six-inch quarter sheet 73 NE/E
For Dampkins Breweries State whether owner, tenant, builder, contractor, consultant, etc.: Owner

Address (if different from above):
Level of ground surface +0.10 from map If well-top is not at ground level, state how far {above: / below: / } ft.
above sea-level (O.D.) ft.

SHAFT 125 ft.; diameter 6 ins.; Full details of headings (dimensions and directions)

BORE 125 ft.; diameter of bore: at top 6 ins.; at bottom 6 ins.
Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.):
Plain 6" from -2' to -76' 2"

Water struck at depths of 75 ft. below well-top.

TEST CONDITIONS
Rest level of water *12 ft. above/below well-top. Suction at ft. Yield on hours' test days' test
pumping at galls. per with depression to ft. below well-top.
Recovery to rest-level in mins. Capacity of pump g.p.h. Date of measurements

NORMAL CONDITIONS
DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:
Make and/or type Motive power
Capacity gallons per hour. Suction at ft.
Amount pumped galls. per day. Estimated consumption galls. per week.
Well made by Dale & Gelland Date of well
Information from

ADDITIONAL NOTES
ANALYSIS (please attach copy if available)
Contaminated by local sewage
Pothole abandoned.
As per by O on 6" Survey 73 NE/E. 1.12.64.

LOG OF STRATA OVERLEAF.

Geological Survey and Museum, South Kensington, London, S.W.7.	Section 6.	Date Received	1" O.S. Map No.	Site marked on 1" Map	(use symbol) on 6" Map
		18.11.64		0	0



BGS ID: 430080 : BGS Reference: SU80SE179

British National Grid (27700) : 489510,100980

(For GEOLOGICAL CLASSIFICATION)	NATURE OF STRATA If measurements start below ground surface, state how far ...	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
	Topsoil			6	
	clay			1	6
	Sand			13	
	Sandy clay			15	
Drift R.B.) 75	Mottled & grey clay			31	
	Blue clay			42	
	clay & sand			52	
	Mottled clay			66	
	Grey clay			70	
	Grey clay, flint & chalk facies			75	
UCK 50	Chalk & flint			100	6
	Chalk			125	
CWD 30.6.72					
	DATA Bank				



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 429932 : BGS Reference: SU80SE31

British National Grid (27700) : 489520,100960

SU 80 SE 31

Survey No. 1234
1" N.S. 332

RECORD of WELL or BORING

at (house or farm) the Royal Oak Parish of Pagham
 Town, Village, & Waggon, E. of Chichester County Sussex
 Exact site (unless a reference from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on map) SU 8962 0096 1" map 73 NE
 of one-inch map Square

Surface level of ground ft. above Ordnance Datum. Well or Bore commenced at ft. below surface level of ground.
 Sunk 24 ft. diameter ft. Bored 725 ft. diameter of boring: at top in., at bottom in.
 Details of lining tubes (internal diameters preferred) 3 in. tubes to 77 ft.

Water struck at depths of (feet)
 Rest-level of water below top of well or bore 8 ft. Pumping level ft. Time of recovery hours.
 Suction at ft. depth. Yield: (i) on test 360 galls. per hour (ii) normal galls. per
 Quality (attach copy of analysis if available) Duke & Richardson, Ltd for Messrs Gale & Co. Date of boring June, 1933
 Information from do do

(For Survey use only). GEOLOGICAL CLASSIFICATION	NATURE OF STRATA. (and any additional remarks)	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
Keating Beds	Dug well (1 mottled clay)			24	
	Mottled clay	3		27	
	light brown clay	10		37	
	Mottled clay	12		49	
	Red clay	17		66	
M. Chalk	Flints	3		69	
	Chalk & flints	56		125	

In use. Well in yard immediately N.W. of farm
 OD 12. Bored on 6" map Sussex 73 N.E.E.
 Visited & Reconn.
 19.2.31.

S.M. 1966

G.S.M. Ref. No. 332/53 1074/1167
 Government Chemist Lab. No.
 Date 13.11.33 Original data filed W/M Govt. Chemist.

Total Alkalinity as CaCO₃ ... 390 p.p.m.
 Total Hardness as CaCO₃ ... 354
 Chlorides as Cl. 192
 Total Dissolved Solids 192
 Conductivity 1250. Microhm/cm³

GEOLOGICAL SURVEY AND MUSEUM,
 SOUTH KENSINGTON,
 LONDON, S.W.7.

For Survey use only.

Date received.	G.S.M.	M. of H. notified.	Site marked on 1" map.
3-8-33	6028	Aug/33	✓ AT

(110083) W1 10238/0175 2.500 9/33
 H. J. R. & L. Ltd Op 616

Contains British Geological Survey Materials, © NERC 2018

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BGS ID: 429932 : BGS Reference: SU80SE31

British National Grid (27700) : 489520,100960

SU80/44 A+B

53 The Royal Oak, Lagneas, Pagham

Surface +12. Shaft 24; rest bore. Lining tubes: 77 x 3 in from surface. Ck -57.
R.W.L. +4. Yield 360 g.p.h. (test). Danda, June 1933.

Yield c.360 g.p.h. Hardness: total 354. Cl 192. Anal. Oct. 1937.

(a)

Drift)					
RB)	...	...	...	69	69
UCx	...	...	...	56	125

	Dray wall (? mottled clay	?	24
	Mottled clay	3	27
Reading	light brown clay	10	37
beds	Mottled clay	12	49
	Red clay	17	66
	Flints	3	69
v. chalk	Chalk & flints	56	125



RECORD of WELL or BORING **SU8044A**

at (Source or farm) **the Royal Oak** Parish of Pagham

Town, Village, & **Lagrove, 1/2 m. E. of Chichester** County **Surrey**

Exact site (unless a tracing from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on map) **SU 8952 0096**

Scale of map **7.5 NE**

One-inch map, **7.5 NE**

Surface level of ground **24** ft. above Ordnance Datum. Well or Bore commenced at **24** ft. below surface level of ground.

Sunk **24** ft., diameter **7.25** ft.; diameter of boring: at top **7.25** in., at bottom **7.25** in.

Details of lining tubes (internal diameters preferred) **3 in. tubes to 77 ft**

Water struck at depths of (feet) **8**

Rest-level of water **below** top of well or bore **8** ft. Pumping level **360** ft. Time of recovery **3** hours.

Suction at **360** ft. depth. Yield: (i) on test **360** galls. per **hour** (ii) normal **360** galls. per **hour**

Quality (attach copy of analysis if available)

Made by **John & Alexander, Ltd** for **Moors Gate Res** Date of boring **June, 1935**

Information from **to**

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA (and any additional remarks)	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
Reading Beds	Dug well (? mottled clay)			24	
	Mottled clay	3		27	
	light brown clay	10		37	
	mottled clay	12		49	
	Red clay	17		66	
	Flints	3		69	
U. Chalk	Chalk & flints	56		125	

In use. Well in good immediately NW of Jan OD 12. Sited on 6" map **SU80 78 NE.E.** Visited 1/1/36 19.2.36.

In use. Borehole sealed by pump. Rm. in surrounding sump 3' 2 1/2". Yields sufficient to fill 60 gallon tank in 15 mins. About 100-160 gpd used. Visited 1/1/36 22.4.37.

SAMPLES

U.S.M. Ref. No. **332/53**

Government Chemist Lab. Nos. **1976/1167**

Date **27.12.37** Original data filed W/M Govt. Chemist.

Total Alkalinity as CaCO₃ **390** P.P.M.

Total Hardness as CaCO₃ **354**

Chlorides as Cl. **192**

Total Dissolved Solids **792**

Conductivity **1250** Microsmes/cm³

For Survey use only.

Geological Survey and Museum, South Kensington, London, S.W. 7.

Date received **3-8-33** G.S.M. **6028** M. of R. notified **Aug/33** Site marked on 1" map **✓ AT**

(11960p) W4 3288/3073 2503 2503 H. J. 2 21, 12 22 616



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 429939 : BGS Reference: SU80SE38

British National Grid (27700) : 489690,101000

SU 80 SE 38

332/

SU 8969 0100

msham Farm

400 OD/2

Station 6 map. 75 NE

Visited 5 Boulders

19.2.41

346. †LAGNESS, about 2½ miles N. of village. 1909. Ht. above
O.D. about 20 ft. Map 73 N.E.

Thickness Depth
Ft. Ft.

Reading Box { Clay. Vein of sand with water at
40 ft. down ... 57 57 -27'

Upper Chalk Chalk and flints ... 83 150

R.L.W. 8 ft. down. Lined with 4½ in. tubes to 63 ft. down. Information Chalk
from Messrs. Duke and Ockenden, Ltd.

-45

332/9. In use. Electric pump - Sealed.

OD. + 19'. Owner - Mr Rusbridge.

SAMPLE Visited 23/10/57. RCT.

G.S.M. Ref. No. ... 332/9.

Government Chemist Lab. Nos. ... 1974/1167.

Date ... 23.10.57. Original data filed W/M Govt. Chemist.

Total Alkalinity as CaCO₃ 395 p.p.m.

Total Hardness as CaCO₃ 317.

Chloride as Cl. 59.

Total Dissolved Solids 438.

Conductivity 700. Micromhos/cm³

Note. From 1" 7" series

332/9 Aldwick now part of
Bognor Regis.

Published in
'Wells & Springs
of Sussex,'

page 164 Also W.S.S. II, p. 197.

DATA Bank



BGS ID: 429939 : BGS Reference: SU80SE38

British National Grid (27700) : 489690,101000

332/9 Grimsham Farm, Lagness, Pagham SU80/45
SU 8969 0100
W.S.Sx. III, p. 154. Surface +19. Lining tubes: 63 x 4 1/2 in from surface. Cl -38.
R.W.L. +11. Dando, 1909.
Hardness: NC. 12, C. 305. Anal. Electric pump. Oct. 1957.
RB ... 57 57
UCK ... 93 150

lending { Clay. vein of sand with
beds. } water at 60ft down 57 57

upper chalk. Chalk & flint 93 150



British
Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 429939 : BGS Reference: SU80SE38

British National Grid (27700) : 489690,101000

SU80/45

332

Crimham Farm

In use OD/2

Station 6" map. T3NE

Visited S. Bucken

19.2.51

346. †LAGNESS, about 2½ miles N. of village. 1909. Ht. above
O.D. about 20 ft. Map 73 N.E.

Reading Beds	Clay. Vein of sand with water at 40 ft. down	Upper Chalk	Chalk and flints	Thickness Ft.	Depth Ft.
				57	57
				93	150

R.L.W. 8 ft. down. Lined with 4½ in. tubes to 63 ft. down. Information from Messrs. Duke and Ockenden, Ltd.

Chalk

-45

332/9

In use. Electric pump - Sealed.

OD. + 19'

burner - Mr. Rushbridge

SAMPLE

Visited 23/10/57. K.C.J.

G.S.M. Ref. No. ...332/9.....

Government Chemist Lab. Nos.1976/1167.....

Date ...23.10.57..... Original data filed W/M Govt. Chemist.

Total Alkalinity as CaCO₃395..... P.P.M.

Total Hardness as CaCO₃317.....

Chloride as Cl.59.....

Total Dissolved Solids438.....

Conductivity700... Micromhos/cm³

Note. From 1" 7" series

330/8 Aldrich now part of
Bognor Regis.

Published in
'Wells & Springs
of Sussex,'

page 164

Also W.S.S. II, p.197.

DATA Bank

APPENDIX II

APPENDIX II – GROUND INVESTIGATION

Introduction

This Appendix, together with Sections 2 to 5 of the report, forms the Ground Investigation Report for the development described in the report, in compliance with the requirements of BS 5930:2015+A1:2020, BS EN1997-1:2004(2007) and BS EN1997-2:2007(2007).

The site operations were carried out on 10 February 2021 under the supervision of a geotechnical engineer from Crossfield Consulting Limited. The scope and rationale for the design of the investigation is presented in Table II-1.

The ground investigation was designed and supervised by qualified and experienced geotechnical specialists from Crossfield Consulting Limited. Where appropriate, and as outlined below, specialist drilling/sampling equipment was procured together with trained and experienced operators. Unless otherwise indicated, sampling and logging remained the responsibility of trained staff from Crossfield Consulting Limited and field records were prepared on site, during or immediately following drilling/sampling or in situ measurements/tests. The results of in situ tests are presented on the relevant record sheets in this Appendix.

An exploratory hole location plan is presented as Figure II-1.

Trial Pits

Five trial pits, denoted as TP1 to TP4 (and TP2A), were excavated by a Kubota KX080 excavator on 10 February. The trial pit records from the investigation are presented in this Appendix and these records include the descriptions and depths of the strata encountered, together with sample depths, groundwater observations and other pertinent comments.

In situ hand vane tests were carried out on fine-grained soils, where appropriate, to provide undrained shear strength data representative of the tested horizon. The tests were carried out using Pilcon-Edeco hand vane tester, with extension rods in accordance with the site health and safety method statement. With reference to the guidance published in Serota & Jangle (1972), it is noted that this instrument is calibrated and scaled to provide a direct reading of undrained shear strength, such that application of additional correction factors on the recorded measurements is not necessary. Published correlations with undrained shear strength, as measured by immediate undrained triaxial tests, indicate this hand vane tester provides measurements with a significantly lower scatter in comparison to triaxial tests, with fewer anomalous results. Specific test measurements are listed on the exploratory hole records.

In Situ Soakaway Tests

In situ soakaway tests were performed in Trial Pits TP1 and TP2A generally in accordance with the requirements of BRE DG365 (2016) except that they were filled only once. Trial Pits were filled with clean water and the fall in water level measured with time. The results of the in situ testing are presented in this Appendix.

Soil Samples

Samples designated for geotechnical testing were collected, stored and transported in accordance with the published requirements for the specific tests scheduled, such that moisture content and soil structure integrity was maintained, as necessary for the test requirements.

Geotechnical Laboratory Testing

The rationale for the geotechnical laboratory testing is set out in the Table II-2.

Selected samples of the soils encountered were submitted for analysis for the following tests:

- Moisture content
- Atterberg Limits
- pH value
- Water soluble sulphate

The analyses were carried out by i2 Analytical, a UKAS accredited laboratory, and the results are presented in this Appendix.

TABLE II-1

RATIONALE FOR THE DESIGN OF THE GROUND INVESTIGATION

The scope of the ground investigation was designed with reference to the published geology and ground conditions indicated in the desk study information.

In compliance with the guidance published in BS EN 1997-2:2007, the ground investigation was designed to verify the preliminary ground model, established from the desk study information and to characterise the ground conditions within influencing distance of the proposed structures. In this regard, the exploratory holes were targeted within relevant areas of the site to provide information on the strata profile down to competent materials.

Exploratory Hole and Technique	Rationale for Hole Location	Depth (m)	Sampling/In Situ Testing and Monitoring
TP1 TP2 TP2A TP3 TP4	All exploratory holes located to provide information on Made Ground thickness, information on groundwater levels, and information on soil density/strength of shallow deposits.		Samples of potential founding strata recovered for geotechnical testing. In-situ hand vane tests were carried out on fine-grained soils (where possible and appropriate) to provide undrained shear strength data representative of the tested horizons.
TP1 TP2A	Exploratory holes were located to provide information on water infiltration characteristics of the ground.		In situ soakaway tests

TABLE II-2

RATIONALE FOR THE GEOTECHNICAL TESTING SUITE

Exploratory Hole and Sample	Selection Criteria	Geotechnical Tests
TP1: 1.2 m TP2A: 0.6 m TP2A: 1.5 m TP3: 2.1 m TP4: 2.5 m	Representative samples of potential founding strata recovered to undertake testing to aid concrete design classification.	pH Water soluble sulphate
TP1: 0.7 m TP2: 1.3 m TP4: 1.7 m	Representative samples of founding strata to undertake classification testing to aid foundation design.	Moisture content Atterberg Limits

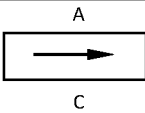
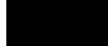
TRIAL PIT RECORDS

KEY

	J	Disturbed Jar Sample	}	Category B Samples
	G	Soil Sample in Glass Container		
	g	Soil Sample in Glass Vial		
	B	Disturbed Bulk Sample		
	C	"Undisturbed" CBR Mould Sample (denoted Category A: OS-TK/W in BS EN 22475-1:2006)		
	W	Water Sample		
FVT	{	c_{fv}	Undrained Shear Strength (from hand vane shear vane test)	
		c_{rv}	Undrained Remoulded Shear Strength (from hand vane shear vane test)	
		c_{fv}^*	Undrained Shear Strength from Hand Vane Shear Strength Test on block sample dug from pit by excavator	

Notes:

1. All measurement values on record sheets are uncorrected, unless otherwise indicated.
2. For corrected test values, refer to report.
3. Identification and classification of strata is based on the guidance published in the current edition of BS5930 together with BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004, BS EN ISO 14689-1:2003
4. Consistency (soft, firm, stiff etc.) relates to a manual test/inspection on site (in compliance with BS EN ISO 14688-1:2002 Section 5.14)
5. Undrained shear strength (low, medium, high etc.) relates to in situ or laboratory test data and the associated assessed strength of a stratum (in compliance with BS EN ISO 14688-2:2004 Section 5.3 and Table 5).
6. The density of coarse-grained soils is based on SPT N values (or equivalent Dynamic Probe test or CPT data) as outlined in BS5930 and BS EN ISO 14688-2:2004.
7. Rock strength (weak, strong etc.) is based on field identification (and/or strength test data), as outlined in BS EN ISO 14689-1:2003 Table 5.

		Trial Pit Record Sheet			Hole Ref. TP1	
		Project Barfoots, Pagham Road, Pagham			Sheet 1 of 1	
		Date 10/02/2021			Job No. CCL03401	
Bearing: South		Shoring None used			Ground Level m OD	
Plant Kubota KX080		Stability Remained stable during excavation. Minor instability on commencing soakaway test.			Co-ordinates	
Trial Pit Plan 					Logged by  Logged on site during excavation	
		Water Minor seepage at base of pit.			Checked by 	

Depth	Face A	Face B	Face C	Depth
0.30		(1)		0.30
0.90		(2)		0.90
2.00		(3)		2.00
		Base of Pit		

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m ²)	Ref. No.	Strata Depth	Description
0.70	J			0.00-0.30	Grass over brown slightly sandy silty clay with rootlets and roots (TOPSOIL)
				0.30-0.90	Stiff consistency orangish brown slightly sandy slightly gravelly clay. Gravel is fine to coarse and sub-rounded (RAISED BEACH DEPOSITS)gravel pockets between 0.7 m and 0.8 m
1.20	J			0.90-2.00	Stiff consistency grey mottled orangish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse and sub-rounded (LONDON CLAY FORMATION)

Remarks				Notes	
				1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. Symbols and abbreviations are explained on the accompanying key 3. All linear dimensions are in metres unless otherwise stated	

Trial Pit Record Sheet

Project

Barfoots, Pagham Road, Pagham

Date

10/02/2021

Hole Ref.

TP2

Sheet

1 of 1

Job No.

CCL03401

Bearing:

North

Shoring

None used

Ground Level

m OD

Plant

Kubota KX080

Stability

Remained stable during excavation.

Co-ordinates

Trial Pit Plan

A

→

B

C

Water

None encountered.

Logged by

GK

Logged on

Checked by

Depth	Face A	Face B	Face C	Depth
0.30		(1)		0.30
0.80		(2)		0.80
1.40		(3)		1.40
		Base of Pit		

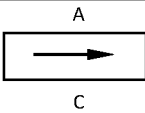
Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m ²)	Ref. No.	Strata Depth	Description
1.10 1.30	c _{iv} J	88, 70, 74		0.00-0.30 0.30-0.80 0.80-1.40	Grass over brown slightly sandy silty clay with rootlets and roots (TOPSOIL) Orangish brown slightly clayey SAND (RAISED BEACH DEPOSITS) Firm to stiff consistency grey mottled orangish brown slightly sandy silty CLAY (LONDON CLAY FORMATION)

Remarks

Pit terminated due to minor inflow from pipe.

Notes

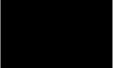
1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. Symbols and abbreviations are explained on the accompanying key
3. All linear dimensions are in metres unless otherwise stated

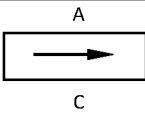
		Trial Pit Record Sheet			Hole Ref. TP2A	
		Project Barfoots, Pagham Road, Pagham			Sheet 1 of 1	
		Date 10/02/2021			Job No. CCL03401	
Bearing: North		Shoring None used			Ground Level m OD	
Plant Kubota KX080		Stability Remained stable during excavation. Minor instability on commencing soakaway test.			Co-ordinates	
Trial Pit Plan 					Logged by GK  Logged on site during excavation	
Water None encountered.		Checked by				

Depth	Face A	Face B	Face C	Depth
0.30		(1)		0.30
0.80		(2)		0.80
1.80		(3)		1.80
		Base of Pit		

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m ²)	Ref. No.	Strata Depth	Description
0.60	J			0.00-0.30	Grass over brown humic slightly sandy silty clay with rootlets and roots (TOPSOIL)
1.00	c _v	50, 65, 76		0.30-0.80	Orangish brown clayey silty SAND (RAISED BEACH DEPOSITS)
				0.80-1.80	Firm to stiff consistency grey mottled orangish brown silty sandy CLAY (LONDON CLAY FORMATION)

Remarks	Notes
	1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. Symbols and abbreviations are explained on the accompanying key 3. All linear dimensions are in metres unless otherwise stated

		Trial Pit Record Sheet			Hole Ref. TP3	
		Project Barfoots, Pagham Road, Pagham			Sheet 1 of 1	
		Date 10/02/2021			Job No. CCL03401	
Bearing: East		Shoring None used			Ground Level m OD	
Plant Kubota KX080		Stability Minor collapse of Face C below 1.8 m.			Co-ordinates	
Trial Pit Plan A → B C		Water Minor seepages below 2.0 m.			Logged by  Logged on site during excavation Checked by 	
Depth	Face A		Face B		Face C	
0.30			(1)			
1.00			(2)			
2.60			(3)			
			Base of Pit			
Sampling		Strata				
Sample/Test Depth	Type	Strength (kN/m ²)	Ref. No.	Strata Depth	Description	
0.60	J			0.00-0.30	Grass over brown sandy silty clay with roots and rootlets (TOPSOIL)	
1.40	J			0.30-1.00	Orangish brown slightly gravelly very clayey SAND/slightly gravelly very sandy CLAY. Gravel is fine to coarse and sub-rounded flint (RAISED BEACH DEPOSITS)	
2.10	J			1.00-2.60	Stiff consistency grey mottled orangish brown silty CLAY with frequent orangish brown sand inclusions/thin orangish brown sand layers (LONDON CLAY FORMATION)	
Remarks					Notes	
Standpipe installed at base of pit. Further progression precluded by instability and risk of collapse.					1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. Symbols and abbreviations are explained on the accompanying key 3. All linear dimensions are in metres unless otherwise stated	

		Trial Pit Record Sheet			Hole Ref. TP4	
		Project Barfoots, Pagham Road, Pagham			Sheet 1 of 1	
		Date 10/02/2021			Job No. CCL03401	
Bearing: South		Shoring None used			Ground Level m OD	
Plant Kubota KX080		Stability Remained stable during excavation.			Co-ordinates	
Trial Pit Plan 		Water None encountered.			Logged by GK Logged on [redacted] Checked by [redacted] Date during excavation	
Depth	Face A		Face B		Face C	
0.30			(1)			
0.70			(2)			
1.00			(3)			
2.80			(4)			
			Base of Pit			
Sampling			Strata			
Sample/Test Depth	Type	Strength (kN/m ²)	Ref. No.	Strata Depth	Description	
0.70	J			0.00-0.30	Topsoil with organic odours (TOPSOIL)	
1.10	c _{fv}	90, 90, 96		0.30-0.70	Dark orangish brown very clayey SAND and GRAVEL/firm consistency slightly sandy gravelly CLAY. Gravel is angular to sub-rounded flint (RAISED BEACH DEPOSITS)	
1.70	J			0.70-1.00	Stiff consistency grey mottled orangish brown slightly sandy silty CLAY with rare relic rootlets (LONDON CLAY FORMATION)	
1.90	c _{fv} *	110, 116, 108		1.00-2.80	Stiff becoming very stiff consistency grey mottled reddish brown with very rare orangish brown mottling CLAY (LONDON CLAY FORMATION/LAMBETH GROUP)	
2.50	J					
Remarks					Notes	
					1. All logging and sampling in accordance with BS 5930:2015+A1:2020 2. Symbols and abbreviations are explained on the accompanying key 3. All linear dimensions are in metres unless otherwise stated	

In Situ Percolation Test

Hole Ref. **TP1**

Project: Barfoots, Pagham Road, Pagham

Sheet 1 of 1

Job No. CCL03401

Date: 10/02/2021

Test by: GK

Checked by [REDACTED]

Trial Pit 1

Depth 2.00 m
Length 1.80 m
Width 0.60 m

Depth to water at start of test 1.06 m
Max Effective Depth 0.94 m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
10:55	0	1.06	0.94
	1	1.06	0.94
	2	1.06	0.94
	3	1.06	0.94
	4	1.06	0.94
	5	1.06	0.94
	10	1.06	0.94
	15	1.06	0.94
	85	1.06	0.94
	140	1.05	0.95
	240	1.03	0.97

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

$$V_{p75} = 0.00 \text{ m}^3$$

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

$$a_{p50} = 3.34 \text{ m}^2$$

Soil Infiltration Rate

as defined in

BRE DG365 (2016)

$$f = V_{p75} / a_{p50} * t_p$$

$$f = <1 \times 10^{-6} \text{ m/sec}$$

In Situ Percolation Test

Hole Ref. **TP2A**

Project: Barfoots, Pagham Road, Pagham

Sheet 1 of 1

Job No. CCL03401

Date: 10/02/2021

Test by: GK

Checked by: [REDACTED]

Trial Pit 2A

Depth 1.80 m
Length 1.80 m
Width 0.60 m

Depth to water at start of test 1.00 m
Max Effective Depth 0.80 m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
10:25	0	1.00	0.80
	1	1.00	0.80
	2	1.00	0.80
	3	1.00	0.80
	4	1.00	0.80
	5	1.00	0.80
	15	1.00	0.80
	35	1.00	0.80
	50	1.00	0.80
	115	1.00	0.80
	165	0.99	0.81
	215	0.98	0.82
	245	0.98	0.82

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

$$V_{p75} = 0.00 \text{ m}^3$$

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

$$a_{p50} = 3.00 \text{ m}^2$$

Soil Infiltration Rate

as defined in

BRE DG365 (2016)

$$f = V_{p75} / a_{p50} * t_p$$

$$f = <1 \times 10^{-6} \text{ m/sec}$$



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Crossfield Consulting Ltd
Client Address: The Granary, White Hall Farm,
Leamington Road, Long Itchington,
Warwickshire, CV47 9PU

Contact: George Kavanagh
Site Address: Barfoots, Pagham

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: CCLO3401
Job Number: 21-56751
Date Sampled: 10/02/2021
Date Received: 12/02/2021
Date Tested: 23/02/2021
Sampled By: Client

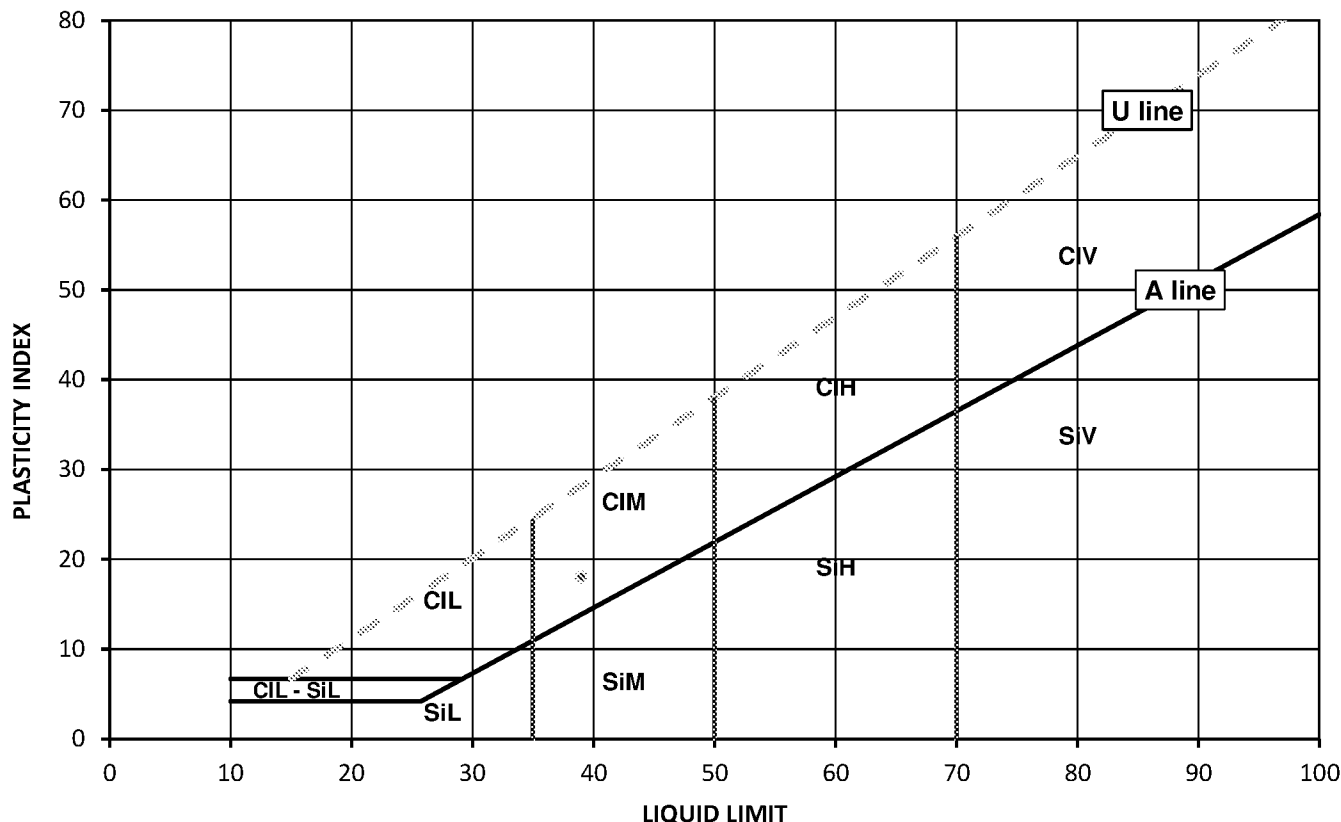
Test Results:

Laboratory Reference: 1769704
Hole No.: TP1
Sample Reference: Not Given
Soil Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 0.70
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425um BS Test Sieve
18	39	21	18	84



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Date Reported: 26/02/2021

GF 236.10



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Crossfield Consulting Ltd
Client Address: The Granary, White Hall Farm,
Leamington Road, Long Itchington,
Warwickshire, CV47 9PU

Contact: George Kavanagh
Site Address: Barfoots, Pagham

Client Reference: CCLO3401
Job Number: 21-56751
Date Sampled: 10/02/2021
Date Received: 12/02/2021
Date Tested: 23/02/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

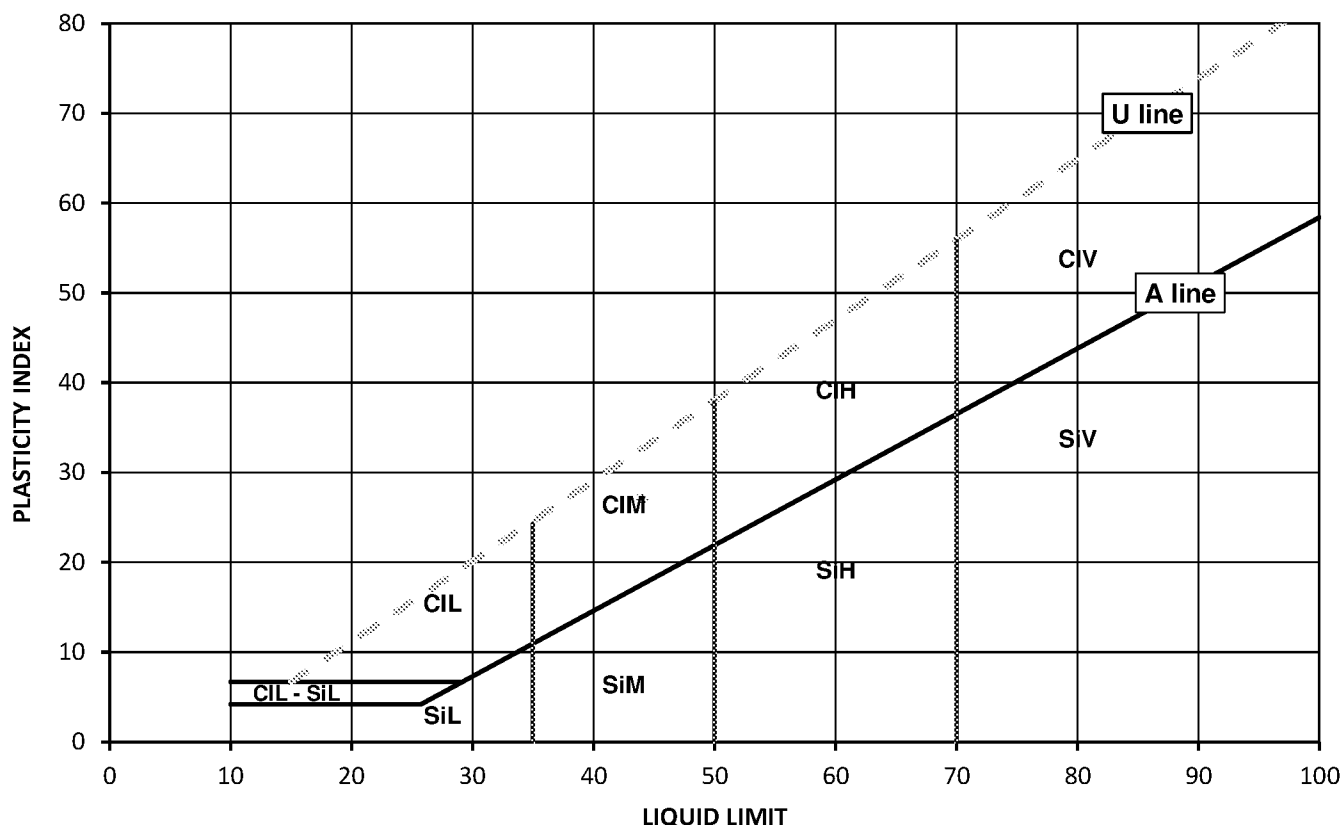
Test Results:

Laboratory Reference: 1769705
Hole No.: TP2
Sample Reference: Not Given
Soil Description: Brown to grey sandy CLAY

Depth Top [m]: 1.30
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	44	17	27	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	Liquid Limit
Si	Silt	L Low	below 35
		M Medium	35 to 50
		H High	50 to 70
		V Very high	exceeding 70
		O Organic	append to classification for organic material (eg CIHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

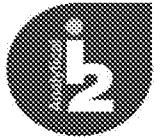
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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Crossfield Consulting Ltd
Client Address: The Granary, White Hall Farm,
Leamington Road, Long Itchington,
Warwickshire, CV47 9PU

Contact: George Kavanagh
Site Address: Barfoots, Pagham

Client Reference: CCLO3401

Job Number: 21-56751

Date Sampled: 10/02/2021

Date Received: 12/02/2021

Date Tested: 23/02/2021

Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1769706

Hole No.: TP4

Sample Reference: Not Given

Soil Description: Multicolour sandy CLAY

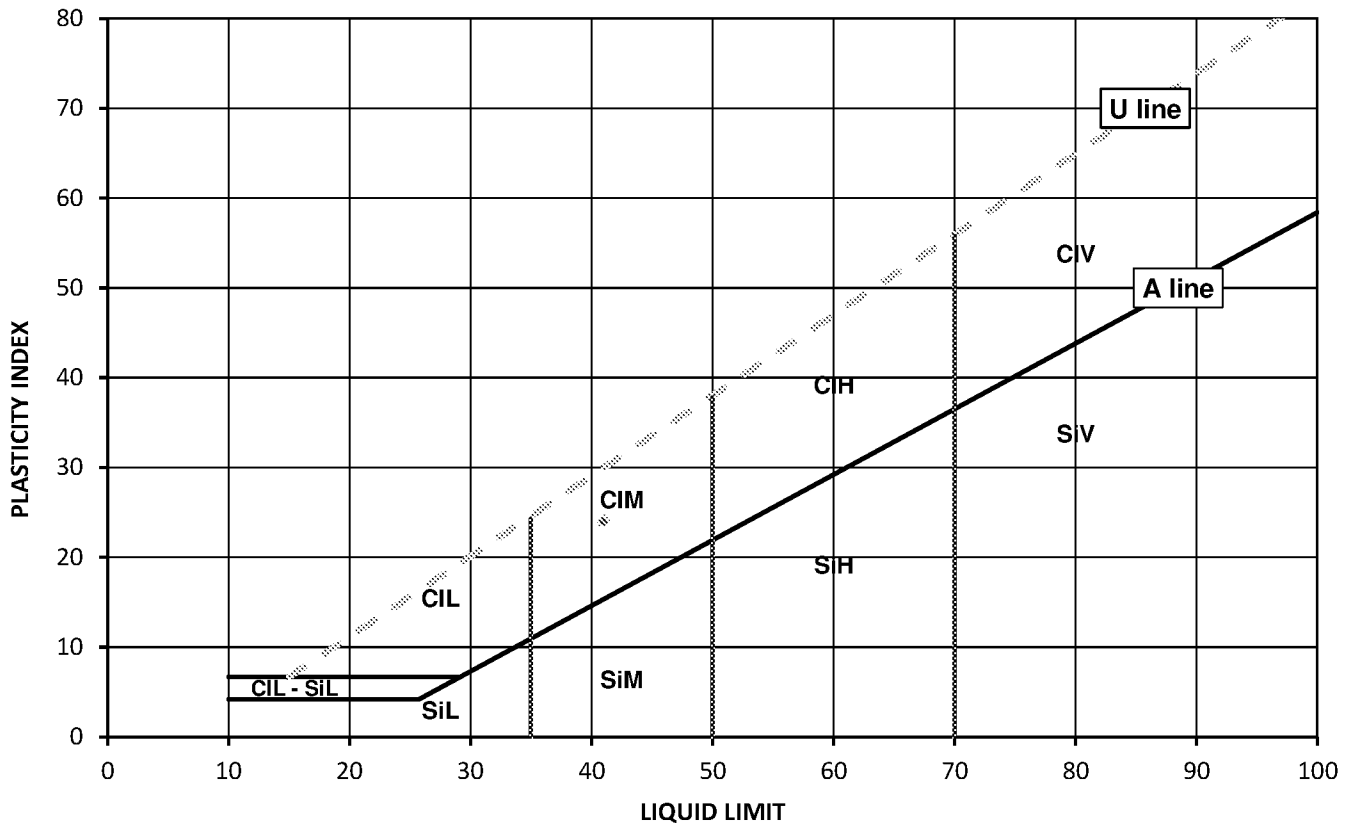
Depth Top [m]: 1.70

Depth Base [m]: Not Given

Sample Type: D

Sample Preparation: Tested in natural condition

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	41	17	24	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	append to classification for organic material (eg CIHO)
	V Very high	
	O Organic	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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Page 1 of 1

Date Reported: 26/02/2021

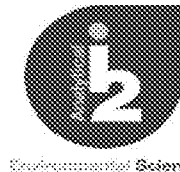
GF 236.10



SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client Reference: CCLO3401
Job Number: 21-56751
Date Sampled: 10/02/2021
Date Received: 12/02/2021
Date Tested: 23/02/2021
Sampled By: Client

Client: Crossfield Consulting Ltd
Client Address: The Granary
White Hall Farm
Leamington Road Long Itchington
Warwickshire CV47 9PU
Contact: George Kavanagh
Site Address: Barfoots, Pagham

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m															
1769704	TP1	Not Given	0.70	Not Given	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	18		84	39	21	18						
1769705	TP2	Not Given	1.30	Not Given	D	Brown to grey sandy CLAY	Atterberg 4 Point	20		100	44	17	27						
1769706	TP4	Not Given	1.70	Not Given	D	Multicolour sandy CLAY	Atterberg 4 Point	16		100	41	17	24						

Note: # Non accredited; NP - Non plastic

Comments:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

George Kavanagh
Crossfield Consulting Ltd
The Granary
White Hall Farm
Leamington Road
Long Itchington
Warwickshire
CV47 9PU

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

e: gk@crossfield-consulting.co.uk

Analytical Report Number : 21-56829

Project / Site name:	Barfoots Pagham	Samples received on:	12/02/2021
Your job number:	CCL03401	Samples instructed on/ Analysis started on:	12/02/2021
Your order number:	PO11800	Analysis completed by:	22/02/2021
Report Issue Number:	1	Report issued on:	22/02/2021
Samples Analysed:	5 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-56829
 Project / Site name: Barfoots Pagham
 Your Order No: PO11800

Lab Sample Number				1770258	1770259	1770260	1770261	1770262
Sample Reference				TP2A	TP1	TP2A	TP3	TP4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.50	2.10	2.50
Date Sampled				10/02/2021	10/02/2021	10/02/2021	10/02/2021	10/02/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	14	16	14	14
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.4	1	1.2

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.8	7.4	7.5	8.2
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.011	0.012	0.021	0.012	0.034

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-56829

Project / Site name: Barfoots Pagham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1770258	TP2A	None Supplied	0.6	Brown clay and sand with gravel and vegetation.
1770259	TP1	None Supplied	1.2	Brown clay and sand.
1770260	TP2A	None Supplied	1.5	Brown clay and sand with gravel.
1770261	TP3	None Supplied	2.1	Brown clay and sand with vegetation.
1770262	TP4	None Supplied	2.5	Red clay and sand with vegetation.

Analytical Report Number : 21-56829
Project / Site name: Barfoots Pagham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

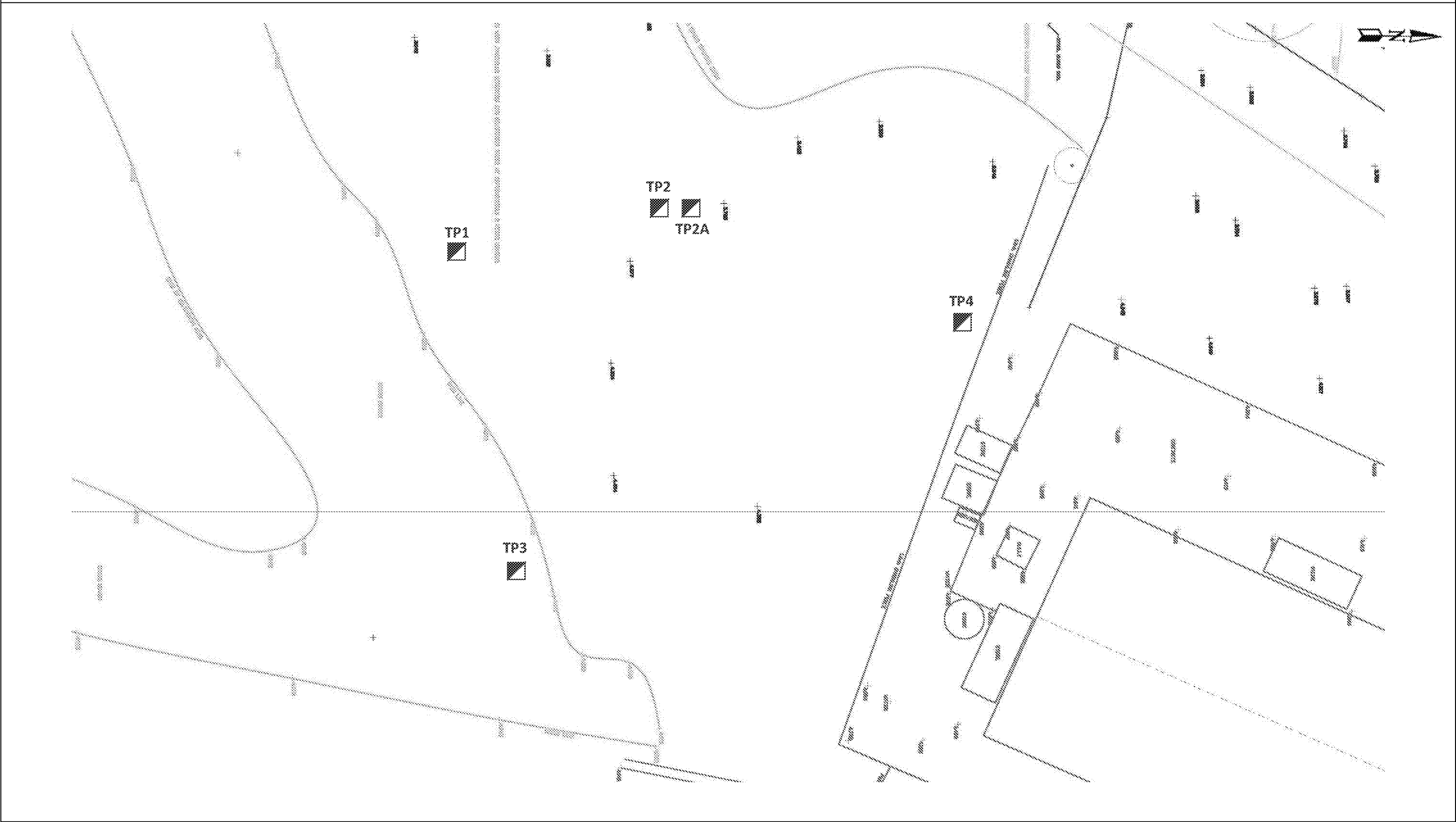
Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

FIGURE II-1



EXPLORATORY HOLE LOCATION PLAN
Scale 1: 250

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