Report Title:

Phase 2 Geo-Environmental Site Investigation

Project Name:

Land at Clay Lane, Fishbourne

Report Reference: **BRD3511-OR2-F**

Date: **October 2022**

BRD Environmental Ltd

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REPORT CONTROL SHEET

REPORT TITLE	**PHASE 2 GEO-ENVIRONMENTAL SITE INVESTIGATION**
PROJECT	**LAND AT CLAY LANE, FISHBOURNE**
CLIENT	**GLEESON LAND**

REPORT REFERENCE	ISSUE DETAIL	DATE	PREPARED BY	CHECKED BY
BRD3511-OR2-F	Sixth Issue with revised masterplan layout	13/10/2022	J Brockwell	J Brockwell

BRD Environmental Limited

Geotechnical and Environmental Services

- Ground Investigation
- Japanese Knotweed Removal
- Soil, Water and Gas Testing
- Contamination Assessment
- Geotechnical Advice
- Remediation Solutions

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REPORT LAYOUT

This report is divided into the following four sections: Summary Report, Technical Report, Supporting Information and Appendices.

SUMMARY REPORT

This expanded executive summary provides the main findings of the work undertaken in brief non-technical language. This section provides an overview of the key outcomes for the benefit of non-specialists and concludes with the main recommendations. This section should only be relied upon in the context of the whole report and the Technical Report should be referred to with respect to any design decisions.

TECHNICAL REPORT

The main report section is intended to provide the technical detail of the investigation and is intended to provide the level of information required by current guidance documents and practice. The Technical Report is written in a language that, in part, assumes knowledge of subject matter so that it can be written in as concise a form as possible. Its intended audience is peers, regulators and other professionals in related disciplines.

SUPPORTING INFORMATION

This section of the report provides background details of a generic nature together with specific technical approaches adopted by BRD and details of the guidance documents that are commonly referenced in the report. The section also includes explanations of technical terms to assist non-specialist readers in understanding the Technical Report. It should be noted that not all the information within this section is necessarily applicable to this specific report.

APPENDICES

The final section of the report presents the factual data collected and employed as part of the investigation.

APPENDIX 1	**SITE PLANS**	
	Site Location Plan	Ref. BRD3511-OP2-B
	Site Layout Plan	Ref. BRD3511-OP1-C
	Proposed Development Layout	'Illustrative Masterplan - Land West of Clay Lane, Fishbourne' richards urban design, DWG No.1270.02, dated 13.09.22
	Revised Conceptual Site Model	Ref. BRD3511-OP7-C
	Exploratory Hole Location Plan	Ref. BRD3511-OD1-C
APPENDIX 2	**EXPLORATORY HOLE RECORDS**	
	Logs of trial pits.	Ref. TP01-TP11 & TP101 to TP110
	Photographic records of trial pits.	Ref. BRD3511-OP6-C
	Logs of boreholes.	Ref. WS01-WS08 & WS101 to WS107, BH101 & BH102
	Rising head permeability test.	2 x A4 pages
	Groundwater monitoring records.	6 x A4 pages
APPENDIX 3	**LABORATORY TEST RESULTS**	
	DETS report 19-15168, 19-15074, 19-15440 & 21-11189	36 x A4 pages
	SPT report 36039 & 39392	37 x A4 pages

SUMMARY REPORT - GENERAL INFORMATION

SUBJECT	COMMENTS
CURRENT SITE CONDITION	The site comprises three overgrown fields and two fields used for grazing / paddocks. A number of ditches separate the various fields and these fall to the south within a ditch bordering the western site boundary. The southernmost grazing field / paddock is separated from the main site area by a railway line.
PROPOSED DEVELOPMENT	Outline planning application (with all matters reserved except for access) for the erection of up to 105No. residential dwellings including affordable housing with the provision of vehicular and pedestrian and cycle access from Clay Lane, alongside open spaces, biodiversity enhancement, sustainable urban drainage systems, landscaping, infrastructure, and earthworks.
HISTORICAL SUMMARY	The majority of the site has remained as fields throughout the mapped history. A small holding was constructed centrally on site by the early 1960s before being demolished by the early 1990s.
PUBLISHED GEOLOGY	The site is shown to be underlain by superficial deposits comprising both Head Deposits and River Terrace Deposits. The shallowest bedrock unit is shown to be the London Clay Formation across the majority of the site, with the southernmost area underlain by the Lambeth Group.
ACTUAL GROUND CONDITIONS	The investigation has proved superficial deposits of Head Deposits and River Terrace Deposits undifferentiated. The London Clay Formation was proven to be the shallowest bedrock unit, which was proven to be underlain by clay soils of the Reading Formation in the south west corner of the site.
HYDROGEOLOGY	The site is situated upon superficial deposits both designated as Secondary A aquifers. The London Clay Formation is designated Unproductive Strata. The Lambeth Group is designated Secondary A aquifer.
HYDROLOGY	The closest water feature to the site are the on site ditches. The site is not in an area indicated to be at risk of flooding.
PREVIOUS GROUND REPORTS	BRD is not aware of any previous ground investigations having been conducted at the site. However, BRD has reviewed two investigation reports for the residential development to the immediate north of the site within a separate Desk Study report.

SUMMARY REPORT - GEOTECHNICAL

SUBJECT	COMMENTS
EXCAVATIONS	It should be possible to forward excavations employing normal equipment. Excavations in the dry season (summer months): Limited groundwater control in the form of pumping from sumps is likely to be required at some areas of the site. Excavations in the wet season (winter months): Specialist groundwater control, such as well pointing, will likely be required at this site. It is unlikely that requirements of the Party Wall Act will apply to the development.
SLOPE STABILITY	It is considered that slope stability is unlikely to be a concern at this site.
SUB-SURFACE CONCRETE	All on site soils except London Clay Formation: Design Sulphate Class of DS-2 and Aggressive Chemical Environment for Concrete class of AC-2 applies. London Clay Formation: Design Sulphate Class of DS-4 and Aggressive Chemical Environment for Concrete class of AC-4 applies.
SOAKAWAYS	Site is not suitable for surface water disposal to soakaways or other forms of infiltration device.
PAVEMENT DESIGN	Made Ground: A preliminary design California Bearing Ratio (CBR) of less than 2% has been recommended. Superficial Deposits: A preliminary design California Bearing Ratio (CBR) of 3% has been recommended
FOUNDATIONS	
LIKELY FOUNDATION TYPE	Outside excessive tree influence, shallow strip or deeper trench fill footings bearing upon the clay/sands of Superficial Deposits and the clay soils of the Reworked and London Clay Formation. Reinforced footings due to changes in soil type. Piled foundations will be required within influence of existing trees and where an isolated area of deep Made Ground has been recorded. Piled foundations may also be preferred in other areas of the site.
VOLUME CHANGE POTENTIAL	High i.e. significant swelling or shrinking with moisture content changes.
ESTIMATED FOUNDATION DEPTHS	The minimum footing depth required is 1.00m, but 1.50 m where required to allow for restricted new tree planting. If required, pile lengths to be determined by specialist piling contractor.
HEAVE PROTECTION	Will be required for those plots located in close proximity to the existing trees.

SUMMARY REPORT – CONTAMINATION ISSUES

SUBJECT	COMMENTS
SOIL RISKS TO HUMAN HEALTH	The vast majority of the site has been found to be uncontaminated. However, in the location of the former small holding the Made Ground is contaminated with Lead and isolated asbestos cement fragments and fibres.
LANDFILL GAS	No plausible sources of landfill gas have been identified.
RADON GAS	Radon gas protection measures are not required.
RISKS TO THE WATER ENVIRONMENT	No unacceptable contamination risks to water resources have been identified by this investigation.
RISKS TO BUILDING MATERIALS AND SERVICES	It is the opinion of BRD that no unacceptable contamination risks to building materials and services have been identified by this investigation, but the water pipe specification should be confirmed with the local water supply company as they may insist on such protective pipes regardless of the level of contamination or remediation present on site.
REMEDIATION	A formal Remediation Strategy will need to be developed for the site once the planning application has been approved and the development layout formalised. It is considered the following remediation items will be required: • Excavate and remove the Lead and asbestos fibre contaminated soils from site to an appropriate landfill facility. • The asbestos cement fragments should be handpicked and disposed of off site at an appropriate landfill facility.
ASBESTOS	Some isolated fragments of cement bonded asbestos as well as asbestos fibres have been identified in the Made Ground in the location of the former small holding and will need to be addressed as part of the remedial works in this area.
WASTE SOIL DISPOSAL	Topsoil should be viewed as a resource rather than a waste. As the topsoil is suitable for residential garden use in terms contamination, the topsoil at the site should be stripped and the surplus reused on other developments. It is considered that natural sub-soils disposed of from the site would be classified as for disposal at landfill as inert waste. The identified contaminated soils in the location of the small holding disposed of from the site would be classified as 'hazardous waste' due to the presence of elevated Zinc and Lead concentrations. Once the asbestos cement fragments have been segregated from the soils, they should be double bagged and then disposed of as 'hazardous waste' to an appropriate landfill facility.

SUMMARY REPORT – KEY RECOMMENDATIONS

RECOMMENDATIONS
Once the final layout has been provided, a further investigation should be undertaken to prove the extent of the isolated deep Made Ground recorded in trial pit TP10 for foundation design of any plots located in that area. The development layout suggests parts of boundary hedgerows will be removed and parts retained. It will be critical for foundation design to know which specific trees are being retained as such trees could grow to maturity and will therefore have a more extensive influence on required foundation depths than their current height. A formal Remediation Strategy will need to be developed for the site once the planning application has been approved and the development layout finalised.

1. INTRODUCTION TO TECHNICAL REPORT

1.1. CONTRACT DETAILS

CLIENT	Gleeson Strategic Land Ltd trading as Gleeson Land.
SITE	Land situated at Clay Lane in the village of Fishbourne.
CLIENT'S ADVISORS	BRD Environmental Limited (BRD) has been commissioned directly by the Client.
REPORT CONTEXT	It is understood that the Client intends to market the site for residential housing.
REPORT TYPE	Geo-environmental site investigation (i.e. combined geotechnical ground investigation and Phase 2 contamination assessment).
REPORT OBJECTIVES	The purpose of the report is to present the findings of a ground investigation, and to present both geotechnical and contamination assessments of the ground conditions revealed. This report will accompany the planning application for the proposed development and supplement the marketing information for selling the site.

1.2. SCOPE OF WORKS

The agreed scope of works was initially:

- Mobilisation to site and production of health and safety documentation.
- Two days of windowless sampling using a percussive drilling rig to provide approximately 8-10No. boreholes to a nominal depth of 3m-5m, ground conditions permitting. Undertake Standard Penetration Tests (SPT) at 1m intervals. Installation of a 4m depth groundwater monitoring well (nominal 50mm diameter) into 8No. boreholes. Installations will be finished with a flush fitting metal stopcock cover.
- Two days of trial pitting using a mechanical excavator to provide approximately 13-14No. trial pits to a nominal depth of 3m, ground conditions permitting. We have also allowed for an additional day of the excavator to clear access routes for the boreholes.
- All exploratory points will be logged and sampled in general accordance with BS5930:2015 by supervising Geo-Environmental Consultant. In-situ geotechnical testing of fine soils using a Hand Shear Vane and/or Pocket Penetrometer.
- Determination of the location of exploratory points by tape measurements or the use of a handheld recreational GPS unit.
- Geo-Environmental Technician to undertake 6No. monthly groundwater monitoring visits to determine resting groundwater levels over the winter period. On the first visit water samples will be collected for geotechnical analysis and a falling head permeability test or simple soakage test (as appropriate the ground conditions) will also be undertaken to determine likely soil permeability or infiltration rates.

- Chemical testing of soil samples to confirm the soils are uncontaminated, to determine waste classification for muckaway and to meet the requirements for new water supply pipe specification. Budget based on the following testing schedule:

    - 12No. Metals Suite - As, Cd, Cr, CrVI, Hg, Pb, Se, Cu, Ni and Zn.
    - 12No. Inorganics Suite – water soluble sulphate, pH, organic matter.
    - 12No. Speciated Polycyclic Aromatic Hydrocarbons (PAH).
    - 6No. Banded aliphatic/aromatic Total Petroleum Hydrocarbons (TPH).
    - 6No. Benzene, Toluene, Ethylbenzene, Xylene (BTEX) and Methyl Tertiary Butyl Ether (MTBE) compounds.
    - 4No. Organochlorine pesticides.
    - 3No. Semi-Volatile Organic Compounds (SVOC) suite.
    - 3No. Asbestos quantification.

- Chemical testing of 1No. soil sample for Waste Acceptance Criteria (WAC) to assist in establishing the waste classification of the soil for disposal purposes.

- Geotechnical testing as appropriate to the nature of the ground conditions encountered, but the budget is based on the following testing schedule:

    - 10No. Moisture content.
    - 10No. Plasticity indices.
    - 3No. Particle size distribution by wet sieve and follow on hydrometer.
    - 10No. pH and water soluble sulphate analysis - soil.
    - 10No. Total sulphate and sulphur analysis - soil.
    - 4No. pH and sulphate analysis - water.

- Provision of a combined factual and interpretative investigation report. Factual findings to include all exploratory point records, monitoring and test results. Interpretative reporting to include a summary of information from desk study research, a Generic Quantitative Contamination Risk Assessment (GQRA), waste classification and a Geotechnical Assessment providing comments on pavement design, concrete classification, soakaway feasibility, foundation design recommendations.

Following the initial phase of site works the following additional scope of works was agreed:

Ecological Clearance Works

- BRD Consultant to attend site to mark out and agree the proposed exploratory point locations and the required access routes around the site.

Additional Investigation

- Mobilisation to site and production of health and safety documentation.

- Two day of windowless sampling, using a percussive drilling rig on one day and a modular rig on the subsequent day, to provide 7No. boreholes to a nominal depth of 5m, ground conditions permitting. Undertake Standard Penetration Tests (SPT) at 1m intervals.

- One day of trial pitting using a mechanical excavator to provide approximately 9No. trial pits to a nominal depth of 3m, ground conditions permitting.

- Drilling of 2No. boreholes using cable percussive drilling techniques up to 18m depth, ground conditions permitting. Recovery of undisturbed and disturbed samples and in-situ Standard Penetration Testing (SPT) in general accordance with BS5930:2015.

- All exploratory points will be logged and sampled in general accordance with BS5930:2015 by supervising Geo-Environmental Consultant.

- In-situ geotechnical testing of fine soils using a Hand Shear Vane and/or Pocket Penetrometer.

- Determination of the location of exploratory points by tape measurements or the use of a handheld recreational GPS unit.

- Chemical testing of soil samples. Budget based on the following testing schedule:

    - 5No. Metals Suite - As, Cd, Cr, CrVI, Hg, Pb, Se, Cu, Ni and Zn.
    - 5No. Additional Zn & Pb.
    - 5No. Inorganics Suite – water soluble sulphate, pH, organic matter.
    - 5No. Speciated Polycyclic Aromatic Hydrocarbons (PAH).
    - 2No. Banded aliphatic/aromatic Total Petroleum Hydrocarbons (TPH).
    - 2No. Benzene, Toluene, Ethylbenzene, Xylene (BTEX) and Methyl Tertiary Butyl Ether (MTBE) compounds.
    - 2No. Organochlorine pesticides suite.
    - 5No. Asbestos quantification.

- Chemical testing of 1No. soil sample for Waste Acceptance Criteria (WAC) to assist in establishing the waste classification of the soil for disposal purposes.

- Geotechnical testing as appropriate to the nature of the ground conditions encountered, but the budget is based on the following testing schedule:

    - 6No. Moisture content.
    - 6No. Plasticity indices.
    - 1No. Particle size distribution by wet sieve and follow on hydrometer.
    - 6No. Shear strength by quick undrained triaxial compression test.
    - 1No. One dimensional consolidation tests by oedometer.
    - 6No. pH and water soluble sulphate analysis.
    - 6No. Total sulphate and sulphur analysis.

- Provision of an updated investigation report to incorporate the additional information and to reflect the current site layout.

1.3. REPORT LIMITATIONS

Any site boundary lines depicted on plans included within this report are approximate only and do not imply legal ownership of land. Any observations of tree species, asbestos containing materials within structures or invasive weeds, does not constitute a formal survey of such features. The identification of such features is therefore tentative only. In the case of Japanese Knotweed, BRD can undertake separate surveys for this plant undertaken by a Property Care Association qualified surveyor.

The report does not consider whether sensitive ecology or archaeology is present as these require consideration by professionals specialising in these matters. It should be recognised that the collection of desk study information may not be exhaustive and that other information pertinent to the site may be available.

The recommendations, interpretations and conclusions of this report are based solely on the ground conditions found at the exploratory holes. Due to the variability in the nature of ground, conditions between exploratory holes can only be interpreted and not defined. The description of the site and the ground conditions is accurate only for the dates of the field works. In particular, groundwater levels can vary due to seasonal and other effects.

The assessment and interpretation of contamination risks is based on the scope of works agreed with the Client together with the budgetary and programme constraints imposed. Further investigation, analysis and assessment of contamination may be required by regulators or other third parties with an interest in the site. An ecological risk assessment of contaminated soils is beyond the scope of this report. This report is concerned with assessing those contamination risks which apply to the future use of the site through the proposed development as part of the planning regime. The assessment does not consider the risk to current site users or continued future use of the site in its current state. If development of the site should occur that differs from that proposed, then the findings of the contamination assessment would need to be re-evaluated.

At the time of writing, detailed information on the proposed structure, such as detailed layout, loadings and serviceability limits, was not available. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules. The scope of this investigation excludes a formal slope stability study and any observations made regarding slopes are for information only.

2. SITE CHARACTERISTICS

2.1. SITE SETTING

SITE ADDRESS AND POST CODE	Land at Clay Lane, Fishbourne, Chichester, West Sussex, PO19 3QF.
NATIONAL GRID REFERENCE	483880E, 105140N.

2.2. SITE SUMMARY

SUBJECT	COMMENTS
CHANGE TO SITE BOUNDARY	Since the publication of the previous version of this site investigation report the site boundary has been revised and a proposed development layout produced. The site description has been revised to reflect the site boundary changes. A revised site layout plan showing the new site boundary is included in Appendix 1.
CURRENT SITE DESCRIPTION	The central and western areas of the site (Areas 1, 2 and 4) are currently very overgrown fields whilst the south eastern and southern fields (Areas 3 and 5) are currently used for animal grazing / paddocks. The southern field (Area 5) is separated from the remainder of the site by a railway line. The site is generally flat and gently slopes from north to south with levels falling by approximately 2.0m. The site entirely comprises soft vegetated cover. The only exception being a small concrete slab in Area 3 which underlies a small stable block. The boundaries of the fields contain but are not limited to a mixture of mature Oak, Ash and Sycamore 10m-20m trees in height as well as mature Hawthorn. Within Area 1 in the location of the former small holding buildings on the site (see history section), there is evidence of demolition arisings and former wall remains. However, the area is very overgrown so it was difficult to ascertain the extent of any former building remains. According to the utility record plans, an 18" cast iron water main crosses the southern part of Area 1. The pipe is not exposed in a nearby ditch to depths of approximately 2.0m, therefore it is assumed to be at significant depth below ground level.
SURROUNDING LAND USE	The site is set on the edge of Fishbourne with residential land use to the west and fields to the east. Clay Lane runs through the centre of the site and extends to the north and east.
PROPOSED DEVELOPMENT	Outline planning application (with all matters reserved except for access) for the following development: Areas 1 to 4: Erection of up to 105No. residential dwellings including affordable housing with the provision of vehicular and pedestrian and cycle access from Clay Lane, alongside open spaces, biodiversity enhancement,

SUBJECT	COMMENTS
	sustainable urban drainage systems (SUDS), landscaping, infrastructure, and earthworks. Area 5: Public open spaces, landscape buffers, biodiversity enhancement and SUDS.
HISTORICAL SUMMARY	The majority of the site has remained as fields throughout the mapped history. A small holding was constructed centrally on site by the early 1960s before being demolished by the early 1990s.
PUBLISHED GEOLOGY	The site is shown to be underlain by superficial deposits comprising both Head Deposits and River Terrace Deposits. The shallowest bedrock unit is shown to be the London Clay Formation across the majority of the site, with the southernmost area underlain by the Lambeth Group.
RADON	Radon gas protection measures are not required.
HYDROGEOLOGY	The site is situated upon superficial deposits both designated as Secondary A aquifer The London Clay Formation is designated Unproductive Strata. The Lambeth Group is designated Secondary A aquifer.
HYDROLOGY	The closest water features to the site are the various on-site ditches. The site is not in an area indicated to be at risk of flooding.

2.3. PREVIOUS INVESTIGATIONS

BRD is unaware of any previous ground investigations having been conducted at the site. However, the site has been the subject of geo-environmental desk study research by BRD. During the desk-based research, a search of the planning website of Chichester District Council found that previous ground investigations have been undertaken on land neighbouring the northern boundary of Area 2.

These reports are referenced as follows:

- "Phase 1 Geo-Environmental Desk Study – Land at Clay Lane, Fishbourne", BRD Environmental Ltd, ref. BRD3511-OR1-B, dated April 2021.
- 'Mosse Gardens, Fishbourne, Chichester – Geo-Environmental Site Assessment', RSK, Report No. 27100 R02 (00), dated June 2014.
- 'Mosse Gardens, Fishbourne, Chichester – Groundwater Monitoring Assessment', RSK, Report No.27100 R03 (00), dated March 2014.

This current report should be read in conjunction with the previous desk study report, where a full review of the neighbouring investigations can be found.

2.3.1. BRD Desk Study

The preliminary findings of the revised desk study were as follows:

2.3.1.1. Preliminary Contamination Risk Assessment

The vast majority of the site being fields is unlikely to be significantly contaminated.

Some localised contamination risks may be present from the former small holding associated with its former use and arisings from any demolition rubble. Likewise there is the potential for some localised cross boundary contamination from the railway line bisecting the site.

2.3.1.2. Preliminary Geotechnical Assessment

Although conventional trench fill/strip foundations should be possible within the anticipated ground conditions, the presence of shallow groundwater at this site may impact on their use as excavations could be difficult to form without suitable groundwater control.

The use of soakaways is unlikely to be feasible as a result of the shallow groundwater and presence of clay soils.

2.3.2. Groundwater Monitoring Assessment

The investigation undertaken on the neighbouring site recorded similar ground conditions to those encountered on site. Of particular interest were the results of the winter groundwater monitoring, which included 6No. monthly visits between October 2014 and February 2015.

The results confirmed that groundwater levels were initially recorded between 1.5m and >3.0m bgl in October 2014, but from November 2014 through to February 2015 the resting levels were typically between 0.1m and 0.5m bgl in all boreholes. RSK concluded that the groundwater was perched and typical of interconnected pockets of groundwater within more granular soils.

3. GROUND INVESTIGATION

3.1. INVESTIGATION DESIGN

METHODOLOGY	The two phases of included the following methods of investigation: • Trial pits were selected as they expose more soils, which enables a more reliable record of the ground conditions encountered. • Windowless boreholes were selected as in-situ density testing in coarse soils and monitoring installations were required. • Cable percussive boreholes were undertaken to determine the ground conditions at depth for pile design.	
DATES OF SITE WORKS	The initial phase of investigation included the following works: Site clearance works to enable access for the investigation were completed on 15th and 16th October 2019. The main field works were undertaken on 21st and 22nd October 2019. Groundwater level monitoring has been completed across the 2019 / 2020 winter period between 29th October 2019 and 19th March 2020. The second phase of investigation included the following works: Site clearance works to enable access for the investigation were completed on 6th and 7th September 2021. The main field works were undertaken between 8th and 10th September 2021.	
CONSTRAINTS TO EXPLORATORY HOLE LAYOUT	There is a water main running along the southern edge of Area 1 and overhead electricity cables running along the eastern edge of Area 1 and through the centre of Area 3. No works were permitted in Area 5. Due to the overgrown nature of the site, BRD completed four days of site clearance under ecological supervision. Paths to the exploratory points and the exploratory points themselves were cut back before site works could commence. Additional exploratory points could then not be undertaken during the forwarding of the exploratory holes as no ecologist was on site to supervise further clearance.	
EXPLORATORY HOLE SPACING	Approximately 40m grid across the majority of the site. Additional exploratory holes targeting areas of contamination in the location of the former small holding in Area 1 were also completed.	
LAYOUT RATIONALE	**SOURCE / FEATURE**	**EXPLORATORY HOLE**
CONTAMINATION SOURCES TARGETED	Former small holding and demolition arisings.	TP06, TP102 to TP105 (inclusive) and WS04
	Suspected Asbestos fragment.	SS01

GROUND FEATURES TARGETED	General site coverage.	TP01 to TP11 TP101 to TP110 WS01 to WS08 WS101 to WS107 BH101 & BH102
	Possible Pond	WS103, TP10 & TP107
	Deep ground conditions for pile design	BH101 & BH102
CONTAMINATION SAMPLING PLAN	Based on the proposed end use and historical activities undertaken on site, the sampling and analysis plan is more positively biased towards near surface samples as these represent the soils most likely to be available to future site users. The analysis is also more biased towards the Made Ground samples in the location of the small holding in particular as this stratum represents the soils most likely to be contaminated. Two samples of the slightly organic soils encountered in trial pit TP10 were also analysed for Total Organic Carbon to determine the potential soil gas risk. Groundwater for geotechnical testing was sampled during the first monitoring visit.	
ANALYSIS PLAN	Given the site's history as fields and a smallholding, BRD have scheduled a general suite of contaminants including metals, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) including benzene, toluene, ethylbenzene and xylene (BTEX) compounds and methyl tertiary butyl ether (MTBE), semi volatile organic compounds (SVOC), Organochlorine Pesticides, and Asbestos Quantification and Bulk Identification. In the location of the small holding additional testing for Lead and Zinc was also completed as these contaminants were identified during the initial phase of site works.	

3.2. BRD FIELDWORK

TRIAL PITS	
REFERENCES	TP01 to TP11 & TP101 to TP110.
DEPTH RANGE	From 0.9m to 3.20m.
EXCAVATOR	Trial pits TP01 to TP11 were excavated with a tracked 8 Tonne 360° excavator. Trial pits TP101 to TP110 were excavated with a JCB 3CX style wheeled backactor.
BACKFILL	All the trial pits were backfilled with arisings upon completion and compacted with rams of the excavator bucket.

WINDOWLESS SAMPLING BOREHOLES	
REFERENCES	WS01 to WS08 and WS101 to WS107.
DEPTH RANGE	From 3.45m to 5.45m.
RIG TYPE	Premier Drilling Rig. Windowless sample boreholes WS106 and WS107 were drilled using the modular rig as access into Area 4 was restricted to a wooden pedestrian bridge.
INSTALLATION / BACKFILL	Boreholes WS01 to WS08 had monitoring wells installed. These comprised 50mm nominal diameter standpipes fitted with a gas tap finished with a flush metal cover. The slotted response length of the well is shown on the individual logs. Bentonite seals are also indicated on the logs. The filter medium used was pea gravel.

CABLE PERCUSSIVE BOREHOLES	
REFERENCES	BH101 to BH102.
DEPTH RANGE	18m.
RIG TYPE	Dando 2000.
INSTALLATION / BACKFILL	The boreholes were backfilled with arisings only.

MONITORING	
TYPE	Groundwater monitoring.
DATES	29th October, 29th November and 19th December 2019. 23rd January, 20th February and 19th March 2020.
GROUNDWATER SAMPLING METHOD	Samples were retrieved using a sampling bailer dedicated to each well during the first monitoring visit.

3.3. LABORATORY TESTING

GEOTECHNICAL TESTING	
The soil samples for geotechnical testing were forwarded to the laboratory of Soil Property Testing Ltd with pH and sulphate analysis undertaken at the laboratory of DETS Ltd. The geotechnical testing suite is detailed below. The UKAS accreditation of the individual test methods is shown on the laboratory test report included in the Appendices.	
TEST	**NUMBER OF SAMPLES TESTED**
Moisture content	19
Liquid and plastic limits	19
Particle size distribution by wet sieve and hydrometer	1
Quick undrained triaxial compression	6
One dimensional consolidation	1
pH and Water soluble Sulphate	32
Total Sulphur and Sulphate	16

GROUNDWATER CHEMICAL TESTING	
The water samples for contamination and/or chemical geotechnical testing were forwarded to the laboratory of DETS Ltd and the testing suite is detailed below. The UKAS or MCERTS accreditation of the individual test methods is shown on the laboratory test report included in the Appendices.	
WATER TESTS	**NUMBER OF SAMPLES TESTED**
pH	4
Sulphate	4

SOIL CHEMICAL TESTING	
The soil samples for contamination and/or chemical geotechnical testing were forwarded to the laboratory of DETS Ltd and the testing suite is detailed below. The UKAS or MCERTS accreditation of the individual test methods is shown on the laboratory test report included in the Appendices.	
SOIL TESTS	**NUMBER OF SAMPLES TESTED**
Arsenic, Cadmium, Chromium, Chromium VI, Copper, Mercury, Nickel, Selenium	16
Lead and Zinc	19
Speciated Polycyclic Aromatic Hydrocarbons (PAH)	16
Total Petroleum Hydrocarbons (TPH) with full carbon banding and aliphatic/aromatic split	7
Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) plus Methyl Tert Butyl Ether (MTBE)	7
Organic Matter	16
Asbestos Quantification	8
Asbestos Bulk ID	1
Organochlorine Pesticides	5
Total Organic Carbon	2
Waste Acceptance Criteria (WAC) testing	2

4. GROUND CONDITIONS

4.1. OVERVIEW

The ground conditions encountered were similar to the publish geology. Beneath the Topsoil / Made Ground Topsoil, superficial deposits were encountered comprising Head Deposits and River Terrace Deposits. Both the Head and River Terrace Deposits have been recorded with characteristics too similar to establish a clear distinction between them. Therefore, both the Head and the River Terrace Deposits have been recorded as undifferentiated. These soils have been encountered comprising mainly clay soils but with gravel and sand beds too.

Beneath the superficial deposits, the bedrock identified as the London Clay Formation was encountered. Occasionally, the London Clay was initially recorded as reworked soils due to the presence of large pockets of sands and gravel, generally saturated. Underneath, the intact London Clay was recorded generally as brown clay-rich soils becoming dark grey and fissured with depth. In borehole BH101 undertaken in the south west corner of Area 1, clay soils of the Reading Formation were encountered.

Details of the various stratigraphic units are given in the following sections.

4.2. TOPSOIL AND MADE GROUND TOPSOIL

The majority of the site is covered with a layer of Made Ground Topsoil with some Topsoil in places. The soils are very similar in composition and are generally described as a gravelly, sandy clay or a gravelly sandy silt. The Made Ground Topsoil differs to the Topsoil due to the fragments of brick and charcoal present. The base of these surface soils varies from 0.10m bgl to 0.50m bgl.

4.3. ARTIFICIAL GROUND

Across the wider site Made Ground was encountered in trial pits TP05, TP09 and borehole WS06 in Area 1. In trial pit TP05 it was recorded as a mix of 'Grey, clayey gravel and orange, gravelly clay'. Part of a timber post was also encountered at 0.4m bgl. In trial pit TP09 the Made Ground soils were described as 'gravelly clays with rare brick fragments'.

4.3.1. Former Small Holding – Area 1

Trial pits TP06, TP102 to TP105 (inclusive) as well as borehole WS04 were all undertaken in the location of the former small holding.

The Made Ground soils were proven to a maximum depth of 0.6m bgl with the soils mainly consisting of reworked topsoil with brick and metal fragments with occasional clinker. Of particular note was TP105 which contained 'Burnt metal, clinker and charcoal fragments'

Trial pit TP06 (0.2m to 0.3m) and TP103 (GL to 0.1m) encountered a concrete slab overlying Made Ground which extended to depths of 0.4m bgl. No reinforcing bar was observed in the concrete. It is considered that these concrete slabs were base of the former barns located in this area.

4.3.2. Possible Former Pond – Area 1

During the first phase of investigation a deep layer of possible Made Ground but mainly reworked natural soils with a slight organic odour was recorded in TP10 to 2.3m depth, these soils were recorded with a soft condition and prone to collapse. The soils in TP10 were slightly organic and are considered to be indicative of a possible former pond.

During the additional works trial pit TP107 and borehole WS103 were forwarded in the vicinity of TP10 and encountered no organic soils. The deeper organic soils were therefore proven to be localised to the TP10 area.

4.4. SUPERFICIAL DEPOSITS

4.4.1. Head Deposits and River Terrace Deposits (Undifferentiated)

The Head Deposits and River Terrace Deposits have recorded as a single unit as a clear distinction between them could not be established. Both deposits will be hereafter referred to as Superficial Deposits.

The superficial deposits varied in composition throughout the site but were generally recorded as layers of either a gravelly clays or occasionally sandy gravels. Lenses of running sands and silts bearing groundwater were also encountered in pockets throughout the site particularly at the interface with the underlying reworked London Clay soils.

These deposits have been recorded with variable thickness across the site. In Area 1 these soils have been recorded to depths of between 0.7m and 2.3m bgl with the deeper deposits generally recorded in the central and southern parts of this area. In Area 2 the superficial deposits were encountered at depths ranging from 1.1m to 2.1m with deeper deposits being recorded towards the southern end of this area.

In Area 3 at the southern end of the site boreholes WS01 and WS02 recorded superficial deposits ranging from 2.0m to 2.5m bgl, but in WS106 were only proven to 1.2m bgl. The variability in Area 3 is indicative of the remainder of the wider site.

4.5. BEDROCK

4.5.1. Reworked London Clay

The Reworked London Clay was sporadically found in exploratory holes (TP01, TP03, TP05, TP09, TP103, TP106, TP107, TP108, TP110 and WS01). These deposits were similar to the intact London Clay and were generally recorded as 'Brown mottled grey CLAY', but also included silty lenses and calcareous aggregates in places. However, these soils have been recorded intersected by large pockets or channels of coarse soils comprising both sands and gravel and generally saturated with associated running sands. The depth to the base of this unit varied between 1.2m and 2.7m bgl.

4.5.2. London Clay Formation

The London Clay Formation was encountered in all of the exploratory holes excavated to depth below either the Superficial Deposits and/or the Reworked London Clay. It was generally described as a 'Dark grey and brown becoming dark blue grey with depth, fissured CLAY'. Occasional grey silty partings, relict rootlets and selenite crystals were also encountered. The London Clay Formation was found to the base of the majority of the exploratory holes and to maximum depth of 18.0m bgl in BH102.

In BH101 at depths ranging from 10.4m to 13.0m bgl the soils were described as a 'Dark grey clayey sandy SILT' and at 13.4m bgl the base of the London Clay was proven.

4.5.3. Reading Formation

Underlying the the London Clay in BH101 at 13.4m bgl, a 'Hard light grey mottled red silty CLAY' was encountered and proven to 18.0m bgl. These soils are considered typical of the Reading Formation which is part of then Lambeth Group shown on the geological mapping to be present near surface towards the southern part of Area 5.

4.6. GEOTECHNICAL COMMENTS

Both the Superficial Deposits and the Reworked London Clay recorded pockets or beds of sands and gravel which were generally saturated. These deposits have been recorded sporadically with no pattern of distribution to depth or laterally extent. Their presence on site could require the use of reinforced footings. Where the sand lenses are saturated the 'running sands' could cause excavation stability difficulties.

4.7. CONTAMINATION OBSERVATIONS

Generally no significant widespread potential contamination sources were identified during the site works. However, Made Ground Topsoil was proven in a number of locations as well a shallow Made Ground soils, although these were typically reworked natural and therefore unlikely to be significantly contaminated if at all.

In the southern area of Area 1 in the location of the former small holding, Made Ground soils with some fragments of metal and plastic were encountered as well as localised fragments of suspected cement bonded asbestos.

In trial pit TP10, a localised area of deep slightly organic Made Ground soils were encountered to 2.3m bgl which are considered to be indicative of a former pond. The organic soils could potential be considered as a possible source of ground gas albeit the generation potential is likely to be low and also localised.

4.8. GROUNDWATER BEHAVIOUR

The following general observations of groundwater behaviour were made in the trial pits during the investigation works:

- During the first phase of investigation slight groundwater seepages were recorded in trial pits TP01 at 2.1m, TP03 at 1.00m in a sandy pocket, TP04 at 0.8m, TP10 at 1.1m and TP11 at 1.20m and 2.1m. Seepage was encountered in TP06 at 2.4m in Face B/C.

- During the second phase of works groundwater seepages were noted in TP101, TP106 and TP110 and at depths ranging from 1.5m to 2.0m bgl.

Groundwater was not encountered in TP01, TP05, TP07 to TP09, TP102 to TP105 and TP107 to TP109.

The groundwater was observed to either be localised to deep pockets of clay confined granular soils or perched near surface where it was underlain by impermeable clay soils.

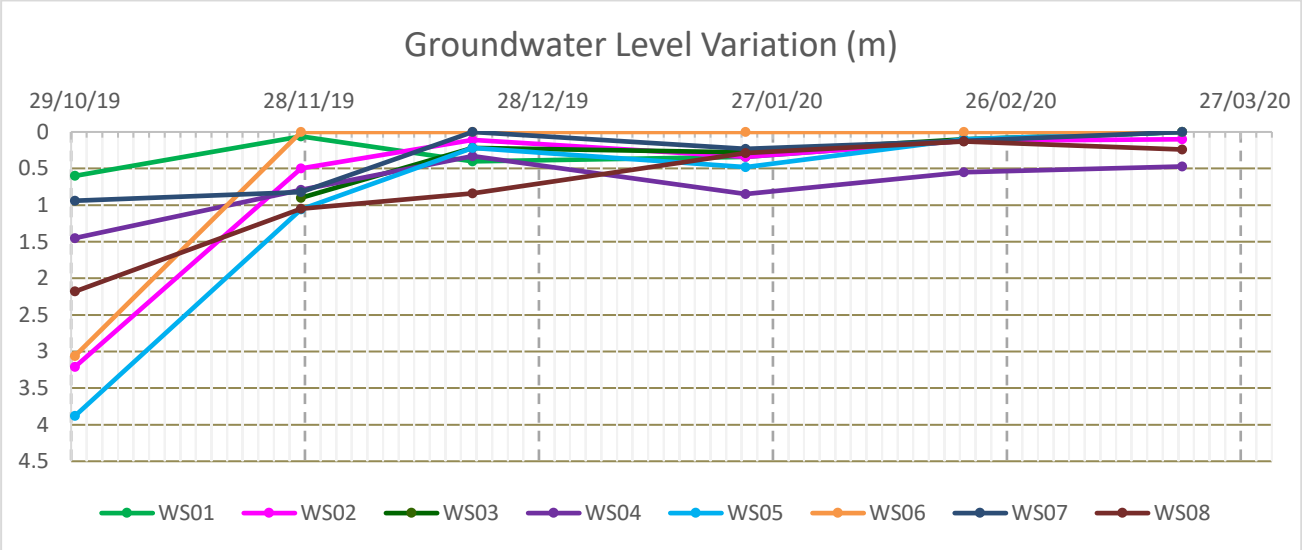
During the forwarding of the boreholes, groundwater was encountered in WS01, WS07, WS08, WS102 and WS103. Borehole WS01 encountered shallow groundwater at 0.75m, which caused the borehole to collapse. Due to time constraints on the first day, WS01 was not cased. Both WS07 and WS08 encountered groundwater at 2.00m within a clayey, gravelly sand layer. The groundwater in WS07 caused the borehole to collapse. The water was then cased out to allow drilling to 5.45m bgl. In boreholes WS102 and WS103 the groundwater was encountered at depths of 2.1m and 1.9m bgl respectively.

4.9. GROUNDWATER MONITORING

DATE	RESTING GROUNDWATER RANGE	COMMENTS
29/10/2019	From 0.60m to 3.88m bgl.	Standing groundwater levels varied significantly across the site. The boreholes which encountered a wet sand layer during drilling (WS01, WS07 and WS08) have recorded the shallow standing water levels ranging between 0.6m to 2.2m bgl. The exception is WS04 were no sand beds were encountered but groundwater at circa 1.5m bgl was recorded. Borehole WS03 located in the northern part of Area 2 was recorded dry. Borehole WS05, located in the south western corner of Area 1, recorded a small amount of water at 3.9m bgl near the base of the installation well suggesting it is slow accumulation of water in the well borehole rather than a true groundwater level.
27/11/2019	Surface flooding to 1.06m bgl.	A general sharp rise on the standing groundwater levels have been recorded in all the installed boreholes. The shallowest groundwater values were recorded in WS01, with a value near the surface, whilst WS06 was completely submerged by surface standing water. The remainder of the boreholes recorded groundwater depths ranging from 0.5m bgl in WS02 to 1.06m bgl in WS05.
19/12/2019	From ground level to 0.84 bgl.	Generally, a rise in the standing groundwater levels was recorded in all the boreholes except for WS01 where values were slightly lower, 0.4m bgl. Borehole WS06 was again submerged by surface standing water. Standing groundwater in WS07 was encountered at ground level with the remainder of the boreholes recording levels ranging from 0.11m bgl in WS02 to 0.84m bgl in WS08.
23/01/2020	Surface flooding to 0.85m bgl.	Borehole WS06 was again submerged by surface standing water. Slightly lower standing groundwater values were recorded but with the exception of WS04 which recorded groundwater at 0.85m bgl, the remainder of the boreholes recorded levels of less than 0.5m bgl.
20/02/2020	Surface flooding to 0.55m bgl.	Borehole WS06 was again submerged by surface standing water.

DATE	RESTING GROUNDWATER RANGE	COMMENTS
		However, slightly shallower standing groundwater values were recorded in all the boreholes. The deepest value was recorded in borehole WS04 at 0.55m bgl but the remainder of the boreholes recorded levels circa 0.1m bgl.
19/03/2020	Surface flooding to 0.47m bgl.	Boreholes WS01, WS03, WS05, WS06 and WS07 were all flooded during the final monitoring visit, whilst in WS02, WS04 and WS08 recorded standing groundwater levels ranging from 0.1m to 0.4m bgl.

The following chart displays the variation of resting groundwater levels in the boreholes and clearly illustrates how groundwater level is affected by seasonal weather.



4.9.1. Discussion

First groundwater monitoring visit was undertaken at end of the dry season and generally all the boreholes recorded standing groundwater values greater than 1.0m and 1.5m depth. However, the following visit was undertaken in the wet season and a marked rise in groundwater level was recorded across the entire site. After that second visit, in November 2019, resting groundwater level have been generally recorded above 0.5m depth with slightly variations but with a generally rising trend. Of particular note is that the last monitoring visit recorded five out of eight boreholes flooded and standing groundwater levels in the rest of the boreholes were recorded at depths shallower than 0.5m depth.

The winter groundwater monitoring has confirmed shallow groundwater to be present at the site across the winter wet season with levels typically of less than 1.0m bgl. This is being caused by the localised and confined nature of the more permeable granular soils encountered during the ground investigation. During the winter period, these granular pockets will steadily accumulate water and as the permeability is so low in the surrounding soils, the groundwater levels will steadily rise.

The monitoring has also confirmed that the site is subject to surface water flooding where rainfall is unable to infiltrate into the impermeable surface soils as identified by the presence of near surface perched water during the ground investigation.

Whilst it is important to recognise that the period of winter groundwater monitoring coincided with higher than average levels of rainwater resulting in widespread flooding across the country, it is considered that the results recorded are generally typical for the site and wider surrounding area. Further confirmation of this is provided by the previous RSK investigation reports undertaken on the neighbouring site where similar winter groundwater levels were also recorded.

5. GEOTECHNICAL PROPERTIES

5.1. COARSE SOIL PARAMETERS

5.1.1. Standard Penetration Tests

Occasionally, coarse soils, sand and gravel, have been recorded in the Superficial Deposits. Standard Penetration Tests in the gravelly deposits ranging between N=18 and N=19 have been recorded, indicative of medium dense soils. Whereas N-values between N=6 and N=18 have been recorded in the sandy beds indicative of loose to medium dense soils.

The low values recorded in the sandy beds are likely related to the presence of groundwater in these deposits which has reduced their apparent relative density. Additionally, these sand beds are relatively thin and intercalating the clay soils and so the whole SPT straddled between both soil types, sand and clay.

5.1.2. Particle Size Distribution

The grading curves of the one sample of granular Superficial Deposits subject to PSD determination revealed the soil to be a well graded, sandy, silty, slightly clayey GRAVEL.

5.1.3. Variable Head Permeability

The records of the variable head permeability tests are presented in the Appendices that includes the calculation of the permeability. The results are presented in the table below:

BOREHOLE	PERMEABILITY	STRATUM TESTED
WS07	1.93×10^{-6} m/s	0.0m - 0.4m: MADE GROUND. 0.4m - 2.3m: Superficial Deposits: layers of gravel, sand and clayey soils intercalated. 2.3m - 4.0m: London Clay.
WS08	9.40×10^{-7} m/s	0.0m - 0.5m: MADE GROUND. 0.5m - 2.3m: Superficial Deposits: layers of gravel, sand and clayey soils intercalated. 2.3m - 4.0m: London Clay.

5.2. FINE SOIL PARAMETERS

5.2.1. Index Property Testing

SOIL TYPE	Superficial Deposits.
PLASTICITY INDEX (PI)	59%(One sample: High volume change potential).
MODIFIED PI	17% - 25% (Three samples: Medium volume change potential 44% (One sample: High volume change potential).
COMMENT	Highly variable volume change potential have been recorded ranging 17% to 59%, but averaging 33%, which is indicative of medium volume change potential.
NHBC CLASS	Medium volume change potential.

SOIL TYPE	London Clay Formation (including Reworked).
PLASTICITY INDEX (PI)	13% (One sample: Low volume change potential). 30% - 33% (Two samples: Medium volume change potential). 43% - 54% (Nine samples: High volume change potential).
MODIFIED PI	39% (One sample: Medium volume change potential).
COMMENT	Variable volume change potential have been recorded ranging 13% to 54%, but averaging 43%, which is indicative of high volume change potential.
NHBC CLASS	High volume change potential.

SOIL TYPE	Reading Formation.
PLASTICITY INDEX (PI)	27%
MODIFIED PI	Not applicable – no oversize particles.
NHBC CLASS	Medium volume change potential.

5.2.2. Undrained Shear Strength

This section discusses all of the laboratory and in-situ tests that produce either direct or indirect measures of undrained shear strength.

5.2.2.1. Hand Shear Vane

SOIL TYPE	Deep Made Ground (TP10).
CORRECTION FACTOR μ	μ=1.0
JUSTIFICATION	Professional judgement.
DISCUSSION OF CORRECTED RESULTS	The recorded undrained shear strength was in the range of 60kPa at shallow depth and then below 1.1m depth a range of 30kPa to 32kPa indicative of low strength soils was recoded.

SOIL TYPE	Superficial Deposits.
CORRECTION FACTOR μ	μ=0.1
JUSTIFICATION	Professional judgement.
DISCUSSION OF CORRECTED RESULTS	Hand shear vane tests undertaken between 0.5m to 1.0m depth recorded undrained shear strength in the range of 30kPa and 72kPa which is indicative of medium strength soils.

SOIL TYPE	Reworked London Clay.
CORRECTION FACTOR μ	μ=0.78
JUSTIFICATION	After Bjerrum 1972, employing Plasticity Index, PI ~50 so μ=0.78
DISCUSSION OF CORRECTED RESULTS	Hand shear vane tests undertaken between 1.0m to 2.0m depth recorded undrained shear strength in the range of 39kPa to 86kPa which is indicative of medium to high strength soil type.

SOIL TYPE	London Clay Formation.
CORRECTION FACTOR μ	μ=0.78
JUSTIFICATION	After Bjerrum 1972, employing Plasticity Index, PI ~50 so μ=0.78
DISCUSSION OF CORRECTED RESULTS	Hand shear vane tests undertaken between 1.0m but generally below 2.0m depth recorded undrained shear strength in the range of 45kPa to 100kPa which is indicative of medium to high strength soil type.

5.2.2.2. Hand Penetrometer

SOIL TYPE	London Clay Formation.
DISCUSSION OF CORRECTED RESULTS	Generally, the recorded undrained shear strength was in the range of 50kPa to 150kPa indicative to medium to high strength soil type. However, lower values of 38kPa indicative low strength soil type, were recorded in boreholes WS04 and WS06 between 1.5m to 3.0m depth.

5.2.2.3. Standard Penetration Test Correlations

The Standard Penetration tests (SPTs) were undertaken in all the boreholes. A total of 83No. Standard Penetration Tests were undertaken in the clay-rich soils recorded on site.

Tests undertaken in the clay-rich soils of the Superficial Deposits have recorded N-values between 4 and 25 which is indicative of firm to stiff soils. Whereas N-values recorded in the bedrock of the Reworked and the London Clay Formation range from 6 to >50 being indicative of firm to very stiff/hard clayey soils. Typically, low values were recorded at shallow depths and SPTs refused (N=>50) in the deep boreholes at depths from 15m.

Two refusal values, N>50, were recorded in the Reading Formation, proved only in BH101 below 13.4m depth.

The SPT N-values of both the Superficial deposits and the London Clay have been converted using industry standard correlations, such as Stroud's method, to equivalent undrained shear strengths of a 100mm-diameter triaxial compression test. For fissured, over consolidated fine-grained soils, i.e. the London Clay, SPT N-values can be converted. This conversion has been conducted on the N-values using values for Stroud's conversion factor, f1, selected on the basis of plasticity index recorded in the samples tested in both the Superficial deposits and the London Clay. Hammer efficiency values for the windowless sample rigs of Er=0.81 (WS01-WS08), Er=0.91 (WS101-WS105) and Er=0.90 (WS106-WS107) have been taken and a value of Er=0.73 from the cable percussive borehole rig. Values have been provided from the annual calibration certificate by each sub-contractor.

Variable equivalent undrained shear strengths for the clay rich soils have been recorded.

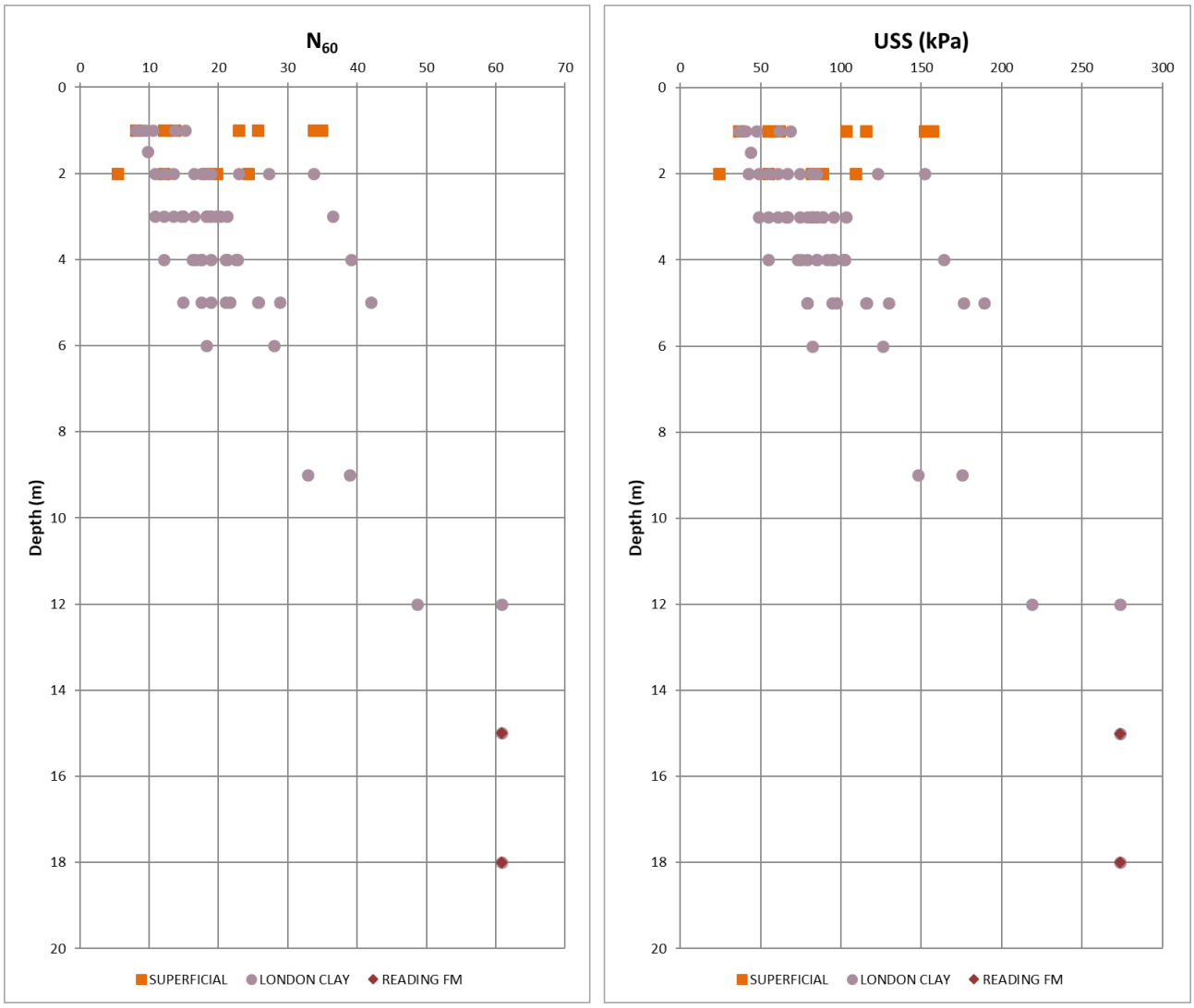
For the Superficial deposits, equivalent undrained shear strength values between 24kPa and 152kPa indicative of low to high strength soils have been recorded to about 2.0m depth. For the London Clay, including the Reworked soils, equivalent undrained shear strength values between 24kPa and 61kPa have been recorded at about 1.0m depth which are indicative of low to medium strength soils. Between 2.0m and 3.0m depth equivalent undrained shear strength values between 43kPa and 152kPa indicative of medium to high strength soils have been recorded. For depths of between 4.0m and 5.0m, equivalent undrained shear strength values between 55kPa and 176Pa indicative of medium to very high strength soils have been recorded.

From the deeper percussive boreholes, at a depth of 6.0m, equivalent undrained shear strength values between 82kPa and 126Pa indicative of high strength soils have been recorded.

At a depth of 9.0m, equivalent undrained shear strength values between 148kPa and 175Pa indicative of high to very strength soils have been recorded.

Below, between 12.0m and 18.0m, equivalent undrained shear strength values between 219kPa and >274kPa indicative of high to very high strength soils have been recorded.

The following charts show the distribution with depth of the N_{60} values recorded in the borehole together with the derived equivalent undrained shear strength values for the soils recorded.



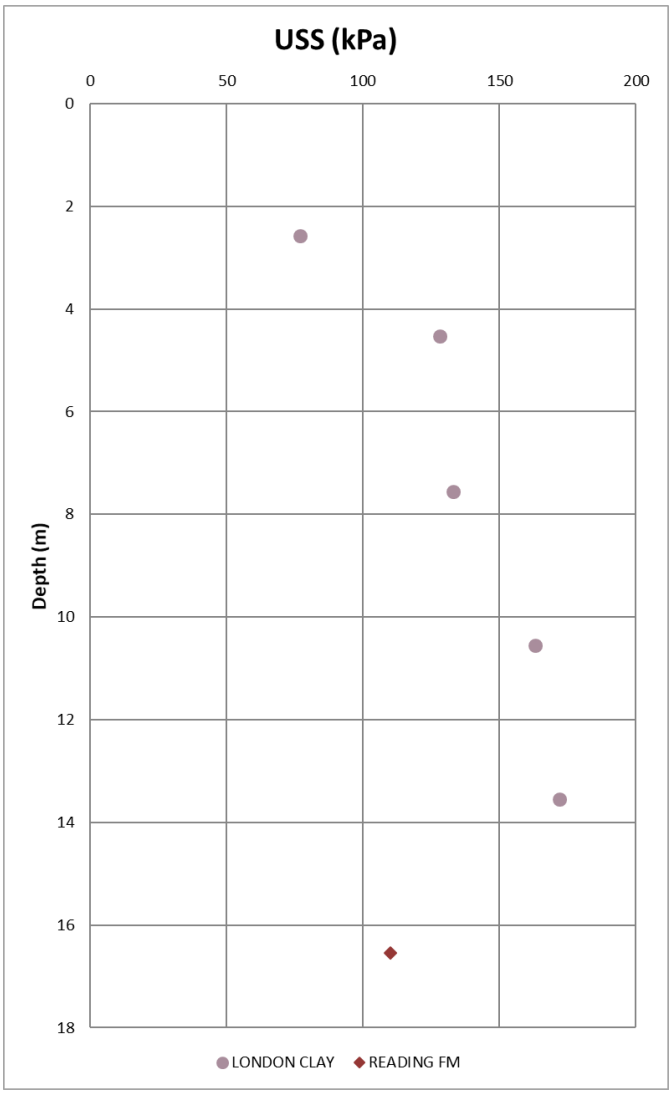
5.2.2.4. Laboratory Tests

Six undisturbed samples (traditional U100 plastic sample tubes) five from the London Clay and one from the Reading Formation were subjected to triaxial compression without measurement of pore water.

For the London Clay samples the recorded undrained shear strength in the range of 77kPa to 172kPa indicating a high to very high strength. Typically, values increase with depth.

For the Reading Formation sample, the recorded undrained shear strength was of 110kPa indicating a high strength.

The following chart shows the distribution with depth of the undrained shear strength values recorded in the triaxial tests.



5.2.3. One-dimensional Consolidation

A single one-dimensional consolidation test was performed on a specimen of London Clay Formation, from borehole BH102 at a depth of 7.5m. The test results show this soil to be an over consolidated clay.

A swelling pressure of 120kPa was recorded before the start of consolidation. The measured Coefficient of compressibility (mv) were between 0.04m^2/MN and 0.12m^2/MN indicative of medium compressibility.

5.3. SULPHATE AND pH

	TOPSOIL / MADE GROUND / SUPERFICIAL DEPOSITS / REWORKED LONDON CLAY / READING FORMATION			
	Sulphate		pH	
Characteristic Value	602 mg/l		6.3 units	
Justification	Highest groundwater result.		Mean of lowest 20% results.	
	No. of tests	Results Range	No. of tests	Results Range
Soil	23	<10 – 336 mg/l	23	6.2 – 8.4 units
Groundwater	3	102 - 602 mg/l	3	7.1 – 7.6 units
Total Potential Sulphate	7	Not applicable as pyrite unlikely in the samples tested.		

	LONDON CLAY FORMATION			
	Sulphate		pH	
Characteristic Value	TPS: 24.03%		7.1 units	
Justification	Based on Total Potential Sulphate.		Lowest measured value.	
	No. of tests	Results Range	No. of tests	Results Range
Soil	9	615 – 145,900 mg/l	9	6.9 – 8.1 units
Groundwater	1	1,890 mg/l	1	7.8 units
Total Potential Sulphate	9	0.06% – 24.03% Two out of four samples potentially pyritic.		

6. GEOTECHNICAL ASSESSMENT

6.1. INTRODUCTION

The report is being written in support of the planning application for the site and the development layout has not yet been finalised, but an illustrative masterplan of the proposed layout is included in Appendix 1. The following advice and recommendations are based on the construction low-rise residential properties. From assessment of the nature of the ground conditions and the type of proposed structures, it is considered that the situation falls within EC7 Geotechnical Category 1.

Should the nature of the development be changed then the results of this investigation would need to be reviewed and reassessed.

6.2. EXCAVATIONS

STABILITY	Any excavation requiring man entry should be battered back to a safe angle, supported by an appropriate proprietary trench support system or adequately shored to provide safe working conditions. Shoring to any excavation requiring man entry must be designed by a suitably qualified and experienced engineer. Any support system will require regular inspection as detailed in published guidelines to ensure the excavation support is adequate and appropriate for the ground conditions present. It is anticipated that narrow trench excavations will remain relatively stable and open for short periods, but minor spalling of side walls could still occur. Where deep Made Ground is present, i.e. trial pit TP10 in Area 1, it is anticipated that excavations will be prone to sidewall collapse as recorded in that hole and will require temporary support to remain open. Occasionally, saturated sandy and clayey gravelly beds/pockets have been recorded associated to the superficial deposits and the reworked London Clay then, trench excavations encountering these pockets of groundwater are likely to suffer side wall collapse. Likewise, due to the presence of these granular material, excavations below the water table at some areas of the site are likely to result in excavation difficulties due to 'running sands' and appropriate groundwater control will therefore be required.
EQUIPMENT	It should be possible to progress excavations with conventional equipment.
GROUNDWATER CONTROL	After a six month period of groundwater monitoring during the winter season, it is considered that groundwater levels at the time of construction will have a critical impact on the ease of which the structure can be built. It is therefore recommended that deep excavations are planned for the late summer or early autumn when seasonally groundwater will be at its lowest. If construction is undertaken during the drier summer and early autumn season then: • For most of the site specific groundwater control is unlikely to be required at this site. Limited pumping from sumps or bailing out may be required to deal with slight seepages or surface water ingress during periods of inclement weather. • For those parts of the site where shallow groundwater levels have been recorded both during the investigation and in the monitoring visit (i.e. WS01, WS07 and WS08), it is anticipated that groundwater control in the

	form of pumping from sumps formed in the base of excavations will be required. Any groundwater control system should be designed and operated to minimise the loss of fines from the soil matrix as this could adversely affect settlement. In case of the time of construction is undertaken in the winter months then: • It is considered that construction without adequate groundwater control will be problematical and that pumping from sumps alone may not be sufficient. Consultation with groundwater control contractors is recommended as specialist measures such as 'well pointing' may be required. Any groundwater control system should be designed and operated to minimise the loss of fines from the soil matrix as this could adversely affect settlement.
PARTY WALL ISSUES	As there are no nearby third party structures, the Party Wall Act is unlikely to apply to the development.

6.3. SLOPE STABILITY

The site is relatively flat and no significant changes in level as part of the development are anticipated. It is therefore considered that slope stability is unlikely to be a significant concern at this site.

6.4. SUB-SURFACE CONCRETE

TOPSOIL / MADE GROUND / SUPERFICIAL DEPOSITS / REWORKED LONDON CLAY	
SITE / SOIL CATEGORY	Natural ground (Topsoil, Superficial Deposits, Reworked London Clay). Brownfield (Made Ground).
DESIGN SULPHATE CLASS	DS-2
GROUNDWATER REGIME	Mobile.
AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE (ACEC) CLASS	AC-2

LONDON CLAY FORMATION	
SITE / SOIL CATEGORY	Natural ground containing pyrite.
DESIGN SULPHATE CLASS	DS-4 (DS-3 for piling design).
GROUNDWATER REGIME	Static.
AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE (ACEC) CLASS	AC-4 (AC-3 for piling design).

COMMENTS	Concrete in pyritic ground that is initially low in soluble sulphate does not have to be designed to withstand a high potential sulphate class unless ground disturbance is such that pyrite may be oxidised. This may prompt a change in construction e.g. employing piled foundations instead of trench fill footings. The restriction to DS-4 has been applied.

READING FORMATION	
SITE / SOIL CATEGORY	Natural ground.
DESIGN SULPHATE CLASS	DS-1
GROUNDWATER REGIME	Mobile.
AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE (ACEC) CLASS	AC-1

6.5. SOAKAWAYS

Two rising head tests were undertaken in boreholes WS07 and WS08 located in Area 1. Both boreholes recorded Superficial deposits to 2.3m depth bgl comprising a sequence of clay and sandy layers intercalated, below the London Clay Formation was recorded to the base.

Both tests recorded permeability values between 1.93 x 10^{-6} m/s and 9.40 x 10^{-7} m/s, which is indicative of low permeability.

Therefore, it is considered that the disposal of collected surface water to soakaways will not be feasible at this site due to the cohesive nature and proved low permeability of the underlying soils.

6.6. PAVEMENT CONSTRUCTION

From consideration of the observed ground conditions and the plasticity of the clay soils of the superficial deposits, it is recommended that a preliminary design California Bearing Ratio (CBR) of 3% is assumed.

For the isolated areas where deep Made Ground is recorded, it is recommended that a preliminary design California Bearing Ratio (CBR) of less than 2% is assumed.

The cohesive deposits will be prone to rapid degradation during wet weather working and this should be avoided where possible.

All unsuitable soils, such as topsoil or desiccated soils, should be removed from beneath proposed paved areas. The exposed sub-grade formation should then be proof rolled to reveal any excessively soft or compressible zones and any such features identified also removed by excavation. Where unsuitable materials are removed, the resultant voids should be filled in layers with appropriately compacted suitable granular fill. To reduce the loss of granular construction materials into the sub-grade, consideration should be given to utilising a geotextile starter layer across the formation level.

6.7. PRELIMINARY FOUNDATION RECOMMENDATIONS

6.7.1. Introduction

It is proposed to develop the site with 105No. new residential properties with private gardens, allocated parking spaces and access roads.

Most of the site comprises a consistent shallow layer of Topsoil, however, isolated deep Made Ground to about 2.3m depth bgl, has been proved in the zone of trial pit TP10, located in the centre western part of Area 1 near to the ditch crossing the site from south to north. An additional trial pit, TP107, has been taken in this additional investigation which has confirmed the absence towards the east of these deposits. Ecological site constraints together with clearance access limited the investigation. However, from the existing development layout trial pit TP10 is located in the area of Plot 50 and these deposits could extend towards Plot 49. It is worth noting that the existing development layout is subject to be modified and then it is considered that further investigation should be undertaken for any plot located in this area to prove the presence of these deposits once the final layout has been confirmed.

Generally, below the Topsoil Superficial Deposits comprising both sand/gravel and clay soils have been recorded across the site with variable extent with depth. Maximum depths to 2.5m bgl have been recorded in Area 3 and minimal depths in the southern parts of Area 1. As mentioned above these soils have been recorded variable, from coarse to fines soils and then it is likely that reinforced footings are required to found onto these soils.

Additionally, shallow groundwater levels have been recorded associated to the granular beds and pockets recorded in the Superficial Deposits. It is considered that the viability of traditional strip footings will be dependent upon actual groundwater levels present at the time of construction. Construction of footings should take place during sustained dry periods or be planned for the summer months when groundwater levels would be expected to be at their lowest. Typically, groundwater levels are at their lowest in July to September.

When excavations are close to or intercept the groundwater, a two phase ‘dig and pour’ approach could be attempted. A semi-dry concrete mix could be employed to form a ‘dig and pour’ trench fill footing, but left at a lower level. A reinforced strip footing can then be constructed upon this trench fill footing. If difficulties in construction of footings prove to be too problematical, then a piled foundation solution should be adopted for affected plots.

The bedrock has been recorded at variable depths from 0.7m to 2.5m bgl. Occasionally the London Clay bedrock has been recorded Reworked from shallow depths with large pockets of granular soils, intercalating the clay-rich soils. The Reworked soils have been recorded sporadically across the whole site.

When the intact London Clay Formation has been recorded from shallow depths, southern part of Area 1 and Areas 3 and 4, the bedrock has been recorded with a moderate strength, however, with depth these soils increase in strength. Soft conditions have also been recorded at shallow depths in the Superficial Deposits.

Outside of the zones of influence of the trees and hedges it is considered that shallow spread foundations may be adopted for the proposed development emplaced within the underlying clay rich natural soils, Superficial Deposits, Reworked and/or London Clay Formation. Reinforced footings will be required for those plots straddling different soils, gravel/sand and clay to guard against differential settlement.

Locally, area of trial pit TP10, there may be a requirement to deepen foundations (trench fill) where deep Made Ground deposits are encountered to place the footings within the underlying London Clay Formation. However, a piled foundation may be required in the area if trench fill foundation are not practical to construct. Once the final layout is confirmed further investigation

in a Plot by Plot basis should be considered in this area to prove the extent of the Made Ground deposits.

Within the zones of influence of the trees deepened trench fill foundations are considered appropriate. However, where plots are located adjacent to the trees and hedges piled foundations may need to be considered if trench fill foundations are too deep to be economic or practical to construct.

The shallow clay-rich soils of the Superficial Deposits and the London Clay Formation have been recorded across the entire site with a generally low to medium strength. Based on that, restrictions in terms of bearing capacity need to be considered. In any case where soft soils are encountered at foundation depths, foundation should be over deepened to be placed into medium strength soil type.

6.7.2. Floor Slabs

In consideration of the near surface clay soils and due to the presence of isolated deep Made Ground at some parts of the site, fully suspended floor slabs designed and constructed in accordance with NHBC Standards are recommended at this development.

With reference to Section 2.2, the floor construction will not have to incorporate radon gas protection measures.

6.7.3. Traditional Footings

Outside of excessive tree influence, the site is suitable for the adoption of shallow strip/trench fill footings. Foundations should be taken through made ground/topsoil to bear upon the Superficial Deposits, Reworked London Clay and/or London Clay Formation.

A presumed bearing value of 75kN/m^2 is considered appropriate for foundations up to 1.2m wide bearing upon the sandy and clay soils of the Superficial Deposits, Reworked London Clay and/or London Clay Formation. Immediate and long term settlement should be in tolerable limits.

Where foundations are installed into sand deposits, settlement will take place largely during the construction period. However, when foundations are embedded within clay deposits settlement will place over several years. Due to the rapid potential variation in ground conditions likely to be encountered, steel mesh reinforcement of the footings is recommended to guard against the potential for differential settlement.

Alternatively, in the areas where the London Clay Formation has been recorded at shallower depths, i.e. Area 3, the footings could be over deepened so that they bear entirely within clay-rich soils and thereby eliminating the potential for differential settlement. The London Clay at shallower depths about 1.0m have been recorded with a moderate strength and a bearing capacity of 75kN/m^2 should be considered. For footings at about 2.0m depth and deeper, a higher bearing capacity of 125kN/m^2 is considered appropriate for foundations up to 1m wide.

Variable volume change potential have been recorded in the clay-rich soils existing on site. The Superficial Deposits clayey soils has been shown a medium volume change potential when assessed against the NHBC standards. However, both the Reworked and the London Clay Formation have been shown to have a high volume change potential. For ease and certainty of foundation design, a high volume change potential should be assumed. The minimum foundation depth required is therefore 1.00m, but 1.50m where required to allow for restricted new tree planting.

Under the NHBC Standards, foundation depths have to be increased if they are within the influence zone of felled trees, existing trees or proposed tree planting. Based on the provided tree survey hedge boundaries comprise high water demand species such as oaks or hawthorn. Oak trees have been typically recorded in a mature state but also in younger stages, particularly within hedgerows. High water demand trees have been also recorded across Area 2 comprising hawthorn,

oaks or goat willows. In Area 1, a group of trees comprising goat willows is recorded to the centre part. Southern part of Area 1, Area 3 and Area 4, comprises several groups of goat willows and Area 3 is delineated along its north, east and western boundary by hedges containing high water demand trees such as hawthorn. Therefore, it is considered that roughly half of the plots will require a piled foundation due to the boundary tree/hedges and trees located across the site. Knowing which tree species are to be retained along the hedges, such as oaks, will be crucial for the foundation design.

It should be noted that where trees are in groups the resulting competition for resources can lead to deeper root systems than allowed for in the NHBC Standards. In any event, foundations should be taken below any roots encountered in foundation trench excavation. Where the required foundation depth varies around a structure, this can be accommodated by forming steps in the foundation as per NHBC Standards.

Where foundation depths exceed 1.50m in clay soils and are within the zone of influence of existing or felled trees or where foundations cut through tree roots, a compressible void former will be required against the internal faces of new foundations in order to accommodate potential long term soil heave. Such precautions against heave should be designed and constructed in accordance with NHBC Standards.

The excavator must be set up with care and operated correctly to ensure trench walls are vertical and base horizontal as any slight inclination will result in eccentric loading on deep trench fill footings.

A number of trees and tree stumps are located across the site. It will be necessary to remove all unwanted trees, stumps and root structures prior to commencing with the development. Any resultant void should be backfilled accordingly with respect to the preferred foundation design.

During the ground investigation, slightly seepages and saturated soils have been recorded associated with the granular beds and pockets intercalating the clay-rich soils. However, after the extended period of monitoring during the wet season it has been recorded that shallow groundwater is subject to seasonal variation at the site. Any excavations encountering the groundwater will rapidly become unstable and this will make construction of the footings problematical or impossible. It is considered that viability of strip or trench fill foundations will be dependent upon actual groundwater levels present at the time of construction. As a consequence of this, it is recommended that foundation construction generally occurs in the summer months when groundwater is likely to be at its deepest.

If groundwater proves problematic then, localised temporary lowering of the groundwater table may prove beneficial. Specialist groundwater control, such as well pointing, will be needed. This is because it will be important to ensure that the de-watering does not cause a loss of fines from the soil, as would be the case from simple sump pumping, which would lead to unacceptable foundation settlement behaviour.

As an alternative, a ‘dig and pour’ approach could be adopted. A semi-dry concrete mix could be employed to form a ‘dig and pour’ trench fill footing, but left at a lower level. A reinforced strip footing can then be constructed upon this trench fill footing. It is an inherent risk of ‘dig and pour’ that spoil disposal and concrete volumes could increase.

During construction, any soft spots found at foundation formation level should be excavated and replaced with lean mix concrete. Foundation excavations should be kept dry and left open for the minimum amount of time possible. Where foundations cannot be completed immediately, a blinding layer of concrete should be placed.

6.7.4. Piling

Due to the tree and hedge influence, it may be that a piled foundation will be required for at least half of the plots. Due to its construction characteristics, the Pump Station will require a piled wall to support a deep excavation for its wet well.

The potential construction risks with deep trench fill footings and/or limitations on the bearing capacity may also make piling the preferred foundation solution for some plots.

Piling foundation maybe also required for Plot 50 due to the presence of isolated deep Made Ground recorded to 2.3m depth in trial pit TP10.

Due to the position of the groundwater, traditional bored piles may be difficult to construct unless they are cased through to the underlying London Clay Formation. The need for casing could be avoided through the use of Continuous Flight Auger (CFA) piling techniques and this may be the best method to construct cast insitu piles.

Driven pre-cast concrete piles would be a viable option, however, the proximity of neighbouring structures in some parts of the site may make them unsuitable due to noise and vibration considerations.

For the purposes of pile design it is recommended that skin friction from the Made Ground and Superficial Deposits is ignored, and that the working load is calculated from a combination of skin friction and end bearing within the underlying London Clay Formation.

The effect of further settlement of deep Made Ground (i.e. TP10) resulting in down drag (i.e. negative skin friction) of the piles should be considered with the design.

The existing trees may cause soil heave. In the influence zone of trees, pile caps and ground beams will have to be separated from the soil by a suitable void former on the sides and in the case of ground beams, underneath. Piles will have to be designed to withstand the seasonal movements exerted by the remaining and proposed vegetation either by the use of suitable reinforcement or by the provision of sleeving through the swelling zone. Such precautions against heave should be designed and constructed in accordance with NHBC Standards.

It is recommended that consultation with a specialist piling contractor is undertaken in order to evaluate likely pile loads, diameter and depths based upon the ground conditions revealed within the context of the specified technical requirements of the chosen piling method. In any event, positive contractual assurances should be sought from the piling contractor in respect of the performance of their proprietary system.

6.8. RECOMMENDATIONS FOR FURTHER GEOTECHNICAL WORK

Once the final layout has been provided, a further investigation should be undertaken to prove the extent of the isolated deep Made Ground recorded in trial pit TP10 for foundation design of any plots located in that area.

The development layout suggests parts of boundary hedgerows will be removed and parts retained. It will be critical for foundation design to know which specific trees are being retained as such trees could grow to maturity and will therefore have a more extensive influence on required foundation depths than their current height.

7. RISK ESTIMATION – SOILS

7.1. HUMAN HEALTH

The Generic Assessment Criteria (GAC) employed below are for residential land use as this is appropriate to the proposed form of development.

CONTAMINANT	UNITS	NUMBER OF TESTS	MAXIMUM CONCENTRATION	GAC	NUMBER EXCEEDING GAC
Arsenic	mg/kg	16	15	37	0
Cadmium	mg/kg	16	2.2	22	0
Chromium (total)	mg/kg	16	31	910	0
Chromium (hexavalent)	mg/kg	16	<2	21	0
Copper	mg/kg	16	136	2,400	0
Lead	mg/kg	19	1720	200	5
Mercury	mg/kg	16	2.3	11	0
Nickel	mg/kg	16	28	180	0
Selenium	mg/kg	16	<3	250	0
Zinc	mg/kg	19	2020	3,700	0
pH	Units	32	6.2-8.4	<5-10>	0
Naphthalene	mg/kg	16	<0.1	2.3	0
Acenaphthylene	mg/kg	16	0.15	170	0
Acenaphthene	mg/kg	16	<0.1	210	0
Fluorene	mg/kg	16	0.18	170	0
Phenanthrene	mg/kg	16	4	95	0
Anthracene	mg/kg	16	0.67	2,400	0
Fluoranthene	mg/kg	16	6.05	280	0
Pyrene	mg/kg	16	4.88	620	0
Benzo(a)anthracene	mg/kg	16	1.95	7.2	0
Chrysene	mg/kg	16	2.44	15	0
Benzo(b)fluoranthene	mg/kg	16	2.53	2.6	0
Benzo(k)fluoranthene	mg/kg	16	0.91	77	0
Benzo(a)pyrene	mg/kg	16	1.70	2.2	0
Indeno(1,2,3-cd)pyrene	mg/kg	16	1.27	27	0
Dibenzo(a,h)anthracene	mg/kg	16	0.19	0.24	0
Benzo(ghi)perylene	mg/kg	16	1.05	320	0
TPH Aliphatic C5-C6	mg/kg	7	<0.01	42	0
TPH Aliphatic C6-C8	mg/kg	7	<0.05	100	0
TPH Aliphatic C8-C10	mg/kg	7	<2	27	0
TPH Aliphatic C10-C12	mg/kg	7	<2	130	0
TPH Aliphatic C12-C16	mg/kg	7	<3	1,100	0
TPH Aliphatic C16-C35	mg/kg	7	33	65,000	0
TPH Aliphatic C35-C44	mg/kg	7	<10	65,000	0

CONTAMINANT	UNITS	NUMBER OF TESTS	MAXIMUM CONCENTRATION	GAC	NUMBER EXCEEDING GAC
TPH Aromatic C5-C7	mg/kg	7	<0.01	70	0
TPH Aromatic C7-C8	mg/kg	7	<0.05	130	0
TPH Aromatic C8-C10	mg/kg	7	<2	34	0
TPH Aromatic C10-C12	mg/kg	7	<2	74	0
TPH Aromatic C12-C16	mg/kg	7	<2	140	0
TPH Aromatic C16-C21	mg/kg	7	27	260	0
TPH Aromatic C21-C35	mg/kg	7	36	1,100	0
TPH Aromatic C35-C44	mg/kg	7	<10	1,100	0
Benzene	mg/kg	7	<2	0.87	0
Toluene	mg/kg	7	<5	130	0
Ethylbenzene	mg/kg	7	<2	47	0
Xylene (total of all types)	mg/kg	7	<2	56	0
Methyl Tert Butyl Ether (MTBE)	mg/kg	7	<5	49	0
Semi-Volatile Organic Compounds (SVOCs)	mg/kg	3	<LOD	LOD*	0
Organochlorine Pesticides	mg/kg	5	<LOD	LOD*	0
Total Organic Carbon	%	2	1	N/A	-
Asbestos	Presence	5	<0.002	Fibres Present	1
Notes: *Limit of detection: Given the large amount of compounds in this group, coupled with the lack of GAC for certain compounds, any concentrations above the limit of detection will be highlighted in the first instance.					

RESULTS EXCEEDING HUMAN HEALTH ASSESSMENT CRITERIA	
LEAD	When compared to the generic assessment criteria of 200mg/kg, a total of five elevated concentrations of Lead were recorded in the Made Ground soils in the location of the former small holding and at concentrations ranging from 252mg/kg in TP103 at 0.2m bgl to 1,720mg/kg in TP105 at 0.3m bgl. With reference to the proposed layout, the former small holding is located in an area proposed for a mix of public open space and residential gardens, but the concentrations recorded in TP102 and TP105 are also elevated above the GAC for the Public Open Space (POS1) land use. Window sample borehole WS04 and TP104 recorded no elevated concentrations of contaminants and indicate the likely northern extent of this contamination.
ZINC	Whilst not elevated above the GAC for human health, the Made Ground soils in TP06 at 0.1m bgl and TP105 at 0.3m bgl have recorded high Zinc concentrations of 1,900mg/kg and 2,020mg/kg respectively, which has implications for its waste classification. It is also likely to be phytotoxic at this concentration.

RESULTS EXCEEDING HUMAN HEALTH ASSESSMENT CRITERIA	
ASBESTOS	A sample of the near surface Made Ground in TP102 at 0.2m bgl has recorded asbestos Chrysotile fibre bundles in the soils at a marginally elevated concentration of 0.002%. In addition to this a suspected asbestos containing material was also identified in the surface Made Ground soils near WS04 and a sample of this material (SS01) indicates the fragments to be Chrysotile containing cement. BRD employed the JIWG 'Decision support tool for the qualitative risk ranking of receptors involved in or exposed to asbestos in soil and Construction & Demolition materials' (Version 2, February 2017). With reference to the proposed development plan and the asbestos being located in an area of proposed open space, the risk ranking from the presence of the loose fibre bundles is low and from the isolated fragment as being very low. It should be noted that none of the other exploratory holes undertaken in this area encountered any asbestos cement fragments or soils containing asbestos fibres, which confirms such occurrences to be localised.
TOTAL ORGANIC CARBON	The investigation has encountered slightly organic soils within the TP10 and samples from these soils have recorded Total Organic Carbon (TOC) concentrations of 1% which is low with reference to CL:AIRE RB17, the potential for generation of concentrations of soil gasses from these soils given the low organic content recorded is not considered to be of significant concern and will not be considered further in this assessment. It should also be noted that the additional exploratory holes undertaken in this area including TP107 and WS103 have confirmed the organic soils to be localised to TP10.

7.2. WATER ENVIRONMENT

It is not appropriate to consider human health assessment criteria for human health in relation to the risk to the water environment, but currently there are no generic soil assessment criteria in respect of the water environment. In the absence of any groundwater sampling data, the soil results are assessed on the basis of professional judgement.

The majority of the site has not recorded any elevated contaminate concentrations of concern to the water environment.

The elevated concentrations of contaminants recorded in the location of the small holding have been confirmed to be limited to the near surface Made Grounds with underlying soils proven to be uncontaminated.

Whilst no groundwater testing has been undertaken, a WAC tests was undertaken on the contaminated soils from TP105 where the highest concentrations of metals was recorded and confirmed that the contamination is not leachable. Based on the evidence provided above it is considered that the identified contamination does not pose any significant risk to the underlying groundwater or surface environments present on site.

7.3. BUILDING MATERIALS

CONTAMINANT	UNITS	NUMBER OF TESTS	MAXIMUM CONCENTRATION	GAC	NUMBER EXCEEDING GAC
pH	units	32	6.2-8.4	<5.5	0
Sulphate (w/s)	mg/l	32	2130	500	4
Sum of SVOC + Aliphatic TPH >C5-C10 + Aromatic TPH >C5-C10 above detection limits	mg/kg	3	<LOD	2	0
Sum of Aliphatic TPH >C10-C21 + Aromatic TPH >C10-C21 above detection limits	mg/kg	7	33	10	2
Sum of Aliphatic TPH >C21-C34 + Aromatic TPH >C10-C35 above detection limits	mg/kg	7	63	500	0
Sum of BTEX + MTBE above detection limits	mg/kg	7	<LOD	0.1	0
Phenols	mg/kg	3	<LOD	2	0
Cresols and chlorinated phenols	mg/kg	3	<LOD	2	0
Naphthalene	mg/kg	16	<0.1	0.5	0
Benzo(a)pyrene	mg/kg	16	1.7	0.5	2

RESULTS EXCEEDING BUILDING MATERIALS ASSESSMENT CRITERIA	
BENZO(A)PYRENE	The concentrations of the Polycyclic Aromatic Hydrocarbon (PAH) benzo(a)pyrene recorded in the Made Ground in WS04 and TP06 are above the limits for the use of conventional polyethylene (PE) water supply pipes.
TPH	Two concentrations of Total Petroleum Hydrocarbon (TPH) within the Made Ground in TP06 and TP105 have been recorded above the limits for the use of conventional polyethylene (PE) water supply pipes.
WATER SOLUBLE SULPHATE	Concentrations of water soluble sulphate are such that they could detrimentally impact sub-surface concrete. The impact on concrete mix design is a geotechnical issue that is considered separately and so no further comment is made on these results within this contamination assessment.

7.3.1. Discussion

The vast majority of the site has recorded no elevated concentrations of organic contaminants that exceed the stringent criteria for the use of plastic water supply pipes.

However, elevated concentrations have been recorded in the surface Made Ground in WS04, TP06 and TP105 which extends to depths of 0.4m, 0.2m and 0.5m bgl respectively. As the identified contamination has been confirmed by the investigation to be restricted to the near surface Made Ground soils, it is considered that the installation of protective barrier water supply pipes would not be required as new water pipes will be installed into the underlying natural soils which has been confirmed to be uncontaminated.

8. RISK EVALUATION

8.1. REVISED CONCEPTUAL MODEL

The revised conceptual site model plan is presented in the Appendices.

ADDITIONAL POLLUTANT LINKAGES	During the ground investigation, no additional sources of contamination were identified.
INVALID POLLUTANT LINKAGES	No contamination resulting from the adjacent railway line has been identified from the investigation. Contamination resulting from the use of pesticides was not encountered during the investigation.
LIMITATIONS AND UNCERTAINTIES	The location of the water main and overhead electric cables restricted the number of exploratory holes in the location of the former small holding (southern part of Area 1). No exploratory holes were undertaken in Area 5, however, with consideration of its proposed reuse within the development alongside the lack of potential contamination sources identified by the desk study research, further investigation works for contamination assessment purposes are not considered to be necessary. Across the remainder of the site it is considered that a sufficient number of exploratory points have been completed for contamination assessment purposes.

8.2. UPDATED CONTAMINATION RISK ASSESSMENT

The pollutant linkages identified in the revised conceptual site model will now be evaluated as to their severity:

SOURCES AND CONTAMINANTS	PATHWAYS (REFERENCE FROM MODEL)	RECEPTORS	POTENTIAL RISK
Small Holding. - Lead -Asbestos (Fragments/Fibres) - PAH. - Petroleum hydrocarbons.	Ingestion (1) Inhalation	Future residents	Moderate risk from the identified Lead concentration Low risk associated with the localised asbestos
	Horizontal & vertical migration	Groundwater	Negligible
	Horizontal migration / surface run off	Surface water	Negligible
	Direct contact	Building materials and services	Negligible

The contamination risks that are presented to the various receptor groups are discussed further in the following sections:

RISK TO HUMAN HEALTH

The investigation of the majority of the site has confirmed the soils to be uncontaminated as expected.

Former Small Holding – Area 1

In the location of the former small holding the investigation has encountered near surface Made Ground soils contaminated with Lead as well as a marginally elevated concentration of asbestos fibres in TP102 and asbestos fragments in SS01 located adjacent to WS04.

In terms of the asbestos, trial pits have confirmed such occurrences to be localised to SS01 and TP102 and within an area of proposed open space which would limit potential contact, however, it is still considered to present low risk to future residents from inhalation of fibres.

The Lead contamination however, appears to be more widespread in the surface Made Ground in this area and therefore is considered to present a moderate risk to future residents from direct contact with these soils in future garden, landscaping and areas of public open space.

RISK TO WATER ENVIRONMENT

The majority of the site is uncontaminated and therefore no risk to the surface of groundwater have been identified.

The investigation has also confirmed that the identified concentrations of contaminants in the small holding area are limited to the near surface soils only and also in a non-leachable form. Therefore the contamination is not considered to pose a potential risk to either the underlying groundwater or surface water environments.

RISK TO BUILDING MATERIALS AND SERVICES

The investigation of the majority of the site has confirmed the soils to be uncontaminated as expected and therefore no risk to water supply pipes has been identified.

The presence of hydrocarbons can denature and permeate plastic services, which is a particular concern for water supply pipes. However, the identified organic contamination in WS04, TP06 and TP105 in the location of the former small holding has been confirmed to be restricted to the near surface soils and will require remediation due to the risk to future residents. Therefore the identified soils will not be in direct contact with newly installed water pipes as these will be laid in the underlying natural soils. The associated risk is therefore considered to be negligible.

It should be noted that the water pipe specification should always be confirmed with the local water supply company as they may insist on such protective pipes regardless of the level of contamination or remediation present on site.

8.3. RISK MANAGEMENT

8.3.1. Introduction

The investigation has found that the majority of the site is uncontaminated. However, Lead contamination as well as isolated asbestos cement fragments and asbestos fibres have been found in the near surface Made Ground in the location of the former small holding. These contaminants are considered to pose moderate / low risks to future residents where they are exposed to them in future garden, landscaping and areas of public open space.

It is recommended that this report is submitted to the planning department of the Local Authority, the organisation undertaking the Building Control function, warranty providers to confirm that the investigation completed to date is satisfactory.

8.3.2. Further Contamination Assessment

No further investigation works are required.

8.3.3. Remediation Strategy

The aim of any remediation undertaken as part of site development will be to remove or break all of the viable pollutant linkages identified in the previous section. A formal remediation strategy should therefore be developed by an experienced Geo-Environmental Consultant once the planning application has been approved and the development layout has been finalised.

The surface Made Ground soils in the location of the small holding are contaminated with Lead and asbestos fibres. As the concentrations of Lead are such that they are unsuitable for both future garden areas as well as areas of public open space it is considered that the most appropriate remedial solution would be for the soils to be scraped up and disposed off site at an appropriate landfill facility.

Based on the limited amount of cement bonded asbestos fragments identified to date it is considered that the most appropriate remediation solution would be for the fragments to be segregated from the contaminated Made Ground soil matrix by hand picking and then disposed of to an appropriate landfill facility. This could be easily undertaken during the excavation works proposed for the removal of the Made Ground soils.

Due to the presence of asbestos, the remedial works should be undertaken with the appropriate asbestos control measures in place and undertaken by qualified operatives experienced in the remediation of asbestos in soils. The remediation works should be documented in a Verification Report.

8.4. WASTE SOIL DISPOSAL

Topsoil should be viewed as a resource rather than a waste. As the topsoil is suitable for residential garden use in terms contamination, the topsoil at the site should be stripped and the surplus reused on other developments. It should be noted that topsoil, even if uncontaminated, is unlikely to constitute 'inert waste' due to its high organic matter content.

It is considered that natural sub-soils disposed of from the site would be classified as 'non-hazardous waste' and would be characterised for disposal to landfill as 'inert waste'. However, the chemical results should be forwarded to the proposed landfill site and the waste classification confirmed prior to disposing of any surplus soils. Waste Acceptance Criteria (WAC) testing of the soils will also be required where the soil is to be disposed of at a landfill permitted to accept inert waste. Such WAC testing has been completed and the results are in the Appendices which confirm the soil tested complies with the inert waste limits. The waste code from the European Waste Catalogue (EWC) 2002 for the soils would be 17 05 04 'Soil and Stones, not containing dangerous substances'.

It is considered that the contaminated soils identified in the location of the small holding disposed of from the site would be classified as 'hazardous waste' due to the presence of elevated concentrations of Zinc and Lead. Such waste will require pre-treatment prior to off-site treatment or disposal e.g. by selective excavation and further testing. Waste Acceptance Criteria (WAC) testing of the soils for disposal will also be required if the soil is to be disposed of to landfill. Such WAC testing has been completed and the results are in the Appendices which confirm the soil tested complies with the stable non-reactive hazardous waste in non-hazard limits. The waste code from the European Waste Catalogue (EWC) 2002 for the soils would be 17 05 03 'Soil and Stones, containing dangerous substances'.

Once the asbestos cement asbestos fragments have been segregated from the soils, they should be double bagged and then disposed of as hazardous waste to an appropriate landfill facility.

9. HEALTH AND SAFETY FILE INFORMATION

9.1. INTRODUCTION

The aim of the following sections is to present pertinent Health and Safety information that has arisen from the current investigation/survey works discussed in this report. The aim is to identify health and safety controls that may be necessary during any subsequent maintenance, refurbishment, demolition or construction works. The information is not exhaustive and stems only from the aspects identified within the scope of the works undertaken by BRD.

Where BRD has been appointed as a Principal Contractor, then this information shall form the Health and Safety Files as required by the Construction Design and Management (CDM) Regulations 2015.

Reports are always forwarded to the Client and they shall be responsible for ensuring this safety information is disseminated to those who need it.

The works undertaken by BRD are detailed in the previous sections of this report.

9.2. HAZARDS

During the course of the BRD works the following noteworthy safety hazards have been identified:

9.2.1. Contamination

Localised contaminated soils are present at the site. Construction workers will be at risk where they are exposed to these soils and groundwater, for example during demolition, utility services work and foundation construction. During the redevelopment of the site, the presence of contaminated soils should be considered within health and safety plans. Measures to protect the health and safety of site workers should be implemented including use of appropriate personal protective equipment, education and good hygiene procedures. If during the redevelopment any anomalous material is encountered that is different to that conditions revealed by this investigation, then expert environmental advice should be sought.

9.2.2. Asbestos

Isolated fragments of cement bonded asbestos and very low concentrations of asbestos fibres have only been identified in the soils in the location of the former small holding.

BRD employed the JIWG 'Decision support tool for the qualitative risk ranking of work activities and receptors involved in or exposed to asbestos in soil and Construction & Demolition materials' (Version 2, February 2017). This confirmed that the remediation works would be characterised as 'Non-Licensed Work' and therefore appropriately qualified operatives should be used to undertake this. Measures to protect operatives would include the use of EN149 type FFP3 disposable masks, Manual/localised dust suppression and localised and basic personal decontamination facilities.

The potential for asbestos containing materials (ACM) within Made Ground on brownfield sites is a common occurrence and competent contractors should have procedures for addressing the associated risks should such materials be encountered elsewhere on site. All below ground operatives would be expected to have asbestos awareness training, so that they can identify any suspected ACM and inform site management so it can be appropriately dealt with.

9.2.3. Other Issues

During the BRD works the following safety hazards were identified:

- There are multiple slip, trip and fall hazards due to the overgrown nature of the site.

- There are a number of open water ditches crossing the site.

- Ecological constraints are in place and the Clients consultant should should be referred to before any future site clearance works are undertaken.

9.3. HAZARDOUS MATERIALS

BRD did not construct anything with hazardous materials.

Any soils to be imported to the site, in particular topsoil, should be tested to confirm their suitability in the development.

9.4. UTILITY SERVICES

The utility services plans held by the Client should be referred to. Of particular note is a live water main which crosses the southern area of the site as well as overhead electric cables.

REPORT SPECIFIC REFERENCES

- British Geological Survey, Sheet 317 / 332 'Chichester / Bognor', Solid and Drift Edition (1:50,000), published 1996.
- 'Phase 1 Geo-Environmental Desk Study – Land at Clay Lane, Fishbourne', BRD Environmental Ltd, Ref. BRD3511-OR1-B, dated April 2021.
- 'RB17 A Pragmatic Approach to Ground Gas Risk Assessment' CL:AIRE 2012.

SUPPORTING INFORMATION

SITE CHARACTERISTICS

The site characteristics are collated from various information sources, including but not limited to Ordnance Survey, British Geological Survey (BGS), Environment Agency (EA) and local authorities.

BRD generally commission the Landmark Information Group to produce an Envirocheck Report for study sites and where employed this is included in the Appendices. It should be noted that some of the data provided in the Envirocheck report is not considered within BRD's interpretation for the site characteristics as part of a geotechnical assessment.

HISTORY

Mapped History

The site history summarises the changes in use or layout of the site over time and is largely developed from a study of available Ordnance Survey maps. It should be noted that changes to the site may have occurred between the editions of the maps employed to assess the history of the site. Historical information of relevance within the 250m surrounding the site is also discussed in a separate section. The historical plans referred to in the text are generally included in an Appendix.

Aerial photography

As a minimum, current and historical aerial images of the site and surrounding areas are studied from the Google Earth program. Where additional historic aerial photographs have been purchased then these are referenced within the technical report.

Internet Searches

A simple search of the internet for relevant material relating to the use or history of the site is made. Information obtained from internet searches has been accepted as fact without validation by BRD except for ensuring the source is reputable. It should be recognised that due to programme and budgetary constraints the search conducted may not have revealed all the information available.

GEOLOGY

The geology of the site is assessed by reference to the relevant British Geological Survey (BGS) 1:50,000 scale sheet in Bedrock and Superficial (historically Solid and Drift) edition. Many of these geological maps are relatively old with superseded terminology and descriptions. BRD therefore employ the BGS Open Geoscience website to determine current nomenclature of strata and to assist in determining geological boundaries against current topographic features. BRD also employ BGS Regional Geology Guides to assist in understanding the geological context of the site.

Ground Stability Hazards

Ground stability hazards caused by mining, ground dissolution, landslide potential, collapsible ground and natural cavities are identified by the Envirocheck database search of records held by The Coal Authority, British Geological Survey and studies completed by Ove Arup and Peter Brett Associates.

The Envirocheck database ground stability hazard entries for compressible ground, running sands and shrinking or swelling clays are not discussed directly. This is because these hazards are very common and are considered within the preliminary geotechnical assessment where necessary.

Radon

Radon is a naturally occurring colourless and odourless gas that is radioactive. It is formed by the radioactive decay of radium which in turn is derived from the radioactive decay of uranium, both of which are minerals that can be found in many soil types. Whilst it is recognised that the air inside every house contains radon, some houses built in certain defined areas of the country might have unacceptably high concentrations and require special precautions to be taken during construction to reduce this risk.

Radon can move through cracks and fissures in the soil into the atmosphere or into buildings via basements and/or underfloor voids. If radon enters the living space of buildings its concentration can potentially increase and provide a risk to human health as the inhalation of the radioactive decay products of radon gas can increase the risk of developing lung cancer.

The maps contained within 'Radon: Guidance on protective measures for new buildings' (2015) identify areas where no radon protection measures are necessary or where higher concentrations are present that either basic or full radon protection measures are required to be fitted to all new buildings together with supplementary advice concerning extensions, conversions and refurbishments. However, some local authorities have local bylaws, that BRD may not be aware of, that insist on radon protection to all new dwellings within their area regardless of the recommendations of the 'Radon: Guidance on protective measures for new buildings' (2015) report.

Basic radon protection measures comprise incorporation of a continuous gas resistant membrane sealed at joints and around service entries into the floor construction and extended across the cavity tray.

Full radon protection measures comprise incorporating a continuous gas resistant membrane into the floor construction together with a ventilated sub-floor void through either the use of suspended floor construction or a 'radon sump'. The membrane is sealed at joints and around service entries into the floor and extended across the cavity tray.

'Radon: Guidance on protective measures for new buildings' (2015) should be referred to for detail on the construction of the protective measures.

GROUND INVESTIGATION

Exploratory holes are logged by an experienced Geo-Environmental Consultant in general accordance with 'Code of practice for site investigations' BS5930:2015, British Standards Institution, 2015. Soil samples for chemical and geotechnical analysis are taken from the exploratory holes at intervals dictated by the nature of the soils and the objectives of the investigation.

Where stated on the logs of inspection pits, trial pits or boreholes (where insitu testing has not been undertaken), the relative density of coarse (sand and gravel) soils is tentative only. Such assessments of density are on the basis of visual inspection only taking into consideration such factors as drilling rates, stability of pit side walls, appearance and behaviour under excavation.

Where Chalk strata is encountered it is logged and graded in general accordance with CIRIA guidance 'C574 - Engineering in Chalk'. It should be recognised that where percussive drilling methods are employed, the structure of the Chalk is destroyed and therefore the grading stated on such logs is either tentative or absent where it is not possible to assess the grade.

Hand Dug Inspection Pits

Hand tools are used to forward shallow inspection pits as a cost effective method of describing and sampling near surface soils. The technique is also used where exposure of existing footings is required. The depth reached by such techniques is a function of the nature of the ground and generally does not exceed 1.5m

Trial Pits

Mechanically excavated trial pits allow detailed inspection of near surface ground due to the large volume of soil exposed. A wheeled backhoe loader is the usual machine for digging trial pits that are typically 3 to 4.5m deep, 0.5m wide and 3m long.

Windowless Sampling Boreholes

This type of borehole is formed by a small tracked dynamic percussion drilling rig with samples retrieved in thin plastic liners within the narrow diameter steel sampling tubes. Borehole depths of up to 5m are typical, but in exceptional circumstances up to 15m depth can be achieved. This is the smallest type of rig that is capable of undertaking Standard Penetration Tests (SPTs).

Hand Held Window Sampling

Hand held window sampling is a useful method of drilling narrow diameter boreholes particularly where access is difficult. Hand held mechanical percussive hammers are used to drive the sampling tube into the ground. The soil samples are collected within the hollow metal sampling tubes and inspected via the open window along one side. Window sampling boreholes can be forwarded to depths of 3m to 6m depending upon ground conditions.

Cable Percussive Boreholes

This form of drilling involves repetitive dropping of a tube into the soil under its own weight from a tripod support. The sample is obtained from the clay cutter head in fine soils or a bailer for wet granular soils. As the borehole progresses SPTs can be undertaken and relatively undisturbed samples can be obtained. Typically these boreholes are 15 to 25m deep, but depths of double that can be achieved in soils, but only thin weak rock layers can be penetrated.

Rotary Boreholes

Where competent rock is required to be drilled then rotary drilling techniques are required. The drilling rigs can vary in size from small tracked units to larger units mounted on four wheel drive trucks. Rotary open hole drilling techniques break the rock into small fragments and so recovery of any samples is limited. In contrast, rotary coring retrieves excellent samples. Some rigs also allow windowless sampling to be undertaken through soil layers. There are no practical limits to the depths that this drilling method can achieve.

Dynamic Probing

Dynamic probing comprises a sectional rod with a sacrificial cone at the base of slightly larger diameter than the rod. The rod is driven into the ground by a constant mass falling through a set distance. The number of blows required to forward the rod per 100mm is then recorded and presented in a graph of N_{10} values. The standard applicable to dynamic probing is "BS EN ISO 22476-2:2005 Incorporating corrigendum no. 1, Geotechnical investigation and testing — Field testing — Part 2: Dynamic probing" BSi, February 2007.

Static Cone Penetration Tests

Cone Penetration Tests (CPT) consist of pushing a conical 60° cone into the ground at a constant rate and recording the force required to do this. Sensors in the cone record other information and this data can be correlated to a number of different geotechnical parameters.

Dynamic Penetrometer

The Transport Research Laboratory Dynamic Cone Penetrometer (TRL DCP) uses an 8 kg hammer dropping through a height of 575mm to drive a 60° cone of 20mm maximum diameter into the ground. The depth driven either per blow or per several blows is recorded. The strength of each of the soil layer encountered is then calculated by converting the penetration rate (mm per blow) into an approximate California Bearing Ratio (CBR) value employing the correlation proposed by TRL.

Gas Monitoring

Gas monitoring is undertaken with a portable gas monitor for oxygen, Methane, Carbon Dioxide, Hydrogen Sulphide and Carbon Monoxide together with recording of atmospheric pressure and any flow rate.

Vapour Monitoring

Headspace tests and monitoring for Volatile Organic Compounds (VOC) or Semi Volatile Organic Compounds (SVOC) is undertaken using a Photo Ionisation Detector (PID). The MiniRAE models used have a 10.6 eV lamp calibrated for isobutylene. The PID is useful tool to indicate the presence of a wide range of volatile compounds, but only provides semi-quantitative data as different compounds provide a different response and thus the reading is not a true reflection of the actual concentration present.

Low PID readings can be recorded in natural uncontaminated organic soils or even as a result of atmospheric pollution. It is generally accepted by consultants and regulators that recorded values in excess 50 parts per million (ppm) represents the presence of organic compound pollutants and in excess of 100 ppm such contamination may be significant.

The headspace test procedure involves the collection of a sample of suspected contaminated soils and placing within a sample bag. A tight seal to the bag is formed with a similar volume of air trapped to that of the soil and the sample is left for fifteen minutes to allow volatilisation of any contaminants. The bag is then pierced by, and sealed around, the sample probe of the PID and a reading taken.

Borehole well monitoring is undertaken by connecting the PID directly to the gas tap on the monitoring well installation.

Groundwater Level Monitoring

Groundwater levels are recorded with an electronic dip meter that has a detector end that is lowered into the borehole well. An audible signal is made when water is reached and the depth recorded from the graduated tape used to lower the detector. Where there is potential for a separate Light Non Aqueous Phase Liquid (LNAPL) to be present floating on the groundwater an oil/water interface meter is used in preference to a conventional dip meter so that any such floating product can be detected.

Geotechnical Sampling

BRD schedule a range of geotechnical testing as appropriate to the identified ground conditions, available budget and the proposed development. Different types of soil samples are obtained as appropriate to the ground conditions and planned testing.

SAMPLE TYPE	SYMBOL USED ON LOGS	DESCRIPTION
Disturbed	D	Small disturbed soil samples of about 1 to 2 kg are collected in plastic bags.
Bulk	B	Large disturbed bulk samples up to about 20 to 30 kg are collected in plastic bags
Undisturbed	U	'Undisturbed' samples generally collected in plastic or metal tubes within cable percussive boreholes of 100mm diameter for samples of fine soils of firm to stiff consistency. Can also be representative of samples taken by cutting plastic sample liners from windowless sampling drilling methods. It is recognised that such samples do not generally meet Eurocode sample quality requirements for the tests commonly employed. However, given the wealth of experience with these sampling methods this continues to be common in United Kingdom practice particularly for less sensitive developments where more expensive sampling techniques are not economically justifiable.
Undisturbed	UT	A thin walled steel sampler developed by Archway Engineering called a UT100 in an attempt to gain better quality samples of soft to firm fine soils when using cable percussive drilling methods.

Contamination Sampling

BRD schedule contamination testing as appropriate to the ground conditions, available budget, potential contaminants and the proposed development. Samples are collected in single use laboratory supplied containers.

Soil samples are retrieved in plastic containers and/or amber glass jars with a lined plastic cap. Contamination samples are indicated by a 'J' on exploratory hole logs.

Water samples are collected in plastic bottles and/or amber glass jars with a lined plastic cap then placed in cool boxes together with freezer packs. Water samples are indicated by a 'W' on exploratory hole records, but generally such samples are not tested as testing from dedicated monitoring wells is preferred for sample quality reasons.

Samples retrieved from the exploratory holes are dispatched to the laboratory by overnight courier. Where samples cannot be transported directly from site they are temporarily stored in the BRD dedicated sample storage facility which includes refrigeration where necessary. The individual accreditation of the test methods is detailed in the laboratory test report.

GEOTECHNICAL ASSESSMENT

Under Eurocode 7 (EC7) the following risk ranking is applied to geotechnical projects:

GEOTECHNICAL CATEGORY	***DESCRIPTION***
1	*Small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations with negligible risk. For example, straightforward ground conditions, local experience, no excavation below the water table unless this will be straight forward.*
2	*Conventional types of structures and foundations. No difficult soil or loading conditions. Quantitative geotechnical data and laboratory testing. Routine procedures for field and laboratory testing. Conventional structures and no exceptional geotechnical risk. For example, spread, raft and piled foundations, retaining walls, bridge piers and abutments, embankments, ground anchors, tunnels and excavations.*
3	*Those structures not in Categories 1 and 2 such as very large or unusual structures, structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions. Structures in highly seismic areas. Structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.*

GEOTECHNICAL PARAMETERS

Soakage Tests

Soakage tests comprise the filling of a test pit with water and recording the time taken for the water to drain away. The tests are undertaken in general accordance with 'Digest DG 365: Soakaway design' BRE, Revised 2016. The test pits are usually gravel filled for safety with a slotted vertical pipe through which water observations are made. Water is generally supplied by a tanker to allow fast filling of the pits with water. Compliant tests are filled and allowed to drain near empty three times.

Standard Penetration Tests

The standard penetration test (SPT) determines the resistance of soils at the base of a borehole to the dynamic penetration of a split barrel sampler and the recovering of disturbed samples for identification purposes. In gravelly soils and some soft rocks a solid cone is used in preference to the sampler.

The basis of the test consists in driving a sampler by dropping a hammer of 63.5 kg mass on from a height of 760 mm. The number of blows (N value) necessary to achieve a penetration of the sampler of 300 mm is recorded. The test is described in 'Geotechnical investigation and testing — Field testing — Part 3: Standard penetration test - BS EN ISO 22476-3:2005 Incorporating corrigendum no. 1', BSi, 2007.

The uncorrected N values of the SPT tests are recorded upon the borehole logs together with a record of blows for each 75mm test portion including the seating blows. Where the full test depth cannot be achieved due to refusal on hard stratum, the number of blows and the distance achieved is recorded and the N value given as >50. The abbreviation SPT(c) is used upon the logs indicates that the test was performed with a solid cone rather than a split spoon sampler.

It is necessary to apply a correction to the N values to account for the effects of energy delivery using the equation: $N_{60} = \frac{E_r}{60} N$ *where* E_r *is the energy ratio of the specific test equipment.*

In the case of tests in sand, for the effects of overburden and rod length the equation is modified to $N_{60} = \frac{E_r}{60} \; x \; \lambda \; x \; C_N \; x \; N$ *where* λ *is the correction factor for energy losses due to the rod length and* C_N *is the correction factor for vertical stress due to overburden of the soil.*

Sulphate

In order to compare the laboratory soil test results with 'Concrete in aggressive ground. BRE Special Digest 1: 2005' (BRE, 2005) laboratory results are converted to SO_4 *mg/l. Laboratory results expressed as* SO_3 *g/l and are multiplied by a factor of 1200 to express the results as* SO_4 *mg/l.*

Index Property Tests

In accordance with National House Building Council (NHBC) Standards Chapter 4.2 – Building near trees, the laboratory plasticity indexes are assessed against their volume change potential. The Modified Plasticity Index is defined as the Plasticity Index of the soil multiplied by the percentage of particles with a nominal diameter of less than 425µm. Whilst the NHBC Standards were developed for residential buildings, the advice is equally applicable to a large number of other types of low rise structures.

Hand Shear Vane

The undrained shear strength of the fine (i.e. clay) soils at the site can be established using hand shear vane apparatus. Usually three readings are taken at every depth tested and the uncorrected results recorded on the exploratory point log. Shear vane readings from depths below 1.2m depth in trial pits are from tests performed on excavated soil. In accordance with Eurocode 7 — Geotechnical design — Part 2: Ground investigation and testing EN 1997-2:2007 the results should be corrected. BRD employ only simple correction methods as the more complex correction methodologies imply undue accuracy to a test that has distinct disadvantages and limitations.

Pocket Penetrometers

The Pocket Penetrometer is a lightweight instrument for use by field personnel to check visual classification of soils. It is a simple test and there is inherent uncertainty related to the small volume of soil being tested and so the results should be used with appropriate caution. Pocket penetrometers are calibrated in terms of unconfined compressive strength and once converted to undrained shear strength (divide by two) the results are further reduced by a factor of 1.5 - 2.0 as the device tends to overestimate strengths.

Instrument Reading (uncompressive strength in kg/cm^2)	*Indicative Undrained Shear Strength (kN/m^2)*	*Indicative Consistency*	*Indicative strength*
1.0	*25 – 33*	*Soft*	*Low*
1.5	*38 – 50*	*Soft to firm*	*Low to medium*
2.0	*50 - 67*	*Firm*	*Medium*
2.5	*63 – 83*	*Firm to stiff*	*Medium to high*
3.5	*88 – 116*	*Stiff*	*High*
4.5	*113 – 150*	*Stiff to very stiff*	*High to very high*

APPENDIX 1

Site Location Plan

Not to scale.

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP2-B
Date Issued:	March 2022

BRD
01295 272244
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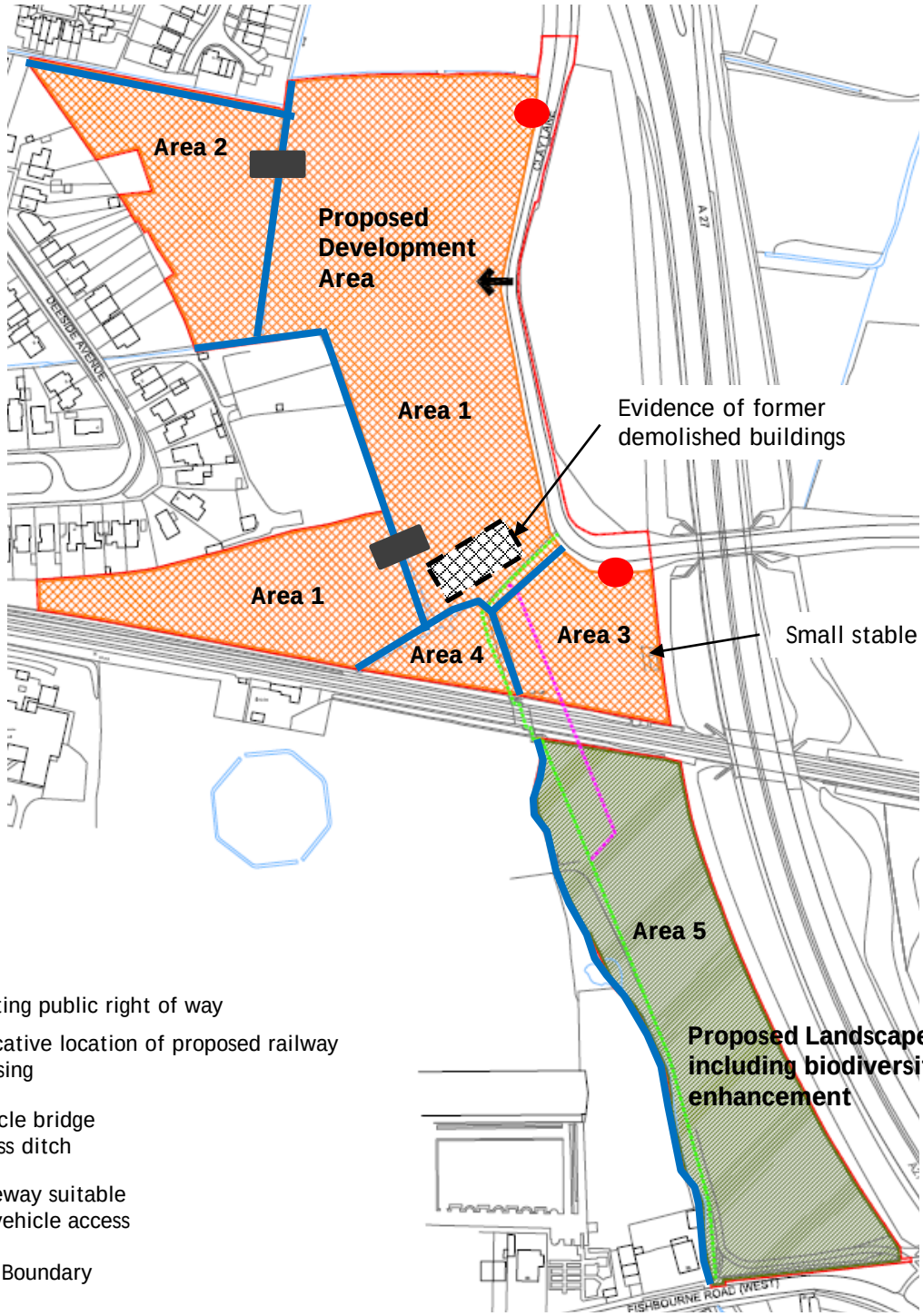
Site Layout Plan



Key:

- Existing public right of way
- Indicative location of proposed railway crossing
- Vehicle bridge across ditch
- Gateway suitable for vehicle access
- Site Boundary

Reproduced from Richards Urban Design Parameter Plan, drawing ref. 1270.03 Dated 01/04/21

Not to scale.

All positions illustrative only.

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP1-C
Date Issued:	March 2022

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Site

LAND WEST OF CLAY LANE, FISHBOURNE

Drawing

Illustrative masterplan

Scale

1:1250@A1

Date

13.09.22

Drawing ref 1270.**02**

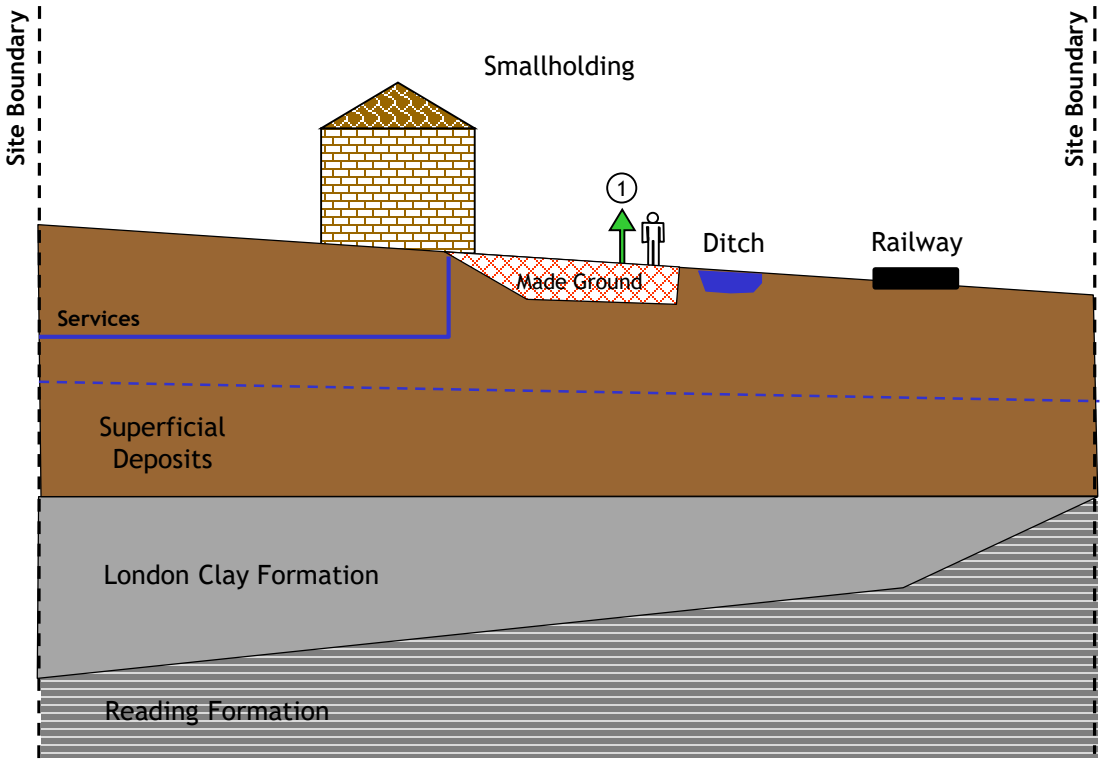
0 10 20 30 40 50m

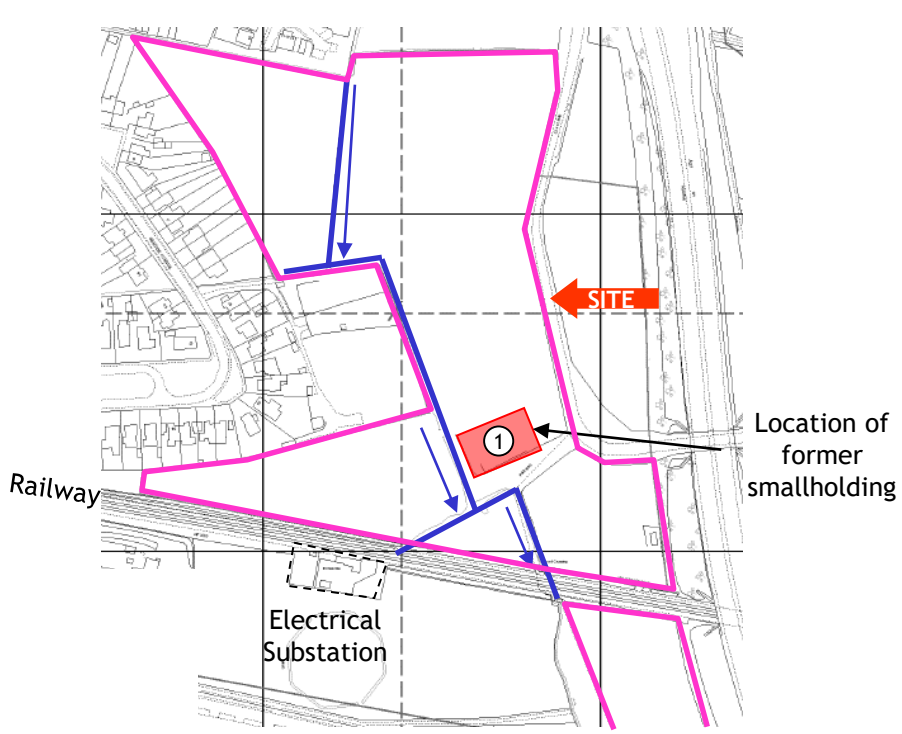
KEY

- Site boundary
- Existing public right of way
- Indicative location of proposed railway crossing

richards urban design

Revised Conceptual Model





KEY:

- Ditches
- Direction of flow
- Site Boundary

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP7-C
Date Issued:	March 2022

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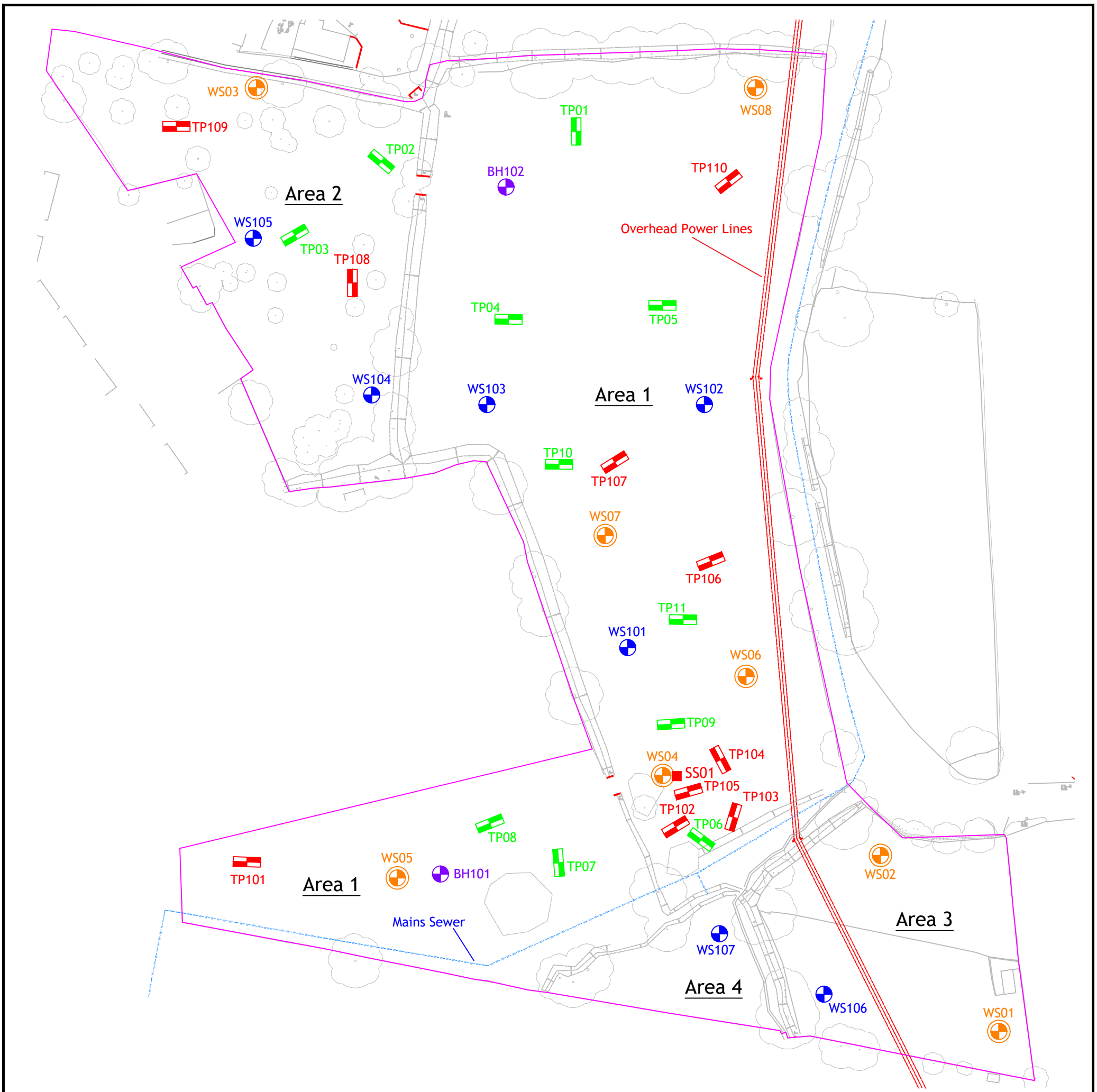

Key:

- BRD Trial Pit Locations (2021)
- BRD Windowless Sample Borehole Locations (2021)
- BRD Cable Percussive Borehole Locations (2021)
- BRD Trial Pit Locations
- BRD Windowless Sample Borehole Location with Monitoring Well Installation
- SS01 BRD Surface Sample
- BRD Site Boundary (Approximate Locations)

Area / Land Ownership:

Area 1: Gleeson Strategic Land

Area 2: West Sussex County Council

Area 3: Smith

Area 4: Gleeson Strategic Land

N

Note:

Drawing reproduced from Digital Terrain Surveys LLP
Title: Site Survey; Drawing Ref: DT5100419-06AA;
Drawing No: 1 of 2; Dated: April 2019

Area 5 not included in Exploratory Point Plan as no investigation works completed in this area. Please refer to BRD3511-OP1-B for full site boundary.

All BRD exploratory points were located using an Handheld Recreational GPS.

Revision	Date	Description	Drawn	Approved
C	15/03/22	Third Issue: Client name alteration	BC	JB
B	08/10/21	Second Issue: Additional Exploratory Point and new topographic survey	IH	BD
A	25/10/19	First Issue: Exploratory Point Plan	DB	BD

Drawing title: EXPLORATORY POINT PLAN

Project title: LAND AT CLAY LANE, FISHBOURNE

Client: GLEESON LAND

Scale	Original drg. size/colour	Date
1:1250	A3 / C	15/03/2022
Drawn: BC	Checked: JB	Approved: JB

Drawing Number: BRD3511-OD1 Rev: C

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APPENDIX 2

TRIAL PIT RECORD

Client:	Gleeson Land
Project Title:	Clay Lane, Fishbourne
Project No:	BRD3511
Logged By:	I Hibberd
Date Completed:	21/10/2019
Method Used:	360° Mechanical Excavator

Trial Pit No.

TP01

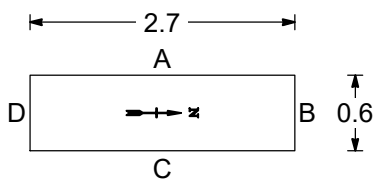
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.20	J1		MADE GROUND: Vegetation over soft, dark brown, gravelly, sandy, silt topsoil. Gravel of fine to coarse, subangular to angular flint and occasional brick fragments.	0.30 ()	MG/TS	
			Soft to firm, light grey, very gravelly CLAY / very clayey GRAVEL. Gravel is fine to coarse, subangular to subrounded flint.	0.50 ()	SUPERFICIAL	
0.60	J2		Medium dense, light brown with some grey, very clayey GRAVEL / very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.			
0.80	D1			1 1.00 ()		
			Stiff, dark brown with grey mottling, CLAY with occasional silty lenses and subangular calcareous aggregates and relict rootlets.		RW LONDON CLAY	
1.30	SV	80/84/82 kPa	1.00 - 2.10 m: FACE C: Pocket of loose, orange, gravelly SAND. Gravel of fine to coarse and some cobbles of subangular to subrounded flint. Slight collapse.			
1.40	D2					
1.50	J3			2 2.10 ()		
			Stiff, dark brown mottled grey, heavily fissured CLAY with occasional light grey, silty partings and relict rootlets.		LONDON CLAY	
2.30	D3					
2.50	SV	84/86/90 kPa				
2.50	J4			3 3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Slight seepage at 2.10m

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
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Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 21/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP02

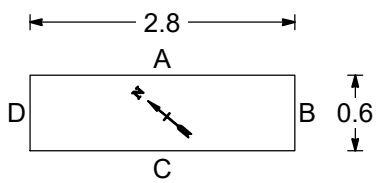
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		TOPSOIL: Vegetation over soft, brown, slightly sandy, silty, slightly gravelly clay. Gravel of fine to coarse, subangular to subrounded flint.	0.30 ()	TS	
0.50	J2		Firm, orange brown and grey with black specks, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1	SUPERFICIAL DEP	
0.60	D1					
0.80	SV	50/52/54 kPa				
1.30	SV	100/102/104 kPa	Very stiff, desiccated, blocky, fissured, brown mottled grey CLAY with occasional subrounded calcareous aggregates, rootlets and desiccated, silty lenses. Occasional polished surfaces.	1.10 ()	LONDON CLAY	
1.40	D2					
2.00	SV	80/82/80 kPa	Stiff, dark brown mottled grey, heavily fissured CLAY with occasional light grey, silty partings and relict rootlets.	1.80 () 2		
2.70	SV	82/76/80 kPa				
2.70	D3			3 3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 21/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP03

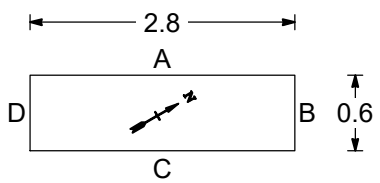
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		TOPSOIL: Vegetation over soft, brown, slightly sandy, silty, slightly gravelly clay. Gravel of fine to coarse, subangular to subrounded flint.	0.20 ()	TS	
0.50	J2		Soft to firm, light grey brown, slightly gravelly, slightly sandy CLAY. Gravel of fine to coarse and occasional cobbles, subangular to angular flint and chalk.	0.60 ()	SUPERFICIAL DEP	
0.70	SV	48/44/42 kPa	Firm, moist, orange brown with black specks and some grey mottling, gravelly CLAY. Gravel of fine to coarse and occasional cobbles, subangular to subrounded flint. Some sandy pockets.	1		
0.90	D1			1.10 ()		
1.20	J3		Firm to stiff, brown mottled grey, slightly fissured CLAY with occasional fine to medium, subrounded calcareous aggregates and silty partings.		REWORKED LONDON CLAY	
1.30	D2		1.10 - 2.20 m: FACE A/D: Sandy pocket (0.70m x 1.60m)			
1.40	SV	70/72/70 kPa		2		
				2.30 ()		
2.50	SV	80/82/80 kPa	Stiff, dark grey with some brown, fissured CLAY with occasional shell fragments.		LCF	
2.50	D3			2.60 ()		
				3		
				4		

Pit Stability: See General Remarks
Groundwater: Slight seepage at 1.00m in sandy pocket.

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 2.60m bgl.
Some collapse in running sand from pocket at corner of Face A/D.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 21/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP04

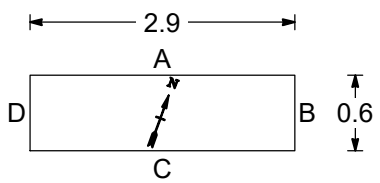
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.20	J1		TOPSOIL: Vegetation over dark brown, slightly clayey, slightly gravelly, sandy SILT. Gravel of fine to coarse, subangular to subrounded flint and rare chalk.	0.30 ()	TS	
0.40	J2		Medium dense, light grey, slightly clayey GRAVEL of fine to coarse and occasional cobbles, subangular, subrounded and angular flint.	0.80 ()	SUPERFICIAL DEPOSITS	
0.90	D1		Firm to stiff, orange brown with black specks, slightly sandy, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1		
1.00	SV	70/70/72 kPa		1.50 ()		
1.80	J3		Medium dense, orange brown, slightly silty, very gravelly SAND with occasional clay pockets. Gravel of fine to coarse and cobbles of subangular, subrounded and angular flint. 1.50 m: FACE A/B: Running sand. 1.70 m: FACE A/B: Dark grey clay.	2		
2.80	D2		Firm to stiff, dark grey with some brown, heavily fissured CLAY with occasional light grey, silty partings. Rare rounded claystone cobbles.	2.10 ()	LONDON CLAY	
				3		
				3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Slight seepage at 0.80m

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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TRIAL PIT RECORD

Client:	Gleeson Land
Project Title:	Clay Lane, Fishbourne
Project No:	BRD3511
Logged By:	I Hibberd
Date Completed:	21/10/2019
Method Used:	360° Mechanical Excavator

Trial Pit No.

TP05

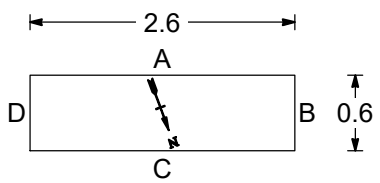
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		MADE GROUND: Vegetation over soft, dark brown, gravelly, slightly sandy topsoil. Gravel of fine to coarse, subangular to angular flint.	0.20 ()	MADE GROUND	
0.50	J2		MADE GROUND: Mix of light grey, clayey gravel and soft, orange, gravelly clay. Gravel of fine to coarse with occasional cobbles, subangular to subrounded flint. 0.40 m: Part of timber post.	0.60 ()		
1.00	SV	58/60/60 kPa	Firm, light brown and grey, slightly gravelly CLAY. Gravel of fine to coarse, subangular, subrounded and angular flint.	1	SUPERFICIAL DEP	
1.00	D1					
1.20	J3			1.30 ()		
1.70	SV	70/72/70 kPa	Firm to stiff, slightly fissured, grey brown CLAY with occasional calcareous aggregates. 1.30 - 2.30 m: FACE A and C: Pocket (1.20m x 1.50m) of very gravelly SAND. 1.80 m: Pocket of subangular claystone cobbles.	2	RW LONDON CLAY	
2.40	D2		Stiff, dark grey with some dark brown, heavily fissured CLAY with shell fragments.	2.30 ()	LONDON CLAY	
2.50	SV	80/78/80 kPa		3		
				3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 22/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP06

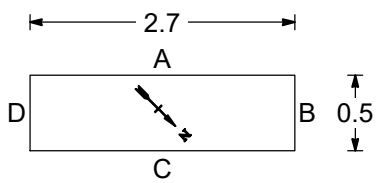
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		MADE GROUND: Vegetation over soft, dark brown / black, sandy, gravelly, silty topsoil. Gravel of fine to cobbles, subangular to angular flint, brick, concrete and occasional glass and metal fragments.	0.20 ()	MG	
			MADE GROUND: Concrete slab.	0.30 ()		
0.50	J2		MADE GROUND: Medium dense, gravelly, sandy, clayey gravel. Gravel of fine to coarse, subangular to subrounded flint and occasional brick fragments.	0.40 ()		
0.70	SV	40/38/40 kPa	Soft to firm, brown and grey, slighty sandy, slightly gravelly CLAY. Gravel of fine to coarse, subangular to angular flint.		SUP DEP	
0.70	D1			0.80 ()		
			Soft to firm, grey, very gravelly CLAY. Gravel of fine to coarse, occasional cobbles, subangular to subrounded flint.	1 1.00 ()		
			Firm to stiff, light grey with some orange brown, slightly gravelly CLAY. Gravel of fine to coarse, subangular to angular flint.		REWORKED LC & SUPERFICIAL DEPOSITS	
1.20	J3		1.00 - 2.10 m: FACE B: Northern western half of trial pit. Soft to firm, orange brown with black specks, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.			
1.40	D2			2		
			2.10 - 2.70 m: Face B: Northern western half of trial pit. Loose to medium dense orange brown clayey sandy GRAVEL of fine to coarse and occasional cobbles of subangular, angular and rounded flint.			
			2.40 m: FACE B/C: Running sand.			
				2.70 ()		
2.80	SV	58/64/64 kPa	Firm, grey with some dark brown, slightly fissured CLAY with occasional subrounded calcareous aggregates.		LCF	
2.80	D3			3 3.00 ()		
				4		

Pit Stability: See General Remarks
Groundwater: Seepage at 2.40m in Face B/C

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.
Slight collapse in granular soils with some running sand.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 22/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP07

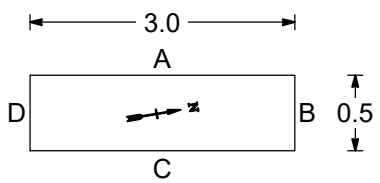
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		TOPSOIL: Vegetation over soft, brown, slightly gravelly, clayey, sandy silt. Gravel of fine to coarse, subangular to subrounded flint.	0.30 ()	TS	
0.60	J2		Soft to firm, light grey, very gravelly CLAY / very clayey GRAVEL. Gravel of fine to coarse, subangular to subrounded and angular flint.		SUP DEP	
0.80	D1			0.90 ()		
1.10	J3		Firm, light grey with sime orange, slightly gravelly, sandy in parts, CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1	REWORKED LONDON CLAY	
1.40	SV	58/58/60 kPa	1.30 - 2.50 m: Pocket of clayey, sandy gravel across half of the trial pit. (1.20m (L) x 0.45m (W))			
1.40	D2					
1.80	SV	88/80/86 kPa	1.80 m: Becomes stiff in clay soils.	2		
2.60	SV	80/86/86 kPa	Stiff, dark grey and mottled brown, slightly fissured CLAY with occasional subrounded calcareous aggregates and light grey silty lenses.	2.50 ()	LCF	
2.60	J4					
2.70	D3			3		
				3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 22/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP08

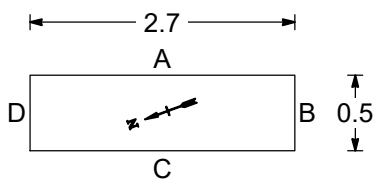
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			TOPSOIL: Vegetation over soft, brown, slightly gravelly, clayey, sandy silt. Gravel of fine to coarse, subangular to subrounded flint.	0.30 ()	TS	
0.50 0.50	SV D1	54/52/58 kPa	Firm, light brown with some grey, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.		S. DEP	
			Firm, light grey with some orange, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.70 ()	RW LC	
				1		
1.30 1.40	J1 D2		Firm to stiff, light grey with some orange CLAY with abundant selenite crystals and rootlets.	1.20 ()	LONDON CLAY	
			2.00 m: Becoming stiff to very stiff.	2		
2.40 2.50 2.50	J2 SV D3	60/62/64 kPa	Firm, dark grey with dark brown, slightly fissured CLAY with occasional light grey, silty partings and rare pockets of selenite crystals.	2.30 ()		
2.80	SV	90/88/92 kPa	2.80 m: Becoming stiff and fissured.	3		
				3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
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TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 22/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP09

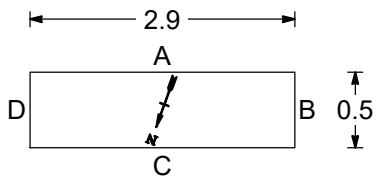
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		MADE GROUND: Vegetation over soft, brown, slightly sandy, slightly gravelly clay. Gravel of fine to coarse, subangular to subrounded flint and occasional brick.	0.20 ()	MG	
0.30	J2		MADE GROUND: Soft to firm, light brown, very gravelly clay. Gravel of fine to coarse, subangular to subrounded flint with rare brick fragments.	0.40 ()		
			Soft to firm, grey brown with some dark orange, slightly sandy, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.70 ()	SUPD	
1.00 1.10	SV J3 D1	52/58/56 kPa	Firm, light grey and light brown, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1	REWORKED LONDON CLAY	
1.60	SV	68/70/70 kPa	Firm to stiff, light grey CLAY with occasional subrounded calcareous aggregates and pockets of orange brown, gravelly sand. Gravel of fine to coarse, subangular to subrounded flint. 1.80 - 2.60 m: Large pocket of orange SAND and GRAVEL across half of the trial pit.	1.40 () 2		
2.70 2.80 2.80	D2 SV J4	68/70/72 kPa	Firm to stiff, dark grey with some dark orange CLAY. Rare subrounded calcareous aggregates and occasional orange sandy pockets.	2.60 () 3	LCF	
				3.10 () 4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.10m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 22/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP10

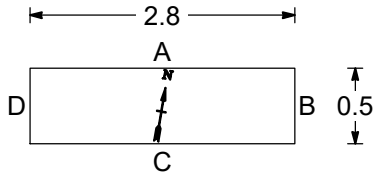
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.10	J1		MADE GROUND: Vegetation over soft, dark brown, slightly gravelly, slightly sandy clay. Gravel of fine to coarse, subangular to subrounded flint.	0.15 ()	MADE GROUND	
			MADE GROUND: Firm, grey and light brown, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint. 0.20 - 2.30 m: Mass collapse of Face A.			
0.60	D1					
0.80	SV	58/60/58 kPa				
			0.90 m: Brick fragment.	1		
			MADE GROUND: Soft, dark grey, slightly silty, slightly gravelly clay. Gravel of fine to coarse, subangular to subrounded flint with rare decaying plant remains and slight natural organic odour.	1.10 ()		
1.30	J2					
1.50	SV	30/32/30 kPa				
1.60	D2					
				2		
			Firm to stiff, grey with some dark brown, blocky, fissured CLAY.	2.30 ()	LCF	
2.60	D3					
2.70	J3					
				2.80 ()		
				3		
				4		

Pit Stability: Generally stable throughout
Groundwater: Slight seepage at 1.10m

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 2.80m bgl due to trial pit collapse.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 22/10/2019
Method Used: 360° Mechanical Excavator

Trial Pit No.

TP11

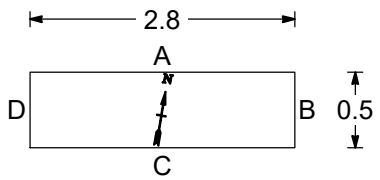
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.20	J1		MADE GROUND: Vegetation over soft, dark brown, slightly gravelly, clayey silt. Gravel of fine to coarse, subangular to subrounded flint and occasional brick, metal, glass and plastic.	0.30 ()	MG	
0.80	B1		Medium dense, light grey, slightly clayey GRAVEL of fine to coarse, subangular to subrounded flint.	1	SUPERFICIAL DEPOSITS	
			Firm, orange and light grey, sandy, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.30 ()		
			Medium dense, orange brown and grey, slightly clayey, very gravelly SAND. Gravel of fine to coarse and cobbles of subangular to subrounded flint with occasional clay pockets.	1.70 () 2		
2.30 2.30	SV D1	76/84/80 kPa	Stiff, dark grey mottled dark brown, slightly fissured CLAY with occasional polished surfaces and relict rootlets.	2.10 ()	LONDON CLAY	
				2.90 () 3		
				4		

Pit Stability: See General Remarks
Groundwater: Seepage at 1.20m and 2.10m

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 2.90m bgl.
Slight collapse in sand layer at 1.70m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 10/09/2021
Method Used: 180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP101

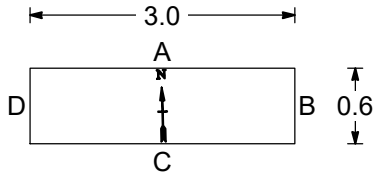
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.20	J1		MADE GROUND: Grass over: Soft to firm brown, slightly gravelly, sandy, silty, clay topsoil. Gravel of fine to coarse, subangular to subrounded flint and rare brick and roots. Slightly desiccated.	0.30 ()	MG	
			Firm to stiff, friable, light brown, slightly gravelly, very silty, desiccated CLAY. Gravel of fine to medium, subangular to subrounded flint.	0.60 ()	SUP	
0.70	SV D1	70/78/74 kPa	Firm to stiff, light brown and grey, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1	REWORKED L.C.	
			Firm to stiff, light grey mottled brown, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint with pockets of very gravelly sand. Gravel of fine to coarse with occasional cobbles of flints.	1.10 ()		
1.60	SV	72/80/74 kPa	1.10 - 1.80 m: FACE A: Pocket of gravelly sand 0.6x1.7m with slight spalling and slight groundwater seepage.	1.80 ()		
			Stiff, grey mottled brown, slightly fissured CLAY.	2	LONDON CLAY FORMATION	
2.00	SV D2	90/80/78 kPa		2.40 ()		
2.60	SV D3	64/58/62 kPa	Firm, blue grey mottled brown, heavily fissured CLAY with some silty partings.	3		
				3.10 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Slight seepage at 1.80m bgl.

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.10m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client:	Gleeson Land
Project Title:	Clay Lane, Fishbourne
Project No:	BRD3511
Logged By:	I Hibberd
Date Completed:	10/09/2021
Method Used:	180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP102

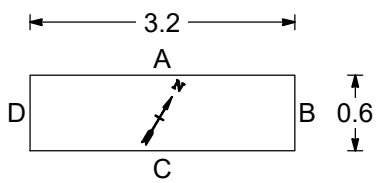
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.20	J1		MADE GROUND: Grass over: Dark brown, very gravelly. sandy, clayey, silty topsoil. Gravel of fine to coarse, subangular to subrounded flint, brick, ceramic and metal with plastic and wood fragments, roots and some charcoal.	0.35 ()	MG	
			MADE GROUND: Soft, grey / brown, very gravelly clay. Gravel of fine to coarse, subangular to subrounded flint and rare brick.	0.60 ()		
			Firm, light brown with some grey, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.00 ()	SUP	

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 1.00m bgl in natural soils.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 10/09/2021
Method Used: 180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP103

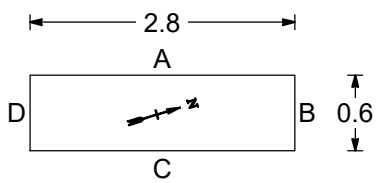
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			MADE GROUND: Vegetation over concrete slab with no reinforcing.	0.10 ()		
0.20	J1		MADE GROUND: Brown, gravelly, sandy, silt topsoil. Gravel of fine to coarse with occasional cobbles, subangular to subrounded flint, brick and some metal fragments.	0.40 ()	MG	
			Medium dense, light brown and grey, very clayey GRAVEL. Gravel of fine to coarse, subangular to subrounded flint.	0.90 ()	SUP DEP	
1.00	SV	56/70/42 kPa	Firm, light grey with orange, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint with occasional orange sandy pockets. 0.90 - 2.10 m: FACE A - C: Channel of medium dense grey and orange clayey GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded flint.	1 2	REWORKED L.C.	
			Firm, dark grey mottled brown fissured CLAY with occasional calcareous aggregations.	2.10 ()	L.C.	
				2.30 ()		
				3		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 2.30m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client:	Gleeson Land
Project Title:	Clay Lane, Fishbourne
Project No:	BRD3511
Logged By:	I Hibberd
Date Completed:	10/09/2021
Method Used:	180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP104

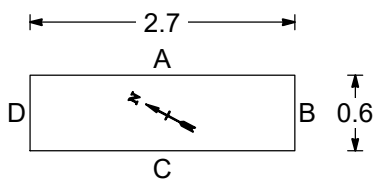
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.30	J1		MADE GROUND: Vegetation over: Brown, gravelly, slightly sandy, clayey, silt topsoil with pockets of firm, orange brown, gravelly clay. Gravel of fine to coarse with occasional cobbles, subangular to subrounded flint, brick, concrete and ceramic with occasional pockets of black clinker gravel.	0.50 ()	MG	
			Medium dense, grey brown, very clayey GRAVEL. Gravel of fine to coarse, subangular to subrounded flint.	0.70 ()	SUP	
0.80	SV	50/51/60 kPa	Firm, brown with some grey, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.90 ()	R.L.C	
				1		
				2		
				3		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated of 0.90m bgl in natural soils.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 10/09/2021
Method Used: 180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP105

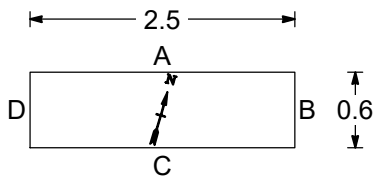
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
0.30	J1		MADE GROUND: Vegetation over: Loose, dark brown and black, very gravelly, sandy silt. Gravel of fine to coarse with cobbles, subangular to subrounded flint, brick, concrete and metal fragments, clinker and a large metal sign. Burn metal and clinker, charcoal fragments throughout with half and whole bricks.	0.50 ()	MG	
0.60	J2		MADE GROUND: Soft, grey, gravelly, silty clay. Gravel of fine to coarse, subangular to subrounded flint with occasional brick.	0.70 ()	MG	
0.80	J3		Firm, brown with some grey, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.10 ()	SUP	

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 1.10m bgl in natural soils.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 10/09/2021
Method Used: 180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP106

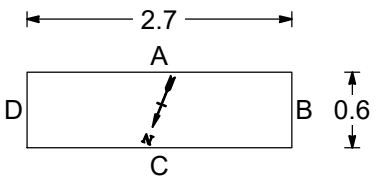
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			TOPSOIL: Vegetation over: Soft, brown, friable, slightly gravelly, clayey silt. Gravel of fine to medium, subangular to subrounded flint and roots.	0.30 ()	TS	
			Firm, light brown, silty, slightly gravelly to gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.70 ()	SUPERFICIAL DEPOSITS	
			Medium dense, light grey and brown, very clayey GRAVEL. Gravel of fine to coarse with occasional cobbles, subangular to subrounded flint.	1	SUPERFICIAL DEPOSITS	
			Firm to stiff, light grey with orange brown, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint with occasional cobbles. 1.50 - 2.20 m: FACE A-C: Pockets of sand / silt / gravel of fine to coarse sub-angular to sub-rounded flint.	1.50 () 2	RW.L.C.	
2.30	SV	80/84/86 kPa	Stiff, dark blue grey with some brown fissured CLAY with relict rootlets. Some polished fissured surfaces.	2.20 ()	LONDON CLAY.	
			2.95 m: Claystone cobbles and slight groundwater seepage.	3 3.00 ()		
				4		

Pit Stability: Generally stable throughout
Groundwater: Slight seepage at 1.50m bgl.

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.00m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 10/09/2021
Method Used: 180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP107

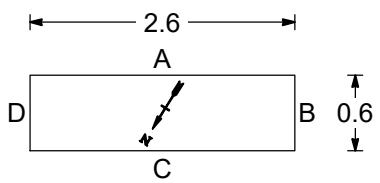
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			TOPSOIL: Grass over: Soft, brown, slightly sandy, slightly gravelly, clayey silt. Gravel of fine to medium, subangular to subrounded flint.	0.30 ()	TS	
			Medium dense, light grey, slightly sandy GRAVEL with occasional cobbles, subangular to subrounded flint.	0.70 ()	SUPERFICIAL DEPOSITS	
0.80	SV	62/60/66 kPa	Firm, orange brown with light grey, slightly gravelly CLAY with pockets of orange sand.	1		
1.30	SV	32/30/30 kPa	1.00 - 1.50 m: Pockets of soft, orange brown with light grey, very silty clay.	1.50 ()		
			Firm, light grey with some brown, slightly gravelly CLAY. Gravel of fine to coarse with occasional cobbles of flint and occasional claystone.		RW.L.C.	
			1.80 m: Some light brown, very silty, sandy pockets.	1.90 ()		
2.00	SV	72/80/70 kPa	Firm to stiff, blue/grey mottled brown, slightly fissured CLAY with relict rootlets.	2	L.C.	
				2.30 ()		
				3		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 2.30m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client:	Gleeson Land
Project Title:	Clay Lane, Fishbourne
Project No:	BRD3511
Logged By:	I Hibberd
Date Completed:	10/09/2021
Method Used:	180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP108

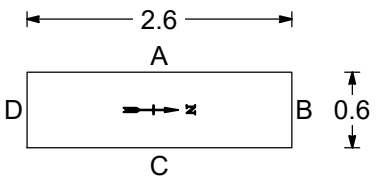
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			TOPSOIL: Vegetation over: Soft, light brown, sandy, slightly gravelly, clayey silt. Gravel of fine to medium, subangular to subrounded flint.	0.20 ()	TS	
			Soft to firm, light brown with some orange, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint with occasional chalk with rootlets.	0.70 ()	SUPERFICIAL DEPOSITS	
1.00	SV	58/60/56 kPa	Firm grey and brown, slightly gravelly CLAY. Gravel of fine to coarse with occasional cobbles, subangular to subrounded flint.	1		
			Firm to stiff, grey with brown mottling CLAY with occasional calcareous aggregation, relict rootlets and pockets of cobbles sized claystone and occasional orange silt and sandy pockets.	1.30 ()	REWORKED L.C.	
1.60	SV	88/90/92 kPa	1.60 m: Becoming stiff.	2		
			Stiff, blue/grey with some brown, heavily fissured CLAY with relict rootlets with occasional shells.	2.10 ()	LONDON CLAY	
2.60	SV	68/70/64 kPa		2.90 ()		
				3		
				4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 2.90m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Completed: 10/09/2021
Method Used: 180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP109

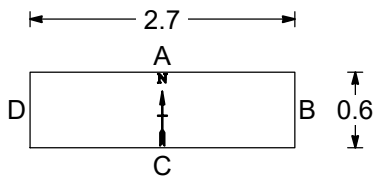
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			TOPSOIL: Vegetation over: Soft, light brown, sandy, slightly gravelly, clayey silt. Gravel of fine to medium, subangular to subrounded flint.	0.20 ()	TS	
			Firm, light brown, slightly sandy, silty, slightly gravelly CLAY. Gravel of fine to medium, subangular to subrounded flint and chalk with rootlets. 0.70 m: Increase in gravel content and becoming orange brown and very sandy.	1	SUP DEP	
			Firm to stiff, grey with brown mottling, slightly fissured CLAY.	1.10 ()	LONDON CLAY FORMATION	
1.80	SV	78/84/82 kPa	Stiff grey with brown mottling, fissured CLAY with relict rootlets with occasional calcareous aggregations with some silty partings.	1.70 () 2		
2.60	SV	92/90/88 kPa	Stiff, blue grey with come blue, fissured CLAY with some calcareous aggregations and some light brown silty partings.	2.40 () 3		
				3.10 () 4		

Pit Stability: Generally stable throughout
Groundwater: Not encountered

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.10m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

TRIAL PIT RECORD

Client:	Gleeson Land
Project Title:	Clay Lane, Fishbourne
Project No:	BRD3511
Logged By:	I Hibberd
Date Completed:	10/09/2021
Method Used:	180° Backhoe excavator (JCB 3CX type)

Trial Pit No.

TP110

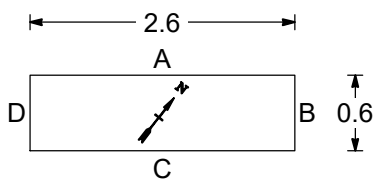
Sheet 1 of 1

Samples & Tests			Description of Strata	Depth / (Level)	Geology	Legend
Depth	Type & No	Value				
			MADE GROUND: Soft, dark brown, gravelly, silty, clay topsoil. Gravel of fine to medium, subangular to subrounded flint and rare brick and ceramics.	0.30 ()	MG	
			Medium dense, grey, sandy GRAVEL of fine to coarse, subangular to subrounded flint and occasional cobbles.	0.70 ()	SUPERFICIAL DEPOSITS	
			Firm, orange brown and light grey, slightly silty, slightly gravelly, sandy CLAY. Gravel of fine to medium, subangular to subrounded flint and rootlets. 1.00 m: Occasional pockets of soft to firm, very silty, very sandy CLAY.	1		
			Stiff, grey brown CLAY with pocket orange sand, silt and gravel. Gravel of fine to coarse, subangular to subrounded flint.	1.50 ()	REWORKED L.C.	
2.30	SV	74/80/82 kPa	Stiff, grey mottled brown, slightly fissured CLAY with occasional calcareous aggregations, relict rootlets and some light grey and orange silty partings.	2	LONDON CLAY	
			Stiff, blue grey mottled brown, heavily fissured CLAY with relict rootlets and shells.	2.20 ()		
				3		
				2.80 ()		
				4		
				3.20 ()		

Pit Stability: Generally stable throughout
Groundwater: Slight seepage at 2.00m bgl.

Surface Elevation Level:

Plan of Trial Pit:



General Remarks:
Trial pit terminated at 3.20m bgl.

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

Trial Pit Photographs

TP01

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP02

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP03

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP04

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP05

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP06

Project Title: Land at Clay Lane, Fishbourne
Client: Gleeson Land
BRD Reference: BRD3511-OP6-C
Date Issued: March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP07

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP08

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP09

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP10

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP11

Project Title: Land at Clay Lane, Fishbourne
Client: Gleeson Land
BRD Reference: BRD3511-OP6-C
Date Issued: March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP101

Project Title: Land at Clay Lane, Fishbourne
Client: Gleeson Land
BRD Reference: BRD3511-OP6-C
Date Issued: March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP102

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP103

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

BRD
01295 272244
info@brduk.com

Trial Pit Photographs

TP104

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP105

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP106

Project Title: Land at Clay Lane, Fishbourne
Client: Gleeson Land
BRD Reference: BRD3511-OP6-C
Date Issued: March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP107

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP108

Project Title:	Land at Clay Lane, Fishbourne
Client:	Gleeson Land
BRD Reference:	BRD3511-OP6-C
Date Issued:	March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP109

Project Title: Land at Clay Lane, Fishbourne
Client: Gleeson Land
BRD Reference: BRD3511-OP6-C
Date Issued: March 2022

01295 272244
info@brduk.com

Trial Pit Photographs

TP110

Project Title: Land at Clay Lane, Fishbourne
Client: Gleeson Land
BRD Reference: BRD3511-OP6-C
Date Issued: March 2022

BRD
01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 21/10/2019
Date Completed: 21/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS01

Sheet 1 of 1

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			TOPSOIL: Grass over soft, dark brown, gravelly, sandy clay. Gravel of fine to coarse, subangular to subrounded flint. Frequent rootlets.	0.40		TOPSOIL	
0.80	J2		1	Soft, moist, brown, gravelly, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint and black mineral. 0.70 m: Becomes wet. 0.80 - 0.90 m: Very gravelly.	1.0 1.00		SUPERFICIAL DEPOSITS	
1.00	SPT	19 N		Medium dense, brown, wet, slightly sandy, very gravelly CLAY / very clayey GRAVEL. Gravel of fine to coarse, subangular to subrounded flint. 1.00 m: SPT: 2,3/5,6,4,4				
1.50	D1				1.70			
				Soft, brown, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	2.0 2.00			
2.00	SPT	11 N		Firm, wet, brown, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint. 2.00 m: SPT: 9,3/4,3,2,2			RW LC	
					2.70			
				Stiff, fissured, dark grey, silty CLAY.	3.0		LONDON CLAY	
3.00	SPT	17 N		3.00 m: SPT: 2,2/3,4,5,5				
3.10	D1							
					3.45			
					4.0			

General Remarks:
Borehole terminated at 3.45m bgl due to borehole collapse.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 21/10/2019
Date Completed: 21/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS02

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
				MADE GROUND: Grass over soft, dark brown, slightly sandy, gravelly clay topsoil. Gravel of fine to coarse, subangular to subrounded flint, brick fragments and charcoal. Frequent rootlets.	0.50		MADE GR / TS	
0.30	J1			Firm, greyish brown mottled orange brown, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.			SUPERFICIAL DEPOSITS	
0.80	J2				1.0 1.00			
1.00	SPT	25 N		Stiff, grey mottled orange brown, silty CLAY.				
1.10	D1			1.00 m: SPT 1,2/4,5,8,8	1.50			
				Medium dense, grey and orange brown, very clayey GRAVEL / very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.				
1.70	D2				2.0			
2.00	SPT	18 N		2.00 m: SPT: 3,4/5,6,4,3	2.50			
2.60	D3			Stiff, grey mottled orange brown, silty CLAY with relict rootlets.			LONDON CLAY FORMATION	
2.80	PEN	3.75/3.0x2 kg/cm²			3.0 3.00			
3.00	SPT	8 N		Firm to stiff, fissured, grey, silty CLAY with selenite crystals.				
				3.00 m: SPT: 1,1/1,2,2,3				
3.30	D4							
3.70	PEN	2.0/2.5x2 kg/cm²			4.0			
4.00	SPT	12 N		4.00 m: SPT: 2,2/2,3,3,4	4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 21/10/2019
Date Completed: 21/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS02

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.50	D5			Continued form 3.00m: Firm, fissured, grey, silty CLAY with selenite crystals.				
4.70	PEN	1.5/2.0/3.5 kg/cm²						
5.00	SPT	13 N		5.00 m: SPT: 2,3/3,3,3,4	5.0			
					5.45		LONDON CLAY	
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 21/10/2019
Date Completed: 21/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS03

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
				TOPSOIL: Grass over soft, dark brown, slightly gravelly, sandy clay. Gravel of fine, subangular to subrounded flint. Frequent rootlets.	0.10		TS	
0.20	J1			Soft, brown, silty CLAY with frequent rootlets and mycelium (fungus).	0.20		SUPERFICIAL DEPOSITS	
				Soft, brown mottled orange brown, slightly gravelly, silty CLAY with mycelium (fungus). Gravel of fine to coarse, subangular to subrounded flint.	0.40			
0.70	J2			Soft, brown mottled orange brown, gravelly, silty CLAY. Gravel of fine to coarse, subangular to subrounded flint, a black mineral and shell fragments.	0.80			
1.00	SPT	17 N		Stiff, brown mottled orange brown, slightly gravelly, sandy CLAY. Gravel of fine to medium, subangular to subrounded flint. 1.00 m: SPT: 4,5/5,4,4,4	1.0			
					1.50			
				Stiff, fissured, reddish brown mottled grey, silty CLAY with occasional orange brown sandy pockets and relict rootlets.			LONDON CLAY FORMATION	
1.70	D1							
1.90	PEN	4.75x3 kg/cm²						
2.00	SPT	25 N		2.00 m: SPT: 2,3/5,7,6,7	2.0			
2.70	D2							
2.90	PEN	3.5/4.0x2 kg/cm²						
3.00	SPT	14 N			3.0			
				Stiff, dark grey, fissured, silty CLAY with fine selenite crystals and shell fragments. 3.00 m: SPT: 1,3/3,3,4,4	3.00			
3.70	D3							
3.90	PEN	3.0x3 kg/cm²						
4.00	SPT	13 N		4.00 m: SPT: 1,3/3,3,3,4	4.0			
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 21/10/2019
Date Completed: 21/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS03

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.60	PEN	3.25/3.0x2 kg/cm²		Continued from 3.00m: Stiff, dark grey, fissured, silty CLAY with fine selenite crystals and shell fragments.	5.0		LONDON CLAY	
5.00	SPT	16 N		5.00 m: SPT: 1,3/3,3,5,5	5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS04

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.20	J1			MADE GROUND: Soft, dark brown, gravelly, sandy clay topsoil. Gravel of fine to coarse, subangular to subrounded flint, brick fragments and charcoal. Frequent rootlets.	0.40		MG / TS	
				MADE GROUND: Bricks.	0.50		M	
0.60	J2			Soft, brown, gravelly CLAY with orange brown sandy pockets. Gravel of fine to coarse, subangular to subrounded flint.	0.80		SUP DEP	
1.00	SPT	6 N		Soft, brownish grey mottled orange brown, slightly sandy, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.0 1.00			
1.30	D1			Firm, grey mottled orange brown, silty CLAY with relict rootlets. 1.00 m: SPT: 1,1/1,1,2,2			LONDON CLAY FORMATION	
1.70	PEN	1.5/1.25x2 kg/cm²						
2.00	SPT	8 N		2.00 m: SPT: 1,2/2,2,2,2 2.00 m: Becomes fissured.	2.0			
2.50	D2							
2.70	PEN	2.25/1.75x2 kg/cm²						
3.00	SPT	11 N		Stiff, fissured, grey, silty CLAY with occasional orange brown pockets. 3.00 m: SPT: 1,2/2,3,3,3	3.0 3.00			
					3.50			
3.60	D3			Stiff to very stiff, fissured, grey, silty CLAY with fine selenite crystals and grey silty partings.				
3.90	PEN	4.0/4.25x2 kg/cm²						
4.00	SPT	14 N		4.00 m: SPT: 1,2/3,3,4,4	4.0			
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

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Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS04

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.60	PEN	3.5/3.75/3.25 kg/cm²		Continued from 3.50m: Stiff to very stiff, fissured, grey, silty CLAY with fine selenite crystals.				
5.00	SPT	19 N		5.00 m: SPT: 1,3/4,5,5,5	5.0		LONDON CLAY	
					5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS05

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			MADE GROUND: Soft, dark brown, gravelly, sandy clay topsoil. Gravel of fine to coarse, subangular to subrounded flint and brick fragments. Frequent rootlets.	0.20		MGTS	
0.50	J2			Soft, brown mottled orange brown, gravelly, silty CLAY. Gravel of fine to coarse, subangular to subrounded flint. Rare flint cobbles.	0.95		SUPERFICIAL DEPOSITS	
1.00	SPT	4 N		Soft to firm, grey mottled orange brown, gravelly, silty CLAY. Gravel of fine to coarse, subangular to subrounded flint. 1.00 m: SPT: 1,0/1,1,1,1	1.0			
1.50	D1			Firm, grey mottled orange brown, silty CLAY.	1.20			
1.70	PEN	1.5x3 kg/cm²						
2.00	SPT	7 N		2.00 m: SPT: 1,0/1,2,2,2	2.0		LONDON CLAY FORMATION	
2.70	PEN	3.0/2.5/2.75 kg/cm²			2.70			
2.80	D2			Firm, fissured, dark grey mottled orange brown, silty CLAY.				
3.00	SPT	14 N		Stiff to very stiff, fissured, dark grey, silty CLAY with selenite crystals and grey silty partings. 3.00 m: SPT: 2,3/3,3,3,5	3.0 3.00			
3.70	PEN	2.25/2.0x2 kg/cm²						
4.00	SPT	27 N		4.00 m: SPT: 3,5/5,7,7,8	4.0			
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS05

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.70	PEN	4.0/4.5x2 kg/cm²		Continued from 3.00m: Firm to stiff, fissured, dark grey, silty CLAY with selenite crystals.	5.0		LONDON CLAY	
5.00	SPT	20 N		5.00 m: SPT: 3,5/4,4,5,7	5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS06

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.20	J1			MADE GROUND: Grass over soft, dark brown, slightly sandy, gravelly clay topsoil. Gravel of fine to medium, subangular to subrounded flint and charcoal.	0.30		MG/TS	
0.50	J2			MADE GROUND: Brown mottled red brown, slightly sandy, very gravelly clay. Gravel of fine to coarse, subangular to subrounded flint with brick, brick fragments and wood fragments.	0.60		MG	
1.00	SPT	9 N		Stiff, grey, very gravelly CLAY / very clayey GRAVEL. Gravel of fine to coarse, subangular to subrounded flint.	1.0		SUPERFICIAL	
1.10	D1			1.00 m: SPT: 8,5/3,2,2,2				
1.70	PEN	1.25/1.0/1.5 kg/cm²		Stiff, grey mottled orange brown, silty CLAY.	1.40			
2.00	SPT	14 N		Stiff, dark grey mottled orange brown, silty CLAY with selenite crystals and relict rootlets.	2.0 2.00		LONDON CLAY FORMATION	
2.60	D2			2.00 m: SPT: 2,2/3,3,4,4				
2.70	PEN	1.25/1.5/1.75 kg/cm²						
3.00	SPT	13 N		Stiff, fissured, dark grey, silty CLAY with fine selenite crystals.	3.0 3.00			
3.20	D3			3.00 m: SPT: 2,2/2,3,4,4				
3.70	PEN	2.0/2.25x2 kg/cm²						
4.00	SPT	14 N		4.00 m: SPT: 2,2/3,3,4,4	4.0			
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS06

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.70	PEN	4.0/4.5/4.25 kg/cm²		Continued from 3.00m: Stiff, fissured, dark grey, silty CLAY with fine selenite crystals.				
5.00	SPT	13 N		5.00 m: SPT: 2,2/2,3,4,4	5.0		LONDON CLAY	
					5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS07

Sheet 1 of 1

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			MADE GROUND: Grass over soft, dark brown, slightly sandy, slightly gravelly clay topsoil. Gravel of fine to medium, subangular to subrounded flint. Frequent rootlets.	0.20		MGTS	
0.30	J2			MADE GROUND: Soft to firm, dark brown, slightly sandy, gravelly clay. Gravel of fine to coarse, subangular to subrounded flint and charcoal. Frequent rootlets.	0.40		MG	
0.60	J3			Soft, brown, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.50		SUPERFICIAL DEPOSITS	
1.00	SPT	10 N		Firm, wet, grey, clayey GRAVEL. Gravel of fine to coarse, subangular to subrounded flint.	0.80			
1.50	D1			Firm, orange brown mottled grey, slightly sandy, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint and black minerals. 1.00 m: SPT: 2,2/2,2,3,3 1.30 m: Becomes sandy.	1.0			
2.00	SPT	8 N	▼1	Firm, moist, grey mottled orange brown, very sandy, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.70 2.0 2.00			
2.20	D2			Loose, wet, orange brown, clayey, gravelly SAND. Gravelly of fine to coarse, subangular to subrounded flint. (Running sand) 2.00 m: SPT: 1,1/1,2,2,3	2.30			
2.70	PEN	1.5/1.75/2.0 kg/cm²		Firm to stiff, dark grey mottled orange brown, silty CLAY.	2.60		LONDON CLAY FORMATION	
2.80	D3			Stiff, fissured, dark grey, silty CLAY.				
3.00	SPT	11 N		3.00 m: SPT: 4,1/2,2,3,4	3.0			
3.70	PEN	2.0/1.5x2 kg/cm²						
4.00	SPT	15 N		4.00 m: SPT: 2,2/3,3,4,5	4.0			
					4.45			

General Remarks:
Borehole terminated at 4.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.
Cased to 3.00m due to running sand.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS08

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.05	J1			MADE GROUND: Grass over soft, dark brown, slightly gravelly, sandy clay topsoil. Gravel of fine to medium, subangular to subrounded flint.	0.10		MADE GR	
0.30	J2			MADE GROUND: Dark brown, gravelly, sandy clay. Gravel of fine to coarse, subangular flint, ceramic and brick fragments.	0.50			
				Firm, grey, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.80		SUPERFICIAL DEPOSITS	
0.90	D1			Firm, grey mottled orange brown, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.0 1.00			
1.00	SPT	9 N		Medium dense, wet, orange brown, clayey, gravelly SAND. Gravelly of fine to coarse, subangular to subrounded flint.	1.10			
				1.00 m: SPT: 2,2/2,2,2,3				
				Firm, dark grey, slightly sandy, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.30			
				Firm, grey mottled orange brown, slightly sandy, slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	1.50			
				Medium dense, grey mottled orange brown, slightly clayey, slightly gravelly SAND. Gravel of fine to coarse, subangular to subrounded flint.	1.80			
1.90	D2		▼1					
2.00	SPT	6 N		Firm, orange brown, gravelly, very sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint.	2.0 2.00			
				Loose, wet, orange brown, clayey, gravelly SAND. Gravelly of fine to coarse, subangular to subrounded flint.	2.30			
				2.00 m: SPT: 2,2/1,1,2,2				
				Firm, reddish brown, orange brown and grey, silty CLAY.				
2.80	D3							
2.90	PEN	2.25/2.5x2 kg/cm²						
3.00	SPT	9 N			3.0 3.00			
				Firm, fissured, dark grey, silty CLAY with selenite crystals.			LONDON CLAY	
				3.00 m: SPT: 2,2/2,2,2,3				
3.70	PEN	2.0/2.25x2 kg/cm²						
					4.0			
4.00	SPT	9 N		4.00 m: SPT: 1,1/2,2,2,3				
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: N Kimber
Date Commenced: 22/10/2019
Date Completed: 22/10/2019
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS08

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.70	PEN	3.0/2.5/2.0 kg/cm²		Continued from 3.00m: Firm, fissured, dark grey, silty CLAY with selenite crystals.	5.0		LONDON CLAY	
5.00	SPT	13 N		5.00 m: SPT: 1,2/2,3,4,4	5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole fitted with gas and groundwater monitoring pipe and flush metal cover.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS101

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			MADE GROUND: Firm, friable, dark brown, gravelly, silty, clay topsoil: Gravel of fine to medium, subangular to angular flint with rare brick and roots.	0.20		MG	
0.45	J2			MADE GROUND: Firm, dark gray mottled orange, gravelly clay. Gravel of fine to medium, subangular to angular flint with rare brick and ceramic with rootlets.	0.50			
1.00	SPT	10 N		Firm to stiff, light grey with some orange, very gravelly CLAY. Gravel of fine to coarse, subangular to angular flint and claystone. 1.00 m: SPT: 2,2/3,2,2,3	1.0 1.10		SUP DEP	
1.30	J3			Firm to stiff, grey mottled brown, slightly silty CLAY with occasional calcareous aggregations.				
1.50	D1							
2.00	SPT	8 N		2.00 m: SPT: 2,2/2,1,2,3	2.0 2.10		LONDON CLAY FORMATION	
2.50	D2			Firm to stiff, dark grey mottled dark brown CLAY with occasional silty partings with occasional selenite crystals and relict rootlets.				
3.00	SPT	12 N		3.00 m: SPT: 1,2/3,3,3,3	3.0			
3.60	D3			Very stiff, dark grey with some blocky fissuring CLAY with slightly damp patches on fissured surfaces.	3.30			
4.00	SPT	14 N		4.00 m: SPT: 2,3/3,3,3,5	4.0 4.50			

General Remarks:
Borehole terminated at 5.45m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS101

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
5.00	SPT	17 N		Description continued from 3.30 to 4.50m: Very stiff, dark grey with some blocky fissuring CLAY with slightly damp patches on fissured surfaces. 5.00 m: SPT: 2,3/3,4,5,5	5.0 5.45 6.0 7.0 8.0 9.0		LONDON CLAY.	

General Remarks:
Borehole terminated at 5.45m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS102

Sheet 1 of 1

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			TOPSOIL: Grass over: Soft, light brown, slightly gravelly, silty clay. Gravel of fine to coarse, subangular to subrounded flint with roots.	0.30		TS	
0.70	D1			Soft to firm, grey with some light brown, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint. 0.80 m: Becoming clayey GRAVEL.	1.0 1.00		SUPERFICIAL DEPOSITS	
1.00	SPT	23 N		Stiff, light grey mottled orange brown, slightly gravelly CLAY. Gravel of fine to coarse, subangular to angular flint. 1.00 m: SPT: 1,2/4,6,6,7	1.50			
1.30	D2			Orange, gravelly, clayey, very sandy SILT / very silty SAND. Gravel of fine to coarse, subangular to subrounded flint.	2.0			
2.00	SPT	12 N	▼	2.00 m: SPT: 2,2/2,3,3,4 2.00 m: Soils are wet.	2.20			
2.60	D3			Stiff, dark grey with brown mottling, slightly silty CLAY with some blocky fissuring and relict rootlets.	3.0		LONDON CLAY FORMATION	
3.00	SPT	13 N		3.00 m: SPT: 2,2/2,3,3,5 3.00 - 4.00 m: 20% recovery due to collapse from 2.00m - 2.20m.				
4.00	SPT	14 N		4.00 m: SPT: 2,2/5,3,2,4	4.0			
					4.45			

General Remarks:
Borehole terminated at 4.45m bgl due to collapsing soils and groundwater.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
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PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS103

Sheet 1 of 1

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.20	J1			MADE GROUND: Grass over: Firm, brown, gravelly, silty, clay topsoil. Gravel of fine to coarse, subangular to subrounded flint and brick, charcoal and rootlets.	0.40		MG	
				Firm, light grey, very gravelly, CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.80		SUPERFICIAL DEPOSITS	
0.90	D1			Firm, mottled light grey and brown CLAY with occasional pockets of fine to medium calcareous aggregations.	1.0			
1.00	SPT	8 N		1.00 m: SPT: 0,1/1,2,2,3				
1.60	D2			1.40 - 1.90 m: Some pockets of orange brown gravelly SAND. Gravel is fine to coarse subangular to subrounded flint.				
			▼1		1.90			
2.00	SPT	13 N		Light grey with brown, slightly gravelly, clayey, very sandy SILT / very silty SAND. 2.00 m: SPT: 1,2/3,3,3,4	2.0			
				Firm, blue grey with dark brown mottling with slightly blocky fissuring CLAY with relict rootlets.	2.20		LONDON CLAY FORMATION	
2.70	D3							
3.00	SPT	13 N		3.00 m: SPT: 1,1/2,3,3,5 3.00 - 4.00 m: 25% recovery.	3.0			
4.00	SPT	15 N		4.00 m: SPT: 2,2/3,3,4,5	4.0			
					4.45			

General Remarks:
Borehole terminated at 4.45m due collapse from groundwater at 1.90m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS104

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.20	J1			MADE GROUND: Hard, desiccated, dark brown, gravelly, clay topsoil with roots. Gravel of fine to coarse, subangular to subrounded flint and occasional brick and charcoal.	0.30		MG	
0.50	J2			MADE GROUND: Hard, desiccated, dark grey brown, gravelly, clay with roots. Gravel of fine for coarse, subangular to subrounded flint with occasional brick with charcoal.	0.60			
1.00	SPT	9 N		Stiff, light grey with some brown, gravelly CLAY. Gravel of fine to coarse, subangular to subrounded to angular flint with rootlets and occasional sandy pockets. Occasional silty lenses. 1.00 m: SPT: 2,1/2,2,2,3	1.0		SUPERFICIAL DEPOSITS	
1.30	D1							
2.00	SPT	12 N		Orange brown, slightly clayey, very sandy SILT / very silty SAND. Gravel of fine to coarse, subangular to subrounded flint and calcareous aggregations. 2.00 m: SPT: 2,1/2,3,3,4	1.60 2.0 2.10			
2.50	D2			Stiff, light grey mottled brown with some blocky fissuring CLAY with relict rootlets with occasional calcareous aggregations.			LONDON CLAY FORMATION	
3.00	SPT	12 N		3.00 m: SPT: 2,2/2,2,3,5	3.0 3.10			
4.00	SPT	15 N		Very stiff, dark grey, slightly silty CLAY with blocky fissuring and occasional shell fragments. 4.00 m: SPT: 1,2/2,3,4,6	4.0 4.50			

General Remarks:
Borehole terminated at 5.45m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS104

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.50	D3			Continued from 3.10m: Very stiff, dark grey, slightly silty CLAY with blocky fissuring and occasional shell fragments.	5.0		LONDON CLAY.	
5.00	SPT	19 N		5.00 m: SPT: 2,2/3,5,5,6	5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 08/09/2021
Date Completed: 08/09/2021
Method Used: See General Remarks

Borehole No.

WS105

Sheet 1 of 1

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			MADE GROUND: Hard desiccated, dark brown, slightly gravelly, silty, clay topsoil. Gravel of fine to medium, subangular to angular flint with rare brick and charcoal.	0.20		MG	
				Firm to stiff, grey brown with some orange , slightly gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint with rare black specks and rootlets.			SUP DEP	
0.80	D1							
1.00	SPT	9 N		1.00 m: SPT: 1,1/2,2,2,3	1.0			
				Stiff, brown mottled grey CLAY with pockets of fine to medium, subrounded calcareous aggregations and light grey silty partings.	1.10		LONDON CLAY FORMATION	
1.80	D2							
2.00	SPT	18 N		2.00 m: SPT: 3,3/3,4,5,6	2.0			
				2.20 m: Becoming dark brown mottled grey with blocky fissuring.				
3.00	SPT	14 N		3.00 m: SPT: 1,2/3,3,4,4	3.0			
4.00	SPT	11 N		4.00 m: SPT: 1,1/2,2,3,4 4.00 m: Becoming dark grey blocky fissured CLAY with come silty parting and occasional shell fragments.	4.0			
					4.45			

General Remarks:
Borehole terminated at 4.45m bgl.
Windowless Percussive Sampling Modular Rig used.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: See General Remarks

Borehole No.

WS106

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.10	J1			TOPSOIL: Grass over: Firm, light brown, slightly desiccated, slightly gravelly, silty CLAY. Gravel of fine to medium, subangular to angular flint.	0.30		TS	
0.60	D1			Firm, light brown with some grey, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0.90		SUP DEP	
1.10	D2			Firm to stiff, light brown with grey mottling, slightly gravelly CLAY. Gravel of fine to medium, subangular to subrounded flint.	1.0			
1.20	SPT	7 N		Stiff, grey mottled orange brown CLAY with relict rootlets. 1.20 m: SPT: 1,1/1,2,2,2	1.20			
1.80	D3							
2.00	SPT	9 N		2.00 m: SPT: 1,1/2,2,2,3	2.0			
2.50	D4			2.50 m: Becoming dark brown with some silty lenses and selenite crystals.	2.70		LONDON CLAY FORMATION	
3.00	SPT	9 N		Stiff, dark grey CLAY with some brown and grey silty lenses with occasional shell fragments. 3.00 m: SPT: 2,1/2,2,2,3	3.0			
3.80	D5			Dark grey, very clayey, slightly sandy SILT.	3.70			
4.00	SPT	15 N		Stiff, dark grey CLAY with some brown and grey silty lenses with occasional shell fragments. 4.00 m: SPT: 2,3/3,3,4,5	4.0 4.00			
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole hand dug to 1.20m bgl for services clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: See General Remarks

Borehole No.

WS106

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.60	D6			Continued from 4.00m bgl: Stiff, dark grey CLAY with some brown and grey silty lenses with occasional shell fragments.	5.0		LONDON CLAY.	
5.00	SPT	14 N		5.00 m: SPT: 2,2/3,3,4,4	5.45			
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole hand dug to 1.20m bgl for services clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS107

Sheet 1 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
0.20	J1			MADE GROUND: Grass over: Firm, dark brown, slightly gravelly, clay topsoil. Gravel of fine to medium, subangular to angular flint and rare brick and rootlets.	0.30		MG	
0.50	J2			Firm, light brown with some grey, very gravelly CLAY becoming clayey GRAVEL in places. Gravel of fine to medium occasional coarse, subangular to subrounded flint.	0.80		SUP DEP	
0.90	D1			Firm, light grey and light brown mottled, slightly gravelly CLAY. Gravel of fine to medium with occasional coarse, subangular to subrounded flint.	1.0			
1.20	SPT	6 N		Stiff, light grey mottled brown CLAY with occasional calcareous aggregations and relict rootlets. 1.20 m: SPT: 1,1/1,1,2,2	1.20		LONDON CLAY FORMATION	
1.50	D2							
2.00	SPT	11 N		2.00 m: SPT: 1,1/2,3,3,3	2.0			
				2.20 m: Becoming dark grey / brown with some silty lenses.	2.50			
2.70	D3			Stiff, dark grey with some blocky fissuring CLAY with occasional lenses and shell fragments.				
3.00	SPT	11 N		3.00 m: SPT: 2,3/3,2,3,3	3.0			
3.80	D4							
4.00	SPT	14 N		4.00 m: SPT: 2,3/3,4,3,4 4.00 m: Very stiff.	4.0			
					4.50			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole hand dug to 1.20m bgl for services clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

PROBEHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Windowless Percussive Sampling Rig

Borehole No.

WS107

Sheet 2 of 2

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
4.50	D5			Continued from 2.50m bgl: Stiff, dark grey with some blocky fissuring CLAY with occasional lenses and shell fragments. 4.50 m: Fragments of carbonised tree roots.				
5.00	SPT	28 N		5.00 m: SPT: 4,5/5,7,8,8	5.0			
					5.45		LONDON CLAY.	
					6.0			
					7.0			
					8.0			
					9.0			

General Remarks:
Borehole terminated at 5.45m bgl.
Borehole hand dug to 1.20m bgl for services clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:25

BRD
Telephone: 01295 272244
Email: info@brduk.com

BOREHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD 3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Cable Percussive Drilling Rig

Borehole No.

BH101

Sheet 1 of 3

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
				TOPSOIL with roots (Drillers description).	0.40 ()		TS	
				Firm, light grey brown, gravelly CLAY. Gravel is fine to medium, sub-angular to angular flint.			SUP DEP	
1.00	B1				1			
				Firm, light grey mottled brown CLAY. Very rare rootlets.	1.30 ()			
1.50	SPT D1	8 N		1.50 m: SPT: 1,1/1,2,2,3.				
2.00	U1 D2	40 Blow			2			
3.00	SPT D3	12 N		3.00 m: Becoming stiff dark grey mottled brown CLAY. 3.00 m: SPT: 1,2/3,3,3,3.	3			
				Stiff, dark grey CLAY.	3.30 ()			
4.00	U2 D4	45 Blow			4		LONDON CLAY FORMATION	
5.00	D5			5.00 m: Dark grey very silty.	5			
5.50	D6			5.50 m: Becoming very stiff.				
6.00	SPT D7	23 N		6.00 m: SPT: 2,3/5,6,6,6.	6			
7.00	U3 D8	65 Blow			7			
					8 8.00			

Drilling Progress

Date	Hole Depth	Casing Depth	Casing Dia (mm)	Water Depth	Water depth after 20mins / Type of test
09-09-21	1.50	0.00	150	Dry	
09-09-21	3.00	2.50	150	Dry	
09-09-21	4.50	2.50	150	Dry	
09-09-21	6.00	2.50	150	Dry	
09-09-21	7.50	2.50	150	Dry	

Chiselling

From	To	Hours

General Remarks:

Borehole terminated at 18.00m bgl.
Hand dug pit excavated to 1.20m bgl for service clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:50

BRD
Telephone: 01295 272244
Email: info@brduk.com

BOREHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD 3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Cable Percussive Drilling Rig

Borehole No.

BH101

Sheet 2 of 3

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
7.95	D9			Continued from 3.3m	()			
8.50	D10							
9.00	SPT D11	27 N		9.00 m: SPT: 3,4/5,6,8,8.	9			
10.00	D12				10			
10.50	U4	75 Blow		Recovered as dark grey clayey sandy SILT.	10.40 ()		LONDON CLAY FORMATION	
10.80	D13							
11.50	D14			11.70 m: Groundwater seepage.	11			
12.00	SPT D15	>50 N		12.00 m: SPT: 5,9/16,15,16,3 for 5mm.	12			
13.00	D16			Hard, dark grey silty CLAY.	13.00 ()			
13.50	U5	100 Blow		Hard, light grey mottled red silty CLAY.	13.40 ()		READING FORMATION	
14.00	B2				14			
14.50	D17							
15.00	SPT D18	>50 N		15.00 m: SPT: 5,8/12,13,16,9 for 15mm.	15			
					16 16.00			

Drilling Progress

Date	Hole Depth	Casing Depth	Casing Dia (mm)	Water Depth	Water depth after 20mins / Type of test
09-09-21	9.00	2.50	150	Dry	
09-09-21	10.50	2.50	150	Dry	
09-09-21	12.00	2.50	150	Dry	
09-09-21	13.50	2.50	150	13.5	
09-09-21	15.00	2.50	150	14.5	

Chiselling

From	To	Hours

General Remarks:

Borehole terminated at 18.00m bgl.
Hand dug pit excavated to 1.20m bgl for service clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:50

BRD
Telephone: 01295 272244
Email: info@brduk.com

BOREHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD 3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Cable Percussive Drilling Rig

Borehole No.

BH101

Sheet 3 of 3

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
16.00	D19			Description continued from 13.40 to 16.00m: Hard, light grey mottled red slightly silty/silty CLAY.	()		READING FORMATION	
16.50	U6	100 Blow			17			
17.00	D20							
17.50	D21							
18.00	SPT D22	>50 N		18m: SPT: 8,12/16,18,17 for 6mm.	18 18.00 ()			
					19			
					20			
					21			
					22			
					23			
					24			

Drilling Progress

Date	Hole Depth	Casing Depth	Casing Dia (mm)	Water Depth	Water depth after 20mins / Type of test
09-09-21	16.50	2.50	150	16	
09-09-21	18.00	2.50	150	Dry	

Chiselling

From	To	Hours

General Remarks:

Borehole terminated at 18.00m bgl.
Hand dug pit excavated to 1.20m bgl for service clearance.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:50

BRD
Telephone: 01295 272244
Email: info@brduk.com

BOREHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD 3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Cable Percussive Drilling Rig

Borehole No.

BH102

Sheet 1 of 3

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
				TOPSOIL with roots (Drillers description).	0.20 ()		TS	
0.50	D1			Firm, dark grey to brown, silty gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded flint.			SUPERFICIAL DEPOSITS	
1.00	B1				1			
1.50	SPT D2	18 N		1.50 m: SPT: 2,4/4,4,5,5.				
2.00	D3			Medium dense, orange brown, silty gravelly SAND. Gravel is fine to coarse, sub-angular to sub-rounded flint.	2 1.90 ()			
2.50	U1	35 Blow		Stiff, dark grey CLAY.	2.40 ()		LONDON CLAY FORMATION	
3.00	SPT B2 D4	15 N		3.00 m: SPT: 1,2/3,4,4,4.	3			
4.00	D5				4			
4.50	U2	45 Blow						
4.85	D6				5			
5.50	D7			5.50 m: Pocket of gravels of calcareous aggretions.				
6.00	SPT	15 N		6.00 m: SPT: 1,2/3,3,4,5.	6			
7.00	D8			Stiff, dark grey slightly silty CLAY.	7 7.00 ()			
7.50	U3	65 Blow						
7.80	D9				8 8.00			

Drilling Progress

Date	Hole Depth	Casing Depth	Casing Dia (mm)	Water Depth	Water depth after 20mins / Type of test
09-09-21	1.50	0.00	150	Dry	
09-09-21	3.00	2.50	150	Dry	
09-09-21	6.00	2.50	150	Dry	

Chiselling

From	To	Hours

General Remarks:

Borehole terminated at 18.00m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:50

BRD
Telephone: 01295 272244
Email: info@brduk.com

BOREHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD 3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Cable Percussive Drilling Rig

Borehole No.

BH102

Sheet 2 of 3

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
				Description continued from 7.00 to 8.00m: Stiff, dark grey slightly silty CLAY.	()			
8.50	D10							
9.00	SPT	32 N		9.00 m: SPT: 3,5/7,8,8,9.	9			
10.00	D11				10			
10.50	U4	100 Blow						
11.00	D12				11		LONDON CLAY FORMATION	
11.50	D11							
12.00	SPT	40 N		12.00 m: SPT: 5,8/8,8,12,12.	12			
13.00	D13				13			
13.50	U5	100 Blow						
14.00	D14				14			
14.50	D15			14.50 m: Becoming more silty.				
15.00	SPT	>50 N		15.00 m: SPT: 6,8/10,14,17,9 for 10mm.	15			
					16 16.00			

Drilling Progress

Date	Hole Depth	Casing Depth	Casing Dia (mm)	Water Depth	Water depth after 20mins / Type of test
09-09-21	9.00	2.50	150	Dry	
09-09-21	12.00	2.50	150	Dry	
09-09-21	15.00	2.50	150	Dry	

Chiselling

From	To	Hours

General Remarks:

Borehole terminated at 18.00m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:50

BRD
Telephone: 01295 272244
Email: info@brduk.com

BOREHOLE RECORD

Client: Gleeson Land
Project Title: Clay Lane, Fishbourne
Project No: BRD 3511
Logged By: I Hibberd
Date Commenced: 09/09/2021
Date Completed: 09/09/2021
Method Used: Cable Percussive Drilling Rig

Borehole No.

BH102

Sheet 3 of 3

Samples & Tests			Water	Description of Strata	Depth / (Level)	Legend	Geology	Installation /Backfill
Depth	Type & No	Value						
16.00	D16			Description continued from 8.00 to 16.00m: Stiff, dark grey slightly silty CLAY.	()		LONDON CLAY	
16.50	U6	100 Blow			17			
16.85	D17							
17.00	D18							
18.00	SPT	>50 N		18.00m: SPT: 7,10/12,15,17,6 for 5mm.	18 18.00 ()			
					19			
					20			
					21			
					22			
					23			
					24			

Drilling Progress

Date	Hole Depth	Casing Depth	Casing Dia (mm)	Water Depth	Water depth after 20mins / Type of test
09-09-21	18.00	2.50	150	Dry	

Chiselling

From	To	Hours

General Remarks:

Borehole terminated at 18.00m bgl.

Surface Elevation Level:

All dimensions in metres
Log Scale 1:50

BRD
Telephone: 01295 272244
Email: info@brduk.com

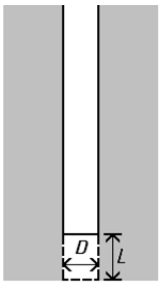
IN-SITU PERMEABILITY TEST

BS5930:1999+A2:2010 - Rising Head

Project No:	BRD3511
Project:	Clay Lane, Fishbourne
Client:	Gleeson Land

Test Details

Borehole Number		WS07	
Test Number		1	
Depth of response zone below GL	*[a]*	4.00	**m**
Depth of resting water level	*[b]*	0.94	**m**
Height of casing above GL	*[c]*	0.00	**m**
Depth of casing below GL	*[d]*	1.00	**m**
Length of response zone	*[L]*	3.00	**m**
Diameter of response zone	*[D]*	0.10	**m**
Intake Factor	*[F]*	4.60	**Well point or hole extended in uniform soil**



Supervising Engineer	Dan Brown
Date of test	29/10/2019

Description of Soil at test level

0.0m-0.4m:MADE GROUND.

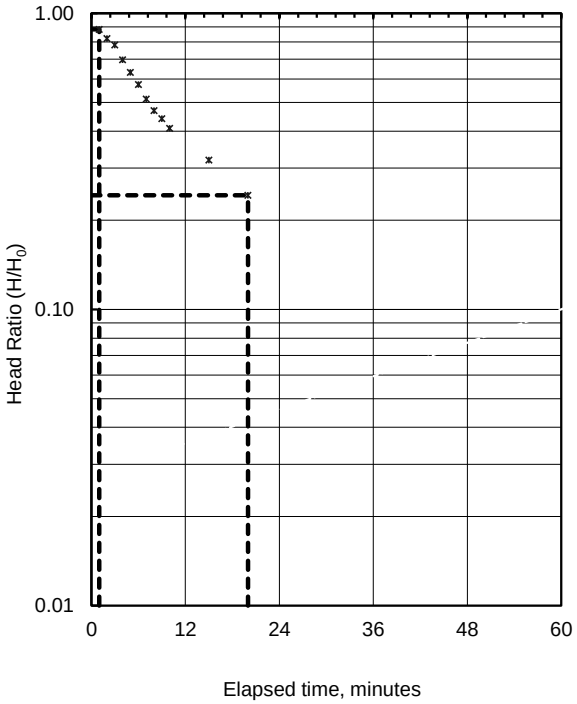
0.4m-2.3m: Superficial Deposits: layers of gravel, sand and clayey soils intercalated.

2.3m-4.0m: London Clay.

Test Record

Elapsed Time	Depth to Water	Head of water	H/H_0
min	m	m	
0	3.41	-2.47	1.00
1	3.12	-2.18	0.88
2	2.97	-2.03	0.82
3	2.87	-1.93	0.78
4	2.66	-1.72	0.70
5	2.50	-1.56	0.63
6	2.36	-1.42	0.57
7	2.21	-1.27	0.51
8	2.10	-1.16	0.47
9	2.03	-1.09	0.44
10	1.95	-1.01	0.41
15	1.73	-0.79	0.32
20	1.54	-0.60	0.24
66	1.02	-0.08	0.03
			0.03
			0.03
			0.03
			0.03
			0.03
			0.03
			0.03

Plot of head ratio against elapsed time



Calculation and Result

$$k = \frac{A}{F(t2-t1).\log_e(H1/H2)}$$ **General Approach**

Cross-sectional area *A* =	0.0079	**m^2**
Time between H1 and H2	19	**minutes**
Permeability *k* =	**1.93 x 10^{-6}**	**m/s**

Remarks

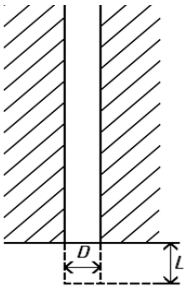
IN-SITU PERMEABILITY TEST

BS5930:1999+A2:2010 - Rising Head

Project No:	BRD3511
Project:	Clay Lane, Fishbourne
Client:	Gleeson Land

Test Details

Borehole Number		WS08	
Test Number		1	
Depth of response zone below GL	*[a]*	4.00	**m**
Depth of resting water level	*[b]*	2.18	**m**
Height of casing above GL	*[c]*	0.00	**m**
Depth of casing below GL	*[d]*	1.00	**m**
Length of response zone	*[L]*	3.00	**m**
Diameter of response zone	*[D]*	0.10	**m**
Intake Factor	*[F]*	4.31	**m**



Well point or hole extended at impervious boundary

Supervising Engineer	Dan Brown
Date of test	29/10/2019

Description of Soil at test level

0.0m-0.5m:MADE GROUND.

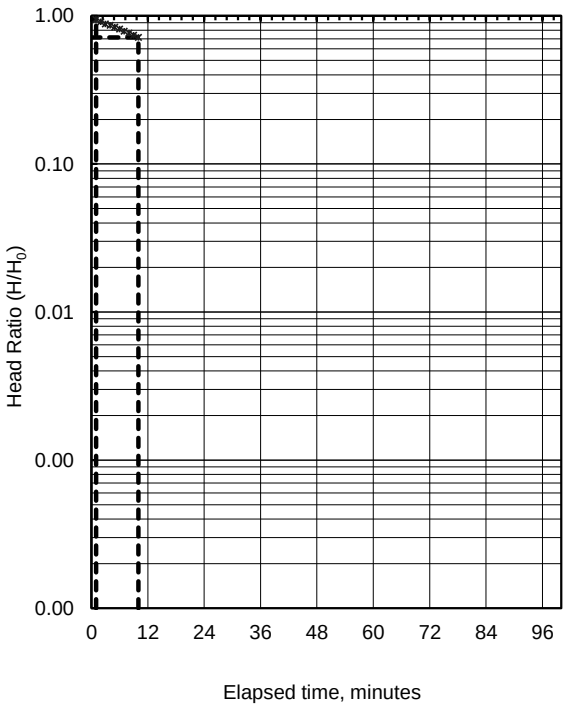
0.5m-2.3m: Superficial Deposits: layers of sand and clayey soils intercalated.

2.3m-4.0m: London Clay.

Test Record

Elapsed Time	Depth to Water	Head of water	H/H_0
min	m	m	
0	3.83	-1.65	1.00
1	3.74	-1.56	0.95
2	3.68	-1.50	0.91
3	3.63	-1.45	0.88
4	3.60	-1.42	0.86
5	3.56	-1.38	0.84
6	3.52	-1.34	0.81
7	3.48	-1.30	0.79
8	3.44	-1.26	0.76
9	3.40	-1.22	0.74
10	3.36	-1.18	0.72
97	1.94	0.24	-0.15
			-0.15
			-0.15
			-0.15
			-0.15
			-0.15
			-0.15
			-0.15
			-0.15
			-0.15

Plot of head ratio against elapsed time



Calculation and Result

$$k = \frac{A}{F(t2-t1).\log_e(H1/H2)}$$ **General Approach**

Cross-sectional area *A* =	0.0079	**m^2**
Time between H1 and H2	9	**minutes**
Permeability *k* =	**0.94 x 10^{-6}**	**m/s**

Remarks

Groundwater Monitoring Record

Project: Clay Lane, Fishbourne
Client: Gleeson Land
Project No: BRD3511

Borehole name	Date	Monitored by (initials)	Borehole depth (m)	Qty free product detected (mm)	Groundwater level below ground surface (m)	Groundwater level below top of standpipe (m)	Amount purged (l)	Post purge groundwater level below top of standpipe (m)	Comments
WS01	29/10/2019	DB	2.01	0.00	0.60	0.40	N/A	N/A	
WS02	29/10/2019	DB	4.00	0.00	3.21	3.10	1.00	Dry	Grey / clear water (3/4 bottle)
WS03	29/10/2019	DB	4.18	0.00	Dry	Dry	N/A	N/A	
WS04	29/10/2019	DB	4.05	0.00	1.45	1.39	N/A	N/A	
WS05	29/10/2019	DB	4.06	0.00	3.88	3.82	0.00	Dry	Grey / clear water (1/4 bottle)
WS06	29/10/2019	DB	4.04	0.00	3.06	2.99	N/A	N/A	
WS07	29/10/2019	DB	3.79	0.00	0.94	0.94	11.00	3.41	Orange brown, sandy water (1 bottle)
WS08	29/10/2019	DB	4.13	0.00	2.18	2.06	6.00	3.83	Orange brown, silty water (1 bottle)

Groundwater Monitoring Record

Project: Clay Lane, Fishbourne
Client: Gleeson Land
Project No: BRD3511

Borehole name	Date	Monitored by (initials)	Borehole depth (m)	Qty free product detected (mm)	Groundwater level below ground surface (m)	Groundwater level below top of standpipe (m)	Amount purged (l)	Post purge groundwater level below top of standpipe (m)	Comments
WS01	27/11/2019	CB	2.01	0.00	0.06	N/A	N/A	N/A	Most of well submerged in water (including surface water)
WS02	27/11/2019	CB	4.12	0.00	0.50	0.38	N/A	N/A	
WS03	27/11/2019	CB	4.20	0.00	0.90	0.75	N/A	N/A	
WS04	27/11/2019	CB	4.12	0.00	0.79	0.67	N/A	N/A	
WS05	27/11/2019	CB	4.14	0.00	1.06	0.91	N/A	N/A	
WS06	27/11/2019	CB	4.06	0.00	N/A	N/A	N/A	N/A	Well submerged, unable to take reading due standing surface water.
WS07	27/11/2019	CB	3.92	0.00	0.82	0.72	N/A	N/A	
WS08	27/11/2019	CB	4.13	0.00	1.05	0.93	N/A	N/A	

Groundwater Monitoring Record

Project: Clay Lane, Fishbourne
Client: Gleeson Land
Project No: BRD3511

Borehole name	Date	Monitored by (initials)	Borehole depth (m)	Qty free product detected (mm)	Groundwater level below ground surface (m)	Groundwater level below top of standpipe (m)	Amount purged (l)	Post purge groundwater level below top of standpipe (m)	Comments
WS01	19/12/2019	DB	2.00	0.00	0.40	0.00	N/A	N/A	WS01 metal cover was flooded prior to removing gas bung.
WS02	19/12/2019	DB	4.00	0.00	0.11	0.00	N/A	N/A	WS02 metal cover was flooded prior to removing gas bung.
WS03	19/12/2019	DB	4.17	0.00	0.22	0.00	N/A	N/A	Bailed 1L of water from standpipe. Recharged within 2 minutes.
WS04	19/12/2019	DB	4.05	0.00	0.33	0.22	N/A	N/A	Rising Head test carried out in WS04. Rose 52cm within 40 minutes
WS05	19/12/2019	DB	4.05	0.00	0.22	0.07	N/A	N/A	Rising Head test carried out in WS05. Rose 34cm within 30 minutes
WS06	19/12/2019	DB	-	-	Flooded	Flooded	N/A	N/A	Area surrounding WS06 completely underwater and unable to monitor.
WS07	19/12/2019	DB	3.78	0.00	0.00	0.00	N/A	N/A	Rising head test carried out in WS07. Rose 39cm within 60 minutes
WS08	19/12/2019	DB	4.14	0.00	0.84	0.71	N/A	N/A	When opening WS08, water levels was monitored at 0.84m. The water rose from 0.84m to 0.69m within 3 minutes. (10:37am). At 11:57am, the standing water level was 0.27m.
									Areas around Window Samples:
									WS01: Areas of standing water around borehole. The borehole was flooded when opened.
									WS02: Areas of standing water around borehole. The borehole was flooded when opened.
									WS03: The ground is completely saturated with large areas around the borehole flooded.
									WS04: The ground is completely saturated with large areas around the borehole flooded.
									WS05: Saturated ground around the borehole.
									WS06: The area around WS06 is completely flooded. There are areas of standing water and unable to monitor.
									WS07: The ground around WS07 was saturated and the borehole was flooded when opened.
									WS08: The ground around WS08 was soft with localised standing water.
									Site ditches were raised but not overflowing.

Groundwater Monitoring Record

Project: Clay Lane, Fishbourne
Client: Gleeson Land
Project No: BRD3511

Borehole name	Date	Monitored by (initials)	Borehole depth (m)	Qty free product detected (mm)	Groundwater level below ground surface (m)	Groundwater level below top of standpipe (m)	Amount purged (l)	Post purge groundwater level below top of standpipe (m)	Comments
WS01	23/01/2020	CB	1.97	0.00	0.34	0.22	N/A	N/A	
WS02	23/01/2020	CB	4.13	0.00	0.34	0.21	N/A	N/A	
WS03	23/01/2020	CB	4.21	0.00	0.28	0.13	N/A	N/A	
WS04	23/01/2020	CB	4.13	0.00	0.85	0.72	N/A	N/A	
WS05	23/01/2020	CB	4.13	0.00	0.48	0.33	N/A	N/A	
WS06	23/01/2020	CB	-	-	Flooded	Flooded	N/A	N/A	Area around WS06 flooded.
WS07	23/01/2020	CB	3.94	0.00	0.23	0.11	N/A	N/A	
WS08	23/01/2020	CB	4.15	0.00	0.29	0.19	N/A	N/A	

Groundwater Monitoring Record

Project: Clay Lane, Fishbourne
Client: Gleeson Land
Project No: BRD3511

Borehole name	Date	Monitored by (initials)	Borehole depth (m)	Qty free product detected (mm)	Groundwater level below ground surface (m)	Groundwater level below top of standpipe (m)	Amount purged (l)	Post purge groundwater level below top of standpipe (m)	Comments
WS01	20/02/2020	DB	2.01	0.00	0.12	Flooded	N/A	N/A	
WS02	20/02/2020	DB	4.01	0.00	0.12	0.02	N/A	N/A	
WS03	20/02/2020	DB	4.17	0.00	0.10	Flooded	N/A	N/A	
WS04	20/02/2020	DB	4.15	0.00	0.55	0.45	N/A	N/A	
WS05	20/02/2020	DB	4.05	0.00	0.10	Flooded	N/A	N/A	
WS06	20/02/2020	DB	-	-	Flooded	Flooded	N/A	N/A	Area around WS06 flooded.
WS07	20/02/2020	DB	3.94	0.00	0.12	Flooded	N/A	N/A	
WS08	20/02/2020	DB	4.10	0.00	0.13	0.03	N/A	N/A	

Groundwater Monitoring Record

Project: Clay Lane, Fishbourne
Client: Gleeson Land
Project No: BRD3511

Borehole name	Date	Monitored by (initials)	Borehole depth (m)	Qty free product detected (mm)	Groundwater level below ground surface (m)	Groundwater level below top of standpipe (m)	Amount purged (l)	Post purge groundwater level below top of standpipe (m)	Comments
WS01	19/03/2020	DB	2.01	N/A	Flooded	Flooded	N/A	N/A	
WS02	19/03/2020	DB	4.00	N/A	0.10	Flooded	N/A	N/A	
WS03	19/03/2020	DB	4.16	N/A	Flooded	Flooded	N/A	N/A	
WS04	19/03/2020	DB	4.15	N/A	0.47	0.35	N/A	N/A	
WS05	19/03/2020	DB	4.04	N/A	Flooded	Flooded	N/A	N/A	
WS06	19/03/2020	DB	4.01	N/A	Flooded	Flooded	N/A	N/A	
WS07	19/03/2020	DB	3.94	N/A	Flooded	Flooded	N/A	N/A	
WS08	19/03/2020	DB	4.12	N/A	0.24	0.14	N/A	N/A	

APPENDIX 3

Ian Hibberd
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Oxfordshire
OX16 5HT

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-15168

Site Reference:	Clay Lane, Fishbourne
Project / Job Ref:	BRD3511
Order No:	None Supplied
Sample Receipt Date:	25/10/2019
Sample Scheduled Date:	25/10/2019
Report Issue Number:	1
Reporting Date:	31/10/2019

Authorised by:

Dave Ashworth
Technical Manager

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 19-15168	**Date Sampled**	22/10/19	21/10/19	22/10/19	22/10/19	22/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	TP08	TP08	TP01	WS02	WS08
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	1.30	2.40	1.50	0.80	0.90
Reporting Date: 31/10/2019	**DETS Sample No**	443870	443871	443872	443873	443874

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.4	7.6	8.2	7.7	7.9
Total Sulphate as SO_4	mg/kg	< 200	NONE	145900	4245	983	555	373
Total Sulphate as SO_4	%	< 0.02	NONE	14.60	0.42	0.10	0.06	0.04
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	1750	2130	336	282	130
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	1.75	2.13	0.34	0.28	0.13
Total Sulphur	%	< 0.02	NONE	8.01	0.16	0.04	0.03	< 0.02

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 19-15168	**Date Sampled**	22/10/19	22/10/19	21/10/19	22/10/19	21/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS08	TP09	TP09	WS03	TP02
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	1.90	1.10	2.80	3.70	0.50
Reporting Date: 31/10/2019	**DETS Sample No**	443875	443876	443877	443878	443879

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.9	7.9	7.7	8.1	7.8
Total Sulphate as SO_4	mg/kg	< 200	NONE	224	242	615	1335	< 200
Total Sulphate as SO_4	%	< 0.02	NONE	0.02	0.02	0.06	0.13	< 0.02
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	41	44	168	381	27
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.04	0.04	0.17	0.38	0.03
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02	0.02	0.74	0.03

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Subcontracted analysis (S)

DETS Ltd
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Lenham Heath
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4480

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-15168	
BRD Environmental Ltd	
Site Reference: Clay Lane, Fishbourne	
Project / Job Ref: BRD3511	
Order No: None Supplied	
Reporting Date: 31/10/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
443870	TP08	None Supplied	1.30	16.1	Brown loamy sand
443871	TP08	None Supplied	2.40	20.3	Brown loamy clay
443872	TP01	None Supplied	1.50	16.3	Brown loamy clay
443873	WS02	None Supplied	0.80	15.9	Brown loamy clay with stones
443874	WS08	None Supplied	0.90	6	Light brown sandy clay with stones
443875	WS08	None Supplied	1.90	6.2	Light brown sandy clay with stones
443876	TP09	None Supplied	1.10	13.8	Brown clay with stones
443877	TP09	None Supplied	2.80	19.8	Brown loamy clay
443878	WS03	None Supplied	3.70	19.6	Brown loamy clay
443879	TP02	None Supplied	0.50	15.9	Brown loamy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Maidstone
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Tel : 01622 850410

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-15168
BRD Environmental Ltd
Site Reference: Clay Lane, Fishbourne
Project / Job Ref: BRD3511
Order No: None Supplied
Reporting Date: 31/10/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 19-15074

Site Reference:	Clay Lane, Fishbourne
Project / Job Ref:	BRD3511
Order No:	None Supplied
Sample Receipt Date:	24/10/2019
Sample Scheduled Date:	24/10/2019
Report Issue Number:	1
Reporting Date:	05/11/2019

Authorised by:

Dave Ashworth
Technical Manager

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Soil Analysis Certificate						
DETS Report No: 19-15074	**Date Sampled**	21/10/19	21/10/19	22/10/19	22/10/19	22/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS01	WS01	WS04	TP06	TP06
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.80	0.20	0.10	0.50
Reporting Date: 05/11/2019	**DETS Sample No**	443411	443412	443413	443415	443416

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025			< 0.001	< 0.001	
pH	pH Units	N/a	MCERTS	6.2	6.9	7.2	7.3	7.8
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Organic Matter	%	< 0.1	MCERTS	4.2	1.1	10.2	12.2	2.7
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	9	10	7	11	6
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.6	1.9	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	27	31	20	24	26
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	27	11	53	136	12
Lead (Pb)	mg/kg	< 3	MCERTS	80	22	174	622	42
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	1.1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	14	19	20	28	13
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	66	49	474	1900	61

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 19-15074	**Date Sampled**	22/10/19	21/10/19	22/10/19	21/10/19	21/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	TP09	TP01	TP10	TP03	TP05
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.60	1.30	0.10	0.10
Reporting Date: 05/11/2019	**DETS Sample No**	443417	443418	443419	443420	443421

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	< 0.001				
pH	pH Units	N/a	MCERTS	7.1	8.4	7.6	6.4	7.3
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	< 10	< 10	107	18	< 10
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	< 0.01	< 0.01	0.11	0.02	< 0.01
Organic Matter	%	< 0.1	MCERTS	4.4	0.5	1.7	2.9	7.6
Total Organic Carbon (TOC)	%	< 0.1	MCERTS			1		
Arsenic (As)	mg/kg	< 2	MCERTS	11	8	7	10	4
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	27	27	26	28	16
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	24	6	14	18	17
Lead (Pb)	mg/kg	< 3	MCERTS	54	14	19	45	48
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	18	17	22	16	10
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	171	41	46	57	45

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 19-15074	**Date Sampled**	22/10/19	22/10/19	22/10/19		
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS05	WS05	TP10		
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.10	0.50	1.60		
Reporting Date: 05/11/2019	**DETS Sample No**	443422	443423	443425		

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	6.4	6.6			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	13	14			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.01	0.01			
Organic Matter	%	< 0.1	MCERTS	5.1	1.5			
Total Organic Carbon (TOC)	%	< 0.1	MCERTS			1		
Arsenic (As)	mg/kg	< 2	MCERTS	9	9			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	25	25			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	24	13			
Lead (Pb)	mg/kg	< 3	MCERTS	51	22			
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	12	10			
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	54	38			

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Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-15074	**Date Sampled**	21/10/19	21/10/19	22/10/19	22/10/19	22/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS01	WS01	WS04	TP06	TP06
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.80	0.20	0.10	0.50
Reporting Date: 05/11/2019	**DETS Sample No**	443411	443412	443413	443415	443416

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.15	0.13	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.16	0.18	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.71	4	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.17	0.67	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.61	6.05	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.37	4.88	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.96	1.95	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.65	2.44	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.18	2.53	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.21	0.91	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.68	1.70	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.72	1.27	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.19	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.48	1.05	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	9.1	27.9	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-15074	**Date Sampled**	22/10/19	21/10/19	22/10/19	21/10/19	21/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	TP09	TP01	TP10	TP03	TP05
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.10	0.60	1.30	0.10	0.10
Reporting Date: 05/11/2019	**DETS Sample No**	443417	443418	443419	443420	443421

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.15	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.58	< 0.1	< 0.1	< 0.1	0.25
Pyrene	mg/kg	< 0.1	MCERTS	0.52	< 0.1	< 0.1	< 0.1	0.22
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.57	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.20	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.56	< 0.1	< 0.1	< 0.1	0.38
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.21	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.42	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.20	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	3.5	< 1.6	< 1.6	< 1.6	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-15074	**Date Sampled**	22/10/19	22/10/19			
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS05	WS05			
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.10	0.50			
Reporting Date: 05/11/2019	**DETS Sample No**	443422	443423			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	0.15	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	0.12	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.28	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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Soil Analysis Certificate - TPH LQM Banded							
DETS Report No: 19-15074	**Date Sampled**	21/10/19	22/10/19	22/10/19	22/10/19	21/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS01	WS04	TP06	TP06	TP01
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.80	0.20	0.10	0.50	0.60
Reporting Date: 05/11/2019	**DETS Sample No**	443412	443413	443415	443416	443418

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C44)	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	27	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	36	< 10	< 10
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (>C5 - C44)	mg/kg	< 30	NONE	< 30	< 30	63	< 30	< 30
Total >C5 - C44	mg/kg	< 60	NONE	< 60	< 60	63	< 60	< 60

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 19-15074	**Date Sampled**	21/10/19	22/10/19	22/10/19	22/10/19	21/10/19
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS01	WS04	TP06	TP06	TP01
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.80	0.20	0.10	0.50	0.60
Reporting Date: 05/11/2019	**DETS Sample No**	443412	443413	443415	443416	443418

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 19-15074	**Date Sampled**	21/10/19	22/10/19	21/10/19		
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS01	WS04	TP01		
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.80	0.20	0.60		
Reporting Date: 05/11/2019	**DETS Sample No**	443412	443413	443418		

Determinand	Unit	RL	Accreditation					
Phenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
1,2,4-Trichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
Nitrobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
0-Cresol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
bis(2-chloroethoxy)methane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
bis(2-chloroethyl)ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
2,4-Dichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
2-Chlorophenol	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
1,3-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
1,4-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
1,2-Dichlorobenzene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
2,4-Dimethylphenol	mg/kg	< 0.15	ISO17025	< 0.15	< 0.15	< 0.15		
Isophorone	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
Hexachloroethane	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
p-Cresol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15		
2,4,6-Trichlorophenol	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
2,4,5-Trichlorophenol	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15		
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
2-Methylnaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
Hexachlorobutadiene	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
2,6-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
2-Chloronaphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
4-Chloroanaline	mg/kg	< 0.15	NONE	< 0.15	< 0.15	< 0.15		
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
4-Bromophenyl phenyl ether	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Hexachlorobenzene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
2,4-Dinitrotoluene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Diethyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dibenzofuran	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Azobenzene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
Dibutyl phthalate	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
Carbazole	mg/kg	< 0.1	ISO17025	< 0.1	< 0.1	< 0.1		
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	MCERTS	< 0.15	< 0.15	< 0.15		
Benzyl butyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Di-n-octyl phthalate	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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Soil Analysis Certificate - Organochlorine Pesticides						
DETS Report No: 19-15074	**Date Sampled**	21/10/19	22/10/19	21/10/19		
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS01	TP06	TP03		
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	0.10	0.10	0.10		
Reporting Date: 05/11/2019	**DETS Sample No**	443411	443415	443420		

Determinand	Unit	RL	Accreditation					
Aldrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
alpha-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
beta-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
cis-chlordane	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
delta-HCH	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Dieldrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Endosulfan A	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Endosulfan B	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Endrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
gamma-HCH (Lindane)	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Heptachlor	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Heptachlor epoxide	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Hexachlorobenzene (HCB)	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Isodrin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Methoxychlor	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
o,p' - DDD	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
o,p' - DDE	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
o,p' - DDT	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
p,p' - DDD	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
p,p' - DDE	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
p,p' - DDT	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
trans-chlordane	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		
Trifluralin	mg/kg	< 0.02	NONE	< 0.02	< 0.02	< 0.02		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

					Landfill Waste Acceptance Criteria Limits		
DETS Report No: 19-15074	**Date Sampled**	22/10/19			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
BRD Environmental Ltd	**Time Sampled**	None Supplied					
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	TP09					
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied					
Order No: None Supplied	**Depth (m)**	1.00					
Reporting Date: 05/11/2019	**DETS Sample No**	443424					

Determinand	**Unit**	**MDL**					
TOC[MU]	%	< 0.1	0.1			3%	5%	6%
Loss on Ignition	%	< 0.01	1.26			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	7.6			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	< 0.02	< 0.02		< 0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]	< 0.001	< 0.001		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	< 0.006	< 0.006		< 0.06	0.06	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	4	1		14	800	15000	25000
Fluoride[U]	0.6	0.5		5.1	10	150	500
Sulphate[U]	10	2		22	1000	20000	50000
TDS	74	36		384	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	7.7	10.6		104	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.20						
Dry Matter (%)	89.4						
Moisture (%)	12						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.11						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Bulk Analysis Certificate						
DETS Report No: 19-15074	**Date Sampled**	22/10/19				
BRD Environmental Ltd	**Time Sampled**	None Supplied				
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	SS01				
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	0.05				
Reporting Date: 05/11/2019	**DETS Sample No**	443414				

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Type (S)	PLM Result	N/a	**ISO17025**	Chrysotile				
Sample Matrix (S)	Material Type	N/a	NONE	Cement				

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification) that is in accordance with the Health and Safety Executive HSG 248 Appendix 2.

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

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

RL: Reporting Limit

Subcontracted analysis (S)

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-15074	
BRD Environmental Ltd	
Site Reference: Clay Lane, Fishbourne	
Project / Job Ref: BRD3511	
Order No: None Supplied	
Reporting Date: 05/11/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
443411	WS01	None Supplied	0.10	10	Brown loamy sand with stones and vegetation
443412	WS01	None Supplied	0.80	14.9	Brown sandy clay with stones
443413	WS04	None Supplied	0.20	19.5	Black loamy sand with stones and vegetation
443415	TP06	None Supplied	0.10	15.2	Black loamy sand with stones and vegetation
443416	TP06	None Supplied	0.50	18.4	Brown loamy sand with stones
443417	TP09	None Supplied	0.10	19.4	Brown loamy clay with stones
443418	TP01	None Supplied	0.60	8.4	Brown sandy clay with stones
443419	TP10	None Supplied	1.30	18	Brown loamy clay with stones
443420	TP03	None Supplied	0.10	16	Brown loamy sand with stones and vegetation
443421	TP05	None Supplied	0.10	12.8	Brown loamy sand with vegetation
443422	WS05	None Supplied	0.10	9.3	Brown loamy sand with stones and brick
443423	WS05	None Supplied	0.50	10.3	Brown loamy clay with stones and vegetation
443424	TP09	None Supplied	1.00	10.6	Brown sandy clay with stones
443425	TP10	None Supplied	1.60	11.6	Brown loamy clay with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 19-15074

BRD Environmental Ltd

Site Reference: Clay Lane, Fishbourne

Project / Job Ref: BRD3511

Order No: None Supplied

Reporting Date: 05/11/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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DETS Report No: 19-15440

Site Reference:	Clay Lane, Fishbourne
Project / Job Ref:	BRD3511
Order No:	None Supplied
Sample Receipt Date:	31/10/2019
Sample Scheduled Date:	31/10/2019
Report Issue Number:	1
Reporting Date:	06/11/2019

Authorised by:

Dave Ashworth
Technical Manager

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Water Analysis Certificate						
DETS Report No: 19-15440	**Date Sampled**	29/10/19	29/10/19	29/10/19	29/10/19	
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS02	WS05	WS07	WS08	
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	**Depth (m)**	3.21	3.88	0.94	2.18	
Reporting Date: 06/11/2019	**DETS Sample No**	444824	444825	444826	444827	

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	ISO17025	7.1	7.8	7.6	7.4
Sulphate as SO_4	mg/l	< 1	ISO17025	602	1890	302	102

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Wate Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-15440
BRD Environmental Ltd
Site Reference: Clay Lane, Fishbourne
Project / Job Ref: BRD3511
Order No: None Supplied
Reporting Date: 06/11/2019

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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Banbury
Oxfordshire
OX16 5HT

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 21-11189

Site Reference:	Clay Lane, Fishbourne
Project / Job Ref:	BRD3511
Order No:	None Supplied
Sample Receipt Date:	14/09/2021
Sample Scheduled Date:	14/09/2021
Report Issue Number:	1
Reporting Date:	20/09/2021

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.

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Soil Analysis Certificate						
DETS Report No: 21-11189	**Date Sampled**	10/09/21	10/09/21	10/09/21	10/09/21	10/09/21
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	TP102	TP103	TP104	TP105	TP105
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.20	0.20	0.30	0.30	0.60
Reporting Date: 20/09/2021	**DETS Sample No**	564222	564223	564224	564225	564226

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Detected				
Sample Matrix (S)	Material Type	N/a	NONE	Chrysotile present as fibre bundles				
Asbestos Type (S)	PLM Result	N/a	ISO17025	Chrysotile				
Asbestos Quantification (S)	%	< 0.001	ISO17025	0.002	< 0.001	< 0.001	< 0.001	< 0.001
pH	pH Units	N/a	MCERTS		7.2		7.0	
Total Sulphate as SO_4	mg/kg	< 200	MCERTS					
Total Sulphate as SO_4	%	< 0.02	MCERTS					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		251		25	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		0.25		0.02	
Total Sulphur	%	< 0.02	NONE					
Organic Matter (SOM)	%	< 0.1	NONE		10		6.5	
Arsenic (As)	mg/kg	< 2	MCERTS		9		15	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS		1.3		2.2	
Chromium (Cr)	mg/kg	< 2	MCERTS		19		22	
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2		< 2	
Copper (Cu)	mg/kg	< 4	MCERTS		85		96	
Lead (Pb)	mg/kg	< 3	MCERTS	732	252	199	1720	98
Mercury (Hg)	mg/kg	< 1	MCERTS		2.3		< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS		28		23	
Selenium (Se)	mg/kg	< 2	MCERTS		< 3		< 3	
Zinc (Zn)	mg/kg	< 3	MCERTS	767	898	401	2020	116

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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Soil Analysis Certificate						
DETS Report No: 21-11189	**Date Sampled**	09/09/21	08/09/21	10/09/21	10/09/21	10/09/21
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS107	WS104	BH102	BH102	BH102
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: None Supplied	**Depth (m)**	0.20	0.20	7.80	11.60	16.85
Reporting Date: 20/09/2021	**DETS Sample No**	564228	564229	564230	564231	564232

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen (S)	N/a	N/a	ISO17025					
Sample Matrix (S)	Material Type	N/a	NONE					
Asbestos Type (S)	PLM Result	N/a	ISO17025					
Asbestos Quantification (S)	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	7.0	6.0	6.9	7.4	7.4
Total Sulphate as SO_4	mg/kg	< 200	MCERTS			1088	903	796
Total Sulphate as SO_4	%	< 0.02	MCERTS			0.11	0.09	0.08
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	< 10	10	334	350	197
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	< 0.01	0.01	0.33	0.35	0.20
Total Sulphur	%	< 0.02	NONE			0.60	0.92	0.54
Organic Matter (SOM)	%	< 0.1	NONE	9.2	7			
Arsenic (As)	mg/kg	< 2	MCERTS	10	8			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	20	24			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	33	16			
Lead (Pb)	mg/kg	< 3	MCERTS	128	77			
Mercury (Hg)	mg/kg	< 1	MCERTS	1.5	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	12	13			
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	178	60			

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 21-11189	**Date Sampled**	09/09/21	09/09/21	09/09/21		
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	BH101	BH101	BH101		
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	**Depth (m)**	3.00	7.98	14.00		
Reporting Date: 20/09/2021	**DETS Sample No**	564233	564234	564235		

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025					
Sample Matrix (S)	Material Type	N/a	NONE					
Asbestos Type (S)	PLM Result	N/a	ISO17025					
Asbestos Quantification (S)	%	< 0.001	ISO17025					
pH	pH Units	N/a	MCERTS	7.2	7.2	7.5		
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	14870	2541	648		
Total Sulphate as SO_4	%	< 0.02	MCERTS	1.49	0.25	0.06		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	1990	797	58		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	1.99	0.80	0.06		
Total Sulphur	%	< 0.02	NONE	0.60	0.53	0.04		
Organic Matter (SOM)	%	< 0.1	NONE					
Arsenic (As)	mg/kg	< 2	MCERTS					
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS					
Mercury (Hg)	mg/kg	< 1	MCERTS					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 2	MCERTS					
Zinc (Zn)	mg/kg	< 3	MCERTS					

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Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-11189	Date Sampled	10/09/21	10/09/21	09/09/21	08/09/21	
BRD Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Clay Lane, Fishbourne	TP / BH No	TP103	TP105	WS107	WS104	
Project / Job Ref: BRD3511	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: None Supplied	Depth (m)	0.20	0.30	0.20	0.20	
Reporting Date: 20/09/2021	DETS Sample No	564223	564225	564228	564229	

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.60	0.23	< 0.1	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	1.03	0.61	0.29	< 0.1	
Pyrene	mg/kg	< 0.1	MCERTS	0.89	0.53	0.25	< 0.1	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.37	0.28	0.13	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	0.41	0.32	0.13	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.45	0.37	0.13	< 0.1	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.18	0.14	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.34	0.26	0.12	< 0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.27	0.23	< 0.1	< 0.1	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.23	0.22	< 0.1	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	4.8	3.2	< 1.6	< 1.6	

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Soil Analysis Certificate - TPH LQM Banded							
DETS Report No: 21-11189	**Date Sampled**	10/09/21	10/09/21			
BRD Environmental Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	TP103	TP105			
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	0.20	0.30			
Reporting Date: 20/09/2021	**DETS Sample No**	564223	564225			

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2			
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2			
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3			
Aliphatic >C16 - C35	mg/kg	< 10	MCERTS	< 10	33			
Aliphatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10			
Aliphatic (C5 - C44)	mg/kg	< 30	NONE	< 30	33			
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10			
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10			
Aromatic (>C5 - C44)	mg/kg	< 30	NONE	< 30	< 30			
Total >C5 - C44	mg/kg	< 60	NONE	< 60	< 60			

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-11189	Date Sampled	10/09/21	10/09/21			
BRD Environmental Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Clay Lane, Fishbourne	TP / BH No	TP103	TP105			
Project / Job Ref: BRD3511	Additional Refs	None Supplied	None Supplied			
Order No: None Supplied	Depth (m)	0.20	0.30			
Reporting Date: 20/09/2021	DETS Sample No	564223	564225			

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2			
Toluene	ug/kg	< 5	MCERTS	< 5	< 5			
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2			
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2			
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2			
MTBE	ug/kg	< 5	MCERTS	< 5	< 5			

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Soil Analysis Certificate - Organochlorine Pesticides							
DETS Report No: 21-11189	**Date Sampled**	08/09/21					
BRD Environmental Ltd	**Time Sampled**	None Supplied					
Site Reference: Clay Lane, Fishbourne	**TP / BH No**	WS104					
Project / Job Ref: BRD3511	**Additional Refs**	None Supplied					
Order No: None Supplied	**Depth (m)**	0.20					
Reporting Date: 20/09/2021	**DETS Sample No**	564229					

Determinand	**Unit**	**RL**	**Accreditation**					
Aldrin	mg/kg	< 0.02	NONE	< 0.02				
alpha-HCH	mg/kg	< 0.02	NONE	< 0.02				
beta-HCH	mg/kg	< 0.02	NONE	< 0.02				
cis-chlordane	mg/kg	< 0.02	NONE	< 0.02				
delta-HCH	mg/kg	< 0.02	NONE	< 0.02				
Dieldrin	mg/kg	< 0.02	NONE	< 0.02				
Endosulfan A	mg/kg	< 0.02	NONE	< 0.02				
Endosulfan B	mg/kg	< 0.02	NONE	< 0.02				
Endrin	mg/kg	< 0.02	NONE	< 0.02				
gamma-HCH (Lindane)	mg/kg	< 0.02	NONE	< 0.02				
Heptachlor	mg/kg	< 0.02	NONE	< 0.02				
Heptachlor epoxide	mg/kg	< 0.02	NONE	< 0.02				
Hexachlorobenzene (HCB)	mg/kg	< 0.02	NONE	< 0.02				
Isodrin	mg/kg	< 0.02	NONE	< 0.02				
Methoxychlor	mg/kg	< 0.02	NONE	< 0.02				
o,p' - DDD	mg/kg	< 0.02	NONE	< 0.02				
o,p' - DDE	mg/kg	< 0.02	NONE	< 0.02				
o,p' - DDT	mg/kg	< 0.02	NONE	< 0.02				
p,p' - DDD	mg/kg	< 0.02	NONE	< 0.02				
p,p' - DDE	mg/kg	< 0.02	NONE	< 0.02				
p,p' - DDT	mg/kg	< 0.02	NONE	< 0.02				
trans-chlordane	mg/kg	< 0.02	NONE	< 0.02				
Trifluralin	mg/kg	< 0.02	NONE	< 0.02				

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 21-11189		**Date Sampled**	10/09/21			**Landfill Waste Acceptance Criteria Limits**		
BRD Environmental Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Clay Lane, Fishbourne		**TP / BH No**	TP105					
Project / Job Ref: BRD3511		**Additional Refs**	None Supplied					
Order No: None Supplied		**Depth (m)**	0.30					
Reporting Date: 20/09/2021		**DETS Sample No**	564225					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	3.8			**3%**	5%	6%
Loss on Ignition	%	< 0.01	20.40			--	--	**10%**
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	34			500	--	--
Total PAH[MU]	mg/kg	< 1.7	3.2			100	--	--
pH[MU]	pH Units	N/a	7.0			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.8			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	0.07	0.06		0.6	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum[U]	0.008	0.006		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	0.024	0.018		0.18	**0.06**	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.05	0.1	0.5	7
Zinc[U]	0.056	0.041		0.4	4	50	200
Chloride[U]	5	3		31	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	17	7		79	1000	20000	50000
TDS	160	111		1155	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	17.5	11.2		118	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.20						
Dry Matter (%)	85.7						
Moisture (%)	16.8						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.16						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 21-11189	
BRD Environmental Ltd	
Site Reference: Clay Lane, Fishbourne	
Project / Job Ref: BRD3511	
Order No: None Supplied	
Reporting Date: 20/09/2021	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
564222	TP102	None Supplied	0.20	13	Brown sandy clay with stones and vegetation
564223	TP103	None Supplied	0.20	11.4	Brown sandy clay with vegetation
564224	TP104	None Supplied	0.30	11.1	Brown sandy clay with stones and vegetation
564225	TP105	None Supplied	0.30	14.3	Black loamy sand with stones and brick
564226	TP105	None Supplied	0.60	12.6	Brown sandy clay with stones
& 564228	WS107	None Supplied	0.20	14.4	Brown sandy clay
& 564229	WS104	None Supplied	0.20	11	Brown sandy clay with vegetation
564230	BH102	None Supplied	7.80	11.6	Grey clay with vegetation
564231	BH102	None Supplied	11.60	9.2	Grey clay
564232	BH102	None Supplied	16.85	9.5	Brown clay
564233	BH101	None Supplied	3.00	14.8	Brown clay
564234	BH101	None Supplied	7.98	8.8	Brown sandy clay
564235	BH101	None Supplied	14.00	6.5	Light brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
& samples received in inappropriate containers for hydrocarbon analysis

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 21-11189
BRD Environmental Ltd
Site Reference: Clay Lane, Fishbourne
Project / Job Ref: BRD3511
Order No: None Supplied
Reporting Date: 20/09/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING
4480

Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 21-11189
BRD Environmental Ltd
Site Reference: Clay Lane, Fishbourne
Project / Job Ref: BRD3511
Order No: None Supplied
Reporting Date: 20/09/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	20.0	%
Loss on Ignition	Soil	BS EN 12457	35.0	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	23.0	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	11.6	%
pH	Soil	BS EN 12457	0.28	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	18.7	%
Barium	Leachate	BS EN 12457	11.6	%
Cadmium	Leachate	BS EN 12457	20.3	%
Chromium	Leachate	BS EN 12457	18.3	%
Copper	Leachate	BS EN 12457	24.3	%
Mercury	Leachate	BS EN 12457	23.7	%
Molybdenum	Leachate	BS EN 12457	14.7	%
Nickel	Leachate	BS EN 12457	16.1	%
Lead	Leachate	BS EN 12457	15.7	%
Antimony	Leachate	BS EN 12457	17.9	%
Selenium	Leachate	BS EN 12457	22.0	%
Zinc	Leachate	BS EN 12457	17.4	%
Chloride	Leachate	BS EN 12457	15.3	%
Fluoride	Leachate	BS EN 12457	16.4	%
Sulphate	Leachate	BS EN 12457	20.6	%
TDS	Leachate	BS EN 12457	12.0	%
Phenol Index	Leachate	BS EN 12457	14.0	%
DOC	Leachate	BS EN 12457	10.0	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	35.0	%
pH	Soil	BS 3882: 2015	0.14	Units
Carbonate	Soil	BS 3882: 2015	16.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16.0	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 07/11/2019

0998

Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

Client:

BRD Environmental Ltd

BRD Environmental Ltd
Hawthorne Villa
1 Old Parr Road
Banbury
Oxfordshire
OX16 5HT

Soil Property Testing Ltd

15, 16, 18 Halcyon Court, St Margaret's Way,
Stukeley Meadows, Huntingdon,
Cambridgeshire, PE29 6DG

Tel: 01480 455579
Email: enquiries@soilpropertytesting.com
Website: www.soilpropertytesting.com

Samples Submitted By:

BRD Environmental Ltd

Samples Labelled:

Clay Lane, Fishbourne

Approved Signatories:

- ☑ **J.C. Garner B.Eng (Hons) FGS** — Technical Director & Quality Manager
- ☐ **S.P. Townend FGS** — Chairman
- ☐ **W. Johnstone** — Materials Lab Manager
- ☐ **D. Sabnis** — Operations Manager

Date Received: 25/10/2019

Samples Tested Between: 25/10/2019 **and** 07/11/2019

Remarks:

For the attention of Ian Hibberd
Your Reference No: BRD3511

Notes:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. (a) UKAS - United Kingdom Accreditation Service.
   (b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 07/11/2019

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Contract	**Clay Lane, Fishbourne**		
Serial No.	**36039**	**Target Date**	07/11/2019
Scheduled By	BRD Environmental Ltd		

SCHEDULE OF LABORATORY TESTS

Schedule Remarks

Bore Hole No.	Type	Sample Ref.	Top Depth	Water Content (BSEN)	Liquid/Plastic Limits	Wet Sieve Preparation	Particle Size Distribution (BS1377)														Sample Remarks
TP01	D	2	1.40	1	1																
TP02	D	1	0.60	1	1	1															
TP02	D	2	1.40	1	1																
TP02	D	3	2.70	1	1																
TP03	D	1	0.90	1	1	1															
TP04	D	1	0.90	1	1	1															
TP06	D	2	1.40	1	1	1															
TP06	D	3	2.80	1	1																
TP07	D	2	1.40	1	1																
TP11	B	1	0.80				1														
WS02	D	1	1.10	1	1																
WS02	D	5	4.50	1	1																
WS05	D	1	1.50	1	1																
WS07	D	3	2.80	1	1																
Totals				**13**	**13**	**4**	**1**														**End of Schedule**

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 07/11/2019

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Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
TP01	1.40	D	2	**25.1**	67	24	43	0.03	From Natural	0 (A)		94	Stiff closely fissured orangish brown CLAY with occasional light bluish grey mottling, calcareous aggregations, and rare recently active and decayed roots.	CH
TP02	0.60	D	1	**21.2**	44	17	27	0.16	Wet Sieved	23 (M)	27.5*	24	Firm yellowish brown slightly gravelly slightly sandy silty CLAY with occasional light bluish grey and black mottling, and recently active roots. Gravel is brown and white fine to coarse angular to subangular chert.	CI
TP02	1.40	D	2	**23.4**	74	24	50	-0.01	From Natural	0 (A)		95	Stiff closely fissured yellowish brown CLAY with occasional bluish grey mottling, decayed roots, and calcareous aggregations.	CV
TP02	2.70	D	3	**32.8**	75	28	47	0.10	From Natural	0 (A)		93	Firm closely fissured brown CLAY with occasional bluish grey mottling, and rare decayed roots.	CV
TP03	0.90	D	1	**19.7**	45	18	27	0.06	Wet Sieved	36 (M)	30.7*	27	Firm orangish brown slightly gravelly slightly sandy silty CLAY with occasional light bluish grey mottling, and recently active roots. Gravel is brown and white fine to coarse angular to subangular chert.	CI
TP04	0.90	D	1	**22.5**	50	19	31	0.11	Wet Sieved	20 (M)	28.1*	26	Firm orangish brown slightly gravelly slightly sandy CLAY with occasional recently active roots. Gravel is brown and white fine to medium angular to subangular chert.	CI/CH
TP06	1.40	D	2	**27.3**	72	23	49	0.09	Wet Sieved	21 (M)	34.6*	25	Firm light olive brown slightly gravelly slightly sandy CLAY with occasional bluish grey and orange mottling, and rare recently active roots. Gravel is brown and white fine to medium angular to subangular chert.	CV
TP06	2.80	D	3	**36.6**	80	26	54	0.20	From Natural	0 (A)		24	Firm mottled bluish grey and orange CLAY with occasional recently active and decayed roots.	CV

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2
Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4
Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments: *Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1.

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

TEST REPORT

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Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
TP07	1.40	D	2	**31.4**	75	21	54	0.19	From Natural	0 (A)		24	Firm light olive brown CLAY with occasional light bluish grey and orange mottling, and rare recently active and decayed roots.	CV
WS02	1.10	D	1	**31.1**	84	25	59	0.10	From Natural	0 (A)		24	Stiff olive yellow CLAY with occasional light bluish grey and orange mottling, and rare recently active roots.	CV
WS02	4.50	D	5	**27.8**	75	26	49	0.04	From Natural	0 (A)		24	Stiff fissured dark grey CLAY.	CV
WS05	1.50	D	1	**28.2**	69	24	45	0.09	From Natural	0 (A)		24	Stiff light bluish grey CLAY with occasional orange mottling, rare recently active roots, and calcareous aggregations.	CH
WS07	2.80	D	3	**34.9**	81	30	51	0.10	From Natural	0 (A)		94	Firm closely fissured olive CLAY with occasional bluish grey mottling, and decayed roots.	CV

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2
Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4
Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

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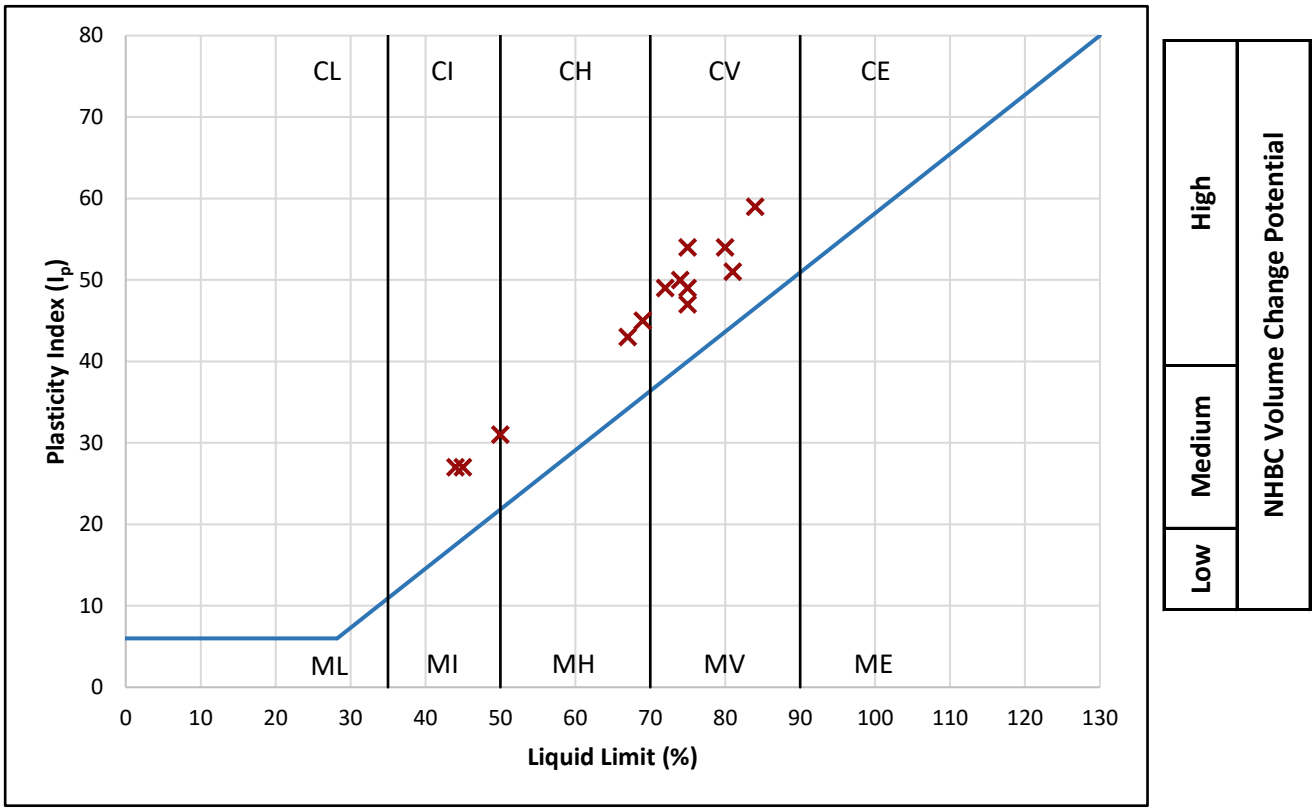
Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART

Plasticity				
Low	Medium	High	Very High	Extremely High



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS1377: Part 2: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 07/11/2019

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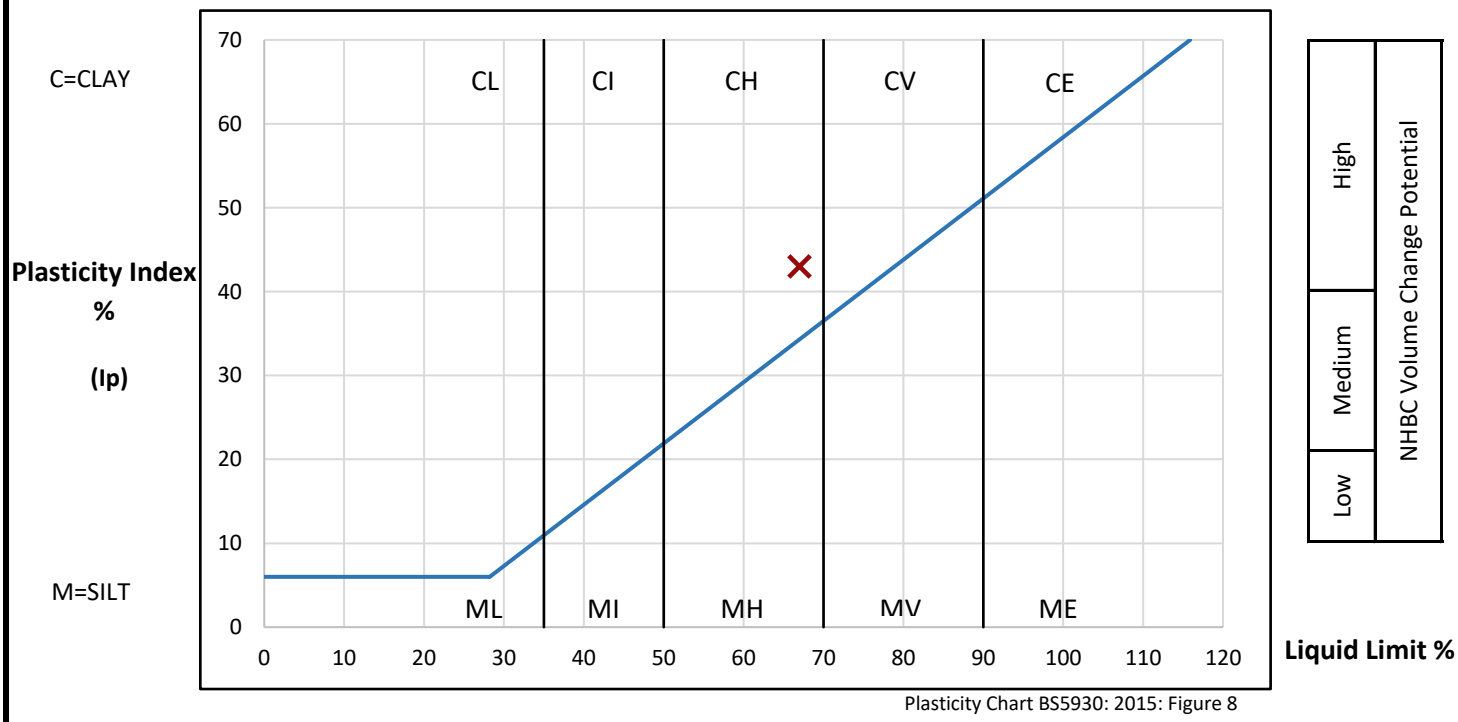
Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP01	1.40	D	2	25.1	Stiff closely fissured orangish brown CLAY with occasional light bluish grey mottling, calcareous aggregations, and rare recently active and decayed roots.	

PREPARATION				Liquid Limit	67 %
Method of preparation		From natural		Plastic Limit	24 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	43 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.03
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	94 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

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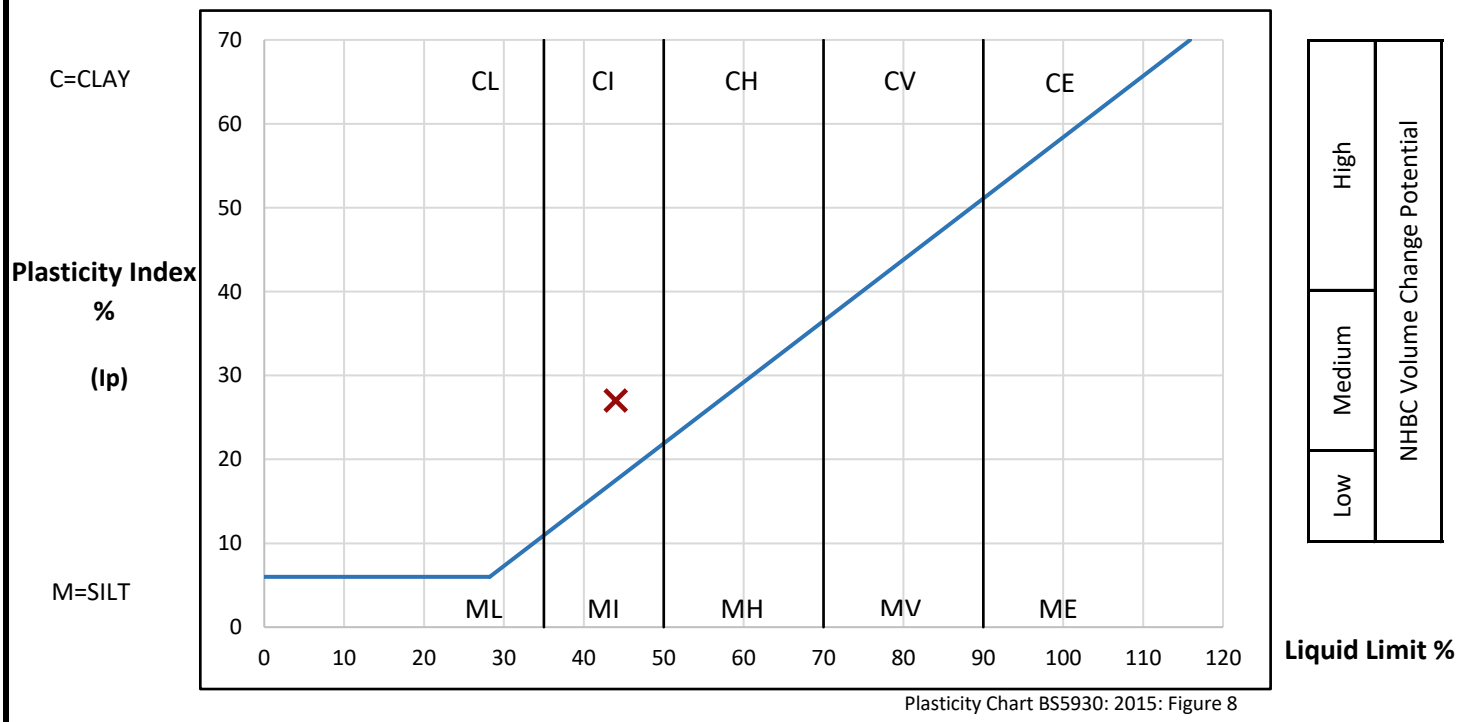
Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP02	0.60	D	1	21.2	Firm yellowish brown slightly gravelly slightly sandy silty CLAY with occasional light bluish grey and black mottling, and recently active roots. Gravel is brown and white fine to coarse angular to subangular chert.	

PREPARATION			Liquid Limit	44 %
Method of preparation	Wet sieved over 0.425mm sieve		Plastic Limit	17 %
Sample retained 0.425mm sieve	(Measured)	23 %	Plasticity Index	27 %
Corrected water content for material passing 0.425mm		27.5 %	Liquidity Index	0.16
Sample retained 2mm sieve	(Measured)	21 %	NHBC Modified (I'p)	21 %
Curing time	24 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

TEST REPORT

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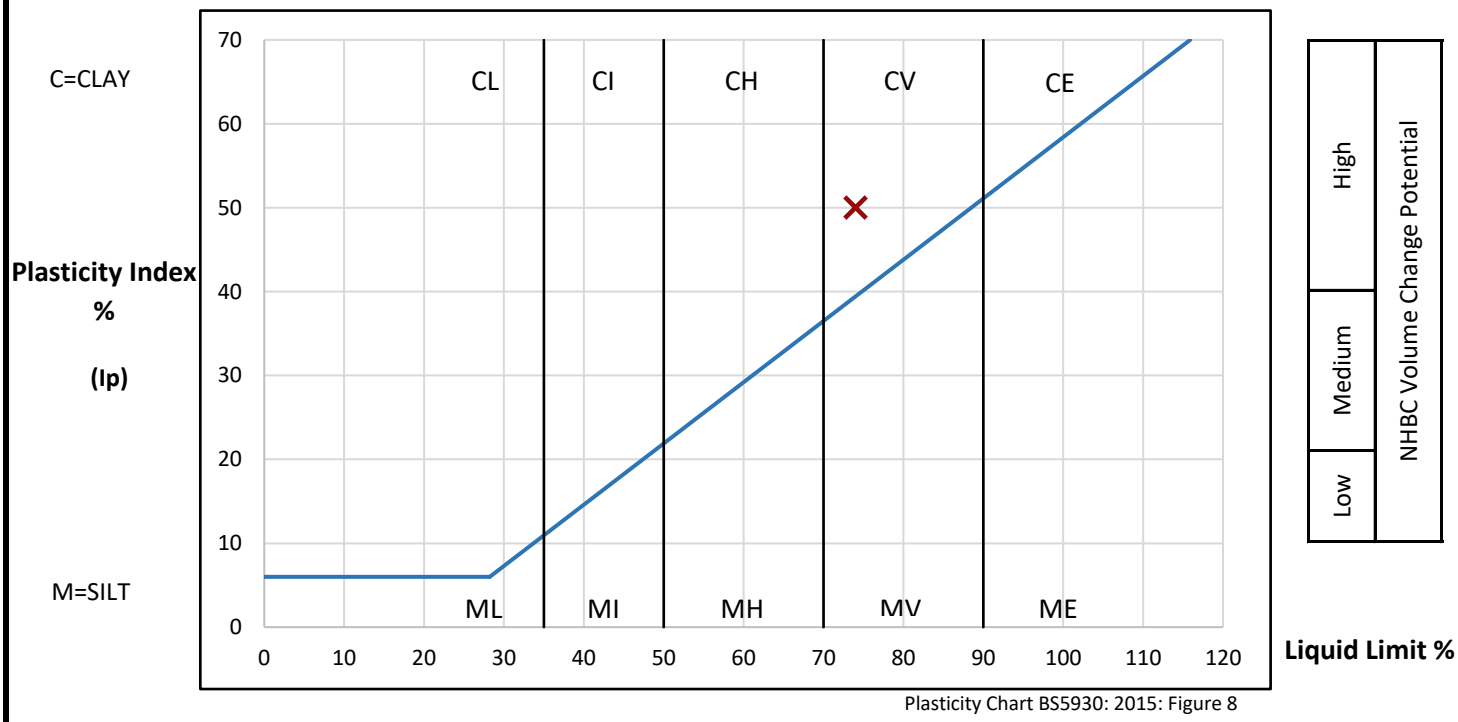
Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP02	1.40	D	2	23.4	Stiff closely fissured yellowish brown CLAY with occasional bluish grey mottling, decayed roots, and calcareous aggregations.	

PREPARATION				Liquid Limit	74 %
Method of preparation		From natural		Plastic Limit	24 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	50 %
Corrected water content for material passing 0.425mm				Liquidity Index	-0.01
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	95 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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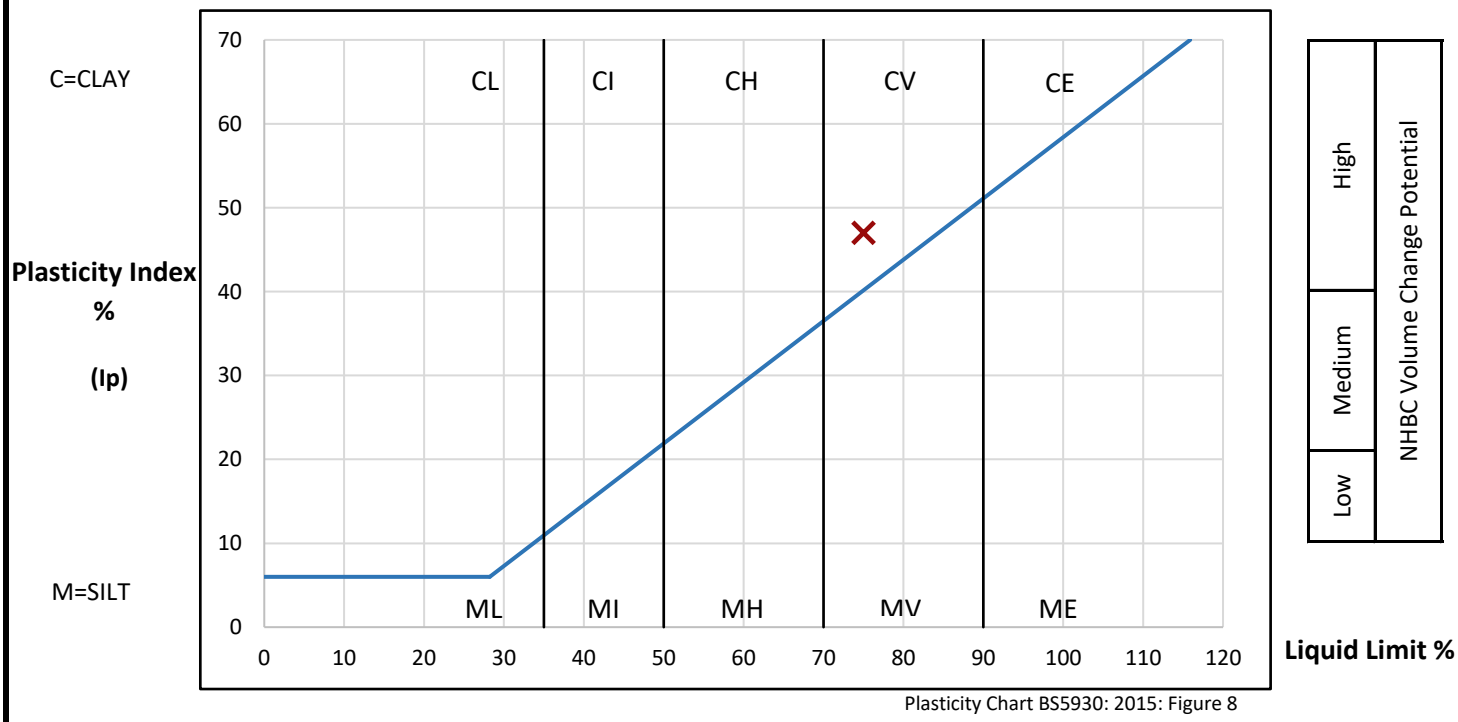
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP02	2.70	D	3	32.8	Firm closely fissured brown CLAY with occasional bluish grey mottling, and rare decayed roots.	

PREPARATION			Liquid Limit	75 %
Method of preparation		From natural	Plastic Limit	28 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	47 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.10
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	93 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

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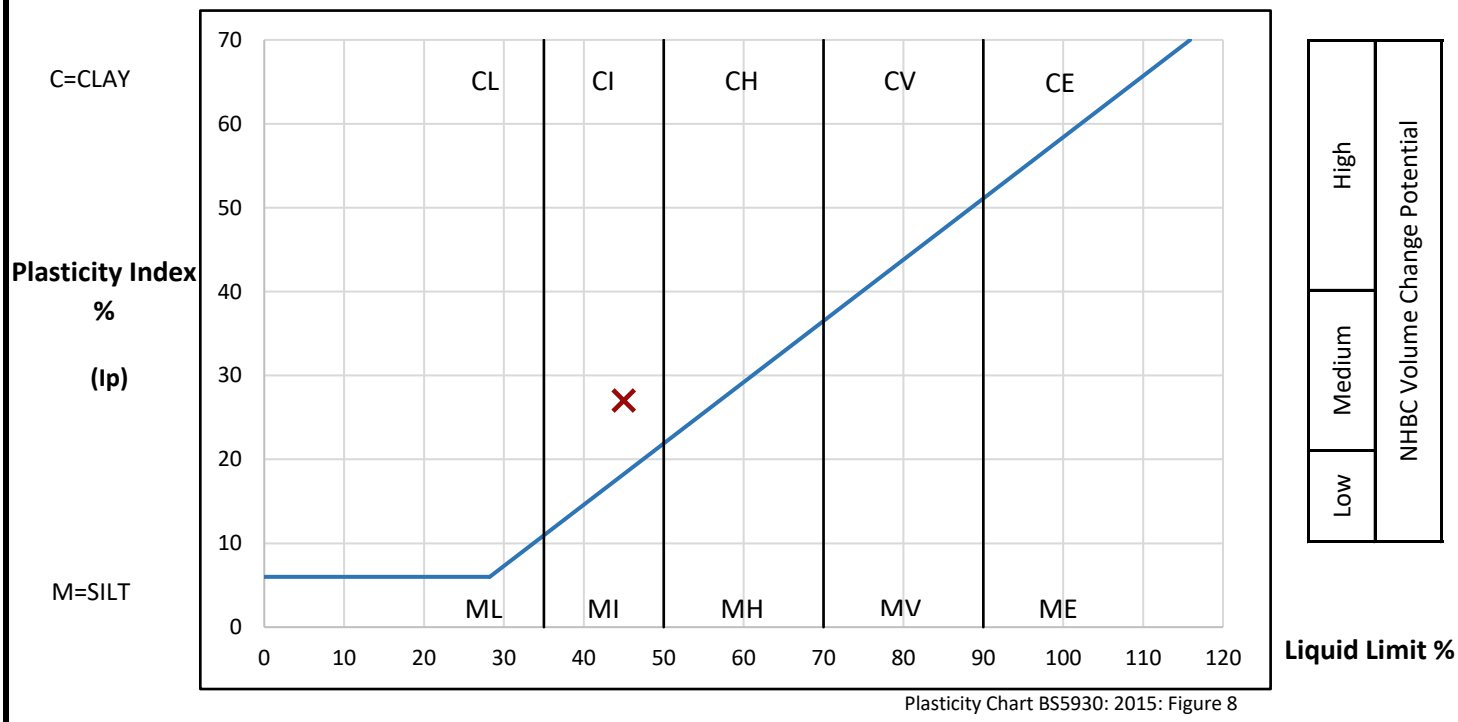
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP03	0.90	D	1	19.7	Firm orangish brown slightly gravelly slightly sandy silty CLAY with occasional light bluish grey mottling, and recently active roots. Gravel is brown and white fine to coarse angular to subangular chert.	

PREPARATION				Liquid Limit	45 %
Method of preparation		Wet sieved over 0.425mm sieve		Plastic Limit	18 %
Sample retained 0.425mm sieve	(Measured)	36 %		Plasticity Index	27 %
Corrected water content for material passing 0.425mm		30.7 %		Liquidity Index	0.06
Sample retained 2mm sieve	(Measured)	31 %		NHBC Modified (I'p)	17 %
Curing time	27 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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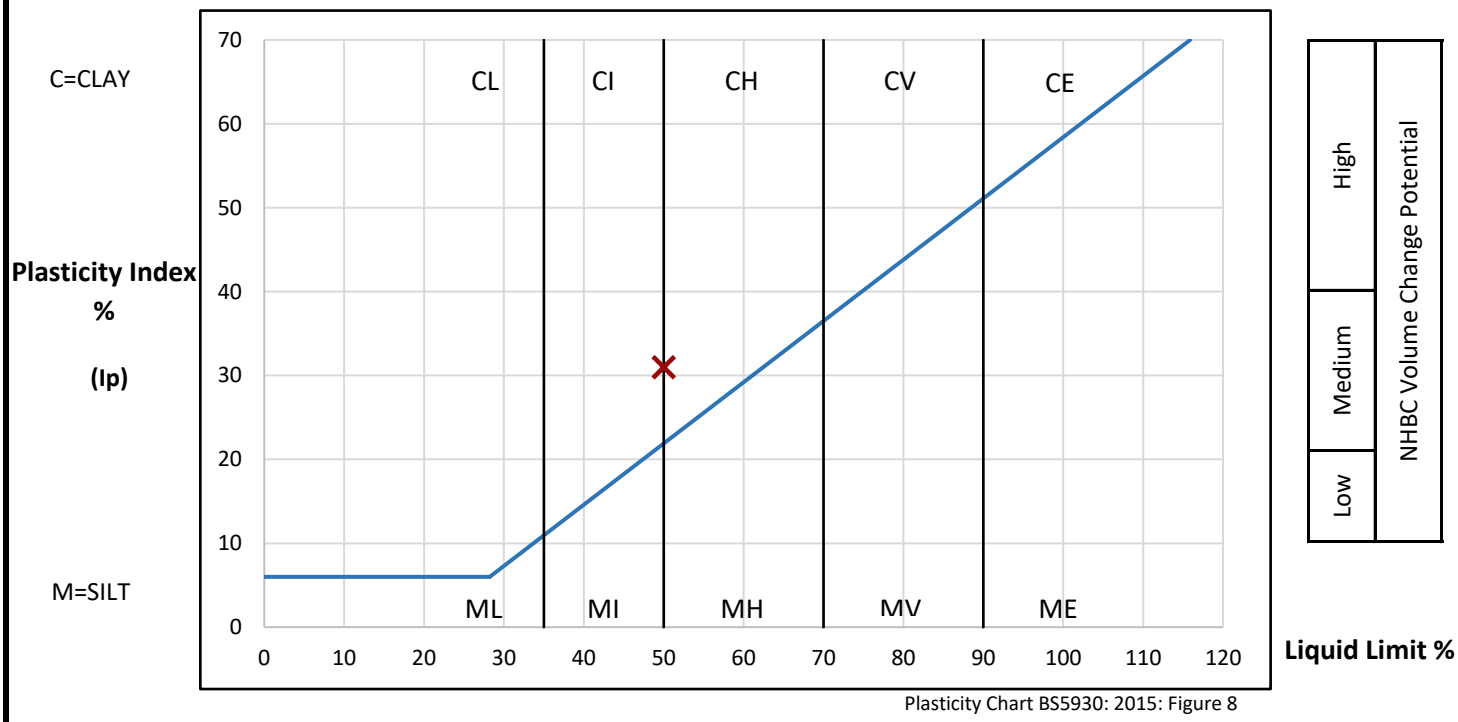
Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP04	0.90	D	1	22.5	Firm orangish brown slightly gravelly slightly sandy CLAY with occasional recently active roots. Gravel is brown and white fine to medium angular to subangular chert.	

PREPARATION					
Method of preparation	Wet sieved over 0.425mm sieve			Liquid Limit	50 %
Sample retained 0.425mm sieve	(Measured)	20 %		Plastic Limit	19 %
Corrected water content for material passing 0.425mm		28.1 %		Plasticity Index	31 %
Sample retained 2mm sieve	(Measured)	18 %		Liquidity Index	0.11
Curing time	26 hrs	Clay Content	Not analysed	NHBC Modified (I'p)	25 %
				Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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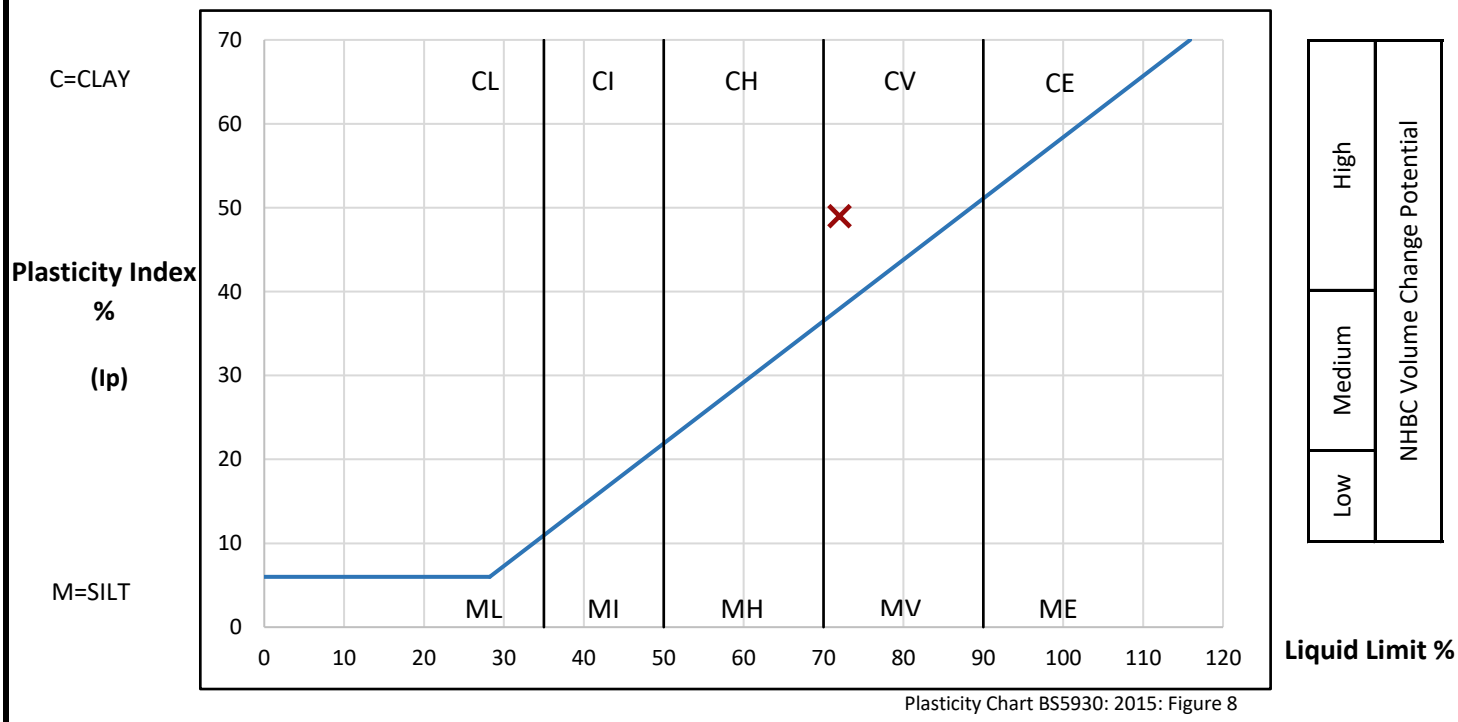
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP06	1.40	D	2	27.3	Firm light olive brown slightly gravelly slightly sandy CLAY with occasional bluish grey and orange mottling, and rare recently active roots. Gravel is brown and white fine to medium angular to subangular chert.	

PREPARATION				Liquid Limit	72 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	23 %
Sample retained 0.425mm sieve	(Measured)	21 %		Plasticity Index	49 %
Corrected water content for material passing 0.425mm		34.6 %		Liquidity Index	0.09
Sample retained 2mm sieve	(Measured)	19 %		NHBC Modified (I'p)	39 %
Curing time	25 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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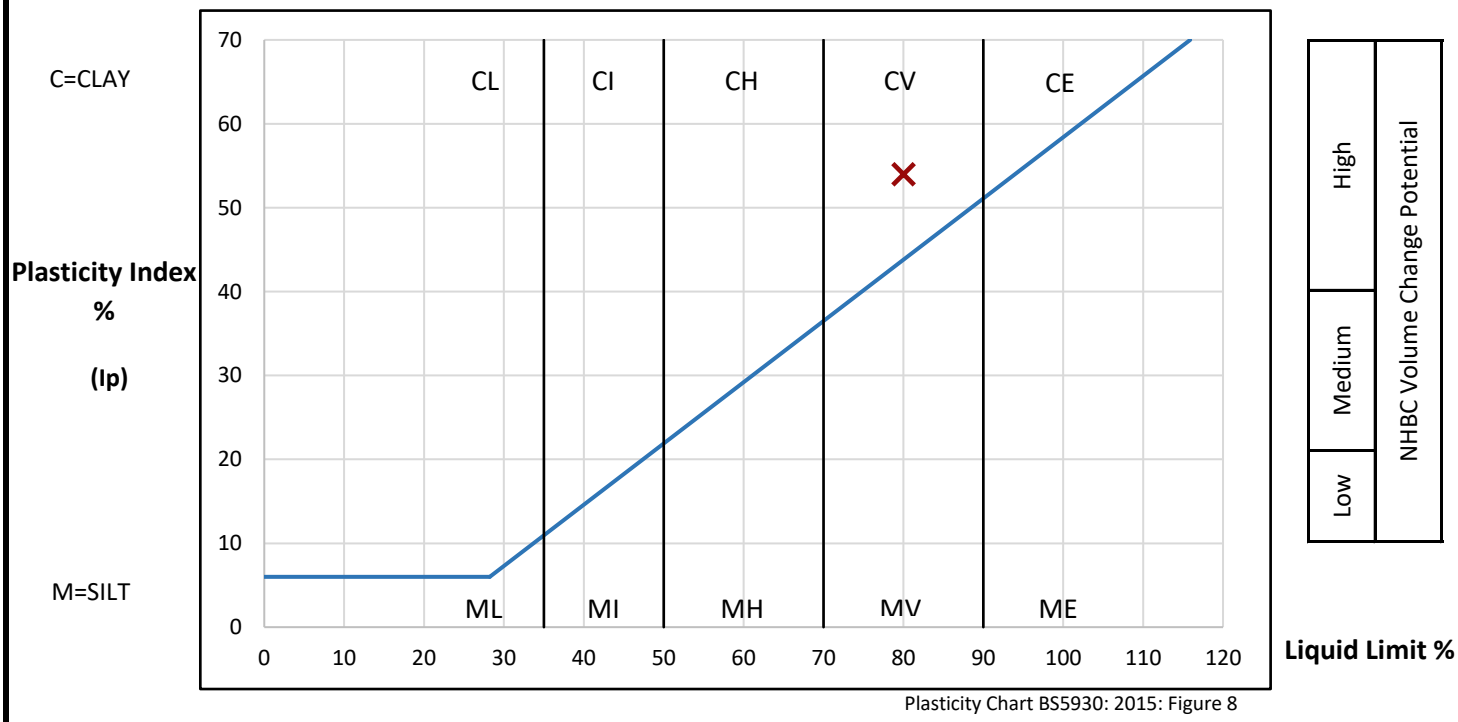
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP06	2.80	D	3	36.6	Firm mottled bluish grey and orange CLAY with occasional recently active and decayed roots.	

PREPARATION				Liquid Limit	80 %
Method of preparation		From natural		Plastic Limit	26 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	54 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.20
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	24 hrs		Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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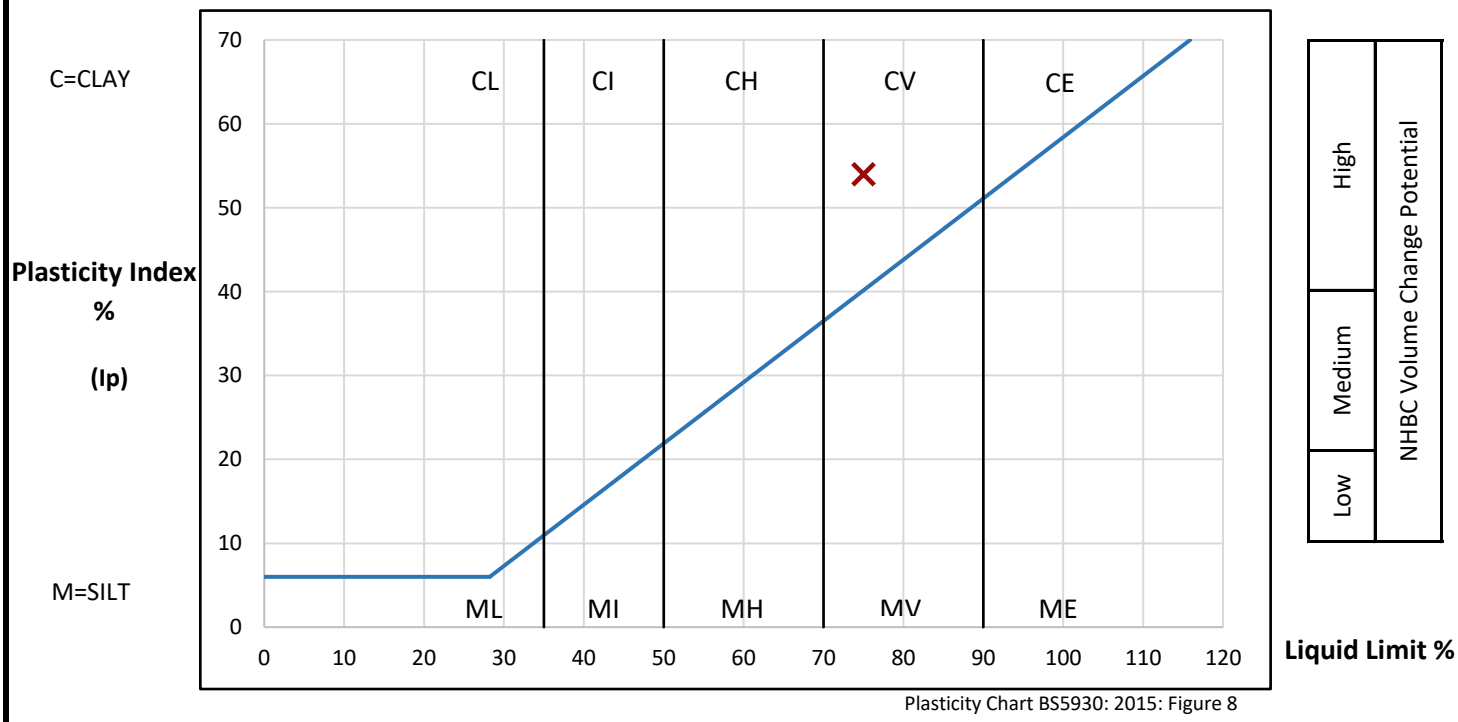
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
TP07	1.40	D	2	31.4	Firm light olive brown CLAY with occasional light bluish grey and orange mottling, and rare recently active and decayed roots.	

PREPARATION				Liquid Limit	75 %
Method of preparation		From natural		Plastic Limit	21 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	54 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.19
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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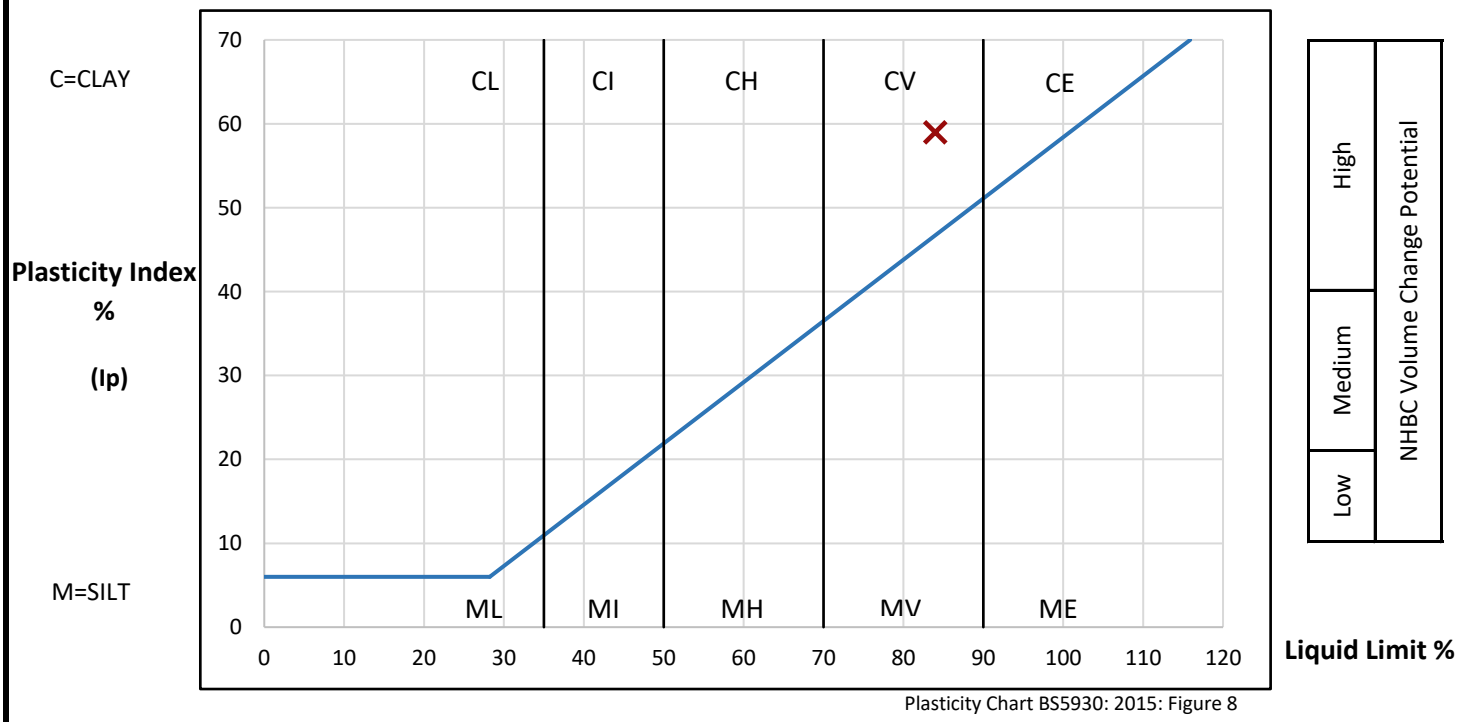
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS02	1.10	D	1	31.1	Stiff olive yellow CLAY with occasional light bluish grey and orange mottling, and rare recently active roots.	

PREPARATION				Liquid Limit	84 %
Method of preparation		From natural		Plastic Limit	25 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	59 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.10
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments:

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Contract	**Clay Lane, Fishbourne**
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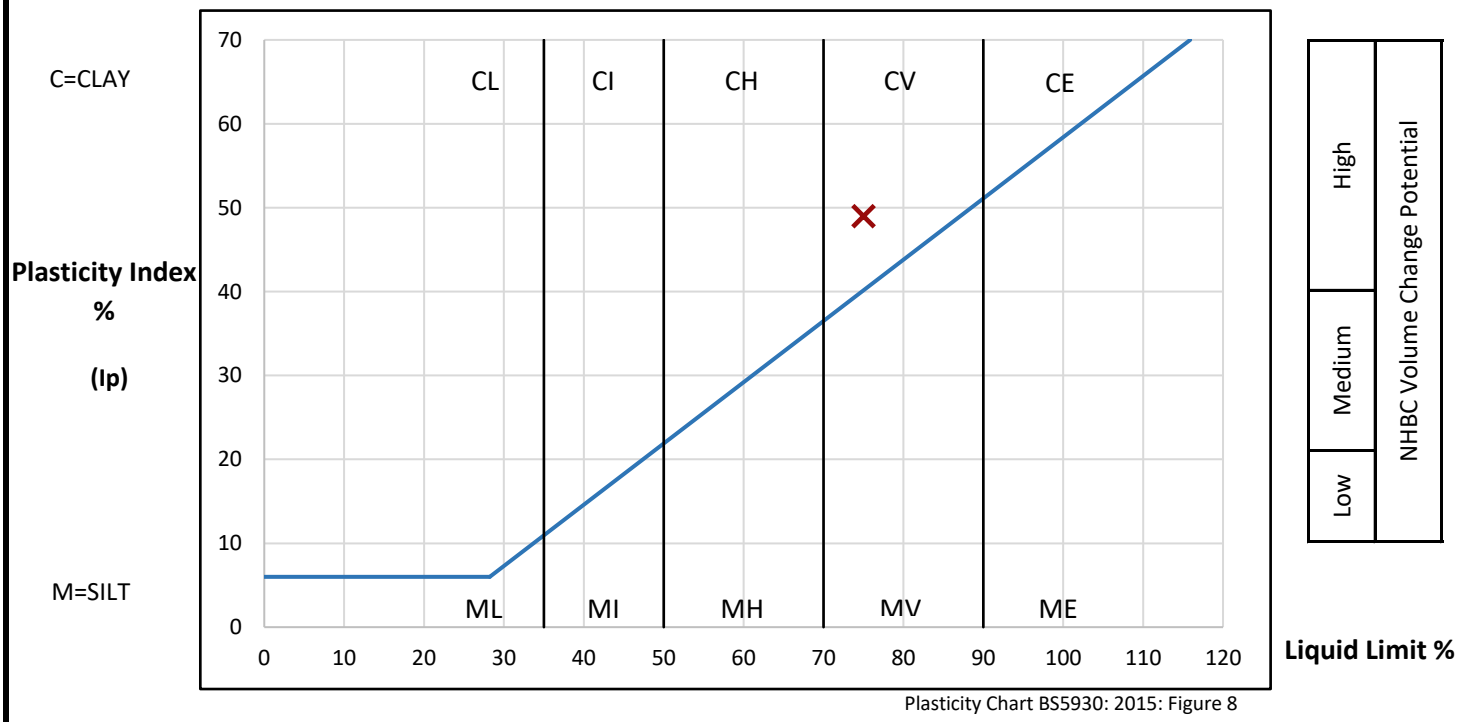
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS02	4.50	D	5	27.8	Stiff fissured dark grey CLAY.	

PREPARATION			Liquid Limit	75 %
Method of preparation		From natural	Plastic Limit	26 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	49 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.04
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	24 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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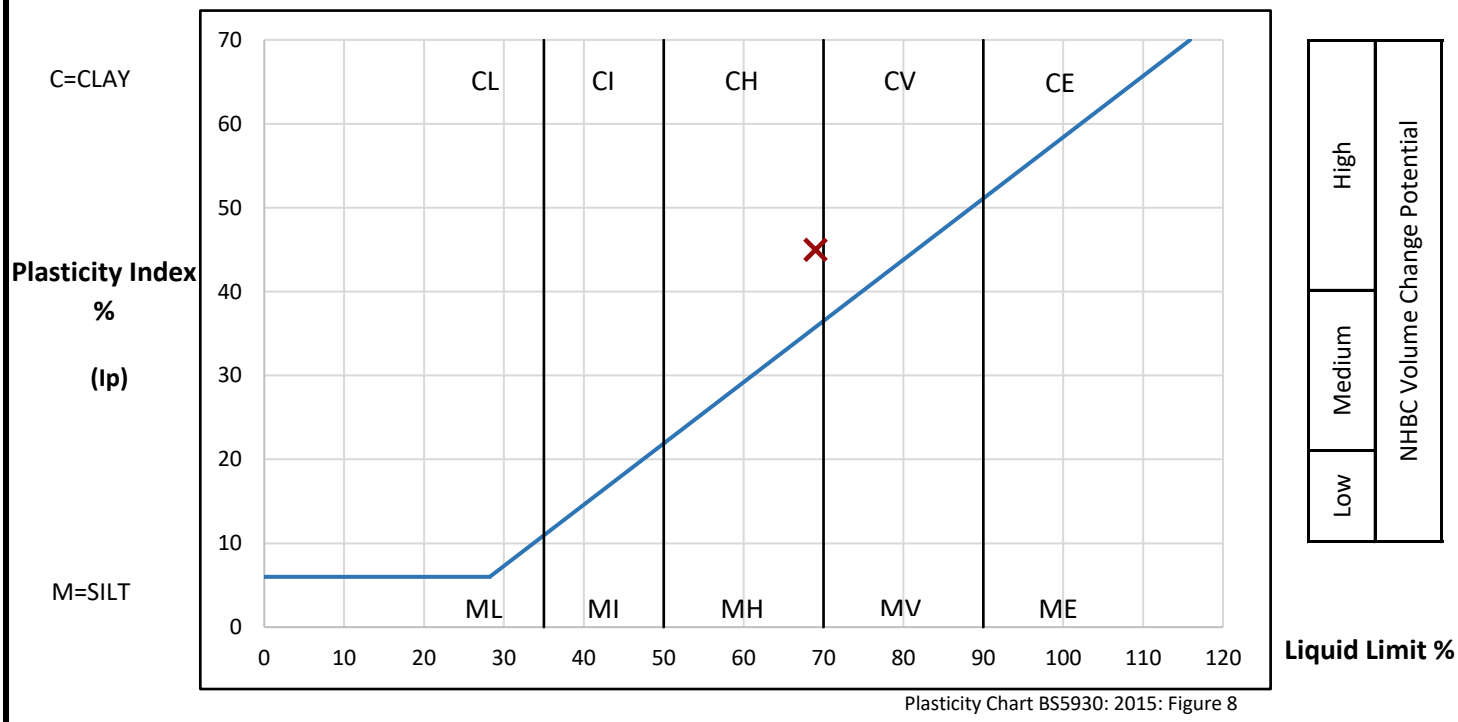
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS05	1.50	D	1	28.2	Stiff light bluish grey CLAY with occasional orange mottling, rare recently active roots, and calcareous aggregations.	

PREPARATION				Liquid Limit	69 %
Method of preparation		From natural		Plastic Limit	24 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	45 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.09
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments:

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Contract	**Clay Lane, Fishbourne**
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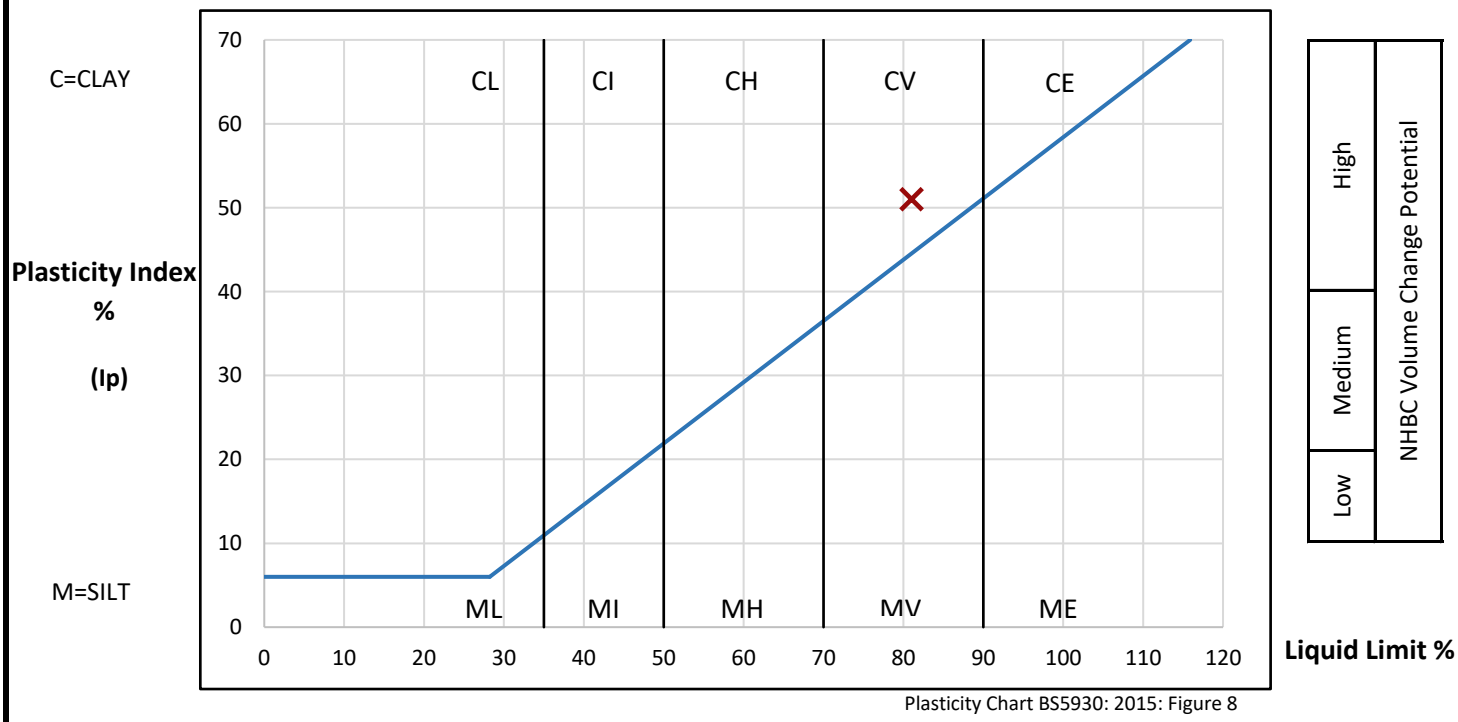
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS07	2.80	D	3	34.9	Firm closely fissured olive CLAY with occasional bluish grey mottling, and decayed roots.	

PREPARATION			Liquid Limit	81 %
Method of preparation		From natural	Plastic Limit	30 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	51 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.10
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	94 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments:

TEST REPORT

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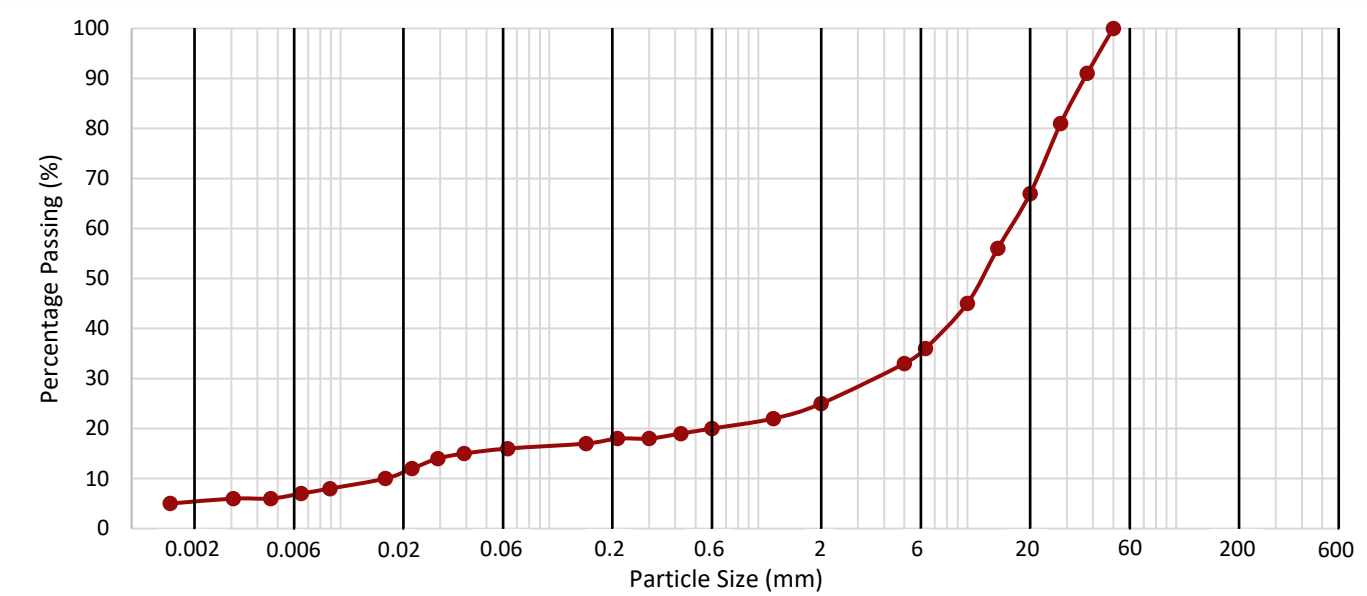
Contract	**Clay Lane, Fishbourne**
Serial No.	**36039**

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
TP11	0.80	B	1	Brown, white and black sandy silty slightly clayey angular to subrounded chert GRAVEL. Sand is grey.	

Method of Test:	Wet Sieve + Hydrometer	Method of Pretreatment:	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0390	15	11
	0.0292	14	
	0.0220	12	
	0.0164	10	Clay by Dry Mass (%)
	0.0089	8	
	0.0065	7	
	0.0046	6	5
	0.0031	6	
	0.0015	5	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	25	9
1.18	22	
0.600	20	
0.425	19	
0.300	18	
0.212	18	
0.150	17	
0.063	16	

Fines By Dry Mass (%)	
<0.063mm	16

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		75
125		
90		
63		
50	100	
37.5	91	
28	81	
20	67	
14	56	
10	45	
6.3	36	
5	33	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2,9.5
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/09/2021

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Contract	**Clay Lane, Fishbourne**
Serial No.	**39392_1**

Client:

BRD Environmental Ltd

BRD Environmental Ltd
Hawthorne Villa
1 Old Parr Road
Banbury
Oxfordshire
OX16 5HT

Soil Property Testing Ltd

15, 16, 18 Halcyon Court, St Margaret's Way,
Stukeley Meadows, Huntingdon,
Cambridgeshire, PE29 6DG

Tel: 01480 455579
Email: enquiries@soilpropertytesting.com
Website: www.soilpropertytesting.com

Samples Submitted By:

BRD Environmental Ltd

Samples Labelled:

Clay Lane, Fishbourne

Approved Signatories:

☑ **J.C. Garner B.Eng (Hons) FGS**
Technical Director & Quality Manager

☐ **W. Johnstone**
Materials Lab Manager

☐ **D. Sabnis**
Operations Manager

Date Received: 15/09/2021

Samples Tested Between: 15/09/2021 **and** 27/09/2021

Remarks:

For the attention of Ian Hibberd
Your Reference No: BRD3511

Notes:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.
5. The results within this report only relate to the items tested or sampled.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/09/2021

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Contract	**Clay Lane, Fishbourne**		
Serial No.	**39392_1**	**Target Date**	29/09/2021
Scheduled By	BRD Environmental Ltd		

Schedule Remarks

Bore Hole No.	Type	Sample Ref.	Top Depth	Triaxial Test	Water Content (BSEN)	Liquid/Plastic Limits	Wet Sieve Preparation	One Dimensional Consolidation														Sample Remarks
BH101	U	2	4.50	1																		
BH101	D	5	5.00		1	1																
BH101	D	13	10.80		1	1																
BH101	U	5	16.50	1																		
BH101	D	21	17.50		1	1																
BH102	U	1	2.50	1																		
BH102	U	3	7.50	1				1														
BH102	D	9	8.50		1	1																
BH102	U	4	10.50	1																		
BH102	U	5	13.50	1																		
BH102	D	15	14.50		1	1																
WS107	D	1	0.90		1	1	1															
Totals				**6**	**6**	**6**	**1**	**1**														**End of Schedule**

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

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Contract	**Clay Lane, Fishbourne**
Serial No.	**39392_1**

SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
BH101	5.00	D	5	**19.5**	48	18	30	0.05	From Natural	0 (A)		25	Stiff dark grey CLAY with rare recently active roots.	CI
BH101	10.80	D	13	**18.5**	35	22	13	-0.27	From Natural	0 (A)		25	Stiff dark grey slightly sandy silty CLAY. Sand is fine.	CL/CI
BH101	17.50	D	21	**15.1**	44	17	27	-0.07	From Natural	0 (A)		29	Hard red silty CLAY with occasional light bluish grey mottling.	CI
BH102	8.50	D	9	**26.3**	79	27	52	-0.01	From Natural	0 (A)		24	Very stiff dark grey CLAY.	CV
BH102	14.50	D	15	**19.6**	52	19	33	0.02	From Natural	0 (A)		24	Stiff dark grey CLAY with occasional fine sand partings.	CH
WS107	0.90	D	1	**32.0**	74	23	51	0.18	Wet Sieved	14 (M)	37.2*	24	Firm light olive brown slightly gravelly slightly sandy CLAY with occasional bluish grey and orange mottling, and recently active roots. Gravel is brown, black and white fine to medium angular to subangular chert.	CV

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4

Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

Comments: *Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1.

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

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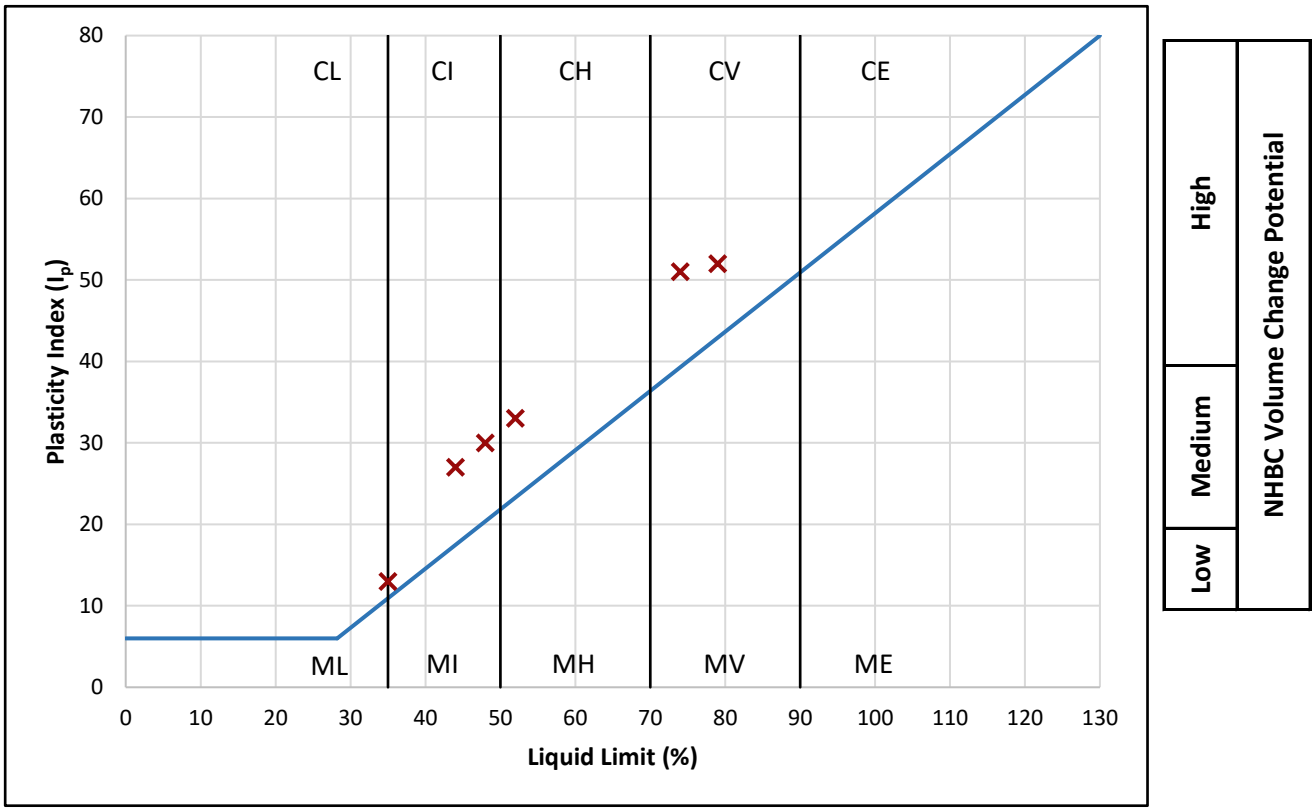
PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART

Plasticity				
Low	Medium	High	Very High	Extremely High



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS 1377: Part 2: 1990: 4.2
Method of Test:	BS1377: Part 2: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index

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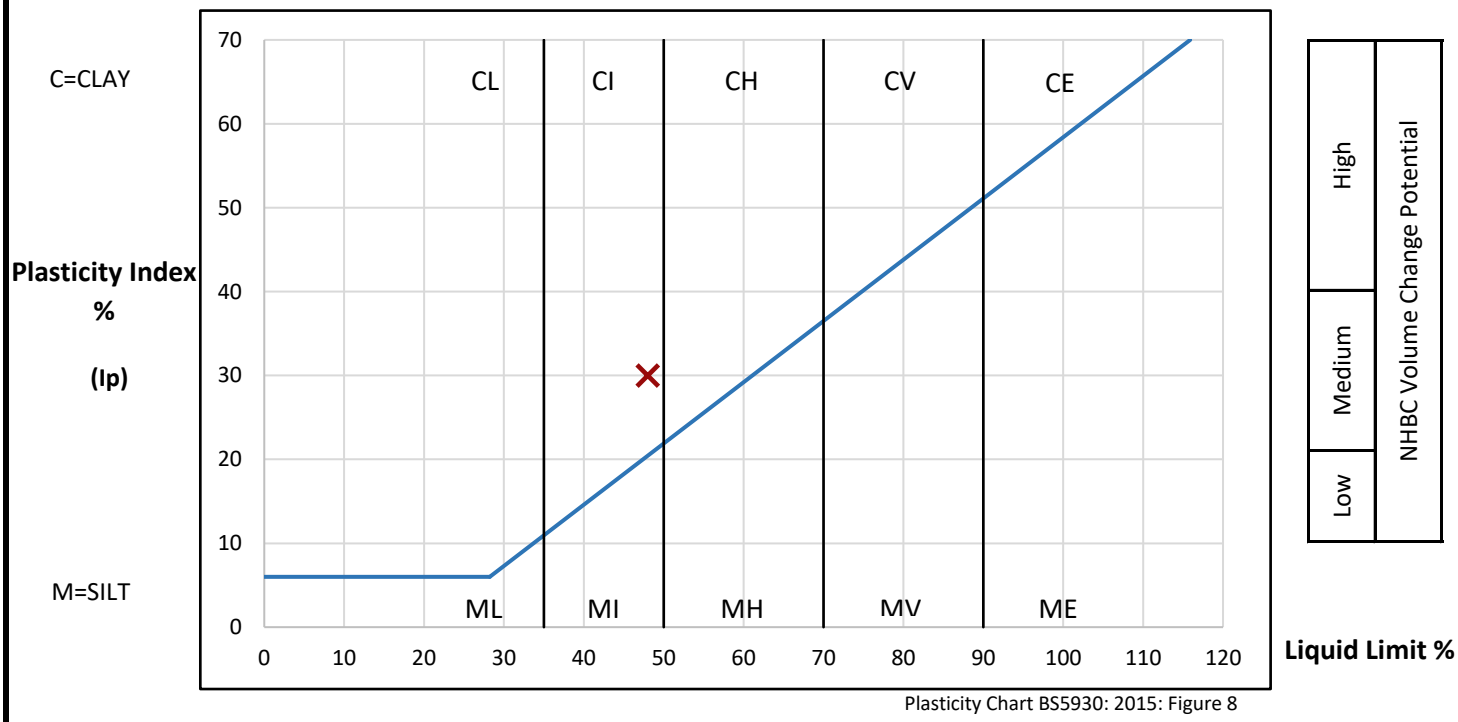
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH101	5.00	D	5	19.5	Stiff dark grey CLAY with rare recently active roots.	

PREPARATION				Liquid Limit	48 %
Method of preparation		From natural		Plastic Limit	18 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	30 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.05
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	25 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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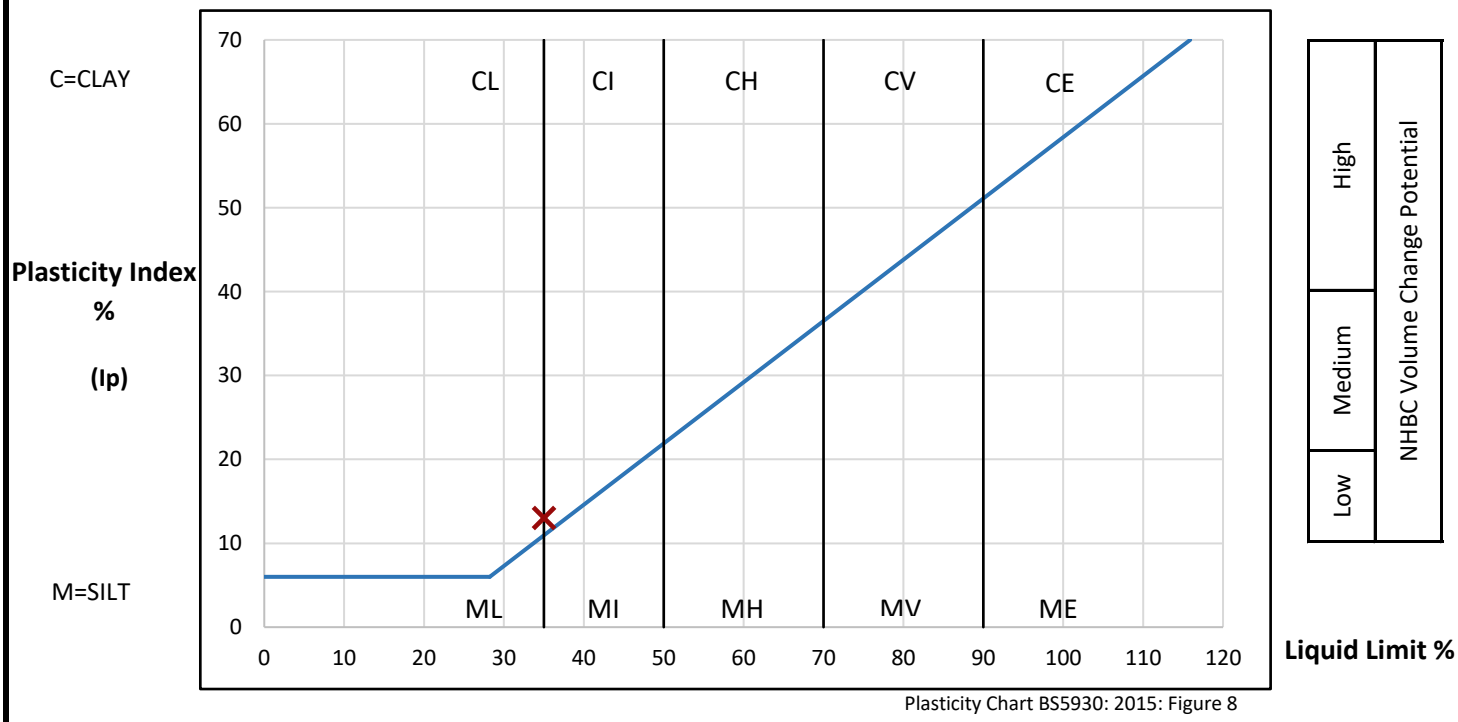
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH101	10.80	D	13	18.5	Stiff dark grey slightly sandy silty CLAY. Sand is fine.	

PREPARATION			Liquid Limit	35 %
Method of preparation		From natural	Plastic Limit	22 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	13 %
Corrected water content for material passing 0.425mm			Liquidity Index	-0.27
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	25 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments:

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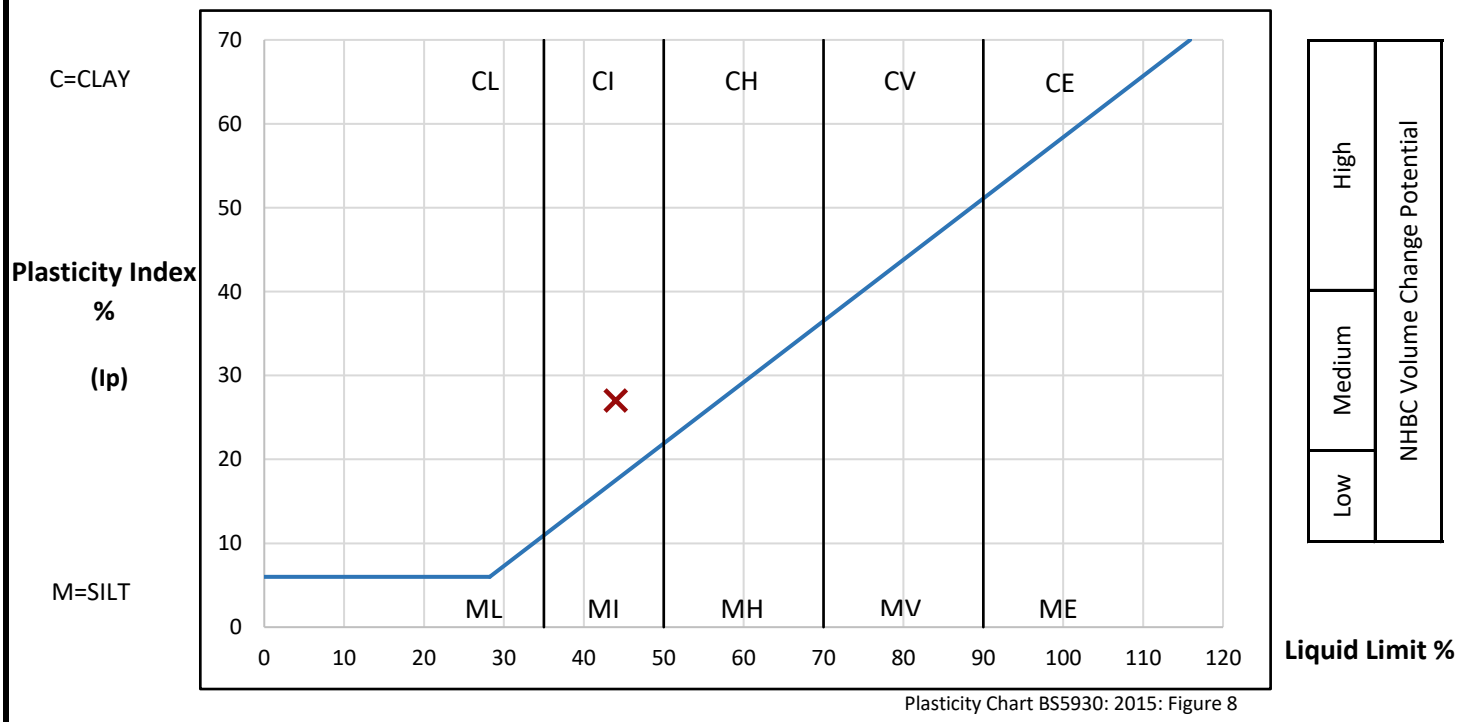
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH101	17.50	D	21	15.1	Hard red silty CLAY with occasional light bluish grey mottling.	

PREPARATION				Liquid Limit	44 %
Method of preparation		From natural		Plastic Limit	17 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	27 %
Corrected water content for material passing 0.425mm				Liquidity Index	-0.07
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	29 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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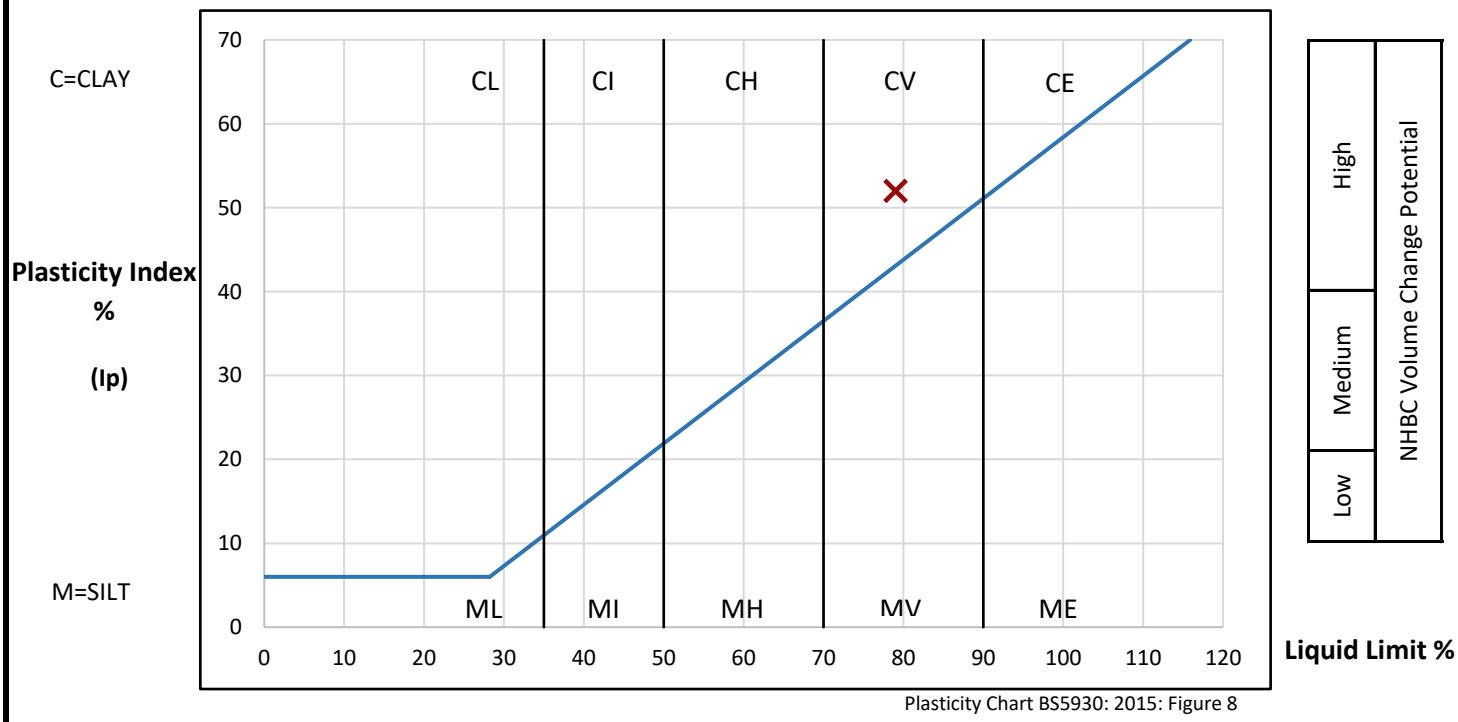
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH102	8.50	D	9	26.3	Very stiff dark grey CLAY.	

PREPARATION				Liquid Limit	79 %
Method of preparation		From natural		Plastic Limit	27 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	52 %
Corrected water content for material passing 0.425mm				Liquidity Index	-0.01
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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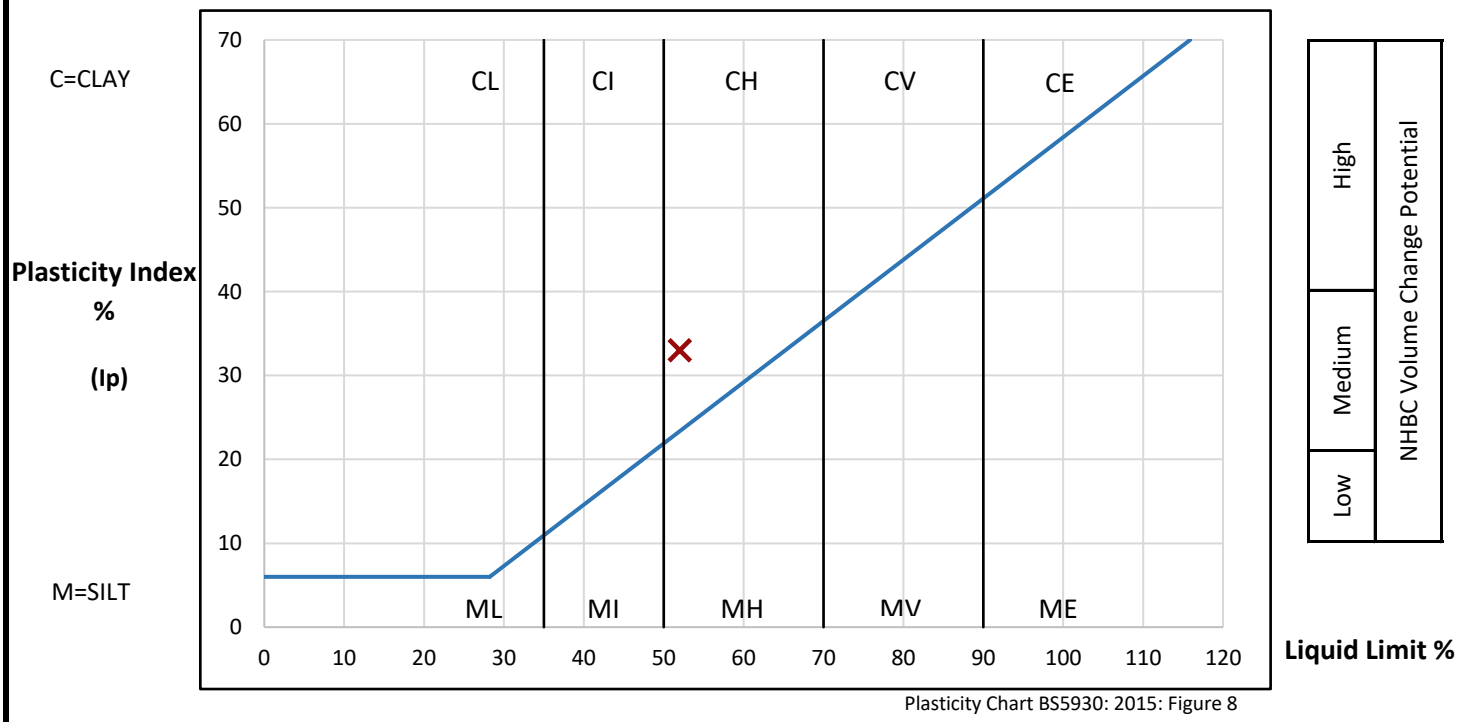
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH102	14.50	D	15	19.6	Stiff dark grey CLAY with occasional fine sand partings.	

PREPARATION			Liquid Limit	52 %
Method of preparation		From natural	Plastic Limit	19 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	33 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.02
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	24 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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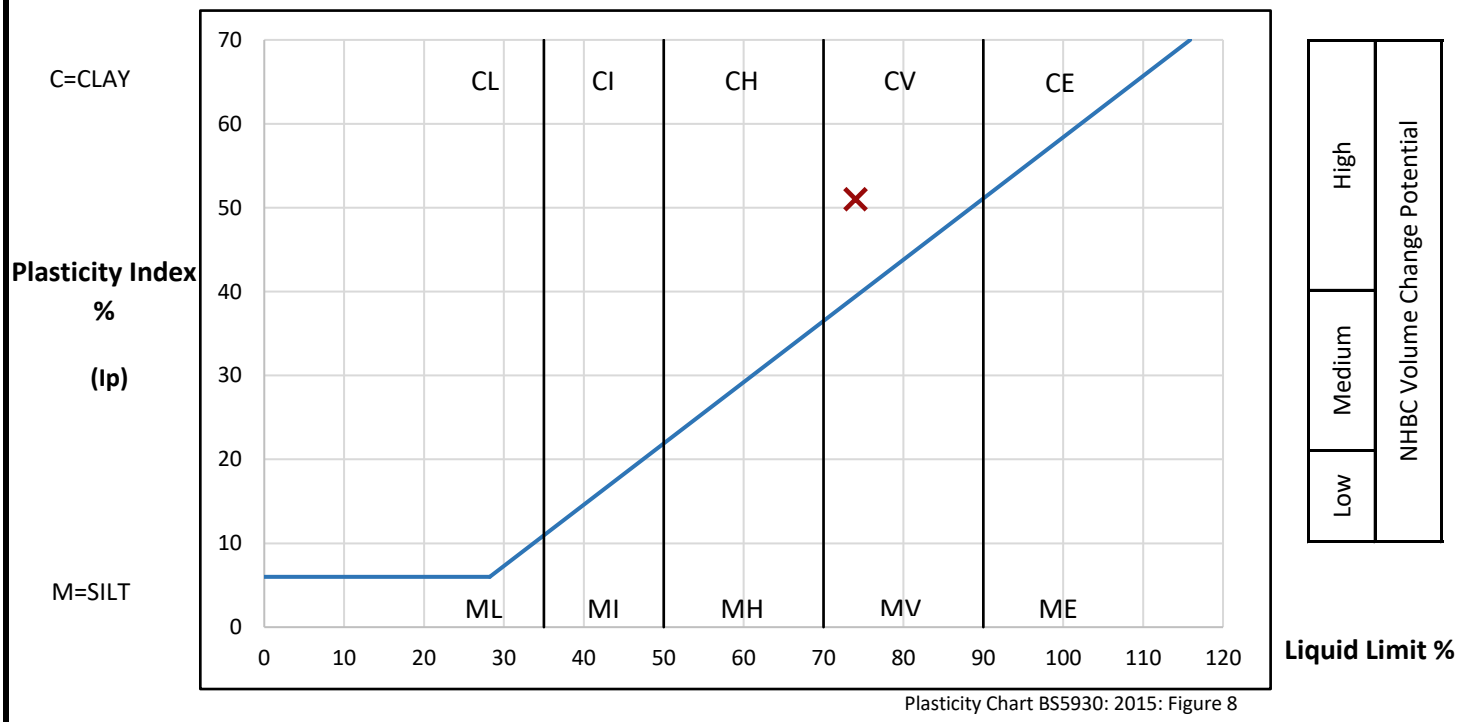
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS107	0.90	D	1	32.0	Firm light olive brown slightly gravelly slightly sandy CLAY with occasional bluish grey and orange mottling, and recently active roots. Gravel is brown, black and white fine to medium angular to subangular chert.	

PREPARATION				Liquid Limit	74 %
Method of preparation		Wet sieved over 0.425mm sieve		Plastic Limit	23 %
Sample retained 0.425mm sieve	(Measured)	14 %		Plasticity Index	51 %
Corrected water content for material passing 0.425mm		37.2 %		Liquidity Index	0.18
Sample retained 2mm sieve	(Measured)	12 %		NHBC Modified (I'p)	44 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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Contract	**Clay Lane, Fishbourne**
Serial No.	**39392_1**

DETERMINATION OF DENSITY, WATER CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASURMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Lateral Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	Mohrs Circle Analysis		Description
										Cu (kPa)	Ø degrees	
BH101	4.53	U	2	20.7	2.08	1.72	93	255	128			Stiff (high strength) very dark grey silty CLAY with rare black staining, and light grey silt partings.
BH101	16.54	U	5	20.3	2.15	1.79	333	220	110			Stiff (high strength) fissured very dark grey CLAY with occasional red mottling.
BH102	2.57	U	1	30.2	1.99	1.53	54	153	77			Stiff (high strength) fissured light olive brown CLAY with occasional greyish brown mottling, grey staining, and decayed roots.
BH102	7.55	U	3	29.2	1.99	1.54	151	266	133			Stiff (high strength) fissured very dark grey CLAY.
BH102	10.56	U	4	25.8	2.01	1.60	213	325	163			Very stiff (very high strength) fissured very dark grey CLAY with rare shell and fossil fragments.
BH102	13.55	U	5	24.0	2.03	1.64	271	343	172			Very stiff (very high strength) fissured very dark grey CLAY with rare fossil fragments.

Method of Preparation:	BS 1377: Part 1: 1990: 7.4.2 & 8, Part 2: 1990: 7.2, Part 7: 1990: 8.3
Method of Test:	BS 1377: Part 2: 1990:3 Determination of Moisture Content, Part2: 1990:7 Determination of Density, Part 7: 1990: 8 Undrained Shear Strenth, 9 Multistage Loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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Contract	**Clay Lane, Fishbourne**
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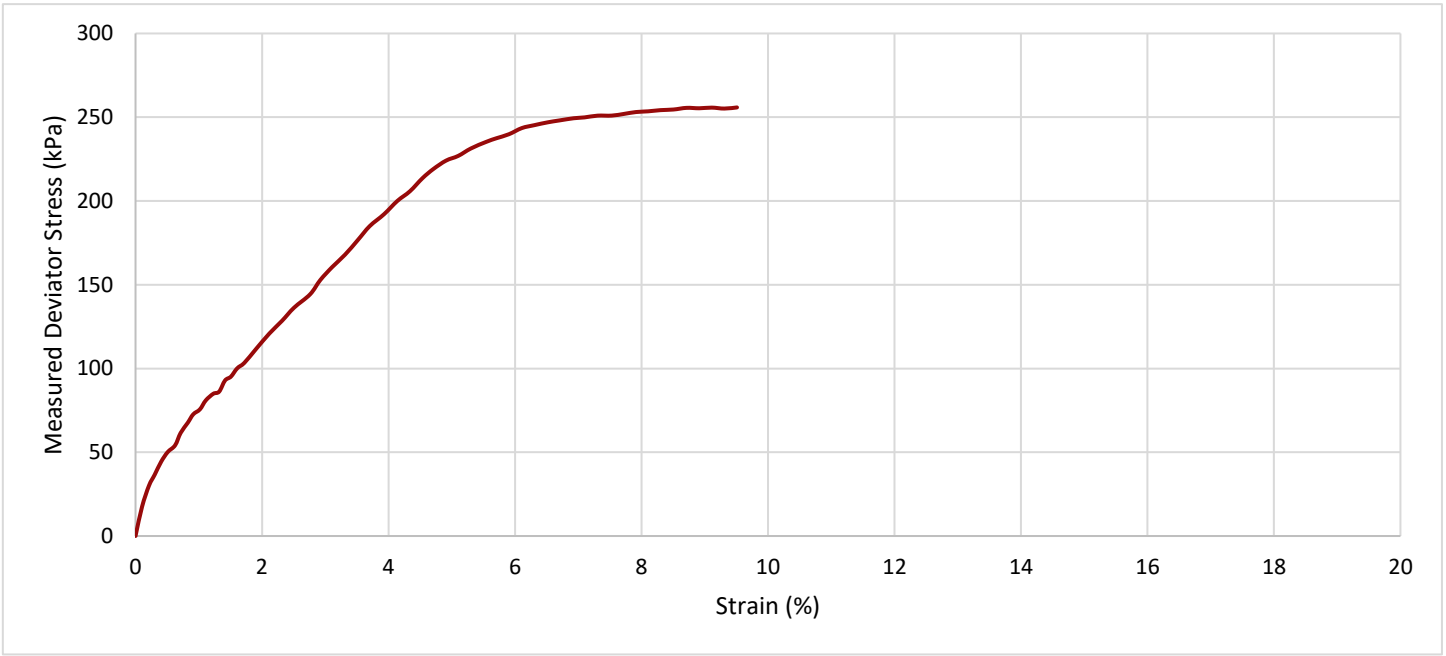
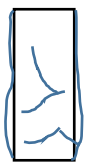
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH101	4.50	U	2	Stiff (high strength) very dark grey silty CLAY with rare black staining, and light grey silt partings.	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 4.53	199.4	102.9	3447	20.7	2.08	1.72

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	93	9.5	0.6	\	255	128		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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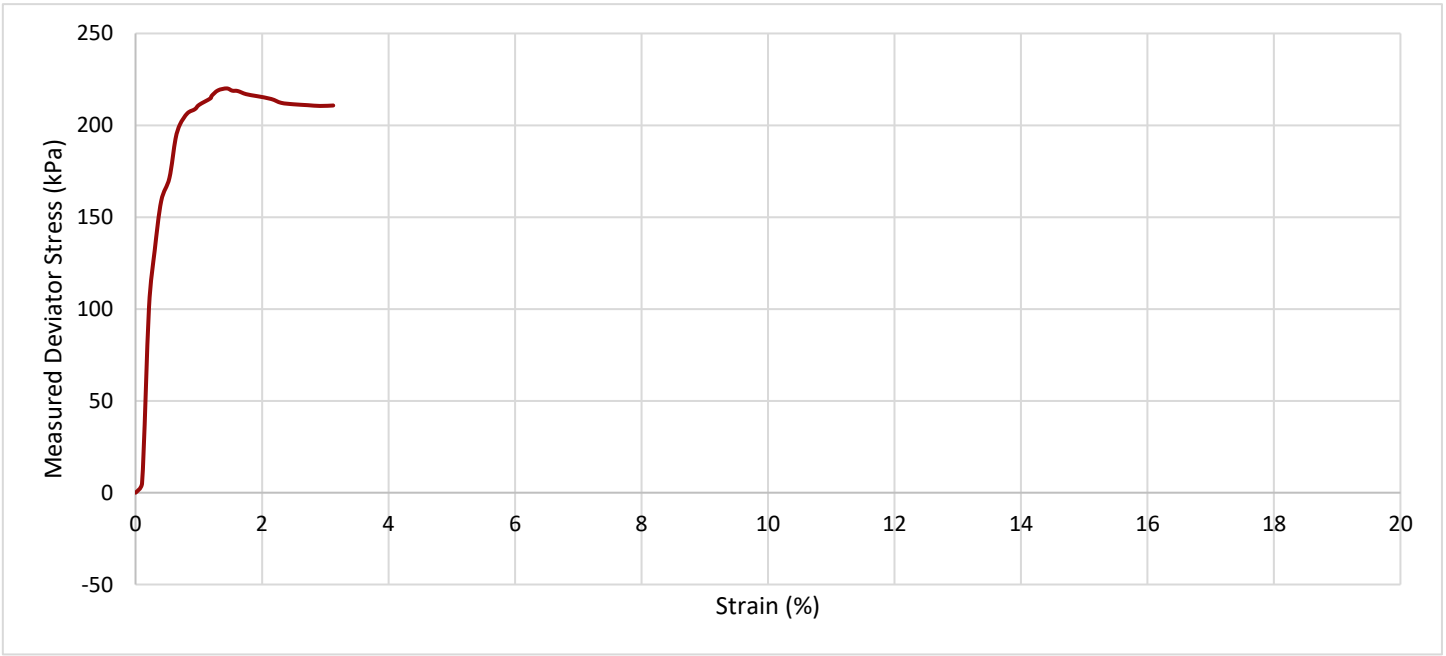
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH101	16.50	U	5	Stiff (high strength) fissured very dark grey CLAY with occasional red mottling.	Premature failure at 1.4% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 16.54	199.2	103.1	3570	20.3	2.15	1.79

TEST INFORMATION	Rate of Strain	1.0	% per Min	Rubber Membrane Thickness	0.3	mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	333	1.4	0.1	\	220	110		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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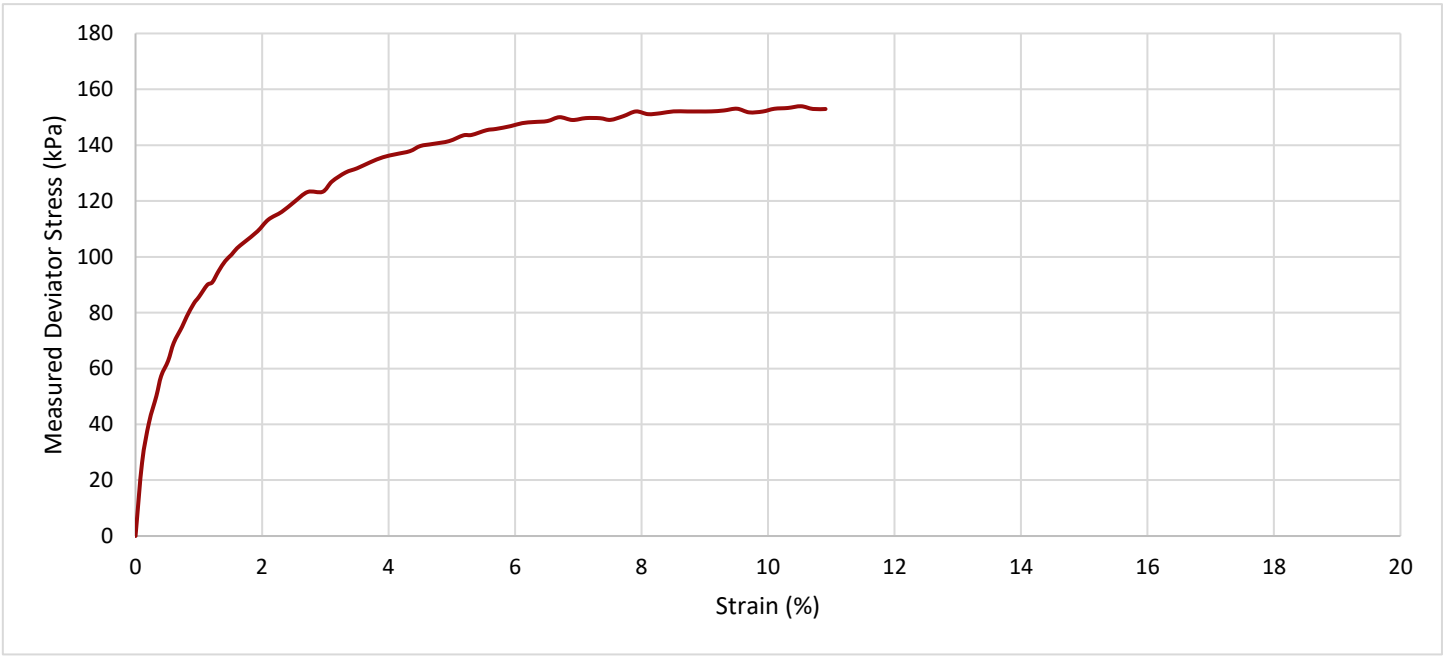
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH102	2.50	U	1	Stiff (high strength) fissured light olive brown CLAY with occasional greyish brown mottling, grey staining, and decayed roots.	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 2.57	199.4	102.6	3290	30.2	1.99	1.53

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	54	10.5	0.7	\	153	77		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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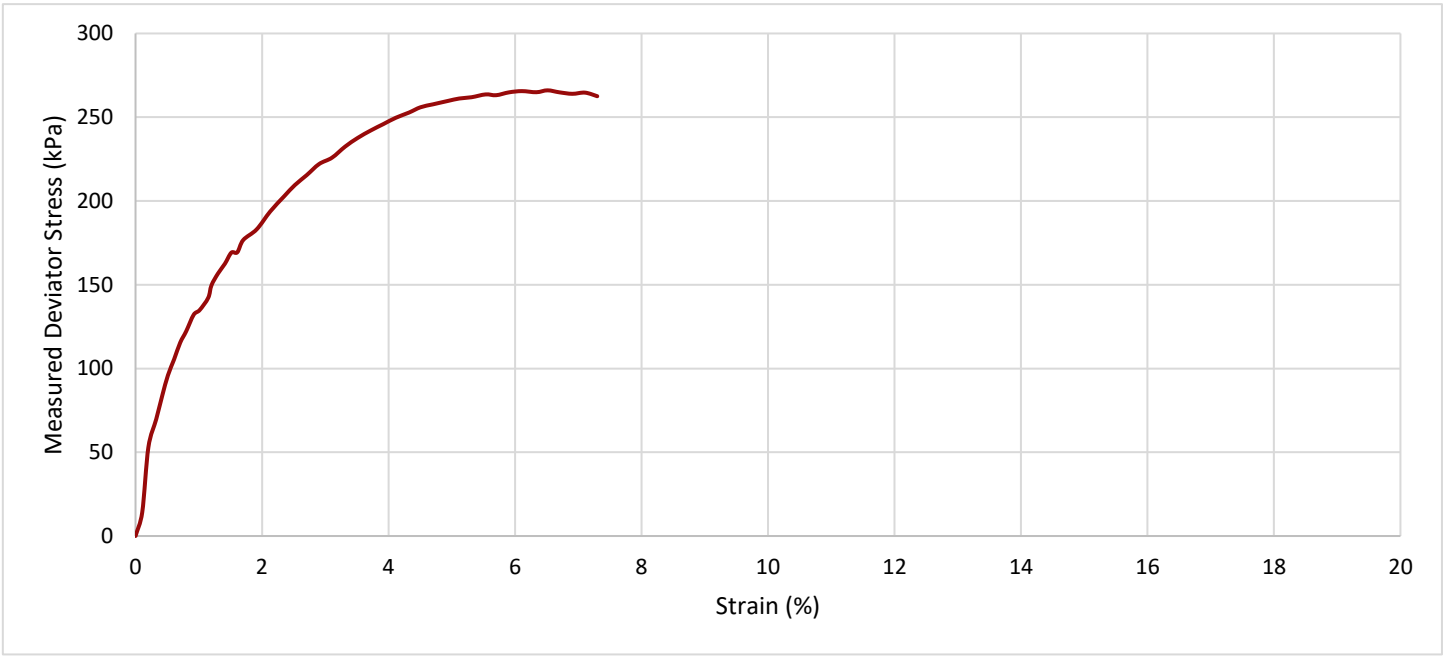
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH102	7.50	U	3	Stiff (high strength) fissured very dark grey CLAY.	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 7.55	155.1	102.7	2557	29.2	1.99	1.54

TEST INFORMATION	Rate of Strain	0.9	% per Min	Rubber Membrane Thickness	0.3	mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	151	6.5	0.5	\	266	133		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/09/2021

0998

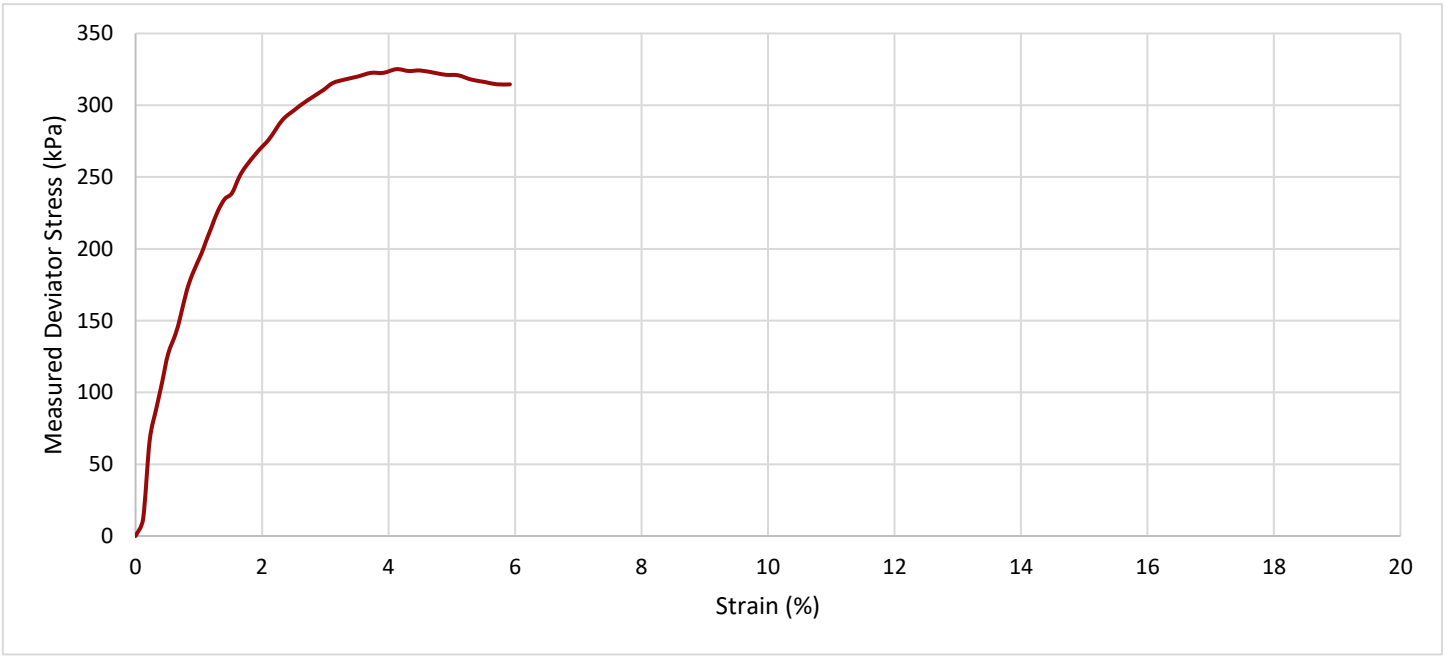
Contract	**Clay Lane, Fishbourne**
Serial No.	**39392_1**

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH102	10.50	U	4	Very stiff (very high strength) fissured very dark grey CLAY with rare shell and fossil fragments.	Premature failure at 4.1% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 10.56	184.1	102.9	3076	25.8	2.01	1.60

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	213	4.1	0.3	\	325	163		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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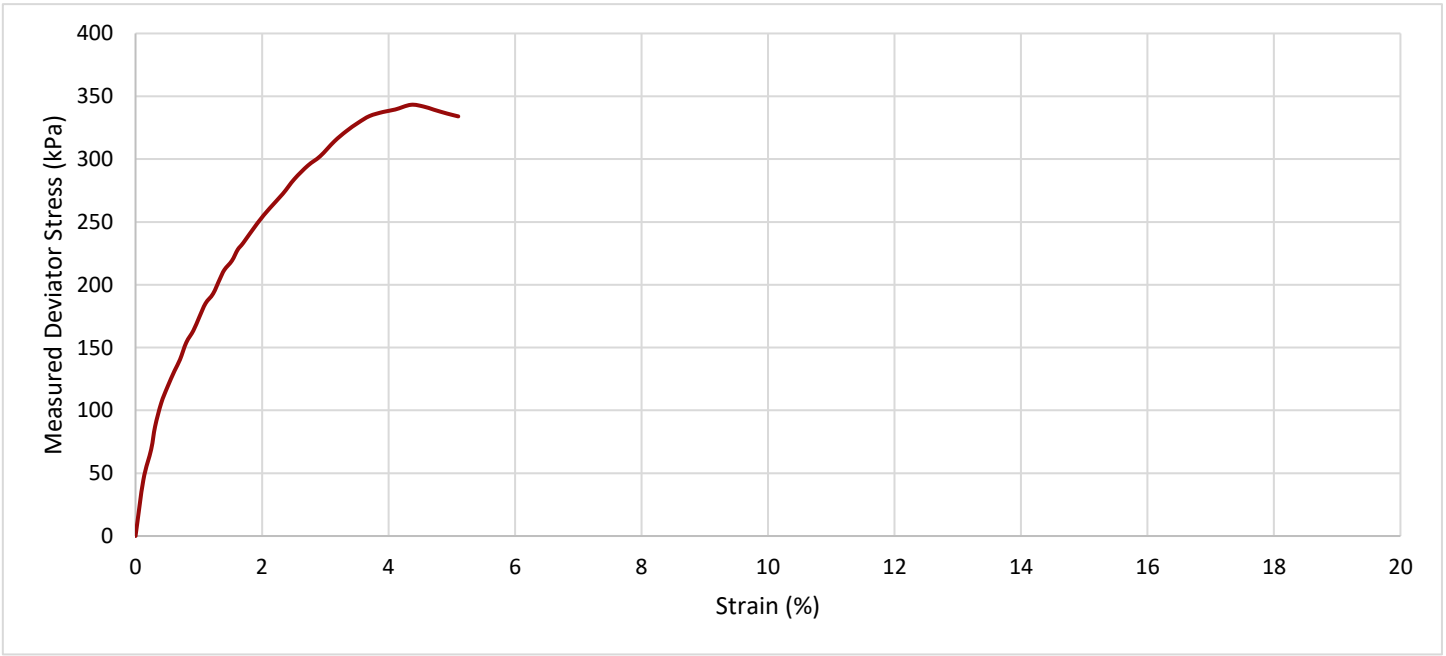
Contract	**Clay Lane, Fishbourne**
Serial No.	**39392_1**

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH102	13.50	U	5	Very stiff (very high strength) fissured very dark grey CLAY with rare fossil fragments.	Premature failure at 4.4% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 13.55	199.3	102.5	3345	24.0	2.03	1.64

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	271	4.4	0.4	\	343	172		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/09/2021

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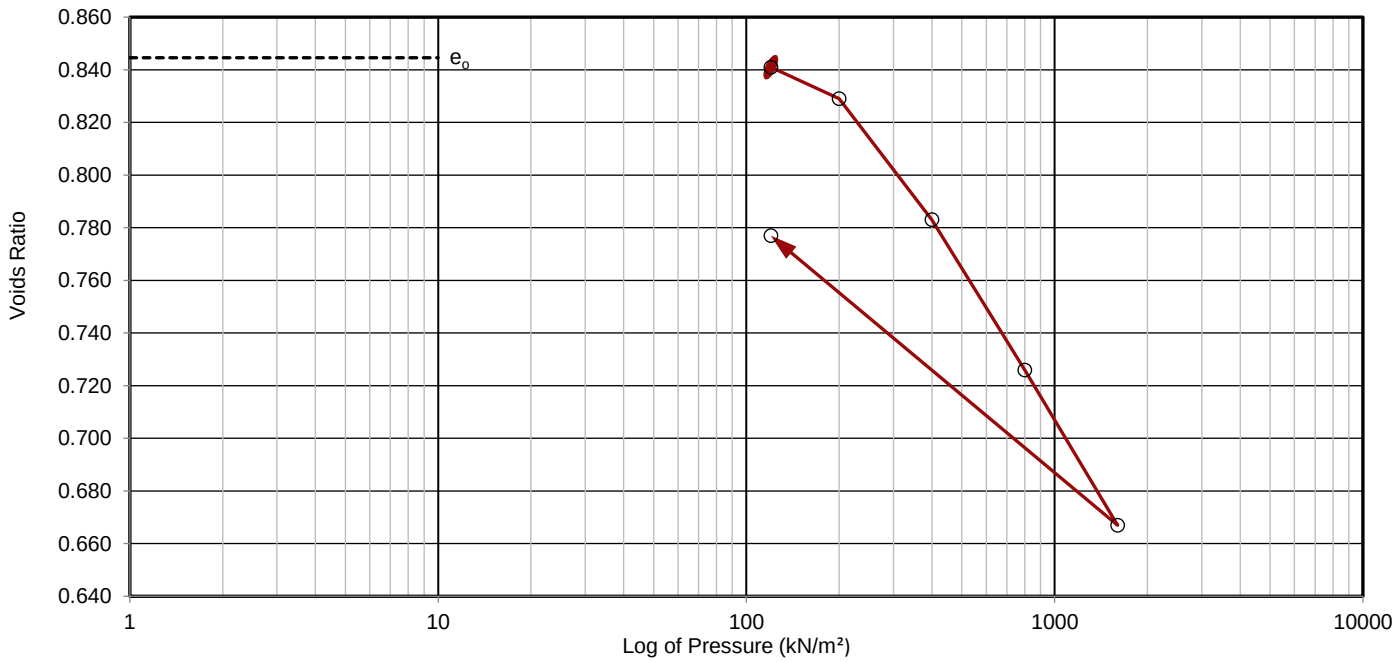
Contract	**Clay Lane, Fishbourne**
Serial No.	**39392_1**

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Borehole/ Pit No.	Depth (m)	Type	Ref.	Specimen Depth (m) and Orientation	Water Content (%)	Description	Remarks
BH102	7.50	U	3	7.52 Vertical	27.8	Stiff (high strength) fissured very dark grey CLAY.	

Initial Conditions			Increment No.	Load (kN/m²)	Change in Height (mm)	Void Ratio	Cv (m²/yr)	Mv (m²/MN)	Temp (°C)	Corrected Cv
Height	mm	18.58	1	120	0.034	0.841			21	
Diameter	mm	49.99	2	200	0.160	0.829	0.52	0.09	21	0.50
Wet Weight	g	71.21	3	400	0.618	0.783	0.45	0.12	21	0.44
Water Content	%	27.8	4	800	1.198	0.726	0.23	0.08	21	0.22
Bulk Density	Mg/m³	1.95	5	1600	1.789	0.667	0.16	0.04	21	0.15
Particle Density		Assumed 2.82	6	120	0.677	0.777		0.05	21	
Voids Ratio		0.845								
Degree of Saturation	%	93								
Swelling Pressure	kN/m²	120								
Dry Density	Mg/m³	1.53								



Method of Preparation:	BS 1377: Part 5: 1990: 3.3 & 3.4
Method of Test:	BS 1377: Part 5: 1990: 3.5
Method of Time Fitting Used:	Square root
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	
Remarks to Include:	Sample disturbance, loss of water, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110 °C.