

**GEO-ENVIRONMENTAL & GEOTECHNICAL ASSESSMENT
(GROUND INVESTIGATION)
REPORT**

FOR

**199-207 HENLEY ROAD,
READING,
RG4 6LJ**



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EXECUTIVE SUMMARY

Thakeham Client commissioned Jomas Associates Ltd to undertake a Geo-environmental and Geotechnical ground investigation at the site 199-207 Henley Road, Reading, RG4 6LJ.

The principle objectives of the study were as follows:

- To determine the nature and where possible, the extent of contaminants potentially present at the site;
- To establish the presence of significant pollutant linkages, in accordance with the procedures set out within the Environment Agency (EA) report R&D CLR11 and relevant guidance within the National Planning Policy Framework (NPPF);
- To assess whether the site is safe and suitable for the purpose for which it is intended, or can be made so by remedial action; and,
- To obtain geotechnical parameters to inform preliminary foundation design.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Site History and Ground Investigation	
Desk Study Overview	A Desk Study report has been produced for the site and issued separately (Jomas – January 2018). A review of historical maps indicates that the earliest recorded site use (1878) is as agricultural land. By the map dated 1932, the north of the site is shown to be occupied by 4No detached residential houses with rear gardens extending southwards. By the map dated 1956, new buildings are shown in the north east and south east corners of site, and some existing structures appear to have been extended slightly. Few significant changes then occur to the site until the present day. Historically, the surrounding area has primarily been in use as agricultural land. A chalk pit and gravel pit are shown in close proximity to the site and are labelled as 'old' by the map dated 1913. By the map dated 1932, these former pits were infilled and a large part of the surrounding area was developed into residential use. Few changes then occur until the map dated 1972 when a large gravel pit is shown approximately 500m south-east of site. The gravel pit expands in size and more pits are shown on maps leading up to 2002, when they are all shown to be flooded as man-made lakes. The British Geological Survey indicates that the site is directly underlain by solid deposits of Seaford Chalk Formation and Newhaven Chalk Formation (Undifferentiated). The BGS indicates that there are no superficial deposits on site but some deposits of Lynch Hill Gravel Member may encroach onto the north of the site and some deposits of Alluvium may encroach onto the south of the site. The solid deposits underlying the site are identified as a Principal Aquifer. A review of the Sitecheck Assess report indicates that the site is located within an Environment Agency SPZ II and SPZ III. There is a potable water abstraction located approximately 600m north (the source of the SPZ) The nearest surface water feature is identified as Berry Brook - along the southern border of the site. The site is located within Environment Agency Zone 2 and 3 floodplains.

Site History and Ground Investigation	
Intrusive Investigation	The ground investigation was undertaken from 3rd to 6th April 2018, and consisted of the following: • 11No. windowless sampling boreholes, drilled up to 5.0m below ground level (bgl), with associated in situ testing and sampling; • 5No. California bearing ratio tests, carried out using the dynamic probe methodology; • 3No. cable percussion boreholes, to determine the permeability of the underlying soil. • Laboratory analysis for chemical and geotechnical purposes; • 1No. return visit to monitor ground gas concentrations and groundwater levels has been completed.
Ground Conditions	The results of the ground investigation revealed a ground profile comprising Topsoil up to 0.40mbgl; overlying cohesive Head deposits up to 2.80mbgl; overlying undifferentiated deposits of the Seaford Chalk Formation and Newhaven Chalk Formation to the base of the borehole at 20mbgl. During the investigation groundwater was reported within boreholes at depths of between 2.0m and 8.7m bgl. This difference in level is likely due to the topography of the site. During the return site visit, wells installed in WS3 at a depths of 0.99mbgl. No water was encountered within the monitoring well at WS10, which was installed to a depth of 5.05m bgl.
Environmental Considerations	Following generic risk assessments, no concentrations of any determinands were detected in soils in excess of generic assessment criteria for the protection of human health within a 'residential with plant uptake' end-use scenario. Asbestos in the form of chrysotile - loose fibres was detected in 1No. sample out of 4No. analysed in the laboratory. Where parts of the site will be covered by proposed building footprint and hard surfacing, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, it would be necessary to provide a clean cover system using certified clean topsoil/subsoil. It is recommended that additional shallow soil sampling and analysis for asbestos is undertaken, in order to delineate areas of asbestos contamination. At this stage there is insufficient data to delineate such areas, and without any further testing, it will be necessary to use a clean cover system in all areas of proposed soft landscaping. Where necessary, the clean cover system will need to comprise a minimum thickness of 600mm, comprising topsoil/subsoil as necessary. Imported soils should be placed on a geotextile or crushed concrete marker layer. Calculating the Gas Screening Value using results from 1No. visit indicates Characteristic Situation 1. For a Type A development on a CS1 site, no formal gas protection measures are considered necessary. However, it is recommended that a full sequence of soil gas monitoring is undertaken in accordance with CIRIA C665.
Geotechnical Considerations	Based upon the information obtained to date, it is considered that conventional foundations will be unsuitable for the proposed development and a piled foundation solution within the underlying chalk should be considered.

Site History and Ground Investigation

As piles are anticipated, suspended floor slabs will be required. As the site lies within an EA Flood Zone 2/3 the finished floor slab will need to be a suitable height (including an allowance for climate change) above the highest predicted relevant flood level. A Flood Risk Assessment is recommended to be carried out to determine this level. In the basement, it may be possible to form a ground bearing floor slab.

Any groundwater encountered during construction works should be addressed by conventional pumping from a sump. Groundwater exclusion may be achieved by utilising a secant piled basement box, where the basement is proposed.

It is recommended that the stability of all excavations should be assessed during construction. Attention is also drawn to the provisions of the Health and Safety at Work Regulations, which state that the sides of any excavations greater than 1.2m depth, into which personnel are required to enter, should be fully supported or battered back to a safe angle.

Based on the results of chemical testing, the required concrete class for the site is DS-1 assuming an Aggressive Chemical Environment for Concrete classification of AC-1 in accordance with the procedures outlined in BRE Special Digest 1.

Interim Advice Note 73/06 Revision 1 Design Guidance for Road Pavement Foundations, suggest that a minimum permitted design CBR of 0.7% is used. However, proof rolling of granular engineered materials may provide a greater result. Further CBR testing should be undertaken following the proof rolling to confirm.

1 INTRODUCTION

1.1 Terms of Reference

- 1.1.1 Thakeham Client ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions at a site referred to as 199-207 Henley Road, Reading, RG4 6LJ, and to provide indicative recommendations for foundation design prior to the redevelopment of the site.
- 1.1.2 To this end a Desk Study has been produced for the site and issued separately (Jomas, January 2018), followed by an intrusive investigation (detailed in this report).
- 1.1.3 A full list of previous reports undertaken for the site by Jomas are detailed in Table 1.1:

Table 1.1: Previous Reports - Jomas

Title	Author	Reference	Date
199 – 207 Henley Road, Caverhsam, Reading - Results of Soakage Testing	Jomas	P9413J811/mw	September 2016
199 - 207 Henley Road, Reading – Ground Investigation and Infiltration Results	Jomas	P9413J811/te	27 th September 2016
Geo-environmental Desk Study / Preliminary Risk Assessment for 199-207 Henley Road, Reading, RG4 6LJ	Jomas	P9413J811 Final v1.0	5 th January 2018

- 1.1.4 The intrusive investigation was undertaken in accordance with Jomas proposal dated 27th March 2018.

1.2 Proposed Development

- 1.2.1 The proposed development is to comprise the demolition of 199-203 Henley Road to allow for the erection of 42 dwellings with associated access roads and soft landscaping. The new dwellings will comprise 12 No semi-detached houses with private gardens to the south of the site, and a 3-storey block of apartments in the north-west of site. The apartment block will also have a basement car park under the entirety of the building footprint.
- 1.2.2 For the purposes of the contamination risk assessment, the proposed development is classified as 'Residential with plant uptake'.
- 1.2.3 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997. GC 2 projects are defined as involving:
- Conventional structures.
 - Quantitative investigation and analysis.
 - Normal risk.
 - No difficult soil and site conditions.

- No difficult loading conditions.
- Routine design and construction methods.

1.3 Objectives

1.3.1 The objectives of Jomas' investigation were as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;;
- To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development;
- To conduct an intrusive investigation, to determine the nature and extent of contaminants potentially present at the site;
- To establish the presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA report R&D CLR 11; and,
- To obtain geotechnical parameters to inform preliminary foundation design.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- Intrusive ground investigation to determine shallow ground conditions, and potential for contamination at the site;
- Undertaking of laboratory chemical and geotechnical testing upon samples obtained;
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Supplied Documentation

1.5.1 A report previously prepared by a third party was supplied to Jomas Associates at the commencement of this investigation. Table 1.2 details the documents supplied:

Table 1.2: Supplied Reports

Title	Author	Reference	Date
Site Check Assess, 199 – 207 Henley Road Caversham READING RG 4 6LJ	Site Check / Argyll Environmental	SAS_78874883_1_1	26 January 2016

1.6 Limitations

1.6.1 Jomas Associates Ltd has prepared this report for the sole use of Thakeham Client, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of

- Jomas Associates Limited. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.
- 1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas Associates Limited has actual knowledge to the contrary, information obtained from public sources or provided to Jomas Associates Limited by site personnel and other information sources, have been assumed to be correct. Jomas Associates Limited does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.
- 1.6.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.
- 1.6.4 Any reports provided to Jomas Associates Limited have been reviewed in good faith. Jomas Associates Limited cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.
- 1.6.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.
- 1.6.6 *This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report in Appendix 1.

Table 2.1: Site Information

Name of Site	
Address of Site	199 - 207 Henley Road, Caversham, Reading, RG4 6LJ
Approx. National Grid Ref.	473000, 175200
Site Area (Approx)	10,538m ²
Site Occupation	Residential
Local Authority	Reading Borough Council
Proposed Site Use	Demolition of existing and construction of new residential dwellings.

2.2 Desk Study Overview

- 2.2.1 A Desk Study report has been produced for the site and issued separately (Jomas – January 2018). A brief overview of the desk study findings is presented below. Reference should be made to the full report for detailed information.
- 2.2.2 A review of historical maps indicates that the earliest recorded site use (1878) is as agricultural land. By the map dated 1932, the north of the site is shown to be occupied by 4No detached residential houses with rear gardens extending southwards. By the map dated 1956, new buildings are shown in the north east and south east corners of site, and some existing structures appear to have been extended slightly. Few significant changes then occur to the site until the present day.
- 2.2.3 Historically, the surrounding area has primarily been in use as agricultural land. A chalk pit and gravel pit are shown in close proximity to the site and are labelled as 'old' by the map dated 1913. By the map dated 1932, these former pits were infilled and a large part of the surrounding area was developed into residential use. Few changes then occur until the map dated 1972 when a large gravel pit is shown approximately 500m south-east of site. The gravel pit expands in size and more pits are shown on maps leading up to 2002, when they are all shown to be flooded as man-made lakes.
- 2.2.4 The British Geological Survey indicates that the site is directly underlain by solid deposits of Seaford Chalk Formation and Newhaven Chalk Formation (Undifferentiated). The BGS indicates that there are no superficial deposits on site but some deposits of Lynch Hill Gravel Member may encroach onto the north of the site and some deposits of Alluvium may encroach onto the south of the site.
- 2.2.5 The solid deposits underlying the site are identified as a Principal Aquifer.
- 2.2.6 A review of the Sitecheck Assess report indicates that the site is located within an Environment Agency SPZ II and SPZ III.
- 2.2.7 There is a potable water abstraction located approximately 600m north (the source of the SPZ)

- 2.2.8 The nearest surface water feature is identified as Berry Brook - along the southern border of the site.
- 2.2.9 The site is located within Environment Agency Zone 2 and 3 floodplains.
- 2.2.10 The conceptual site model provided within the report identifies the following potential sources, pathways and receptors. The report indicates the following potential sources of contamination:
- Potential for Made Ground associated with previous development operations – on site (S1)
 - Potential asbestos containing materials within existing buildings – on site (S2)
 - Potential asbestos impacted soils from demolition of previous buildings – on site (S3)
 - Potential infilled chalk pit – approx. 5m off site (S4)
 - Potential ground gas generation from infilled chalk and gravel pits, chalk and from organic rich alluvium (S5)
- 2.2.11 The conceptual site model identifies the following potential pathways:
- Ingestion and dermal contact with contaminated soil (P1)
 - Inhalation or contact with potentially contaminated dust and vapours (P2)
 - Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3)
 - Horizontal and vertical migration of contaminants within groundwater (P4)
 - Accumulation and Migration of Soil Gases (P5)
 - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)
- 2.2.12 The conceptual site model identifies the following potential receptors:
- Construction workers (R1)
 - Maintenance workers (R2)
 - Neighbouring site users (R3)
 - Future site users (R4)
 - Building foundations and on site buried services (water mains, electricity and sewer) (R5)
 - Controlled waters - Berry Brook; Principal Aquifer; site in SPZ II (R6)

3 GROUND INVESTIGATION

3.1 Rationale for Ground Investigation

- 3.1.1 The site investigation has been undertaken generally in accordance with Contaminated Land Report 11, BS10175, NHBC Standards Chapter 4.1, and other associated Statutory Guidance. If required, further targeted investigations and remedial option appraisal would be dependent on the findings of this site investigation.
- 3.1.2 The soil sampling rationale for the site investigation was developed with reference to EA guidance 'Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination' (Technical Report P5-066/TR).
- 3.1.3 The sampling proposal was designed in order to gather data representative of the site conditions whilst taking into account the identified sources and receptors.

3.2 Scope of Ground Investigation

- 3.2.1 The ground investigation was undertaken from 3rd to 6th April 2018.
- 3.2.2 The work was undertaken in accordance with BS5930 'Code of Practice for Site Investigation' and BS10175 'Investigation of Potentially Contaminated Sites'. All works were completed without incident.
- 3.2.3 The investigation focused on collecting data on the following:
- Quality of Made Ground/ natural ground within the site boundaries;
 - Presence of groundwater beneath the site (if any), perched or otherwise;
 - Determination of the presence or absence of hazardous ground gases;
 - Obtaining geotechnical parameters to allow initial design to take place.
- 3.2.4 A summary of the fieldwork carried out at the site, with justifications for exploratory hole positions, are offered in Table 3.1 below.

Table 3.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved (m BGL)	Justification
Window Sample Boreholes	11	WS1 – WS11	Up to 6.00mbgl	Obtain shallow samples for laboratory contamination and geotechnical testing. To allow in-situ geotechnical testing.
Cable Percussion Boreholes	3	BH1 - BH3	Up to 20mbgl	Obtain deeper samples for laboratory contamination and geotechnical testing. To allow in-situ geotechnical testing.
California Bearing Ratio Tests	5	WS1, WS8, WS9, WS10, CBR1	Up to 1.00mbgl	To aid roadway design.

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved (m BGL)	Justification
Monitoring Wells	3	WS3, WS7, WS10	Up to 5.05mbgl	Combined soil gas and groundwater monitoring wells. The response zones were: WS3 – Superficial clay and sand WS7 – Superficial sand WS10 - Chalk

3.2.5 In all cases, all holes were logged in accordance with BS5930:2015.

3.2.6 Exploratory hole positions were located approximately with reference to known features on site, as shown in the exploratory hole location plan presented in Appendix 1. The exploratory hole records are included in Appendix 2.

3.2.7 Where monitoring well installations were not installed, the exploratory holes were backfilled with the arisings (in the reverse order in which they were drilled) and the ground surface was reinstated so that no depression was left.

3.3 In-situ Geotechnical Testing

3.3.1 In-situ geotechnical testing included Standard Penetration Tests. The determined 'N' values have been used to determine the relative density of granular materials and have been used with standard correlations to infer various other derived geotechnical parameters including the undrained shear strength of the cohesive strata. The results of the individual tests are on the appropriate exploratory hole logs in Appendix 2.

3.3.2 In-situ California Bearing Ratio (CBR's) were determined across the site using the dynamic probe methodology using a Perth Penetrometer Probe and the methodology laid out in IAN 73/06. Copies of the results and calculations are provided in Appendix 6.

3.4 Sampling Rationale

3.4.1 Our soil sampling rationale for the site investigation was developed with reference to EA guidance 'Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination' (Technical Report P5-066/TR).

3.4.2 The exploratory holes were positioned by applying a non-targeted sampling strategy.

3.4.3 Soil samples were taken from across the site at various depths as shown in the exploratory hole logs.

3.4.4 Jomas Associates Limited's engineers normally collect samples at appropriate depths based on field observations such as:

- appearance, colour and odour of the strata and other materials, and changes in these;
- the presence or otherwise of sub-surface features such as pipework, tanks, foundations and walls; and,

- areas of obvious damage, e.g. to the building fabric.

3.4.5 A number of the samples were taken from the top 0-1m to aid in the assessment of the pollutant linkages identified at the site. In addition, some deeper samples were taken to aid in the interpretation of fate and transport of any contamination identified.

3.4.6 Soil samples were taken from across the site at various depths as shown in the exploratory hole logs (copies of which are provided in Appendix 2). The methodology used and type of samples taken were chosen to allow the Sampling category to be A or B according to EN ISO 22475-1. This in turn allows suitable geotechnical testing to be carried out.

3.4.7 Groundwater strikes noted during drilling, are recorded within the exploratory hole records in Appendix 2.

3.4.8 Samples were stored in cool boxes (<4°C) and preserved in accordance with laboratory guidance.

3.5 Sampling Limitations

3.5.1 BH1 and BH3 were repositioned within 10m of their proposed locations due to the topography of the site, and difficulty in manoeuvring the drilling equipment.

3.5.2 The remaining boreholes were drilled in the proposed locations and to the proposed depths.

3.6 Laboratory Analysis

3.6.1 A programme of laboratory testing, scheduled by Jomas Associates Limited, was carried out on selected samples of Made Ground and natural strata.

Chemical Testing

3.6.2 Soil samples were submitted to i2 Analytical (a UKAS and MCerts accredited laboratory), for analysis.

3.6.3 The samples were analysed for a wide range of contaminants as shown in Table 3.2 below:

Table 3.2: Chemical Tests Scheduled

Test Suite	No. of tests	
	Topsoil	Natural
Jomas Suite s3	1	5
Total Organic Carbon	1	2
Asbestos Screen & ID	1	3
Jomas Suite S5	0	2
Hydrocarbon Suite	0	2
PCBs	0	1
Water Soluble Sulphate*	0	4

**Also included in Jomas Suites S3 and S5*

3.6.4 The determinands contained in the basic suite are as detailed in Table 3.3 below:

Table 3.3: Basic Suite of Determinands

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Arsenic	1	Y (MCERTS)	ICPMS
Cadmium	0.2	Y (MCERTS)	ICPMS
Chromium	1	Y (MCERTS)	ICPMS
Chromium (Hexavalent)	4	Y (MCERTS)	Colorimetry
Lead	1	Y (MCERTS)	ICPMS
Mercury	0.3	Y (MCERTS)	ICPMS
Nickel	1	Y (MCERTS)	ICPMS
Selenium	1	Y (MCERTS)	ICPMS
Copper	1	Y (MCERTS)	ICPMS
Zinc	1	Y (MCERTS)	ICPMS
Boron (Water Soluble)	0.2	Y (MCERTS)	ICPMS
pH Value	0.1 units	Y (MCERTS)	Electrometric
Sulphate (Water Soluble)	0.0125g/l	Y (MCERTS)	Ion Chromatography
Total Cyanide	1	Y (MCERTS)	Colorimetry
Speciated/Total PAH	0.05/0.80	Y (MCERTS)	GCFID
Phenols	1	Y (MCERTS)	HPLC
Total Petroleum Hydrocarbons (banded)	-	N Y (MCERTS)	Gas Chromatography

3.6.5 To support the selection of appropriate tier 1 screening values, 3No. samples were analysed for total organic carbon.

3.6.6 Laboratory test results are summarised in Section 6, with raw laboratory data included in Appendix 3.

Geotechnical Laboratory Testing

3.6.7 In addition to the contamination assessment, soil samples were submitted to the UKAS Accredited laboratory of i2 Analytical Ltd. for a series of analysis.

3.6.8 This testing was specifically designed to:

- to classify the samples; and
- to obtain parameters (either directly or sufficient to allow relevant correlations to be used) relevant to the technical objectives of the investigation.

3.6.9 The following laboratory geotechnical testing (as summarised in Table 3.4) was carried out:

Table 3.4 Laboratory Geotechnical Analysis

BS 1377 (1990) Test Number	Test Description	Number of tests
<u>Part 2</u>		
3.2	Moisture Content Determination	9
4.3 and 5.3	Liquid and Plastic Limit Determination (Atterberg Limits)	9
9.2 and 9.3	Particle Size Distribution - Sieving	3
<u>Part 4</u>		
3.3	Determination of the Dry Density / Moisture Content Relationship using light (2.5kg) compaction	2
<u>Part 7</u>		
8	Determination of the undrained shear strength in triaxial compression with single stage loading and without measurement of pore pressure	1

- 3.6.10 It should be noted that more Quick Undrained Triaxial tests were scheduled, however on preparation of the samples for testing the samples proven unsuitable with samples crumbling etc..
- 3.6.11 The water soluble sulphate and pH results obtained as part of the chemical analysis have been used in combination with BRE Special Digest 1 to allow the classification of buried concrete to be determined.
- 3.6.12 The results of the geotechnical laboratory testing are presented as Appendix 4 and discussed in Section 10 of this report.

4 GROUND CONDITIONS

4.1 Soil

- 4.1.1 Ground conditions were logged in accordance with the requirements of BS5930:2015. Detailed exploratory hole logs are provided in Appendix 2. The ground conditions encountered are summarised in Table 4.1 below, based on the strata observed during the investigation.

Table 4.1: Ground Conditions Encountered

Stratum and Description	Encountered from (m bgl)	Base of strata (m bgl)	Thickness range (m)
Dark brown organic sandy gravelly clay. Gravel consists of medium sub-rounded flint. (TOPSOIL). Not encountered within WS8.	0.00	0.10 - 0.40	0.10 - 0.40
Brown very low to medium strength sandy gravelly CLAY. Gravel consists of flint and chalk. (HEAD DEPOSITS) Not encountered within WS11, BH1 or BH2.	0.00 - 0.30	0.50 - 2.80	0.30 - 2.50
Brown to white structureless CHALK. (Grade Dm to Dc). Chalk recovered as clayey sandy gravel / sandy gravelly clay with occasional cobbles. Gravel and cobbles consists of chalk and flint. (UNDIFFERENTIATED CHALK) Encountered to base of all boreholes.	0.10 - 2.80	>4.00 - >20.00	>2.00 - >19.60

- 4.1.2 The site slopes steeply down to the south. Therefore, the near surface cohesive deposits reported in the southern half of the site only, are likely representative of Head deposits formed by solifluction and /or hillwash and soil creep.

- 4.1.3 Considering the above and given the likely ground strata profile identified in the Desk Study it is considered that the encountered strata represents Topsoil up to 0.40mbgl; overlying cohesive Head deposits up to 2.80mbgl; overlying undifferentiated deposits of the undifferentiated Seaford Chalk Formation and Newhaven Chalk Formation to the base of the borehole at 20mbgl.

4.2 Hydrogeology

- 4.2.1 Groundwater strikes and groundwater monitoring are summarised below.

Table 4.2: Groundwater Strikes During Drilling

Exploratory Hole ID	Depth Encountered (mbgl)	Depth After 20mins (mbgl)	Stratum
WS1	3.1	-	Chalk
WS2	3.0	-	Chalk
WS3	2.0	-	Chalk
WS4	2.0	-	Chalk
WS5	2.0	-	Chalk
WS6	-	-	-
WS7	3.0	-	Chalk
WS8	3.0	-	Chalk
WS9	3.0	-	Chalk
WS10	-	-	-
WS11	-	-	-
BH1	8.7	-	Chalk
BH2	6.3	6.1	Chalk
BH3	4.3	3.8	Chalk

Table 4.3: Groundwater Monitoring Records

Exploratory Hole ID	Depth Encountered (m bgl)	Depth to Base of Well (m bgl)	Stratum
WS3	0.99	2.50	Chalk
WS10	Dry	5.05	-

4.2.2 During the monitoring period access to WS7 could not be obtained.

4.3 Physical and Olfactory Evidence of Contamination

4.3.1 Visual or olfactory evidence of contamination was not observed during the course of the investigation.

5 RISK ASSESSMENT – ANALYTICAL FRAMEWORK

5.1 Context and Objectives

- 5.1.1 This section seeks to evaluate the level of risk pertaining to human health and the environment which may result from both the existing use and proposed future use of the site. It makes use of the site investigation findings, as described in the previous sections, to evaluate further the potential pollutant linkages identified in the desk study. A combination of qualitative and quantitative techniques is used, as described below.
- 5.1.2 The purpose of generic quantitative risk assessment is to compare concentrations of contaminants found on site against screening level generic assessment criteria (GAC) to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed assessment is required. The approaches detailed all broadly fit within a tiered assessment structure in line with the framework set out in the Department of Environment, Food and Rural Affairs (DEFRA), EA and Institute for Environment and Health Publication, Guidelines for Environmental Risk Assessment and Management.
- 5.1.3 It should be noted that the statistical tests carried out in this report in accordance with CL:AIRE and CIEH (2008) recommendations, are for guidance purposes only and the conclusions of this report should be approved by the local authority prior to any redevelopment works being undertaken.

5.2 Analytical Framework – Soils

- 5.2.1 There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.
- 5.2.2 The CLEA model provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data have been used to calculate Soil Guideline Values (SGV) for individual contaminants, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.
- 5.2.3 In the absence of any published SGVs for certain substances, or where the assumptions made in generating the SGVs do not apply to the site, Jomas Associates Limited have obtained Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH S4ULs and DEFRA C4SL. Site-specific assessments are undertaken wherever possible and/or applicable. All assessments are carried out in accordance with the CLEA protocol.
- 5.2.4 CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.
- 5.2.5 The assessment criteria used for the screening of determinands within soils are identified within Table 5.1.

Table 5.1: Selected Assessment Criteria – Contaminants in Soils

Substance Group	Determinand(s)	Assessment Criteria Selected
<i>Organic Substances</i>		
Non-halogenated Hydrocarbons	Total Petroleum Hydrocarbons (TPHCWG banded)	S4UL
	Total Phenols	S4UL
Polycyclic Aromatic Hydrocarbons (PAH-16)	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene	S4UL
Volatile Organic Compounds (VOCs/sVOCs).	Toluene, Ethylbenzene, Benzene, Xylenes	S4UL
<i>Inorganic Substances</i>		
Heavy Metals and Metalloids	Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Copper, Zinc	S4UL
	Copper, Zinc, Nickel	BS: 3882 (2015).
Cyanides	Free Cyanide	CLEA v1.06
Sulphates	Water Soluble Sulphate	BRE Special Digest 1:2005

5.3 BRE

- 5.3.1 The BRE Special Digest 1:2005, 'Concrete in Aggressive Ground' is used with soluble sulphate and pH results to assess the aggressive chemical environment of future underground concrete structures at the site.

5.4 Site Specific Criteria

- 5.4.1 The criteria adopted in the selection of correct screening criteria from published reports as previously described, are provided within Tables 5.2.

Table 5.2: Site Specific Data

Input Details	Value
Land Use	Residential with plant uptake
Soil Organic Matter	1%

- 5.4.2 As the published reports only offer the option of selecting an SOM value of 1%, 2.5% or 6%, an SOM value of 1% has been used for the generation of generic assessment criteria, as 0.90% was the mean value obtained from laboratory analysis.

- 5.4.3 It is understood that the site is to be developed to provide residential units including some private gardens. As a result, the site has been assessed as residential without plant uptake.

6 GENERIC QUANTITATIVE RISK ASSESSMENT

6.1 Screening of Soil Chemical Analysis Results – Human Health Risk Assessment

6.1.1 To focus on the contaminants of potential concern (COPC), the results have been compared with the respective SGV/GAC. Those contaminants which exceed the SGV/GAC are considered to be the COPC. Those which do not exceed the respective SGV/GAC are not considered to be COPC and as such do not require further assessment in relation to the proposed development of the site.

6.1.2 Laboratory analysis for soils are summarised in Tables 6.1 to 6.4. Raw laboratory data is included in Appendix 3.

Table 6.1: Soil Laboratory Analysis Results – Metals, Metalloids, Phenol, Cyanide

Determinand	Unit	No. samples tested	Screening Criteria	Min	Max	No. Exceeding
Arsenic	mg/kg	8	S4UL 37	<1.0	15	0
Cadmium	mg/kg	8	S4UL 11	<0.2	<0.2	0
Chromium	mg/kg	8	S4UL 910	3.5	25	0
Lead	mg/kg	8	C4SL 200	1.5	49	0
Mercury	mg/kg	8	S4UL 40	<0.3	<0.3	0
Nickel	mg/kg	8	S4UL 180	2.3	23	0
Copper	mg/kg	8	S4UL 2400	3.6	18	0
Zinc	mg/kg	8	S4UL 3700	6.0	76	0
Total Cyanide ^A	mg/kg	8	CLEA v 1.06 33	<1	<1	0
Selenium	mg/kg	8	S4UL 250	<1.0	<1.0	0
Boron Water Soluble	mg/kg	8	S4UL 290	<0.2	0.9	0
Phenols	mg/kg	8	S4UL 120	<1.0	<1.0	0

Notes:

^A Generic assessment criteria derived for free inorganic cyanide.

Table 6.2: Soil Laboratory Analysis Results – Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. Samples Tested	Screening Criteria	Min	Max	No. Exceeding
Naphthalene	mg/kg	8	S4UL 2.3	<0.05	<0.05	0
Acenaphthylene	mg/kg	8	S4UL 170	<0.05	<0.05	0
Acenaphthene	mg/kg	8	S4UL 210	<0.05	<0.05	0
Fluorene	mg/kg	8	S4UL 170	<0.05	<0.05	0
Phenanthrene	mg/kg	8	S4UL 95	<0.05	<0.05	0
Anthracene	mg/kg	8	S4UL 2400	<0.05	<0.05	0
Fluoranthene	mg/kg	8	S4UL 280	<0.05	<0.05	0

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Pyrene	mg/kg	8	S4UL	620	<0.05	<0.05	0
Benzo(a)anthracene	mg/kg	8	S4UL	7.2	<0.05	<0.05	0
Chrysene	mg/kg	8	S4UL	15	<0.05	<0.05	0
Benzo(b)fluoranthene	mg/kg	8	S4UL	2.6	<0.05	<0.05	0
Benzo(k)fluoranthene	mg/kg	8	S4UL	77	<0.05	<0.05	0
Benzo(a)pyrene	mg/kg	8	S4UL	2.2	<0.05	<0.05	0
Indeno(123-cd)pyrene	mg/kg	8	S4UL	27	<0.05	<0.05	0
Dibenzo(ah)anthracene	mg/kg	8	S4UL	0.24	<0.05	<0.05	0
Benzo(ghi)perylene	mg/kg	8	S4UL	320	<0.05	<0.05	0
Total PAH	mg/kg	8	-	-	<0.80	<0.80	-

Table 6.3: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPH)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C ₈ -C ₁₀	mg/kg	6	S4UL	27	<0.1	<0.1	0
>C ₁₀ -C ₁₂	mg/kg	6	S4UL	74	<2.0	<2.0	0
>C ₁₂ -C ₁₆	mg/kg	6	S4UL	140	<4.0	<4.0	0
>C ₁₆ -C ₂₁	mg/kg	6	S4UL	260	<1.0	<1.0	0
>C ₂₁ -C ₃₅	mg/kg	6	S4UL	1100	<10	<10	0
Total TPH	mg/kg	6	-	-	<17.1	<17.1	-

Note: *The lower value of guidelines for Aromatic/Aliphatics has been selected

Table 6.4: Soil Laboratory Analysis Results – Total Petroleum Hydrocarbons (TPHCWG)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C ₅ -C ₆ Aliphatic	mg/kg	2	S4UL	42	<0.001	<0.001	0
>C ₆ -C ₈ Aliphatic	mg/kg	2	S4UL	100	<0.001	<0.001	0
>C ₈ -C ₁₀ Aliphatic	mg/kg	2	S4UL	27	<0.001	<0.001	0
>C ₁₀ -C ₁₂ Aliphatic	mg/kg	2	S4UL	130	<1.0	<1.0	0
>C ₁₂ -C ₁₆ Aliphatic	mg/kg	2	S4UL	1100	<2.0	<2.0	0
>C ₁₆ -C ₃₅ Aliphatic	mg/kg	2	S4UL	65000	<16.0	238	0
>C ₅ -C ₇ Aromatic	mg/kg	2	S4UL	70	<0.001	<0.001	0
>C ₇ -C ₈ Aromatic	mg/kg	2	S4UL	130	<0.001	<0.001	0
>C ₈ -C ₁₀ Aromatic	mg/kg	2	S4UL	34	<0.001	<0.001	0
>C ₁₀ -C ₁₂ Aromatic	mg/kg	2	S4UL	74	<1.0	<1.0	0
>C ₁₂ -C ₁₆ Aromatic	mg/kg	2	S4UL	140	<2.0	<2.0	0

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
>C ₁₆ -C ₂₁ Aromatic	mg/kg	2	S4UL	260	<10	<10	0
>C ₂₁ -C ₃₅ Aromatic	mg/kg	2	S4UL	1100	<10	110	0
Total TPH (Ali/Aro)	mg/kg	2	-	-	<20	350	-

6.2 Volatile Organic Compounds

6.2.1 In addition to the suites outlined previously, 2No. samples were tested for the presence of volatile organic compounds including BTEX compounds (benzene, toluene, ethylbenzene, xylene). No VOCs were reported above the laboratory detection limit within any tested sample.

6.3 Polychlorinated Biphenyl (PCB) Concentrations

6.3.1 1No. sample, targeting the electrical substation on the western boundary, was analysed for the presence of PCBs. No PCBs were reported above the laboratory method detection limit.

6.4 Asbestos in Soil

6.4.1 4No. samples were screened in the laboratory for the presence of asbestos. The results of the analysis is summarised below in Table 6.5 below

Table 6.5: Asbestos Analysis – Summary

Sample	Screening result.	Comments
WS1 – 0.50mbgl	Detected	Chrysotile - Loose Fibres
WS9 – 0.25mbgl	Not Detected	N/A
WS10 – 1.00mbgl	Not Detected	N/A
WS11 – 0.25mbgl	Not Detected	N/A

6.4.2 It should be noted that for the purposes of human health assessment there is no level of asbestos below which it is deemed the materials are “safe”.

6.5 Screening of Soil Chemical Analysis Results – Potential Risks to Plant Growth

6.5.1 Zinc, copper and nickel are phytotoxins and could therefore inhibit plant growth in soft landscaped areas. Concentrations measured in soil for these determinands have been compared with the pH dependent values given in BS: 3882 (2015).

6.5.2 Adopting a pH value of greater than 7, as indicated by the results of the laboratory analysis, the following is noted;

Table 6.6: Soil Laboratory Analysis Results – Phytotoxic Determinands

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Zinc	300	6.0	76	0

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Copper	200	3.6	18	0
Nickel	110	2.3	23	0

6.6 Screening for Water Pipes

6.6.1 The results of the analysis have been assessed for potential impact upon water supply pipes. Table 6.7 below summarises the findings of the assessment:

Table 6.7: Screening Guide for Water Pipes

Determinand	Threshold adopted for PE (mg/kg)	Min Value for site data (mg/kg)	Max Value from site data (mg/kg)
Total VOCs	0.5	<0.056*	<0.056*
BTEX	0.1	<0.005*	<0.005*
MTBE	0.1	<0.001*	<0.001*
EC5-EC10	1	<0.006*	<0.1*
EC10-EC16	10	<6.0*	<6.0*
EC16-EC40	500	<20*	350
Naphthalene	5	<0.05*	<0.05*
Phenols	2	<1.0*	<1.0*

*Laboratory detection limit

6.6.2 The above results indicate that standard pipework should be sufficient.

6.6.3 The water supply pipe requirements for this site should be discussed at an early stage with the relevant Utility provider.

6.7 Waste Characterisation and Disposal

6.7.1 The following comments are given as guidance and should be confirmed by the waste disposal facility accepting the waste. The waste disposal facility may have their own classification methodology and are under no obligation to honour the comments given below.

6.7.2 A single sample was submitted to a UKAS and MCERTS accredited laboratory for Waste Acceptance Criteria testing. The results indicate that soil arisings from WS10 at 1.00mbgl do not exceed the criteria for disposal at an "inert waste landfill".

6.7.3 The accepting waste facility will also need to review the full results of chemical analysis in order to determine whether waste is hazardous or not.

7 SOIL GAS RISK ASSESSMENT

7.1 Soil Gas Results

- 7.1.1 One return monitoring visit was undertaken on 20th April 2018, to monitor wells installed within boreholes at the site for soil gas concentrations and groundwater levels.
- 7.1.2 During this visit atmospheric pressure was 1020mb and the pressure trend was reportedly static.
- 7.1.3 The results of the monitoring undertaken is summarised in Table 7.1 below, with the monitoring records presented in Appendix 6.

Table 7.1: Summary of Gas Monitoring Data

Hole No.	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	H ₂ S (ppm)	VOCs	Peak Flow Rate (l/hr)	Depth to water (mbgl)	Depth of installation (mbgl)
WS3	0.0	0.5	19.5	0	1	-0.1	0.99	2.50
WS10	0.0	1.0	18.2	0	2	0.0	Dry	5.05

- 7.1.4 WS7 could not be monitored due to access restraints at the time of the visit.

7.2 Screening of Results

- 7.2.1 As shown in Table 7.1, no methane has been reported to date. Carbon dioxide has been reported to a maximum concentration of 1.0% v/v. Screening of the monitoring well headspaces with a photo-ionisation detector (PID) has detected maximum Volatile organic compound (VOC) concentration to a maximum level of 2ppm. A maximum flow rate of -0.1l/hr has been reported.
- 7.2.2 In the assessment of risks posed by hazardous ground gases and selection of appropriate mitigation measures, BS8485 (2015) identifies four types of development, termed Type A to Type D.
- 7.2.3 Type A buildings are defined as:
- “...private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.”*
- 7.2.4 Type A has been adopted as the relevant category for the proposed development.
- 7.2.5 The soil gas assessment method is based on that proposed by Wilson & Card (1999), which was a development of a method proposed in CIRIA publication R149 (CIRIA, 1995). The method uses both gas concentrations and borehole flow rates to define a characteristic situation based on the limiting borehole gas volume flow for methane and carbon dioxide. In both these methods, the limiting borehole gas volume flow is renamed as the Gas Screening Value (GSV).
- 7.2.6 The Gas Screening Value (litres of gas per hour) is calculated by using the following equation

$$\text{GSV} = (\text{Concentration}/100) \times \text{Flow rate}$$

Where concentration is measured in percent (%)
and flow rate is measured in litres per hour (l/hr)

- 7.2.7 The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.
- 7.2.8 To accord with C665, worst case conditions are used in the calculation of GSVs for the site.
- 7.2.9 A worst case flow rate of 0.1l/hr (maximum reported) will be used in the calculation of GSVs for the site. The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.
- 7.2.10 Although no methane was detected, a value of 0.1% v/v has been adopted in order to completed the GSV calculation.
- 7.2.11 To accord with C665, worst case conditions are used in the calculation of GSVs for the site. These have been summarised below in Table 7.2

Table 7.2: Summary of Gas Monitoring Data

Gas	Concentration (v/v %)	Peak Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (after CIRIA C665)
CO ₂	1.0	0.1	0.001	1
CH ₄	0.1	0.1	0.0001	1

- 7.2.12 The methodology set out in BS 8485 (2015) has been used for determining the required gas protection measures. For a Type A development on a CS1 site, no formal gas protection measures are considered necessary.
- 7.2.13 It should be noted that only one ground gas monitoring visit has been completed, and only two of the three installed wells could be monitored. To determine whether gas protection measures are necessary, it is recommended that a full sequence of soil gas monitoring is undertaken in accordance with CIRIA C665.
- 7.2.14 It is assumed that the proposed basement car park will be formed in accordance with Building Regulations (2000). Approved Document F. Due to the basement car park being well ventilated this will provide a score of '4' in accordance with BS: 8485.
- 7.2.15 BS: 8576 (2013) has been used to derived threshold levels for Carbon Monoxide and Volatile Organic Compounds.
- 7.2.16 Given the recorded levels it is not considered that additional protection measures need to be incorporated to protect end users from the recorded Carbon Monoxide concentrations.
- 7.2.17 PID screening of the monitoring well headspace has revealed maximum concentrations of VOCs of 2ppm. Concentrations of VOCs and hydrocarbons in soil were proven to be below detection limit following laboratory testing. In addition, no sources of VOCs were identified in the Desk Study. Therefore, it is considered that the PID screening of monitoring well confirms the assessment that risks to human health receptors via vapour inhalation pathways are low.

8 SUMMARY OF RESULTS

8.1 Land Quality Impact Summary

8.1.1 Following the ground investigation, the following is noted:

- It is understood that the proposed development will comprise the demolition of 199-203 Henley Road to allow for the erection of 42 dwellings with associated access roads and soft landscaping. The new dwellings will comprise 12No semi-detached houses with private gardens to the south of the site, and a 3-storey block of apartments in the north-west of site. The apartment block will also have a basement car park under the entirety of the building footprint.
- Following generic risk assessments, no concentrations of any determinands were detected in soils in excess of generic assessment criteria for the protection of human health within a 'residential with plant uptake' end-use scenario.
- Asbestos in the form of chrysotile - loose fibres was detected in 1No. sample out of 4No. analysed in the laboratory.
- Where parts of the site will be covered by proposed building footprint and hard surfacing, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors. In areas of soft landscaping, it would be necessary to provide a clean cover system using certified clean topsoil/subsoil.
- It is recommended that additional shallow soil sampling and analysis for asbestos is undertaken, in order to delineate areas of asbestos contamination. At this stage there is insufficient data to delineate such areas, and without any further testing, it will be necessary to use a clean cover system in all areas of proposed soft landscaping.
- Where necessary, the clean cover system will need to comprise a minimum thickness of 600mm, comprising topsoil/subsoil as necessary. Imported soils should be placed on a geotextile or crushed concrete marker layer.
- Calculating the Gas Screening Value using results from 1No. visit indicates Characteristic Situation 1. For a Type A development on a CS1 site, no formal gas protection measures are considered necessary. However, it is recommended that a full sequence of soil gas monitoring is undertaken in accordance with CIRIA C665.
- As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.

8.1.2 The above conclusions are made subject to approval by the statutory regulatory bodies.

8.2 Review of Pollutant Linkages Following Site Investigation

8.2.1 The site CSM has been revised and updated from that suggested in the desk study in view of the ground investigation data, including soil laboratory analysis results. Table 8.1 highlights whether pollutant linkages identified in the original CSM are still relevant

following the risk assessment, or whether pollutant linkages, not previously identified, exist.

SECTION 8 SUMMARY OF RESULTS



Table 8.1: Plausible Pollutants Linkages Summary (Pre Remediation)

Potential Source (from desk study)	Pathway	Receptor	Relevant Pollutant Linkage?	Comment
- Potential for Made Ground associated with previous development operations – on site (S1) - Potential asbestos containing materials within existing buildings – on site (S2) - Potential asbestos impacted soils from demolition of previous buildings – on site (S3)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	✓	see 8.1 above for remedial measures. The findings of this report should be included in the construction health and safety file, with adequate measures put in place for the protection of construction and maintenance workers.
- Potential infilled chalk pit – approx. 5m off site (S4) - Potential ground gas generation from infilled chalk and gravel pits, chalk and from organic rich alluvium (S5)	Accumulation and migration of soil gases (P5)		?	Further ground gas monitoring in accordance with CIRIA C665 may be required
	- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) - Horizontal and vertical migration of contaminants within groundwater (P4)	- Neighbouring site users (R3) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled waters - Berry Brook; Principal Aquifer; site in SPZ II+III (R6)	X	Contact should be made with relevant utility providers to confirm if upgraded materials are required.

9 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

9.1 Ground Investigation Summary

- 9.1.1 No detailed structural engineering design information, with respect to the type of construction and associated structural loadings, was provided at the time of preparing this report. Consequently, a detailed discussion of all the problems that may arise during the proposed redevelopment scheme is beyond the scope of this report.
- 9.1.2 Practical solutions to the difficulties encountered, both prior to, and during construction, are frequently decided by structural constraints or economic factors. For these reasons, this discussion is predominantly confined to remarks of a general nature, which are based on site conditions encountered during the intrusive investigations.
- 9.1.3 It is understood that the proposed development the demolition of 199-203 Henley Road to allow for the erection of 42 dwellings with associated access roads and soft landscaping. The new dwellings will comprise 12No semi-detached houses with private gardens to the south of the site, and a 3-storey block of apartments in the north-west of site. The apartment block will also have a basement car park under the entirety of the building footprint.

9.2 Geotechnical Classification

- 9.2.1 At the Desk Study stage this development was deemed to be a GC2 development in accordance with BS: 1997.
- 9.2.2 The findings of the investigation undertaken and discussed previously does not change this assessment.

9.3 Data Summary

- 9.3.1 The results of the ground investigation revealed a ground profile comprising a variable thickness of Topsoil up to 0.40mbgl; overlying cohesive Head deposits up to 2.80mbgl; overlying undifferentiated deposits of the Seaford Chalk Formation and Newhaven Chalk Formation to the base of the borehole at 20mbgl.
- 9.3.2 A summary of ground conditions obtained from the ground investigation and the derived geotechnical parameters, is provided in Table 9.1 below.

SECTION 9
GEOTECHNICAL ENGINEERING
RECOMMENDATIONS



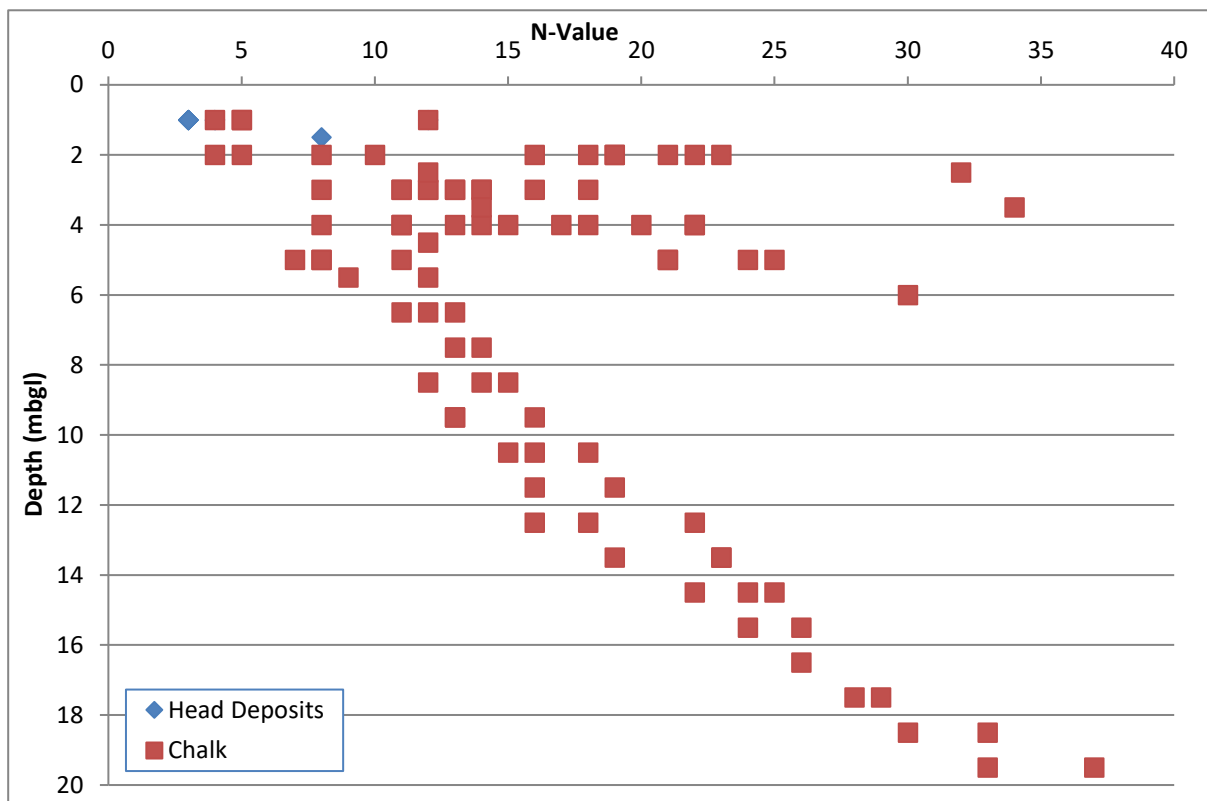
Table 9.1: Ground Conditions and Derived Geotechnical Parameters

Strata	Depth Encountered (from-to) (mbgl)	SPT 'N' Value	Inferred Shear Strength (SPT) (kPa)	Inferred Shear Strength (Hand Penetrometer) (kPa)	Measured Shear Strength (kPa)	Moisture content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (corrected plasticity) (%)	NHBC Volume Change Classification
Dark brown organic sandy gravelly clay. Gravel consists of medium sub-rounded flint. (TOPSOIL). Not encountered within WS8.	0.00 to 0.10 - 0.40	-	-	-	-	-	-	-	-	-
Brown very low to medium strength sandy gravelly CLAY. Gravel consists of flint and chalk. (HEAD DEPOSITS) Not encountered within WS11, BH1 or BH2.	0.00 - 0.30 to 0.50 - 2.80	3 - 12	13.5 - 54	21 - 70	-	12 - 27	26 - 44	15 - 19	10 - 25 (7.7 - 25)	Non-plastic to Medium
Brown to white structureless CHALK. Chalk recovered as clayey sandy gravel / sandy gravelly clay with occasional cobbles. Gravel and cobbles consists of chalk and flint. (Grade Dm to Dc - UNDIFFERENTIATED CHALK) Encountered to base of all boreholes.	0.10 - 2.80 to >4.00 - >20.00	4 - 37	18 - 166.5	21 - 221	45	25 - 27	33 - 37	23 - 26	11 (5.39 - 9.90)	Non-plastic

9.4 Standard Penetration Tests

- 9.4.1 Standard Penetration Tests were undertaken at regular intervals throughout the window sampler holes and cable percussive borehole. The results of the SPTs are plotted against depth in Figure 9.1 below.
- 9.4.2 The strata have been grouped into “Head Deposits” and “Chalk”.
- 9.4.3 N_{eq} results have been calculated for both strata where the SPT crossed strata boundaries.

Figure 9.1: SPT N Value v depth



- 9.4.4 The chalk was recovered as both heavily weathered cohesive and granular soil. Therefore, there is some disparity between recorded ‘N’ values in the shallower material, with higher values representing Grade Dc Chalk and lower values representing Grade Dm Chalk. The values become less diverse with depth as the chalk becomes more uniform.
- 9.4.5 For the purposes of clarity, only two results from the Head Deposits have been included in the graph above, as similar results were frequently obtained in this material.

9.5 Undrained Shear Strength

- 9.5.1 As discussed above the N values recorded in the Head Deposits varies with depth, this infers that the undrained shear strength of this cohesive material similarly varies. Figure 9.2 below shows the undrained shear strength inferred by the correlation suggested by Stroud (1974),

$c_u = f_1 \times N$ can be applied,

in which

c_u = mass shear strength (kN)

f_1 = constant

N = SPT Value achieved during boring operations

- 9.5.2 In the above equation f_1 is dependent on the plasticity of the material that the SPT is being carried out in. The plasticity indices ranged between 10 and 25 and consequently a conservative value for f_1 of 5.0 has been adopted after Tomlinson (2001).
- 9.5.3 The graph below shows the shear strength profile of the Head Deposits encountered at the site, based on the SPT to shear strength correlation described above.
- 9.5.4 In addition, Hand Penetrometer tests were undertaken through the window sampler boreholes. The results have been converted from unconfined compressive strength to provide an inferred undrained shear strength.
- 9.5.5 A sample taken from the Head deposits was subject to laboratory analysis to determine undrained shear strength using the Quick Undrained Triaxial methodology without the measurement of pore water pressure.
- 9.5.6 All of the undrained shear strengths are summarised below:

Table 9.2: Obtained Undrained Shear Strength – Cohesive Head Deposits

Method of Undrained Shear Strength Determination	Depth Range (m bgl)	Undrained Shear Strength (kPa)
Quick Undrained Triaxial	2.5	45
SPT and Stroud Correlation	1.0 – 1.5	20 - 60
Pocket Penetrometer	1.0 – 1.5	26 - 70

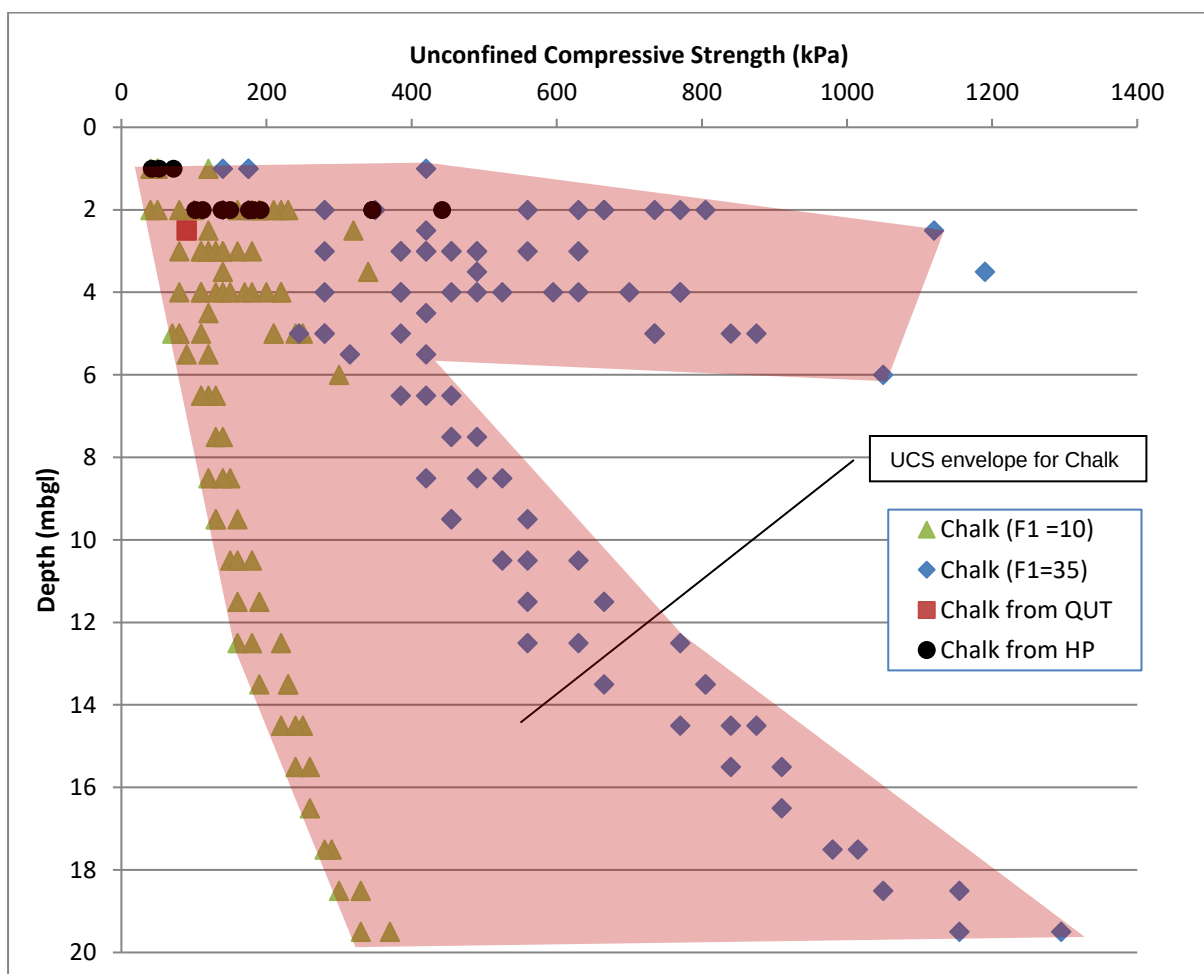
- 9.5.7 From Table 9.2 it can be observed that the range of shear strengths determined in the Cohesive Head Deposits were relatively consistent across the site and the various test methods employed.

9.6 Unconfined Compressive Strength (Chalk)

- 9.6.1 SPTs were carried out within the encountered Chalk. These results are plotted above in Figure 9.1.
- 9.6.2 As shown in Figure 9.1, there is a general increase in the recorded N values with depth and the undrained shear strength of the completely weathered chalk materials. The percussive nature of the drilling meant that the recovered materials within the chalk were heavily disturbed. The SPT 'N' values recorded show a general increase with depth, although greater variation is noted in the upper 5m.

- 9.6.3 It is usual to use unconfined compressive shear strength with rock strata. The unconfined compressive strength of chalk has often been inferred using the Stroud Correlation, described above.
- 9.6.4 Within Chalk the f_1 factor can range between 10 and 35 dependant on a number of factors, including the physical structure of the chalk (weathering grade, inclusions (i.e. flints), and jointing (including the aperture, infill and tightness)).
- 9.6.5 Consequently CIRIA C574 "Engineering in Chalk" (2002) states that the general use of SPT's to assess chalk is unlikely to be particularly useful other than to identify generic changes in the material rather than being able to provide a specific strength.
- 9.6.6 The Hand Penetrometer results from the Chalk have also been included.

Figure 9.2: Inferred Unconfined Compressive Strength Envelope v Depth



- 9.6.7 If definitive unconfined compressive strengths are required for the chalk, it would be recommended that rotary cored boreholes are undertaken with unconfined compressive strength testing be undertaken on lengths of the retrieved core.

9.7 Building Near Trees

- 9.7.1 The underlying soil conditions have been shown to be of medium volume change potential.
- 9.7.2 Using the geotechnical testing obtained (summarised in Table 9.1) and with reference to NHBC Chapter 4.2 it can be seen that a minimum founding depth of 1.25m will be required. This would allow for restricted new planting.
- 9.7.3 Presence of existing and proposed trees may increase this minimum depth. It is recommended that a tree survey that should include: location, species and height of all trees on and near to the proposed development is recommended.
- 9.7.4 Guidance is also given in relation to other aspects of construction where the shrink / swell potential of the soils may be needed to take into consideration. This guidance is summarised in the appropriate sections below.

9.8 Foundations

- 9.8.1 Foundations should not be formed in either Made Ground or the Topsoil due to the unacceptable risk of total and differential settlement.
- 9.8.2 It should be noted that the demolition and removal of existing structures, foundations and services may increase the depth of Made Ground on the site.
- 9.8.3 Based upon the information obtained to date, it is considered that conventional foundations will be unsuitable for the proposed development and a piled foundation solution within the underlying chalk should be considered.
- 9.8.4 The piles should be designed by a suitably qualified and experienced piling specialist using a suitable factor of safety with the settlement at working load specified to meet any structural requirements. Table 9.3 provides some indicative capacities for a single pile at a range of various depths, of a 600mm diameter.
- 9.8.5 To calculate the indicative allowable load that could be carried by the piles the FPS document "The design of bored piles in chalk" has been used. This document provides design charts based on a joint CIRIA and the FPS report, PR86, and assumes a 600mm diameter pile.
- 9.8.6 In using the above the following ground conditions have been used to determine which pile chart to use:
- a 'low' SPT profile ($N = 5 + z$)
 - 5m natural overburden over chalk
 - Initially encountering the chalk at 5m bgl.
- 9.8.7 It would be normal for a pile to develop carrying capacity via both end bearing and skin friction. Due to the pile being formed in the chalk it is considered that it is unlikely that the full end bearing capacity will be used and as such there would be minimal movement of the pile through the ground and as such the full potential skin friction would not be developed.

- 9.8.8 Any skin friction that is developed would provide additional carrying capacity or additional factor of safety. Within the chalk the concrete could lock into fractures/joints in the chalk and provide additional skin friction.

Table 9.3: Indicative End Bearing Piles Capacities (kN) After FPS Document “The Design Of Bored Piles In Chalk” For 0.6m Diameter Pile

Pile toe depth (m bgl)	Indicative Allowable End Bearing Pile Capacity (kN)
9	3056
11	3410
13	3765
15	4356

- 9.8.9 It should be noted that the above assumes a bored piling system. Other methods of piling and equipment may provide different results.
- 9.8.10 It would be normal practice, in line with BS EN 1997 and guidance from the Federation of Piling Specialists that the ground conditions are proven to at least 5m below the toe of the pile.
- 9.8.11 A granular engineered piling mat designed to BRE 470 will be required to support the piling rig.
- 9.8.12 As piles are proposed to be installed into the principal aquifer (the chalk) an Environment Agency piling risk assessment may be required as part of the planning process.
- 9.8.13 Where the basement is to be formed, it is recommended that a fully embedded retaining wall consisting of contiguous piled box is utilised.
- 9.8.14 The contiguous piles forming the pile box would need to act as retaining walls as well as carry the structural loadings. The piles should be designed to withstand the earth pressures, and still meet the required structural requirements regarding issues such as deflection, deformation and bending.
- 9.8.15 To provide sufficient support for the excavation, it is recommended that un-propped piles are formed to at least 12mbgl within the Chalk.
- 9.8.16 The above comments are indicative only based on limited ground investigation data. Foundations should be designed by a suitably qualified Engineer. Once structural loads have been fully determined a full design check in accordance with BS EN 1997 should be undertaken to confirm suitability of foundation choice.

9.9 Concrete in the Ground

- 9.9.1 Sulphate attack on building foundations occurs where sulphate solutions react with the various products of hydration in Ordinary Portland Cement (OPC) or converted High-Alumina Cement (HAC). The reaction is expansive, and therefore disruptive, not only due to the formation of minute cracks, but also due to loss of cohesion in the matrix.
- 9.9.2 In accordance with BRE Special Digest 1, as there are less than 10 results in the data set the highest value has been taken.

- 9.9.3 Table 9.4 summarises the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

Table 9.4: Concrete in the Ground Classes

Stratum	No. Samples	pH range	Highest WS Sulphate (mg/l)	Design Sulphate Class	ACEC Class
Topsoil	1	8.2	9.0	DS-1	AC-1s
Head Deposits	5	7.5 - 8.3	14.6	DS-1	AC-1s
Chalk	6	8.6 - 9.0	17	DS-1	AC-1 ^d

9.10 Ground Floor Slabs

- 9.10.1 Where there is to be a basement formed on the site, it is expected that the finished floor level would be approximately 4m below current ground level.
- 9.10.2 If a cantilever retaining wall is utilised, then a ground bearing floor slab could be used. Such a slab would need to be constructed on a suitable thickness of engineered granular material.
- 9.10.3 In this case, formations of the structures should be inspected by a competent person. Any loose or soft material should be removed and replaced with well-graded, properly compacted granular fill or lean mix concrete. The formation should be blinded if left exposed for more than a few hours or if inclement weather is experienced.
- 9.10.4 Such a floor slab would also need to be suitably reinforced, not only to distribute the structural loading but also to ensure that the floor slab can prop the retaining walls and does not buckle from the lateral pressures imposed by the cantilever retaining walls.
- 9.10.5 The floor slab (and basement walls) would need to be constructed to conform to BS: 8102 (2009).
- 9.10.6 For structures without a basement, as the development is to be piled, suspended floor slabs will be required.
- 9.10.7 Due to the presence of cohesive ground with a medium volume change potential, in accordance with NHBC Chapter 4.2 a suspended floor slab will be required. The depth of clear void beneath the suspended floor slab will be dependant on the floor type used.
- 9.10.8 Under suspended in-situ concrete ground floor a minimum void of 100mm is required. Whilst under suspended precast concrete and timber floors a minimum of 250mm is required.
- 9.10.9 As the site lies within an EA Flood Zone 2/3 the finished floor slab will need to be a suitable height (including an allowance for climate change) above the highest predicted relevant flood level. A Flood Risk Assessment is recommended to be carried out to determine this level. Due to the proposed distribution of buildings following the FRA floor slabs may be able to be formed at different levels across the site.
- 9.10.10 The loadings from the suspended floor slab will need to be carried by the foundations, which will need to be designed to not only carry the structural loadings but the additional floor loadings.

9.11 Retaining Walls

- 9.11.1 Retaining walls would need to be designed to both withstand the earth pressures and to be able to transfer the above loading successfully i.e. the retaining wall should be designed to act as a foundation for the structure.
- 9.11.2 A check against sliding failure would need to be made to the retaining wall design. This may alter the above recommendations regarding allowable bearing capacities.
- 9.11.3 At the current time, insufficient structural information is available to allow details of the retaining wall to be determined. Given the obtained information it is considered that a friction angle for the cohesive materials could be taken as 0° in its undrained state (Meyerhoff, 1956).
- 9.11.4 Given the medium-volume change potential of the underlying clays these should consist of 25mm void or the equivalent thickness of compressible material adjacent to the foundation.
- 9.11.5 It is understood that up to 6m deep cuttings and 4m deep fill of engineered road stone will be used on site. In addition, up to 7m high retaining structures are anticipated due to the site topography. These structures will need to be designed by a suitably qualified engineer and taken into account the above comments regarding retaining walls.

9.12 Excavations

- 9.12.1 It is likely that some shallow excavations will be required at the site for services etc, in addition to larger excavations during the remediation and construction works. These are anticipated to remain stable for the short term only.
- 9.12.2 The stability of all excavations should be assessed during construction. The sides of any excavations into which personnel are required to enter, should be assessed and where necessary fully supported or battered back to a safe angle.
- 9.12.3 The progression of the basement excavation will need to consider the potential impact to existing structures off site and provide adequate and appropriate support.
- 9.12.4 Where the basement is to be formed it is recommended that the piles are installed first to provide stability to the excavation.

9.13 Groundwater Control

- 9.13.1 During the investigation groundwater was reported within boreholes at depths of between 2.0m and 8.7m bgl. This difference in level is likely due to the topography of the site.
- 9.13.2 Subject to seasonal variations, any groundwater encountered during site works could be readily dealt with by conventional pumping from a sump used to collate waters.
- 9.13.3 Surface water or rainfall ingress could be similarly dealt with.
- 9.13.4 If a secant piled wall is utilised to for the basement, this will also act as a form of groundwater exclusion. A contiguous piled wall would not provide this.

9.14 In Situ CBR Measurements

- 9.14.1 California Bearing Ratio tests were undertaken using a Perth Penetrometer Probe at 5No. positions across the site as shown on a plan in Appendix 1.
- 9.14.2 The results have then been used to calculate CBR values using the methodology outlined in Interim Advice Notice 73/06.
- 9.14.3 The recorded penetration and the calculated CBR values from each position are provided in Appendix 6.
- 9.14.4 The results are summarised in the table below:

Table 9.5 – CBR Results

Position	Initial-Final Depth (mm bgl)	CBR (%)
WS1	200 - 500	4.8
	500 - 700	11.4
	700 - 1000	4.0
WS8	100 - 400	0.7
	400 - 800	10.1
	800 - 1000	3.6
WS9	100 - 500	9.4
	500 - 800	3.1
	800 - 1000	2.3
WS10	500 - 750	7.9
	800 - 850	37.8
	850 - 1000	15.4
CBR1	50 - 300	14.3
	300 - 400	46.4
	400 - 450	302

- 9.14.5 It should be noted that there is a large difference in the highest and lowest CBR values reported. This is due to some tests refusing. Therefore, the result in CBR1 at 302% should be discounted.
- 9.14.6 It is therefore considered that in accordance with Interim Advice Note 73/06 Revision 1 as a CBR of less than 2.5% has been locally determined (WS8 0.1m to 0.4m and WS9 0.8m to 1.0m) these materials would be unsuitable as a sub base and will require permanent improvement.
- 9.14.7 Given the very shallow nature of the location exhibiting the very low CBR result it is possible that localised removal of these materials and replacement of the materials with suitably compacted granular materials would allow a CBR of 2.5% to be adopted for design purposes.

- 9.14.8 It is recommended that following the improvements described above a CBR of 2.5% could be adopted for the purpose of road design. However, proof rolling of granular engineered materials may provide a greater result.
- 9.14.9 Following compaction further CBR testing should be undertaken following the proof rolling to confirm that suitable improvement was achieved.

10 REFERENCES

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BRE Special Digest 1: Concrete in Aggressive Ground, 2005

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CIRIA C665 (2007) *Assessing risks posed by hazardous ground gases to buildings* London, CIRIA

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British Standards Institution (2013) BS 8576:2013 *Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOC's)*, Milton Keynes: BSI

APPENDICES

APPENDIX 1 – FIGURES

Project Name	199-207 Henley Road, Reading	Client	Thakeham Client
Project No.	P9413J811	Date	January 2018
Title	Site Location Plan		





Project Name:	199-207 Henley Road, Reading, RG4 6LJ	Client:	Thakeham Client
Title:	Proposed Layout Plan	Project No.	P9413J811
Date:	28 March 2018		





Project Name:	199-207 Henley Road, Reading, RG4 6LJ	Client:	Thakeham Client
Title:	Proposed Exploratory Hole Plan	Project No.	P9413J811
Date:	28 March 2018		



APPENDIX 2 – EXPLORATORY HOLE RECORDS



WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS1

Site Address: 199-207 HENLEY ROAD READING RG4 6LJ

Client: Thakeham Client

Logged By: RO

Checked By: PSw

Type and diameter of equipment: Windowless Sampler

Project No: P9413J811

Ground Level:

Date Commenced: 03/04/2018

Date Completed: 03/04/2018

Sheet No: 1 Of 2

Water levels recorded during boring, m

Date: 04/04/2018

Hole depth: 5.00

Casing depth:

Level water on strike: 3.00

Water Level after 20mins:

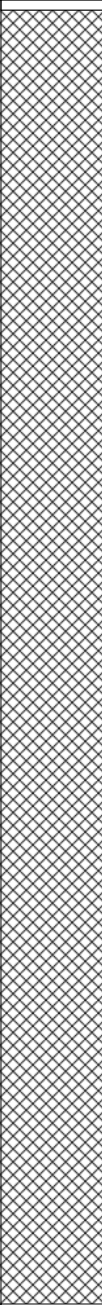
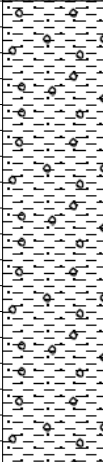
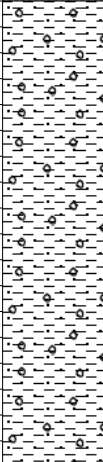
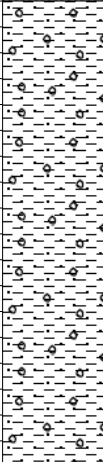
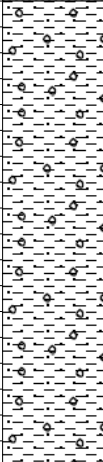
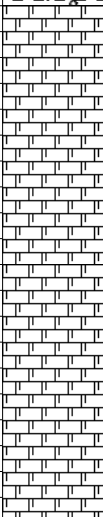
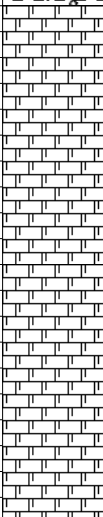
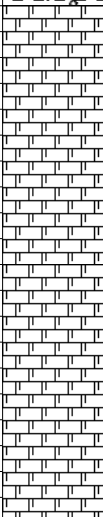
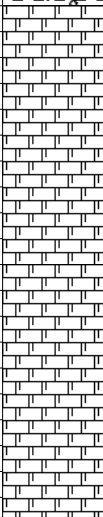
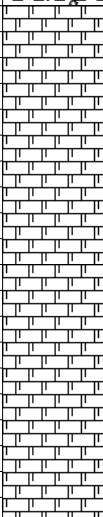
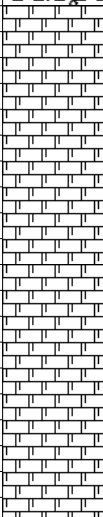
Remarks

1: *Field description.

2:

3:

4:

Sample or Tests										Strata				Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75	N							
P+J	0.25								0.00		0.20		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).		
P+J	0.50								0.50				Brown low to medium strength slightly sandy gravelly CLAY. Gravel consists of fine to medium, sub-rounded to angular flint. (HEAD DEPOSITS)		
P+J	1.00								1.00						
D															
HPT															
	31kpa														
SPT		0	0	0	1	1	2	4	1.50						
D	2.00								2.00		2.00		Structureless heavily weathered CHALK recovered as medium to high strength cream very sandy very gravelly CLAY. (Dm Grade CHALK)		
HPT															
	75kpa														
SPT		2	4	4	6	4	4	18	2.50						
D	3.00								3.00		3.00		Structureless heavily weathered CHALK recovered as medium dense brown coarse gravelly chalky SAND. Gravel consists of fine to medium angular to sub-rounded chalk and flint. (Dc Grade CHALK)		
HPT															
	173kpa														
SPT		3	5	3	3	4	3	13	3.50						
D	4.00								4.00		4.00		No recovery. (RUNNING SAND).		
SPT		2	3	4	4	3	3	14	4.50						
D	5.00								5.00						
SPT		1	1	2	2	2	2	8							

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com



WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

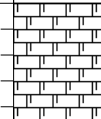
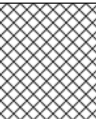
Exploratory Hole No:

WS1

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RO	Date Commenced:	03/04/2018
Checked By:	PSw	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	2 Of 2

Water levels recorded during boring, m						
Date:	04/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	3.00					
Water Level after 20mins:						

Remarks						
1: *Field description.						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D SPT	5.00	1	1	2	2	2	2	8	5.00				No recovery. (RUNNING SAND).	
									5.50					
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

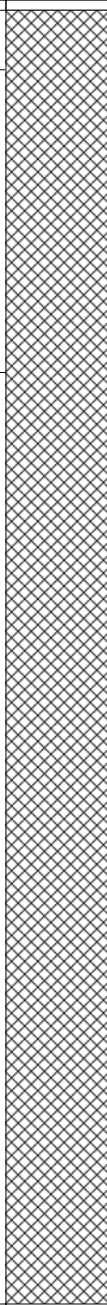
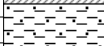
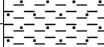
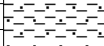
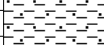
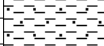
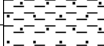
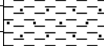
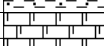
Exploratory Hole No:

WS2

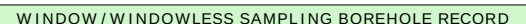
Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RO	Date Commenced:	03/04/2018
Checked By:	PSw	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 2

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	3.00					
Water Level after 20mins:						

Remarks						
1: *Field description.						
2: No installation due to hole collapsing to 2.00m bgl.						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P+J	0.25								0.00		0.15		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
P+J	0.50								0.50				Very soft consistency* brown sandy CLAY. (HEAD DEPOSITS)	
P+J D HPT	1.00								1.00					
	26kpa										1.40			
SPT		0	0	1	0	1	1	3	1.50				Structureless extremely weak highly weathered brown CHALK recovered as a medium dense very clayey gravelly SAND. Sand is medium to coarse. Gravel consists of fine to medium, angular to sub-rounded flint. (Dc Grade CHALK)	
D HPT	2.00								2.00					
	31kpa													
SPT		2	4	6	5	6	4	21	2.50					
D SPT	3.00	2	3	3	4	3	3	13	3.00					
									3.50					
D SPT	4.00	2	1	1	4	6	4	15	4.00					
									4.50					
D SPT	5.00	6	5	5	6	7	6	24	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WS2

Project No:	P9413J811
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Ground Level:

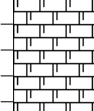
Date Commenced:	03/04/2018
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Date Completed:	03/04/2018
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Sheet No:	2 Of 2
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Date:	03/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	3.00					
Water Level after 20mins:						

4:

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D SPT	5.00	6	5	5	6	7	6	24	5.00		5.45		Structureless extremely weak highly weathered brown CHALK recovered as a medium dense very clayey gravelly SAND. Sand is medium to coarse. Gravel consists of fine to medium, angular to sub-rounded flint. (Dc Grade CHALK)	
									5.50					
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

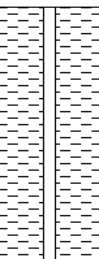
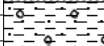
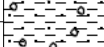
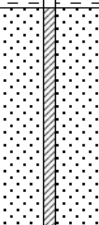
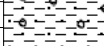
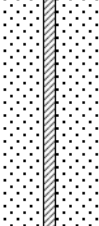
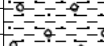
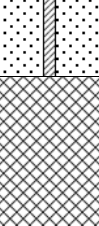
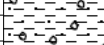
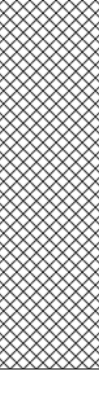
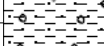
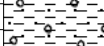
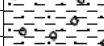
Exploratory Hole No:

WS3

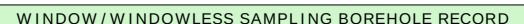
Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RO	Date Commenced:	03/04/2018
Checked By:	PSw	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 2

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks						
1: *Field description.						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation	
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75	N							
P+J	0.25								0.00		0.15		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).		
P+J	0.50								0.50				Soft consistency* brown slightly sandy gravelly CLAY. Gravel consists of fine to medium, sub-rounded to angular flint. (HEAD DEPOSITS)		
P+J	1.00								1.00						
D HPT															
	47kpa														
SPT		0	1	0	1	0	2	3	1.50						
D HPT	2.00								2.00		1.90		Structureless extremely weak heavily weathered brown CHALK recovered as a medium dense medium clayey gravelly SAND. Gravel consists of fine to medium, angular to sub-rounded flint and chalk. (Dc Grade CHALK_		
	83kpa														
SPT		4	5	6	4	4	5	19	2.50		2.80		Structureless extremely weak heavily weathered brown CHALK recovered as medium to coarse gravelly SAND. Gravel consists of fine to medium, angular to sub-rounded flint. (Dc Grade CHALK)		
D SPT	3.00	2	3	3	2	3	3	11	3.00						
D SPT	4.00	3	4	4	2	6	5	17	4.00						
D SPT	5.00	5	5	6	5	5	5	21	5.00						

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WS3

Project No:	P9413J811
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Ground Level:

Date Commenced:	03/04/2018
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Date Completed:	03/04/2018
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Sheet No:	2 Of 2
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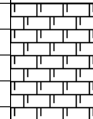
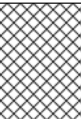
Water Level after 20mins:

1: *Field description.

2:

3:

4:

Sample or Tests									Strata			Strata Description	Installation	
Type	Depth (mbgl)	Result							Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75							N
D SPT	5.00	5	5	6	5	5	5	21	5.00		5.45		Structureless extremely weak heavily weathered brown CHALK recovered as medium to coarse gravelly SAND. Gravel consists of fine to medium, angular to sub-rounded flint. (Dc Grade CHALK)	
									5.50					
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

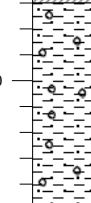
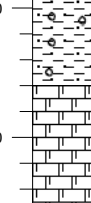
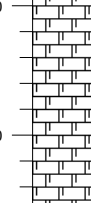
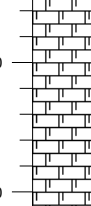
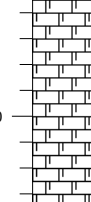
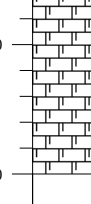
Exploratory Hole No:

WS4

Site Address:	199-207 Henley Road, Reading, RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RS	Date Commenced:	03/04/2018
Checked By:	PS	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 2

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	2.00m					
Water Level after 20mins:						

Remarks						
1: HPT = Hand Penetrometer Test (Results converted from unconfined compressive strength to undrained shear strength)						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P + J + V	0.25								0.00		0.20		TOPSOIL.	
P + J + V	0.50								0.50				Brown very low to low strength sandy slightly gravelly CLAY. Sand is medium. Gravel consists of fine to medium sub-angular flint.	
P + J + V	1.00								1.00					
D SPT HPT		0	0	1	1	1	1	4			1.30			
	36kpa								1.50				Structureless extremely weak highly weathered CHALK recovered as medium dense brown clayey gravelly SAND. Sand is medium to coarse. Gravel consists of fine to medium angular to sub-rounded chalk and flint. (Dc Grade CHALK)	
D SPT HPT	2.00	5	4	7	5	5	6	23	2.00					
	70kpa								2.50					
D SPT HPT	3.00	2	3	3	3	3	2	11	3.00					
	51kpa								3.50					
D SPT	4.00	4	4	2	3	3	3	11	4.00					
									4.50					
D SPT	5.00	6	5	5	5	6	5	21	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

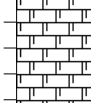
Exploratory Hole No:

WS4

Site Address:	199-207 Henley Road, Reading, RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RS	Date Commenced:	03/04/2018
Checked By:	PS	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	2 Of 2

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	2.00m					
Water Level after 20mins:						

Remarks						
1: HPT = Hand Penetrometer Test (Results converted from unconfined compressive strength to undrained shear strength)						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D SPT	5.00	6	5	5	5	6	5	21	5.00				Structureless extremely weak highly weathered CHALK recovered as medium dense brown clayey gravelly SAND. Sand is medium to coarse. Gravel consists of fine to medium angular to sub-rounded chalk and flint. (Dc Grade CHALK)	
									5.50		5.45			
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS5

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RO	Date Commenced:	03/04/2018
Checked By:	PSw	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:	4.00					
Casing depth:						
Level water on strike:	2.00					
Water Level after 20mins:						

Remarks						
1: *Field description.						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P+J	0.25								0.00		0.10		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
P+J	0.50								0.50				Soft consistency* brown sandy gravelly CLAY. Gravel consists of fine to medium sub-angular flint. (HEAD DEPOSITS)	
P+J D HPT	1.00								1.00					
	70kpa													
SPT		0	0	0	1	1	1	3	1.50					
D HPT	2.00								2.00		2.00		Structureless heavily to completely weathered CHALK recovered as soft consistency* brown-white sandy gravelly CLAY. Gravel consists of occasional fine to coarse angular flint. (Dm Grade CHALK)	
	96kpa													
SPT		1	1	1	1	1	1	4	2.50		2.80		Structureless heavily to completely weathered CHALK recovered as medium dense brown coarse gravelly SAND. Gravel consists of fine to coarse, angular to sub-rounded flint. (Dc Grade CHALK)	
D HPT	3.00								3.00					
	69kpa													
SPT		2	2	4	2	3	3	12	3.50					
D SPT	4.00	2	4	5	5	5	5	20	4.00					
									4.50		4.45			
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

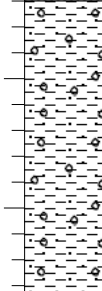
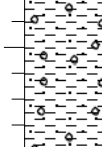
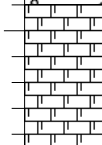
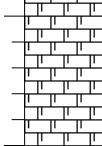
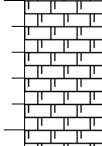
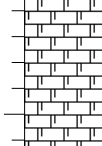
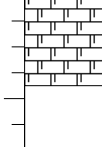
Exploratory Hole No:

WS6

Site Address:	199-207 Henley Road, Reading, RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RS	Date Commenced:	03/04/2018
Checked By:	PS	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 1

Water levels recorded during boring, m						
Date:						
Hole depth:						
Casing depth:						
Level water on strike:						
Water Level after 20mins:						

Remarks						
1: HPT = Hand Penetrometer Test (Results converted from unconfined compressive strenght to undrained shear strength)						
2: No water reported.						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P + J + V	0.25								0.00		0.20		TOPSOIL.	
P + J + V	0.50								0.50				Brown very low to low strength sandy very gravelly CLAY. Sand is medium. Gravel consists of fine to coarse angular to sub-rounded flint. (HEAD DEPOSITS)	
P + J + V	1.00								1.00					
D														
SPT		0	0	0	1	1	1	3						
HPT														
	38kpa													
									1.50					
														
														
D	2.00								2.00		1.90		Structureless extremely weak brown to white CHALK recovered as medium dense clayey gravelly sand. Gravel consists of fine to medium angular chalk and flint. (Dc Grade CHALK)	
SPT		0	0	0	1	3	1	5						
HPT														
	56kpa													
									2.50					
D	3.00								3.00					
SPT		3	4	4	3	4	3	14						
									3.50					
D	4.00								4.00					
SPT		2	3	5	5	6	6	22						
									4.50					
									5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS8

Site Address:	199-207 Henley Road, Reading, RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RS	Date Commenced:	03/04/2018
Checked By:	PS	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	1 Of 2

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	3.00m					
Water Level after 20mins:						

Remarks						
1: HPT = Hand Penetrometer Test (Results converted from unconfined compressive strength to undrained shear strength)						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P + J + V	0.25								0.00		1.90		Brown medium strength sandy very gravelly CLAY. Sand is medium. Gravel consists of fine to coarse angular to sub-rounded flint. (HEAD DEPOSITS)	
P + J + V	0.50								0.50					
P + J + V	1.00								1.00					
D HPT	33kpa													
SPT		3	4	3	3	3	3	12	1.50					
D HPT	2.00								2.00					
SPT	88kpa	7	9	8	5	3	3	19	2.50		3.00		Structureless extremely weak brown to white CHALK recovered as medium dense clayey GRAVEL. Gravel consists of fine to coarse angular flint and chalk. (Dc Grade CHALK)	
D HPT	3.00								3.00					
SPT	221kpa	1	1	3	6	3	2	14	3.50					
D SPT	4.00	2	2	2	2	2	2	8	4.00					
D SPT	5.00	2	2	2	1	2	2	7	5.00				4.5 114 tructureless extremely weak brown to white CHALK recovered as loose clayey sandy GRAVEL. Gravel consists of fine to coarse angular chalk. (Dc Grade CHALK)	

Sampling Code: U - Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

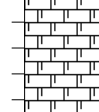
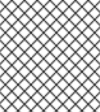
Exploratory Hole No:

WS8

Site Address:	199-207 Henley Road, Reading, RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	RS	Date Commenced:	03/04/2018
Checked By:	PS	Date Completed:	03/04/2018
Type and diameter of equipment:	Windowless Sampler	Sheet No:	2 Of 2

Water levels recorded during boring, m						
Date:	03/04/2018					
Hole depth:	5.00					
Casing depth:						
Level water on strike:	3.00m					
Water Level after 20mins:						

Remarks						
1: HPT = Hand Penetrometer Test (Results converted from unconfined compressive strength to undrained shear strength)						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D SPT	5.00	2	2	2	1	2	2	7	5.00		5.45		4.5 114 tructureless extremely weak brown to white CHALK recovered as loose clayey sandy GRAVEL. Gravel consists of fine to coarse angular chalk. (Dc Grade CHALK)	
									5.50					
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS9

Site Address: 199-207 HENLEY ROAD READING RG4 6LJ

Client: Thakeham Client

Logged By: RO

Checked By: PS

Type and diameter of equipment: Windowless Sampler

Project No: P9413J811

Ground Level:

Date Commenced: 04/04/2018

Date Completed: 04/04/2018

Sheet No: 1 Of 2

Water levels recorded during boring, m

Date: 04/04/2018

Hole depth: 5.00

Casing depth:

Level water on strike: 3.00

Water Level after 20mins:

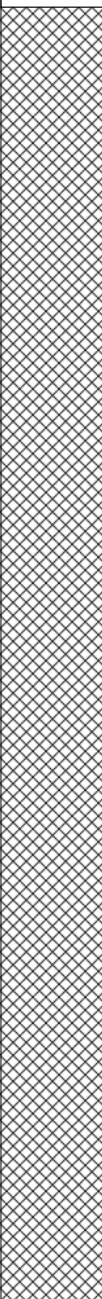
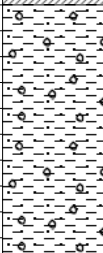
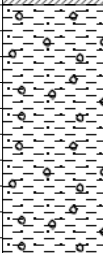
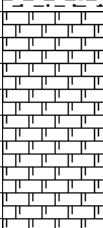
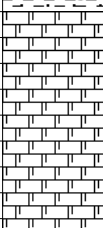
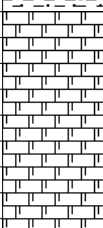
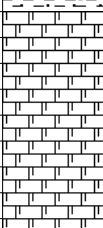
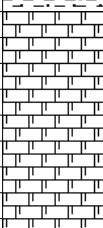
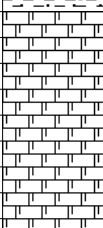
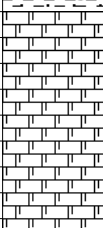
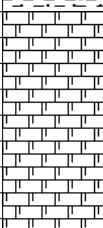
Remarks

1: *Field description.

2:

3:

4:

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P+J	0.25								0.00		0.30		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
P+J	0.50								0.50			Soft consistency* brown sandy gravelly CLAY. Gravel consists of fine to medium sub-angular flint. (HEAD DEPOSITS)		
P+J D HPT	1.00								1.00					
	46kpa										1.30			
SPT		0	0	1	2	0	0	3	1.50			Structureless extremely weak heavily weathered CHALK recovered as very white medium strength to high strength slightly sandy slightly gravelly CLAY. Gravel consists of fine to medium angular flint. (Dm Grade CHALK)		
D HPT	2.00								2.00					
	91kpa													
SPT		4	9	9	5	4	4	22	2.50					
D HPT	3.00								3.00					
	173kpa													
SPT		2	2	4	3	4	5	16	3.50					
D SPT	4.00	2	3	4	3	3	3	13	4.00					
									4.50					
D SPT	5.00	3	2	2	2	3	1	8	5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS9

Site Address: 199-207 HENLEY ROAD READING RG4 6LJ

Client: Thakeham Client

Logged By: RO

Checked By: PS

Type and diameter of equipment: Windowless Sampler

Project No: P9413J811

Ground Level:

Date Commenced: 04/04/2018

Date Completed: 04/04/2018

Sheet No: 2 Of 2

Water levels recorded during boring, m

Date: 04/04/2018

Hole depth: 5.00

Casing depth:

Level water on strike: 3.00

Water Level after 20mins:

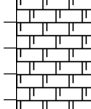
Remarks

1: *Field description.

2:

3:

4:

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D SPT	5.00	3	2	2	2	3	1	8	5.00		5.45	Structureless extremely weak heavily weathered CHALK recovered as very white medium strength to high strength slightly sandy slightly gravelly CLAY. Gravel consists of fine to medium angular flint. (Dm Grade CHALK)		
									5.50					
									6.00					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS10

Site Address: 199-207 HENLEY ROAD READING RG4 6LJ

Client: Thakeham Client

Logged By: RO

Checked By: PS

Type and diameter of equipment: Windowless Sampler

Project No: P9413J811

Ground Level:

Date Commenced: 04/04/2018

Date Completed: 04/04/2018

Sheet No: 1 Of 2

Water levels recorded during boring, m

Date:

Hole depth:

Casing depth:

Level water on strike:

Water Level after 20mins:

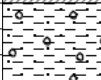
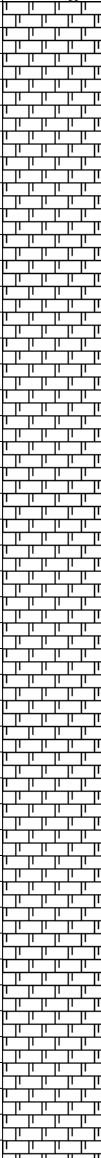
Remarks

1: *Field description.

2: No water reported.

3:

4:

Sample or Tests										Strata			Strata Description	Installation	
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75	N							
P+J	0.25								0.00		0.20		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).		
P+J	0.50								0.50		0.50		Soft consistency* brown sandy chalky gravelly CLAY. Gravel consists of fine to medium sub-angular flint. (HEAD DEPOSITS)		
P+J D HPT	1.00								1.00			Structureless extremely weak heavily weathered CHALK recovered as brown-white medium strength gravelly CLAY with with medium cobble content. Gravel consists of fine to coarse subangular flint. Cobbles consist of flint (Dm / Dc Grade CHALK)			
	26kpa														
SPT		1	1	2	1	1	1	5	1.50						
D SPT	2.00	2	2	2	2	2	2	8	2.00						
									2.50						
D SPT	3.00	2	2	2	2	2	2	8	3.00						
									3.50						
D SPT	4.00	3	3	3	4	2	2	11	4.00						
									4.50						
D SPT	5.00	1	2	2	3	3	3	11	5.00						

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS10

Site Address: 199-207 HENLEY ROAD READING RG4 6LJ

Client: Thakeham Client

Logged By: RO

Checked By: PS

Type and diameter of equipment: Windowless Sampler

Project No: P9413J811

Ground Level:

Date Commenced: 04/04/2018

Date Completed: 04/04/2018

Sheet No: 2 Of 2

Water levels recorded during boring, m

Date:

Hole depth:

Casing depth:

Level water on strike:

Water Level after 20mins:

Remarks

1: *Field description.

2: No water reported.

3:

4:

Sample or Tests

Strata

Type

Depth
(mbgl)

Result

75

75

75

75

75

75

N

Legend

Depth
(mbgl)Water
Strikes
(mbgl)

Strata Description

Installation

D
SPT

5.00

1

2

2

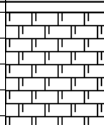
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3

3

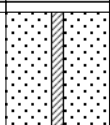
11

5.00



5.45

Structureless extremely weak heavily weathered CHALK recovered as brown-white medium strength gravelly CLAY with with medium cobble content. Gravel consists of fine to coarse subangular flint. Cobbles consist of flint (Dm / Dc Grade CHALK)



5.50

6.00

6.50

7.00

7.50

8.00

8.50

9.00

9.50

10.00

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
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WINDOW / WINDOWLESS SAMPLING BOREHOLE RECORD

Exploratory Hole No:

WS11

Site Address: 199-207 HENLEY ROAD READING RG4 6LJ

Client: Thakeham Client

Logged By: RO

Checked By:

Type and diameter of equipment: Windowless Sampler

Project No: P9413J811

Ground Level:

Date Commenced: 04/04/2018

Date Completed: 04/04/2018

Sheet No: 1 Of 2

Water levels recorded during boring, m

Date:

Hole depth:

Casing depth:

Level water on strike:

Water Level after 20mins:

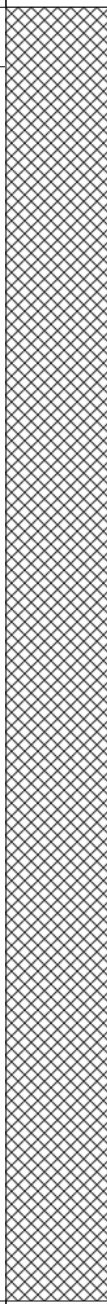
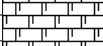
Remarks

1: *Field description.

2: No water reported.

3:

4:

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
P+J	0.25								0.00		0.10		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
P+J	0.50								0.50				Structureless extremely weak CHALK recovered as brown-white gravelly CLAY. Gravel consists of fine to coarse angular flint and chalk. (Dm Grade CHALK).	
P+J	1.00								1.00					
D														
SPT		1	1	2	1	1	1	5						
									1.50					
														
									2.00					
D	2.00	1	2	1	3	3	3	10						
SPT									2.50					
														
									3.00					
D	3.00	1	3	3	3	3	3	12						
SPT									3.50					
														
									4.00					
D	4.00	2	5	7	6	5	4	22						
SPT									4.50					
														
									5.00					
D	5.00	3	4	6	6	7	6	25						
SPT														

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

Exploratory Hole No:

WS11

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ
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Project No:	P9413J811
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Client:	Thakeham Client
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Ground Level:	
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Logged By:	RO
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Date Commenced:	04/04/2018
-----------------	------------

Checked By:	
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Date Completed:	04/04/2018
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Water levels recorded during boring, m

Date:

Hole depth:

Casing depth:

Level water on strike:

Water Level after 20mins:

Remarks

1: *Field description.

2: No water reported.

3:

4:

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D SPT	5.00	3	4	6	6	7	6	25	5.00				Structureless extremely weak CHALK recovered as brown-white gravelly CLAY. Gravel consists of fine to coarse angular flint and chalk. (Dm Grade CHALK).	
									5.50					
D SPT	6.00	2	4	5	5	10	10	30	6.00					
									6.45					
									6.50					
									7.00					
									7.50					
									8.00					
									8.50					
									9.00					
									9.50					
									10.00					



CABLE PERCUSSION BOREHOLE RECORD

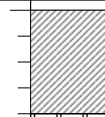
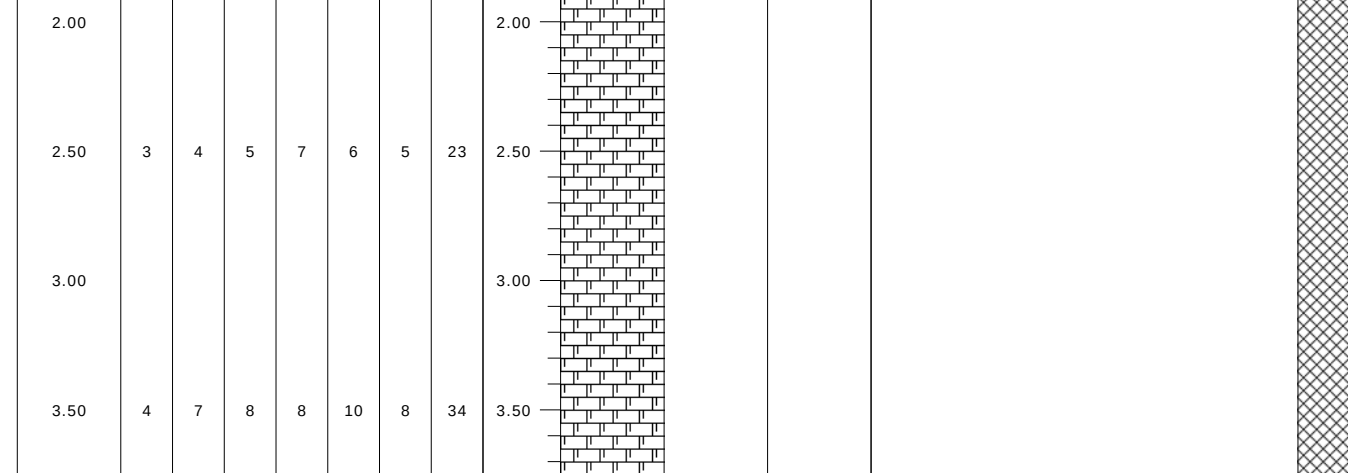
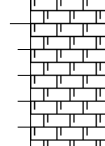
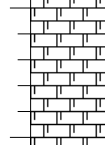
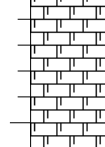
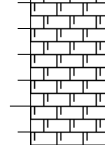
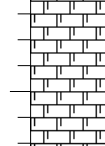
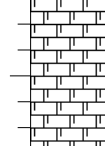
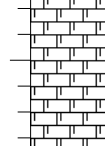
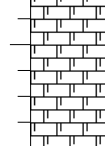
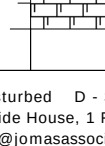
Exploratory Hole No:

BH1

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	06/04/2018
Checked By:	PSw	Date Completed:	06/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 3

Water levels recorded during boring, m						
Date:	06/04/2018					
Hole depth:	15.00					
Casing depth:						
Level water on strike:	8.70					
Water Level after 20mins:						

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation	
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75	N							
B	0.50									0.00				Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
											0.40		Structureless extremely weak locally very weak CHALK recovered as white high strength gravelly CLAY with a high cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. int and chalk. (Dm / Dc Grade CHALK)		
U	1.50									0.50					
											1.00				
D	2.00									1.50					
											2.00				
S	2.50	3	4	5	7	6	5	23		2.50					
											3.00				
D	3.00									3.50					
											4.00				
S	3.50	4	7	8	8	10	8	34		4.50					
											5.00				
D	4.00														
U	4.50														
D	5.00														

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com



CABLE PERCUSSION BOREHOLE RECORD

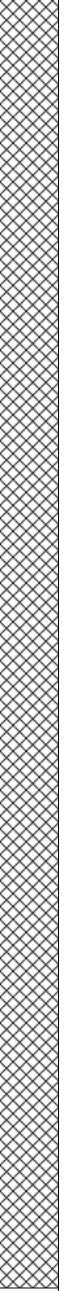
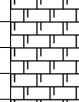
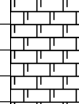
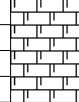
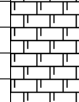
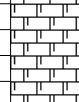
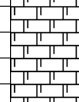
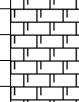
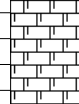
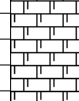
Exploratory Hole No:

BH1

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	06/04/2018
Checked By:	PSw	Date Completed:	06/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 3

Water levels recorded during boring, m						
Date:	06/04/2018					
Hole depth:	15.00					
Casing depth:						
Level water on strike:	8.70					
Water Level after 20mins:						

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D	5.00								5.00				Structureless extremely weak locally very weak CHALK recovered as white high strength gravelly CLAY with a high cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. int and chalk. (Dm / Dc Grade CHALK)	
S	5.50	2	3	3	3	3	3	12	5.50					
D	6.00								6.00					
S	6.50	2	3	3	3	3	4	13	6.50					
									7.00					
S	7.50	3	3	3	3	3	4	13	7.50					
D	8.00								8.00					
S	8.50	3	3	4	4	4	3	15	8.50					
									9.00					
S	9.50	3	4	3	5	4	4	16	9.50					
D	10.00								10.00					



CABLE PERCUSSION BOREHOLE RECORD

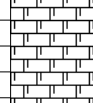
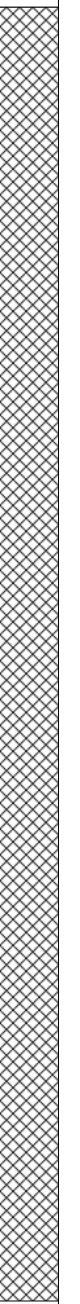
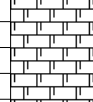
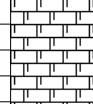
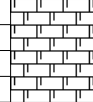
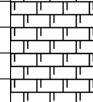
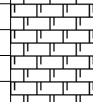
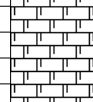
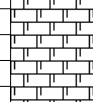
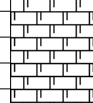
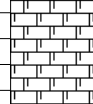
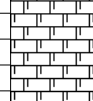
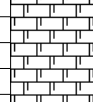
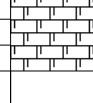
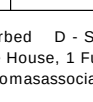
Exploratory Hole No:

BH1

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	06/04/2018
Checked By:	PSw	Date Completed:	06/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	3 Of 3

Water levels recorded during boring, m						
Date:	06/04/2018					
Hole depth:	15.00					
Casing depth:						
Level water on strike:	8.70					
Water Level after 20mins:						

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
D	10.00								10.00				Structureless extremely weak locally very weak CHALK recovered as white high strength gravelly CLAY with a high cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. int and chalk. (Dm / Dc Grade CHALK)	
S	10.50	3	5	3	5	5	5	18	10.50					
														
									11.00					
S	11.50	4	5	5	5	5	4	19	11.50					
														
D	12.00								12.00					
														
S	12.50	4	4	6	5	6	5	22	12.50					
														
									13.00					
S	13.50	3	5	5	6	6	6	23	13.50					
														
D	14.00								14.00					
														
S	14.50	4	5	6	6	6	7	25	14.50					
									15.00		15.00			



CABLE PERCUSSION BOREHOLE RECORD

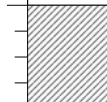
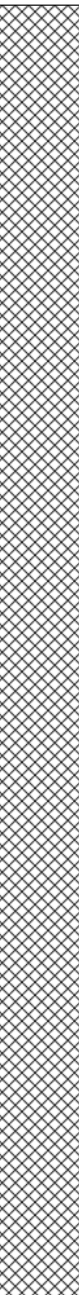
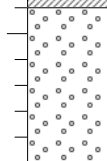
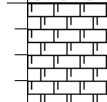
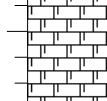
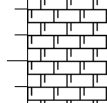
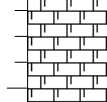
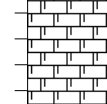
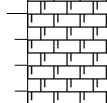
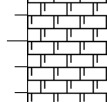
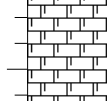
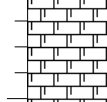
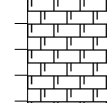
Exploratory Hole No:

BH2

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	04/04/2018
Checked By:	PS	Date Completed:	05/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 4

Water levels recorded during boring, m						
Date:	04/04/2018					
Hole depth:	20.00					
Casing depth:						
Level water on strike:	6.30					
Water Level after 20mins:	6.10					

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
B	0.50								0.00		0.40		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
									0.50		1.00		Brown-white chalky GRAVEL. Gravel consists of fine to coarse sub-angular to sub-rounded flint. (HEAD DEPOSITS)	
U	1.50							1.00				Structureless extremely weak locally very weak CHALK recovered as white high strength gravelly CLAY with a high cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. int and chalk. (Dm / Dc Grade CHALK)		
								1.50						
								2.00						
								2.50						
S	2.50	2	3	3	3	3	3	12	2.50					
D	3.00								3.00					
									3.50					
U	3.50								3.50					
									4.00					
S	4.50	2	2	3	3	3	3	12	4.50					
									5.00					
D	5.00								5.00					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com



Exploratory Hole No:

BH2

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ
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Client:	Thakeham Client
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Logged By:	SK
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Checked By:	PS
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Type and diameter of equipment:	DANDO 2000
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Project No:	P9413J811
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Ground Level:	
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Date Commenced:	04/04/2018
-----------------	------------

Date Completed:	05/04/2018
-----------------	------------

Sheet No: 3 Of 4

Water levels recorded during boring, m

Date:	04/04/2018
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Hole depth:	20.00
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Casing depth:

Level water on strike:	6.30
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Water Level after 20mins:	6.10
---------------------------	------

Remarks

1:

2:

3:

4:

[illegible]

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
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CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:

BH2

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	04/04/2018
Checked By:	PS	Date Completed:	05/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	4 Of 4

Water levels recorded during boring, m						
Date:	04/04/2018					
Hole depth:	20.00					
Casing depth:						
Level water on strike:	6.30					
Water Level after 20mins:	6.10					

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation	
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75	N							
S	15.50	4	4	5	6	6	7	24	15.00				Structureless extremely weak locally very weak CHALK recovered as white high strength gravelly CLAY with a high cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. int and chalk. (Dm / Dc Grade CHALK)		
									15.50						
									16.00						
D	16.00								16.00						
									16.50						
									17.00						
S	16.50	4	5	5	6	7	8	26	16.50						
									17.50						
									18.00						
D	17.50	5	6	6	7	8	8	29	17.50						
									18.50						
									19.00						
S	18.50	5	7	8	8	8	9	33	18.50						
									19.50						
									20.00						
S	19.50	6	6	8	9	10	10	37	19.50						
									20.00						
									20.00						
											20.00				

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com



CABLE PERCUSSION BOREHOLE RECORD

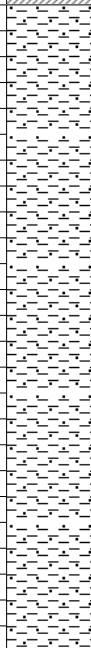
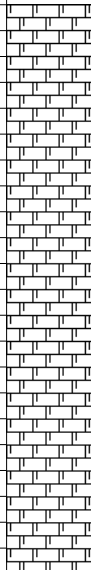
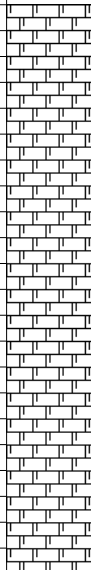
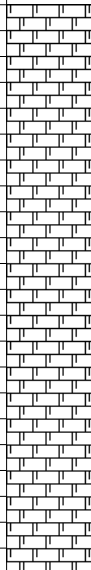
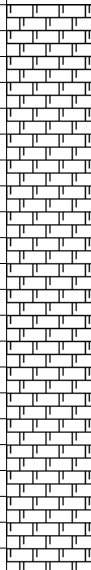
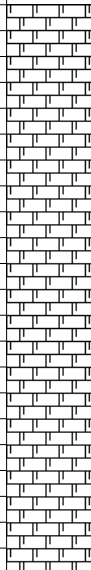
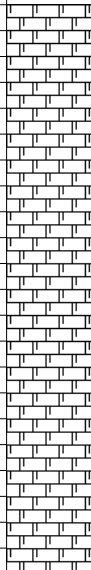
Exploratory Hole No:

BH3

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	04/04/2018
Checked By:	PS	Date Completed:	04/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	1 Of 4

Water levels recorded during boring, m						
Date:	04/04/2018					
Hole depth:	20.00					
Casing depth:						
Level water on strike:	4.30					
Water Level after 20mins:	3.80					

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
B	0.50								0.00		0.30		Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).	
									0.50					
									1.00					
S	1.50	1	2	2	2	2	2	8	1.50		2.80		Yellow-brown low strength sandy CLAY. (HEAD DEPOSITS)	
D	2.00							2.00						
U	2.50							2.50						
S	3.50							2	3	4	3	3	4	14
D	4.00								4.00		2.80		Structureless extremely weak heavily weathered brown-white CHALK recovered as medium strength gravelly CLAY moderate cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. Cobbles consist of flint. (Dm Grade CHALK)	
U	4.50								4.50					

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com



CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:

BH3

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	04/04/2018
Checked By:	PS	Date Completed:	04/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	2 Of 4

Water levels recorded during boring, m						
Date:	04/04/2018					
Hole depth:	20.00					
Casing depth:						
Level water on strike:	4.30					
Water Level after 20mins:	3.80					

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)		
		75	75	75	75	75	75	N						
S	5.50	2	2	2	2	2	3	9	5.00				Structureless extremely weak heavily weathered brown-white CHALK recovered as medium strength gravelly CLAY moderate cobble content. Gravel consists of fine to coarse sub-angular to sub-rounded chalk and flint. Cobbles consist of flint. (Dm Grade CHALK)	
									5.50					
									6.00					
D	6.00								6.00					
									6.50					
									7.00					
S	6.50	2	2	3	2	3	3	11	6.50					
									7.00					
									7.50					
D	7.00								7.00					
									7.50					
									7.80					
S	7.50								7.50					
									8.00					
									8.50					
D	8.00								8.00					
									8.50					
									9.00					
S	8.50	2	3	3	3	3	3	12	8.50					
									9.00					
									9.50					
D	9.00								9.00					
									9.50					
									10.00					
S	9.50	3	3	3	3	3	4	13	9.50					
									10.00					
D	10.00								10.00					



CABLE PERCUSSION BOREHOLE RECORD

Exploratory Hole No:

BH3

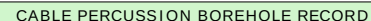
Site Address:	199-207 HENLEY ROAD READING RG4 6LJ	Project No:	P9413J811
Client:	Thakeham Client	Ground Level:	
Logged By:	SK	Date Commenced:	04/04/2018
Checked By:	PS	Date Completed:	04/04/2018
Type and diameter of equipment:	DANDO 2000	Sheet No:	3 Of 4

Water levels recorded during boring, m						
Date:	04/04/2018					
Hole depth:	20.00					
Casing depth:						
Level water on strike:	4.30					
Water Level after 20mins:	3.80					

Remarks						
1:						
2:						
3:						
4:						

Sample or Tests										Strata			Strata Description	Installation		
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)				
		75	75	75	75	75	75	N								
D	10.00								10.00				Structureless extremely weak becoming very weak heavily weathered white CHALK recovered as medium to high strength CLAY with moderate cobble content. Cobbles consist of flint. (Dm Grade CHALK)			
S	10.50	3	4	3	4	4	5	16	10.50							
D	11.00								11.00							
S	11.50								11.50							
D	12.00								12.00							
S	12.50	3	4	4	4	4	4	16	12.50							
D	13.00								13.00							
S	13.50	4	5	5	6	6	6	23	13.50							
									14.00							
S	14.50	3	5	5	6	6	7	24	14.50							
D	15.00								15.00							

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com



Exploratory Hole No:

BH3

Site Address:	199-207 HENLEY ROAD READING RG4 6LJ
---------------	-------------------------------------

Client:	Thakeham Client
---------	-----------------

Logged By:	SK
------------	----

Checked By:	PS
-------------	----

Type and diameter of equipment:	DANDO 2000
---------------------------------	------------

Project No:	P9413J811
-------------	-----------

Ground Level:	
---------------	--

Date Commenced:	04/04/2018
-----------------	------------

Date Completed:	04/04/2018
-----------------	------------

Sheet No: 4 Of 4

Water levels recorded during boring, m

Date:	04/04/2018
-------	------------

Hole depth:	20.00
-------------	-------

Casing depth:

Level water on strike:	4.30
------------------------	------

Water Level after 20mins:	3.80
---------------------------	------

Remarks

1:

2:

3:

4:

Sample or Tests										Strata			Strata Description	Installation	
Type	Depth (mbgl)	Result								Legend	Depth (mbgl)	Water Strikes (mbgl)			
		75	75	75	75	75	75	N							
D	15.00								15.00				Structureless extremely weak becoming very weak heavily weathered white CHALK recovered as medium to high strength CLAY with moderate cobble content. Cobbles consist of flint. (Dm Grade CHALK)		
S	15.50	4	5	6	6	7	7	26	15.50						
									16.00						
S	16.50								16.50						
D	17.00								17.00						
S	17.50	5	6	6	7	7	8	28	17.50						
									18.00						
S	18.50	4	5	7	8	7	8	30	18.50						
D	19.00								19.00						
S	19.50	5	7	7	8	8	10	33	19.50						
									20.00		20.00				

Sampling Code: U- Undisturbed B - Large Disturbed D - Small Disturbed W - Water (U*) Non recovery of Sample
 Jomas Associates Ltd - Lakeside House, 1 Furzeground Way, Stockley Park, UB11 1BD
 T: 0843 289 2187 E: info@jomasassociates.com W: www.jomasassociates.com

APPENDIX 3 – CHEMICAL LABORATORY TEST RESULTS



Emma Hucker

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Lakeside House
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e: reception@i2analytical.com

e: Jomas Associates -

Analytical Report Number : 18-81838

Project / Site name:	199- 207 Henley Road, Reading RG4 6LJ	Samples received on:	06/04/2018
Your job number:	J811	Samples instructed on:	11/04/2018
Your order number:	P9413J811.15	Analysis completed by:	18/04/2018
Report Issue Number:	1	Report issued on:	18/04/2018
Samples Analysed:	1 10:1 WAC Samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



i2 Analytical

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email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	18-81838						
					Client: JOMASASSOC		
Location	199- 207 Henley Road, Reading RG4 6LJ						
Lab Reference (Sample Number)	941241 / 941242				Landfill Waste Acceptance Criteria		
					Limits		
Sampling Date	04/04/2018				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS10						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.4				3%	5%	6%
Loss on Ignition (%) **	1.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	180				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.9				100	--	--
pH (units)**	8.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	23				--	To be evaluated	To be evaluated
Eluate Analysis					Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
	mg/l			mg/kg			
Arsenic *	< 0.0011			< 0.0110	0.5	2	25
Barium *	0.0039			0.0288	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0004			< 0.0040	0.5	10	70
Copper *	0.0040			0.029	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	< 0.0004			< 0.0040	0.5	10	30
Nickel *	0.0014			0.011	0.4	10	40
Lead *	0.0012			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0035			0.025	4	50	200
Chloride *	0.92			6.7	800	4000	25000
Fluoride	0.17			1.2	10	150	500
Sulphate *	0.82			6.0	1000	20000	50000
TDS*	31			230	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	2.88			21.1	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.52						
Dry Matter (%)	80						
Moisture (%)	20						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.					** = UKAS accredited (liquid eluate analysis only)		
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation					** = MCERTS accredited		

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Iss No 18-81838-1 199- 207 Henley Road, Reading RG4 6LJ J811

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The results included within the report are representative of the samples submitted for analysis.



Analytical Report Number : 18-81838

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
941241	WS10	None Supplied	1.00	Beige chalk with gravel. **

** Non MCERTS matrix.



Analytical Report Number : 18-81838

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance"	L046-UK	W	NONE
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	D	NONE



Analytical Report Number : 18-81838

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil TM	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests TM	L009-PL	D	MCERTS

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

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

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



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e: Jomas Associates -

Analytical Report Number : 18-81834

Project / Site name:	199- 207 Henley Road, Reading RG4 6LJ	Samples received on:	06/04/2018
Your job number:	J811	Samples instructed on:	11/04/2018
Your order number:	P9413J811.15	Analysis completed by:	18/04/2018
Report Issue Number:	1	Report issued on:	18/04/2018
Samples Analysed:	14 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number	941200	941201	941202	941203	941204
Sample Reference	WS1	WS10	WS11	WS2	WS3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	1.00	0.50	0.50	0.50
Date Sampled	04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	20
Total mass of sample received	kg	0.001	NONE	0.98	0.52
				0.79	0.74
				0.68	

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile- Loose Fibres	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8.6	8.7	7.6	7.5
Total Cyanide	mg/kg	1	MCERTS	-	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	410	460	300	550
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.0033	0.0034	0.015	0.0098
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	3.3	3.4	14.6	9.8
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	0.7	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	3.1	13	14
Boron (water soluble)	mg/kg	0.2	MCERTS	-	< 0.2	0.2	0.7	0.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	3.5	3.8	22	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	3.6	4.4	10	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	1.5	2.6	12	33
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	2.3	5.6	18	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	< 1.0	1.1
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	6.0	7.8	37	53

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number	941200	941201	941202	941203	941204
Sample Reference	WS1	WS10	WS11	WS2	WS3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.50	1.00	0.50	0.50	0.50
Date Sampled	04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
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TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	< 2.0	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	< 8.0	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	230	< 8.0	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	230	< 10	-	-

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	< 2.0	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	< 10	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	110	< 10	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	120	< 10	-	-

TPH (C10 - C12)	mg/kg	2	MCERTS	-	-	-	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	-	-	-	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
TPH (C21 - C40)	mg/kg	10	MCERTS	-	-	-	< 10	< 10



Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941200	941201	941202	941203	941204
Sample Reference				WS1	WS10	WS11	WS2	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.50	0.50	0.50
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Chloroethane	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
Bromomethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Vinyl Chloride	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Trichloromethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
Benzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Trichloroethene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Dibromomethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Styrene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Tribromomethane	µg/kg	1	NONE	-	< 1.0	< 1.0	-	-
o-Xylene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	< 1.0	-	-

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941200	941201	941202	941203	941204
Sample Reference				WS1	WS10	WS11	WS2	WS3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.50	0.50	0.50
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-

Total PCBs by GC-MS

Total PCBs	mg/kg	0.007	MCERTS	< 0.007	-	-	-	-
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Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941205	941206	941207	941208	941209
Sample Reference				WS5	WS7	WS6	WS9	WS11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.25	0.25
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	79	46	< 0.1	41	-
Moisture Content	%	N/A	NONE	7.3	9.7	10	9.5	-
Total mass of sample received	kg	0.001	NONE	0.87	0.92	0.86	0.83	-

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	8.2	8.2	8.2	-
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	320	350	330	480	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0071	0.0052	0.0064	0.0090	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	7.1	5.2	6.4	9.0	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	0.7	1.3	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.3	15	13	13	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.8	0.5	0.9	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	21	22	20	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	7.2	11	11	18	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	8.4	17	12	49	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	23	20	20	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	27	44	37	76	-

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941205	941206	941207	941208	941209
Sample Reference				WS5	WS7	WS6	WS9	WS11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.25	0.25
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
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TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	-
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	-
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
TPH (C21 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	-

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941205	941206	941207	941208	941209
Sample Reference				WS5	WS7	WS6	WS9	WS11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.25	0.25
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941205	941206	941207	941208	941209
Sample Reference				WS5	WS7	WS6	WS9	WS11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.50	0.25	0.25
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	04/04/2018
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	-
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	-
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	-

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941210	941211	941212	941213	
Sample Reference				BH1	BH1	BH2	BH3	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				5.00	12.00	10.00	8.00	
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	45	< 0.1	34	24	
Moisture Content	%	N/A	NONE	13	23	22	23	
Total mass of sample received	kg	0.001	NONE	2.0	1.8	1.4	2.0	

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.9	9.0	8.9	9.0	
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0092	0.014	0.016	0.017	
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	-	-	
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	-	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	

Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number	941210	941211	941212	941213	
Sample Reference	BH1	BH1	BH2	BH3	
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)	5.00	12.00	10.00	8.00	
Date Sampled	04/04/2018	04/04/2018	04/04/2018	04/04/2018	
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	-	-	-	-	
Toluene	µg/kg	1	MCERTS	-	-	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	
o-xylene	µg/kg	1	MCERTS	-	-	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	

Petroleum Hydrocarbons

Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	-	-	-	-	
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TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	

TPH (C10 - C12)	mg/kg	2	MCERTS	-	-	-	-	
TPH (C12 - C16)	mg/kg	4	MCERTS	-	-	-	-	
TPH (C16 - C21)	mg/kg	1	MCERTS	-	-	-	-	
TPH (C21 - C40)	mg/kg	10	MCERTS	-	-	-	-	



Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941210	941211	941212	941213	
Sample Reference				BH1	BH1	BH2	BH3	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				5.00	12.00	10.00	8.00	
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	
Chloroethane	µg/kg	1	NONE	-	-	-	-	
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	
Benzene	µg/kg	1	MCERTS	-	-	-	-	
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	
Toluene	µg/kg	1	MCERTS	-	-	-	-	
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	
Styrene	µg/kg	1	MCERTS	-	-	-	-	
Tribromomethane	µg/kg	1	NONE	-	-	-	-	
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	



Analytical Report Number: 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

Your Order No: P9413J811.15

Lab Sample Number				941210	941211	941212	941213	
Sample Reference				BH1	BH1	BH2	BH3	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				5.00	12.00	10.00	8.00	
Date Sampled				04/04/2018	04/04/2018	04/04/2018	04/04/2018	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 52	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 101	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 118	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 138	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 153	mg/kg	0.001	MCERTS	-	-	-	-	
PCB Congener 180	mg/kg	0.001	MCERTS	-	-	-	-	
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	-	-	-	-	



Analytical Report Number : 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
941200	WS1	None Supplied	0.50	Brown clay and sand with gravel.
941201	WS10	None Supplied	1.00	Beige chalk with gravel. **
941202	WS11	None Supplied	0.50	Beige clay with chalk and gravel.
941203	WS2	None Supplied	0.50	Brown clay and sand with stones.
941204	WS3	None Supplied	0.50	Brown clay and loam with gravel and vegetation.
941205	WS5	None Supplied	0.50	Brown clay and loam with stones and vegetation.
941206	WS7	None Supplied	0.50	Brown loam and clay with stones and vegetation.
941207	WS6	None Supplied	0.50	Brown loam and clay with gravel and vegetation.
941208	WS9	None Supplied	0.25	Brown loam and clay with stones and gravel
941209	WS11	None Supplied	0.25	-
941210	BH1	None Supplied	5.00	White chalk with stones and vegetation. **
941211	BH1	None Supplied	12.00	White chalk with gravel. **
941212	BH2	None Supplied	10.00	White chalk with stones. **
941213	BH3	None Supplied	8.00	White chalk with stones. **

** Non MCERTS matrix.

Analytical Report Number : 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L009-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	MCERTS

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 18-81834

Project / Site name: 199- 207 Henley Road, Reading RG4 6LJ

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

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

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

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

APPENDIX 4 – GEOTECHNICAL LABORATORY TEST RESULTS



4041

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

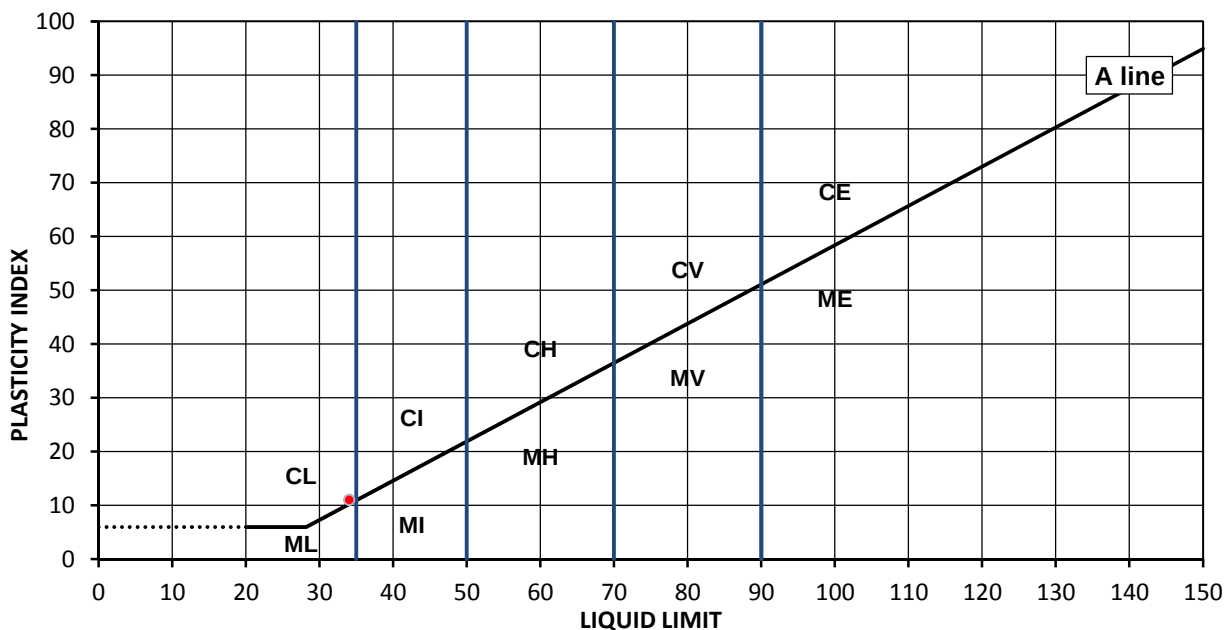
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942275
Hole No.: BH2
Sample Reference: Not Given
Soil Description: White gravelly clayey CHALK
Sample Preparation: Tested after washing to remove >425um

Depth Top [m]: 1.50
Depth Base [m]: 1.95
Sample Type: U

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
25	34	23	11	49



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L Low	below 35
		I Medium	35 to 50
		H High	50 to 70
		V Very high	70 to 90
		E Extremely high	exceeding 90
Organic		O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."



4041

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

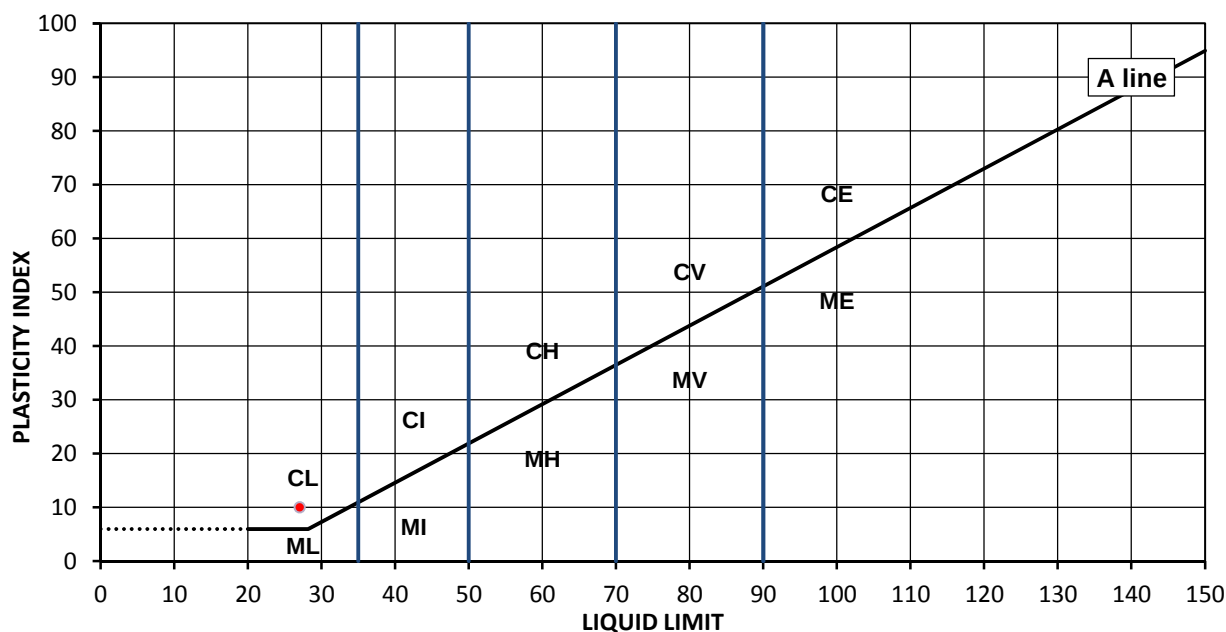
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942277
Hole No.: WS1
Sample Reference: Not Given
Soil Description: Yellowish brown very sandy slightly gravelly CLAY
Sample Preparation: Tested after >425um removed by hand

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
19	27	17	10	96



Legend, based on BS 5930:2015 Code of practice for site investigations

	Plasticity	Liquid Limit
C	Clay	below 35
M	Silt	35 to 50
	L	Low
	I	Medium
	H	High
	V	Very high
	E	Extremely high
Organic	O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Environmental Science

Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

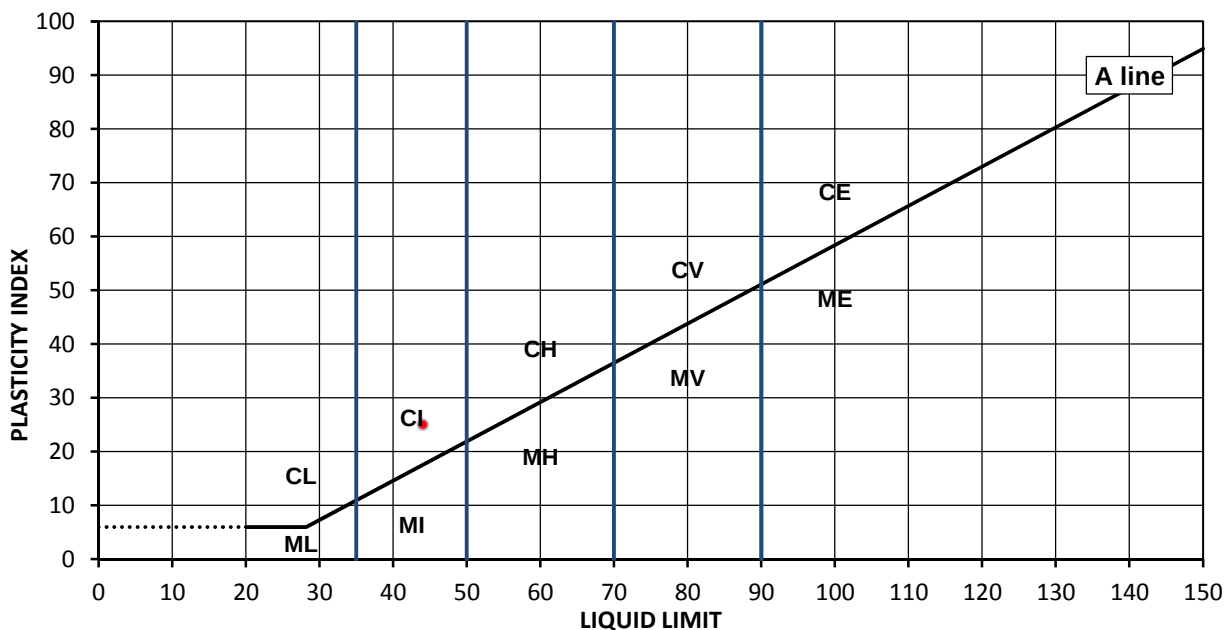
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942279
Hole No.: WS2
Sample Reference: Not Given
Soil Description: Yellowish brown sandy CLAY
Sample Preparation: Tested in natural condition

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	44	19	25	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L Low	below 35
		I Medium	35 to 50
		H High	50 to 70
		V Very high	70 to 90
		E Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Environmental Science

Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

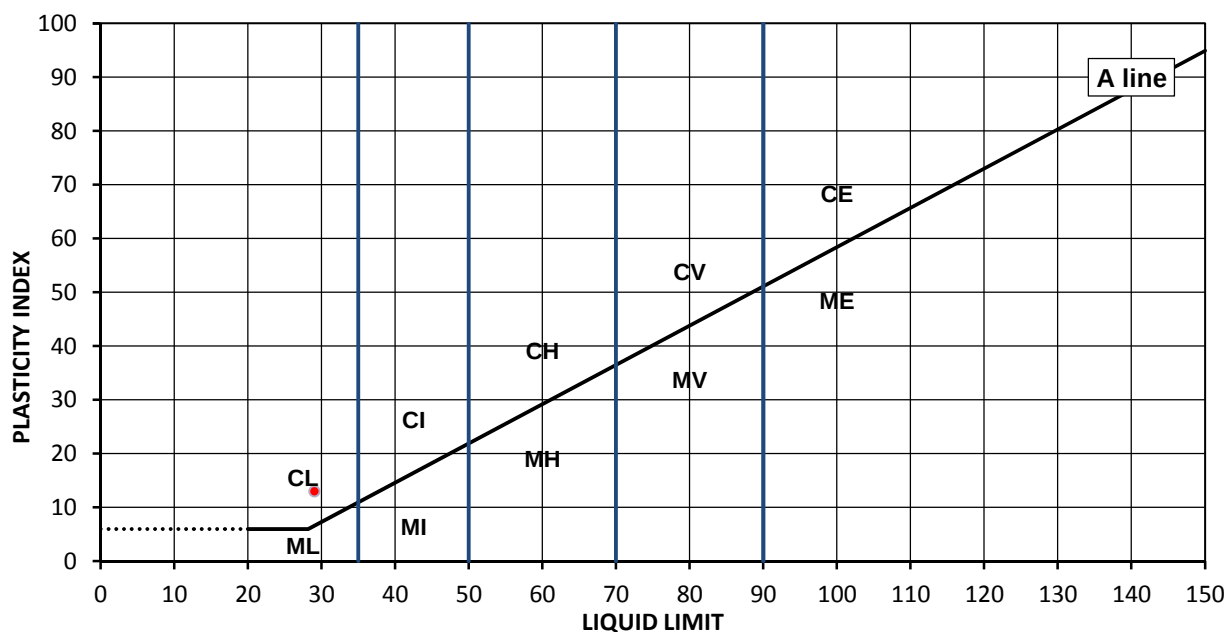
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942281
Hole No.: WS4
Sample Reference: Not Given
Soil Description: Yellowish brown slightly gravelly very sandy CLAY
Sample Preparation: Tested after >425um removed by hand

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	29	16	13	97



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L Low	below 35
		I Medium	35 to 50
		H High	50 to 70
		V Very high	70 to 90
		E Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

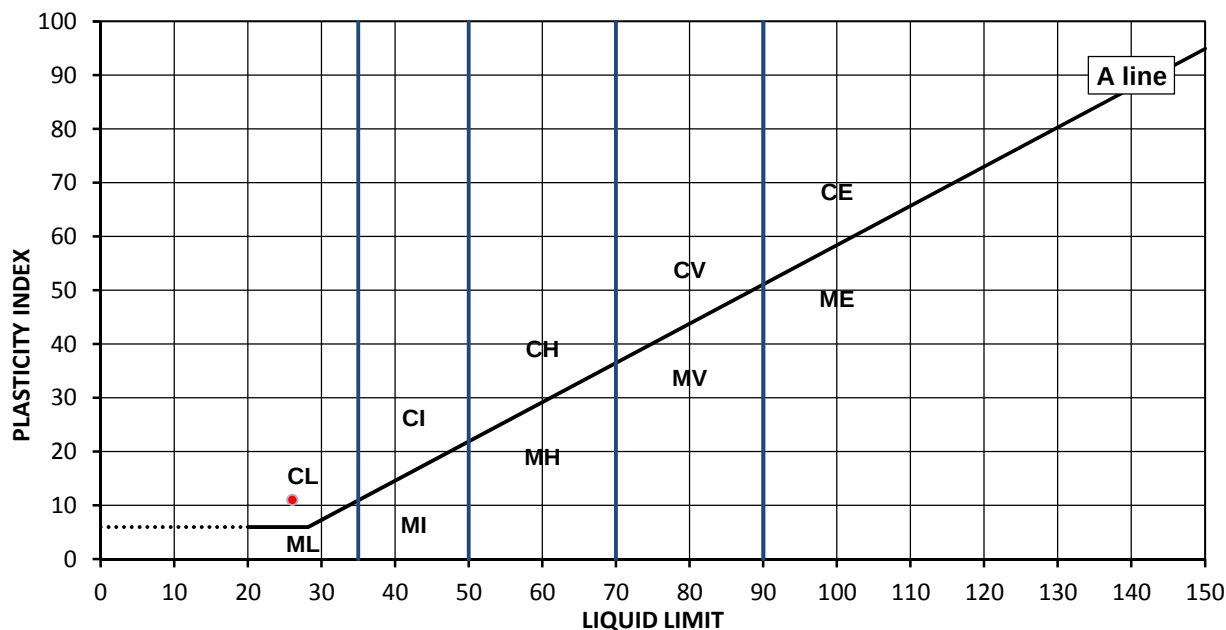
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942282
Hole No.: WS5
Sample Reference: Not Given
Soil Description: Brown slightly gravelly very sandy CLAY
Sample Preparation: Tested after >425um removed by hand

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
12	26	15	11	76



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
Organic		O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

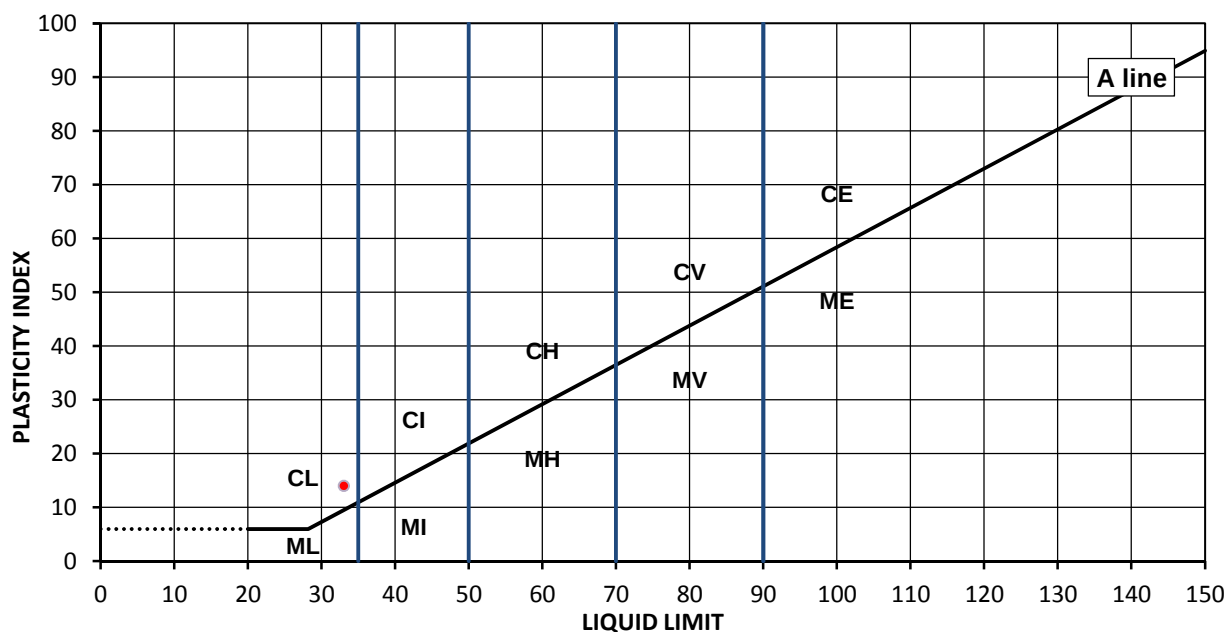
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942283
Hole No.: WS8
Sample Reference: Not Given
Soil Description: Yellowish brown very sandy slightly gravelly CLAY
Sample Preparation: Tested after washing to remove >425um

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
15	33	19	14	55



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L Low	below 35
		I Medium	35 to 50
		H High	50 to 70
		V Very high	70 to 90
		E Extremely high	exceeding 90
Organic		O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

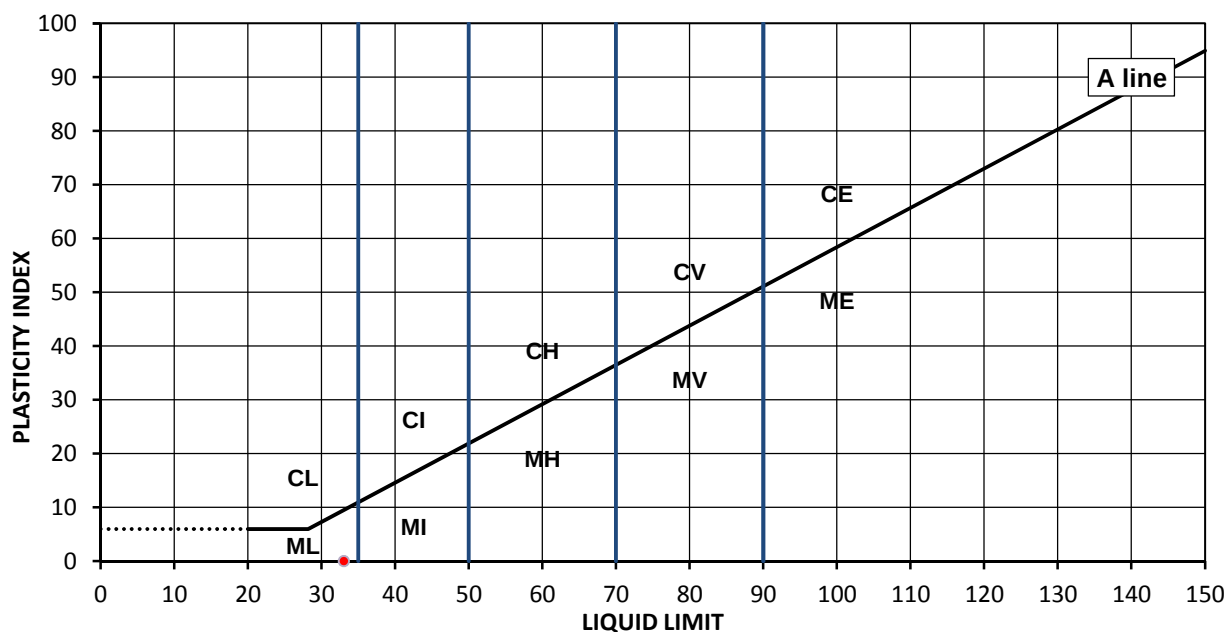
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942285
Hole No.: WS11
Sample Reference: Not Given
Soil Description: White slightly gravelly slightly clayey CHALK
Sample Preparation: Tested after washing to remove >425um

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	33	NP	NP	77



Legend, based on BS 5930:2015 Code of practice for site investigations

Plasticity		Liquid Limit
C	Clay	below 35
M	Silt	35 to 50
L	Low	50 to 70
I	Medium	70 to 90
H	High	exceeding 90
V	Very high	
E	Extremely high	
Organic	O	append to classification for organic material (eg CHO)

Remarks: NP – non plastic

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

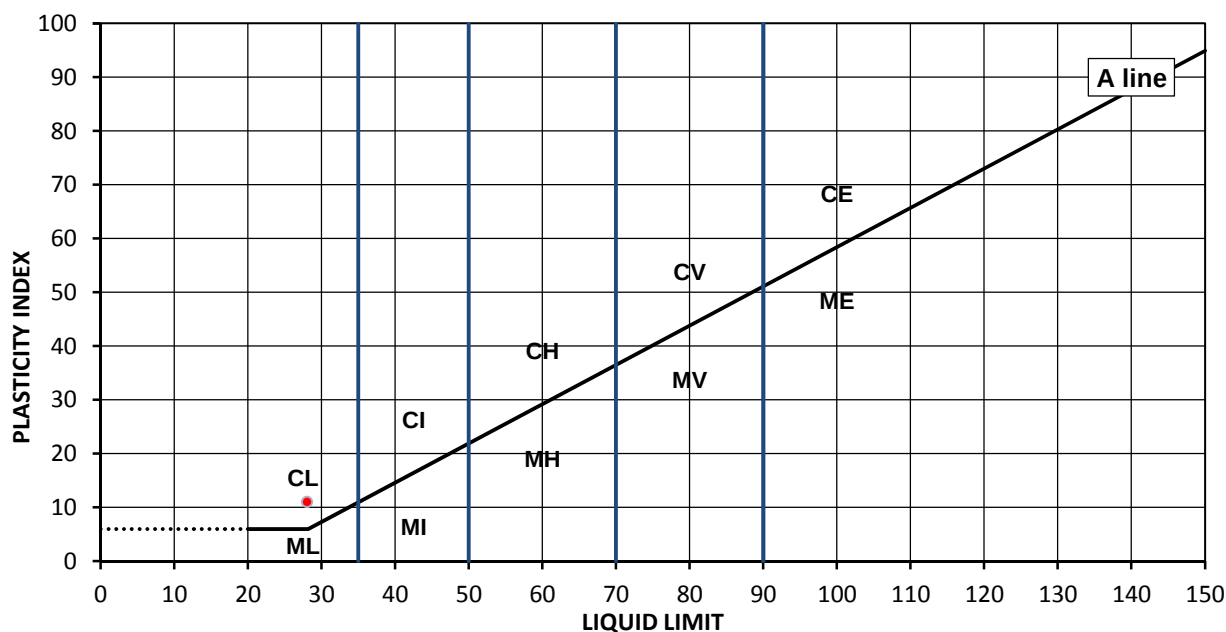
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942286
Hole No.: WS7
Sample Reference: Not Given
Soil Description: Yellowish brown very sandy slightly gravelly CLAY
Sample Preparation: Tested after >425um removed by hand

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
20	28	17	11	94



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L Low	below 35
		I Medium	35 to 50
		H High	50 to 70
		V Very high	70 to 90
		E Extremely high	exceeding 90
Organic		O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

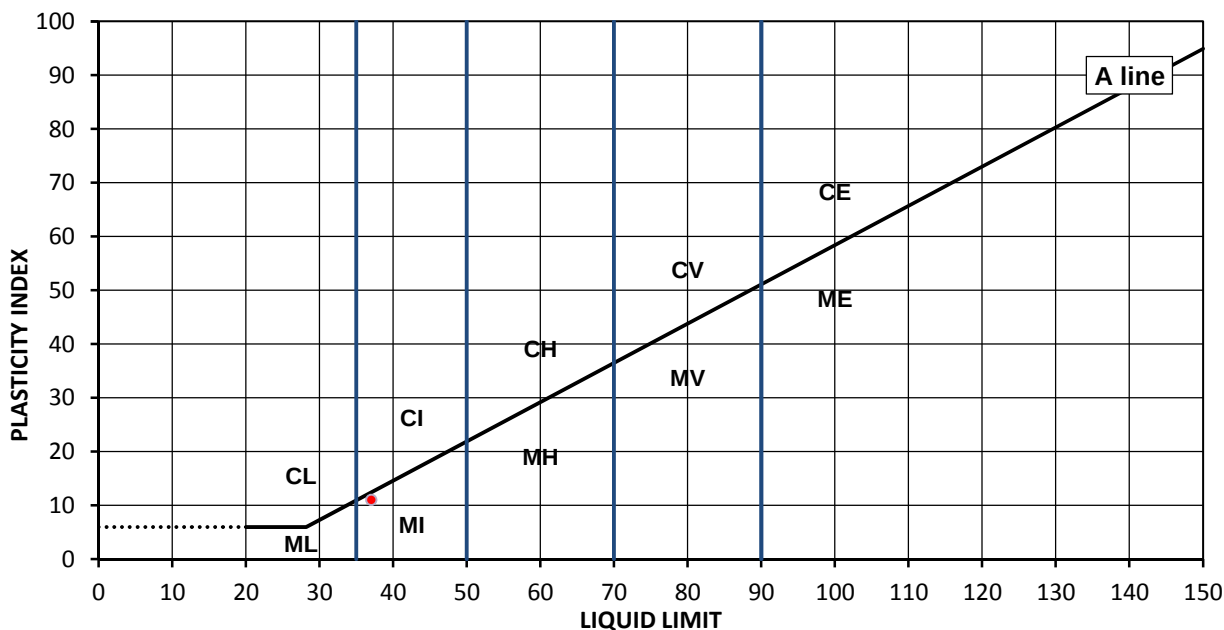
Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test Results

Laboratory Reference: 942287
Hole No.: WS10
Sample Reference: Not Given
Soil Description: White slightly gravelly clayey CHALK
Sample Preparation: Tested after washing to remove >425um

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
25	37	26	11	90



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L Low	below 35
		I Medium	35 to 50
		H High	50 to 70
		V Very high	70 to 90
		E Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory
Manager
Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Summary of Classification Test Results

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	M/C	Atterberg				Density		Total Porosity
		Reference	Top depth [m]	Base depth [m]	Type			% Passing 425um	LL	PL	PI	bulk	PD	
							%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3
942275	BH2	Not Given	1.50	1.95	U	White gravelly clayey CHALK	25	49	34	23	11			
942277	WS1	Not Given	1.00	Not Given	D	Yellowish brown very sandy slightly gravelly CLAY	19	96	27	17	10			
942287	WS10	Not Given	1.00	Not Given	D	White slightly gravelly clayey CHALK	25	90	37	26	11			
942285	WS11	Not Given	1.00	Not Given	D	White slightly gravelly slightly clayey CHALK	27	77	33	NP	NP			
942279	WS2	Not Given	1.00	Not Given	D	Yellowish brown sandy CLAY	27	100	44	19	25			
942281	WS4	Not Given	1.00	Not Given	D	Yellowish brown slightly gravelly very sandy CLAY	22	97	29	16	13			
942282	WS5	Not Given	1.00	Not Given	D	Brown slightly gravelly very sandy CLAY	12	76	26	15	11			
942286	WS7	Not Given	1.00	Not Given	D	Yellowish brown very sandy slightly gravelly CLAY	20	94	28	17	11			
942283	WS8	Not Given	1.00	Not Given	D	Yellowish brown very sandy slightly gravelly CLAY	15	55	33	19	14			

Comments: NP - non plastic

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General Manager

for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE**Determination of Particle Size Distribution**

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



Tested in Accordance with BS1377:Part 2:1990, clause 9.2

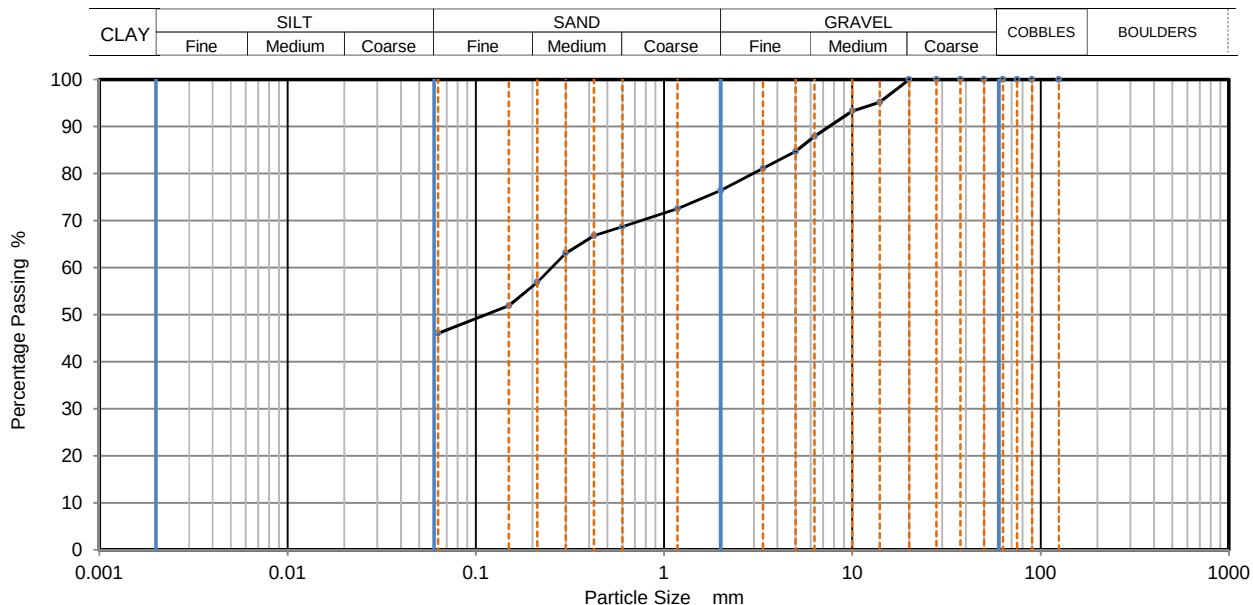
Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

TEST RESULTS

Laboratory Reference: 942278
Sample description: Cream color very gravelly very sandy CLAY
Location: WS1
Supplier: Not Given

Sample Reference: Not Given
Sample Type: D
Depth Top [m]: 3.00
Depth Base [m]: Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	95		
10	93		
6.3	88		
5	85		
3.35	81		
2	76		
1.18	73		
0.6	69		
0.425	67		
0.3	63		
0.212	57		
0.15	52		
0.063	46		

Dry Mass of sample [g]: 531

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	23.60
Sand	30.00
Fines <0.063mm	46.40

Grading Analysis	
D100	mm 20
D60	mm 0.252
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Darren Berrill
Geotechnical General
Manager

Date Reported: 26/04/2018

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE**Determination of Particle Size Distribution**

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



Tested in Accordance with BS1377:Part 2:1990, clause 9.2

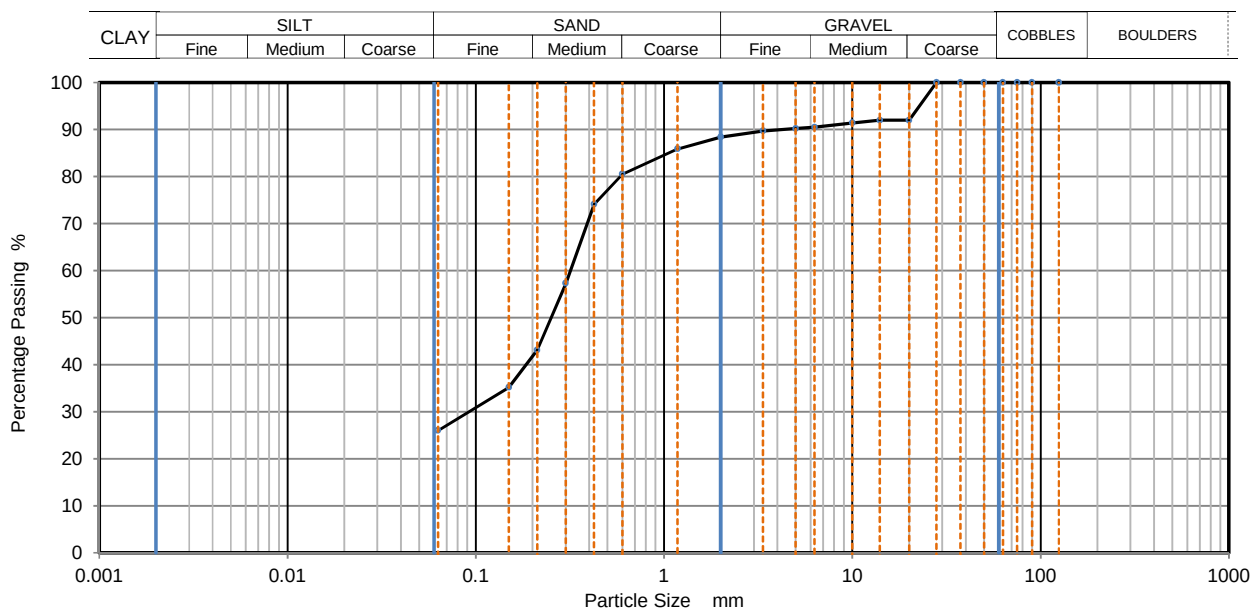
Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

TEST RESULTS

Laboratory Reference: 942280
Sample description: Yellowish brown gravelly very clayey SAND
Location: WS2
Supplier: Not Given

Sample Reference: Not Given
Sample Type: D
Depth Top [m]: 2.00
Depth Base [m]: Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	92		
14	92		
10	91		
6.3	91		
5	90		
3.35	90		
2	88		
1.18	86		
0.6	81		
0.425	74		
0.3	57		
0.212	43		
0.15	35		
0.063	26		

Dry Mass of sample [g]: 290

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	11.60
Sand	62.30
Fines <0.063mm	26.10

Grading Analysis	
D100	mm 28
D60	mm 0.317
D30	mm 0.0913
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Darren Berrill
Geotechnical General
Manager

Date Reported: 26/04/2018

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE**Determination of Particle Size Distribution**

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

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



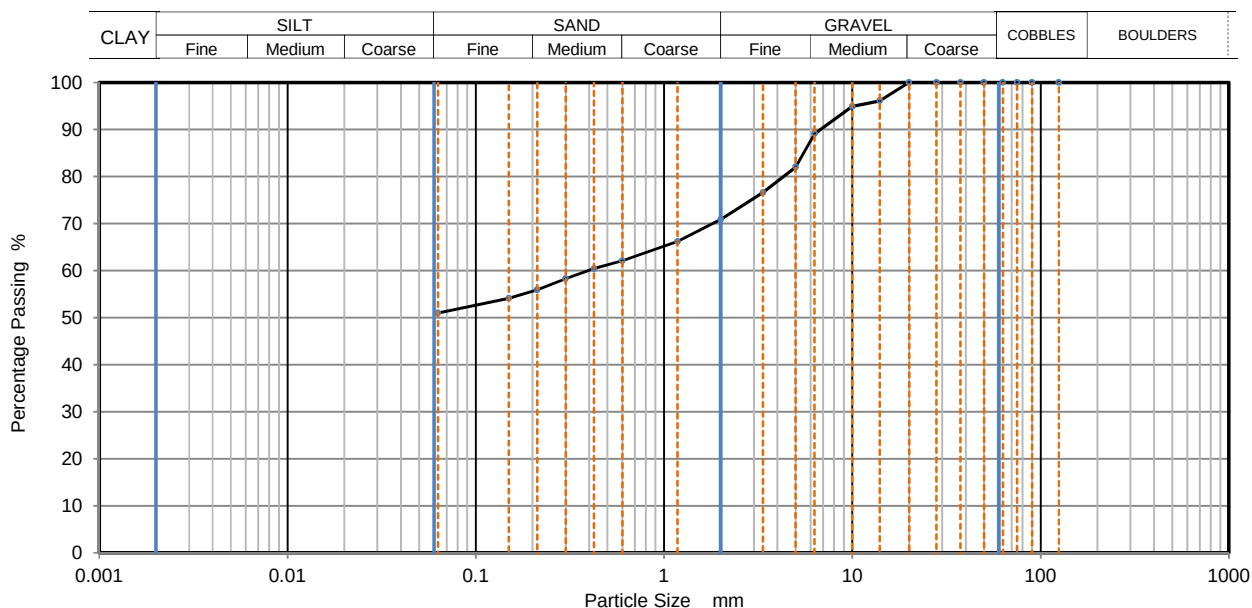
Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

TEST RESULTS

Laboratory Reference: 942284
Sample description: White slightly sandy slightly gravelly CLAY
Location: WS9
Supplier: Not Given

Sample Reference: Not Given
Sample Type: D
Depth Top [m]: 2.00
Depth Base [m]: Not Given



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	95		
6.3	89		
5	82		
3.35	77		
2	71		
1.18	66		
0.6	62		
0.425	60		
0.3	58		
0.212	56		
0.15	54		
0.063	51		

Dry Mass of sample [g]: 267

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	29.10
Sand	19.80
Fines <0.063mm	51.10

Grading Analysis	
D100	mm 20
D60	mm 0.4
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Darren Berrill
Geotechnical General
Manager

Date Reported: 26/04/2018

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Dry Density / Moisture Content Relationship

Light Compaction

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



Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

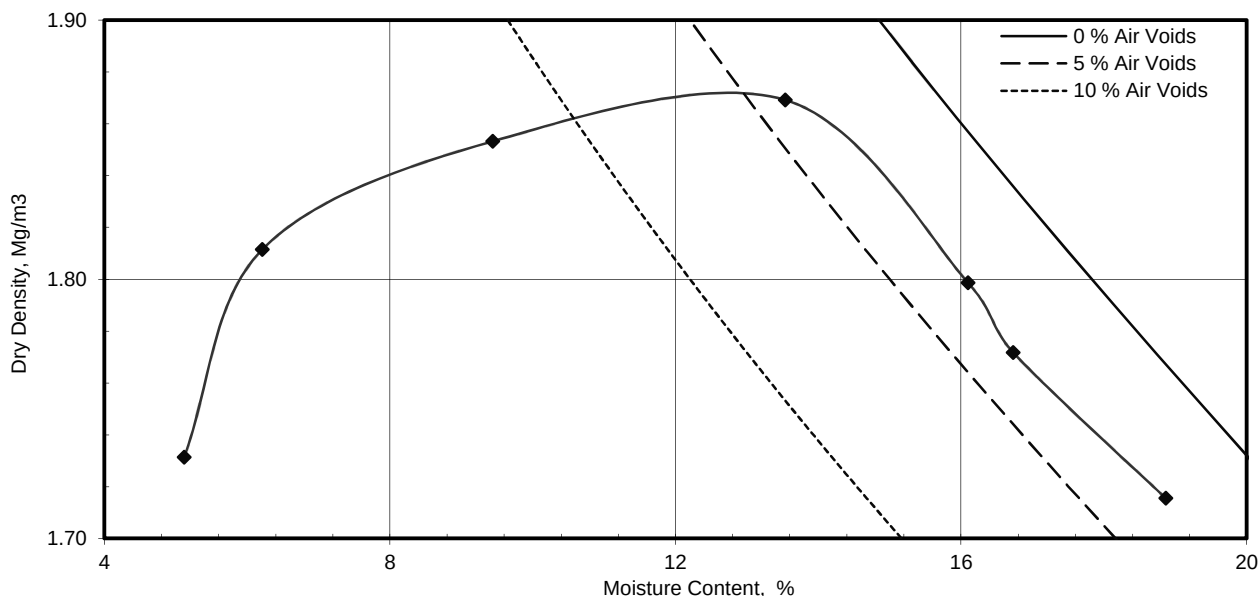
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 25/04/2018
Sampled By: Not Given

TEST RESULTS

Laboratory Reference: 942273
Hole No.: BH3
Sample Reference: Not Given
Sample Description: Brown gravelly CLAY

Depth Top [m]: 0.50
Depth Base [m]: 1.00
Sample Type: B



Preparation	Material used was natural	
Mould Type	1 Litre	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	4
Particle Density - Assumed	Mg/m³	2.65
As received Moisture Content	%	17
Maximum Dry Density	Mg/m³	1.87

Optimum Moisture Content	%	14
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Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Darren Berrill
Geotechnical General
Manager

Date Reported: 26/04/2018

for and on behalf of i2 Analytical Ltd

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The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."



4041

TEST CERTIFICATE**Dry Density / Moisture Content Relationship****Light Compaction**

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



Environmental Science

Tested in accordance with BS 1377-4:1990: Clause 3.3 using 2.5kg[light] Rammer

Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD

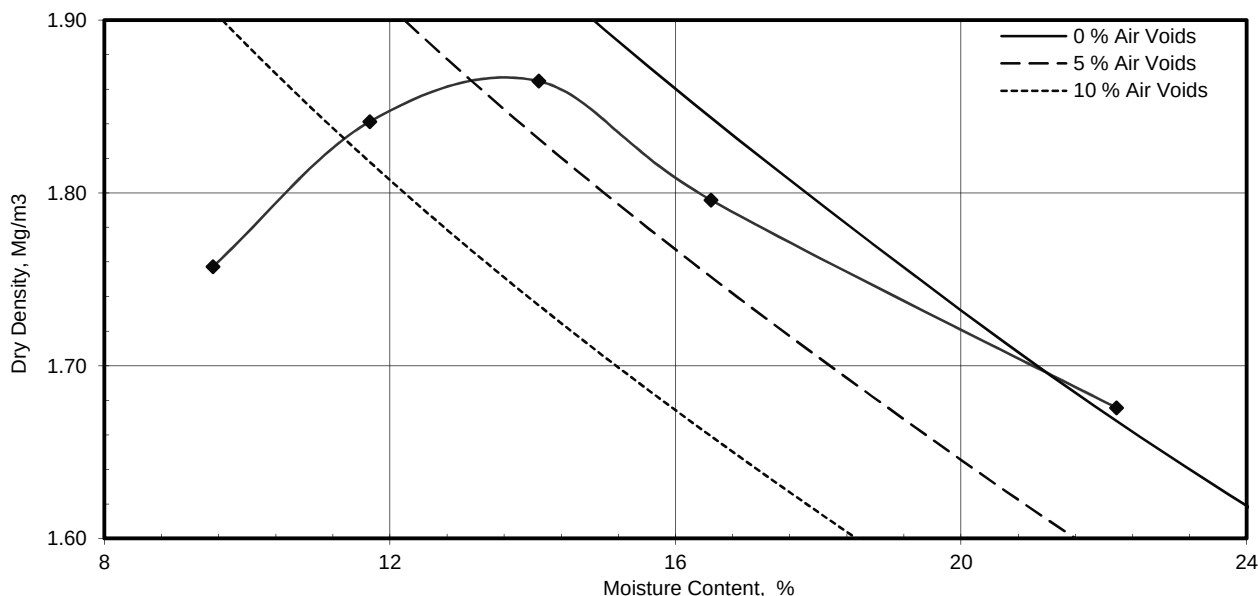
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 23/04/2018
Sampled By: Not Given

TEST RESULTS

Laboratory Reference: 942274
Hole No.: BH3
Sample Reference: Not Given
Sample Description: Brown gravelly sandy CLAY

Depth Top [m]: 2.50
Depth Base [m]: 2.95
Sample Type: U



Preparation	Material used was natural	
Mould Type	1 Litre	
Samples Used	Composite specimens tested	
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	1
Particle Density - Assumed	Mg/m³	2.65
As received Moisture Content	%	22
Maximum Dry Density	Mg/m³	1.86
Optimum Moisture Content	%	14

Remarks:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Darren Berrill
Geotechnical General
Manager

Date Reported: 26/04/2018

for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Determination of Unconsolidated Undrained Triaxial Compression

Tested in Accordance with BS1377: Part 7: 1990, clause 8, single specimen

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



Client: Jomas Associates Ltd
Client Address: Lakeside House
1 Furzeground Way
Stockley Park
UB11 1BD
Contact: Peter Swettenham
Site Name: 199-207 Henley Road, Reading
Site Address: Not Given

Client Reference: J811
Job Number: 18-82032
Date Sampled: Not Given
Date Received: 09/04/2018
Date Tested: 20/04/2018
Sampled By: Not Given

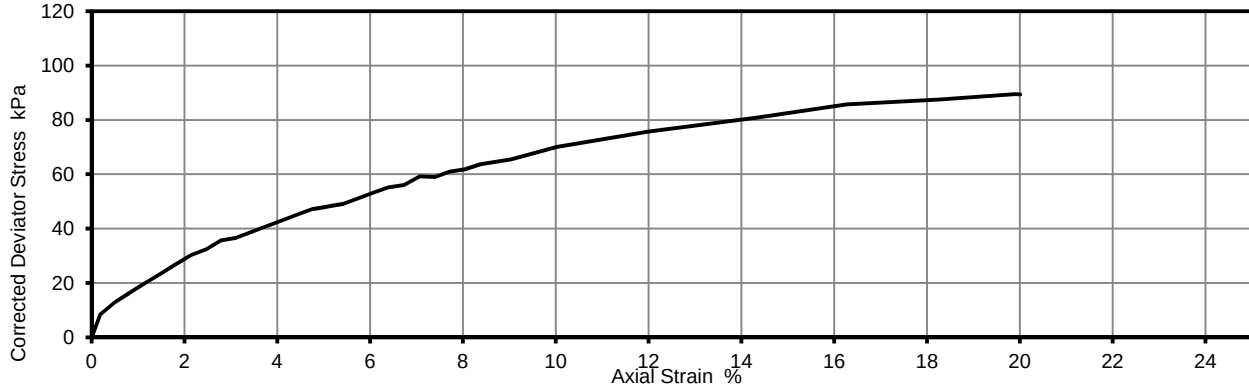
Test Result

Laboratory Reference: 942274
Hole No.: BH3
Sample Reference: Not Given
Sample Description: Brown gravelly sandy CLAY
Test Number: 1
Length: 201.72 mm
Diameter: 103.53 mm
Bulk Density: 1.97 Mg/m³
Moisture Content: 22 %
Dry Density: 1.62 Mg/m³
Membrane Correction: 0.92 kPa

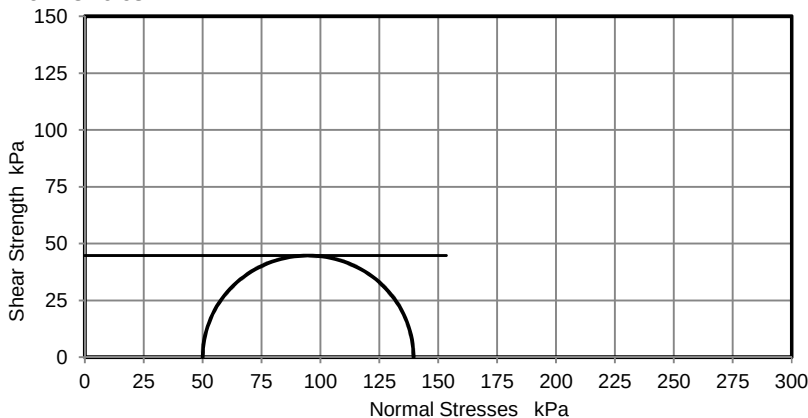
Rate of Strain: 1.98 %/min
Cell Pressure: 50 kPa
Axial Strain at failure: 19.9 %
Deviator Stress, $(\sigma_1 - \sigma_3)_f$: 89 kPa
Undrained Shear Strength, c_u : 45 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure: Compound
Membrane thickness: 0.25 mm

Depth Top [m]: 2.50
Depth Base [m]: 2.95
Sample Type: U

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Notes:

Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks:

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Date Reported: 26/04/2018

Signed:

Darren Berrill
Geotechnical General
Manager

for and on behalf of i2 Analytical Ltd

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APPENDIX 5 – SOIL GAS MONITORING TEST RESULTS

GAS AND GROUNDWATER MONITORING BOREHOLE RECORD SHEET					
Site: Henley Road	Operative(s): AM	Date: 20/04/2018	Time: 13:30	Round: 1	Page: 1
MONITORING EQUIPMENT					
Instrument Type	Instrument Make	Serial No.	Date Last Calibrated		
Analox	GA5000		10/01/2018		
PID	Phocheck tiger		20/05/2016		
Dip Meter	GeoTech				
MONITORING CONDITIONS					
Weather Conditions: Sunny		Ground Conditions: Dry		Temperature: 17 °C	
Barometric Pressure (mbar): 1020		Barometric Pressure Trend (24hr): Steady		Ambient Concentration: 0.0%CH ₄ , 0.1%CO ₂ , 20.2%O ₂	

MONITORING RESULTS														
Monitoring Point Location	Flow		Atmospheric Pressure (mbar)	CH ₄ %	CH ₄ % LEL	CO ₂ %	O ₂ %	VOC (ppm)		H ₂ s (ppm)	CO (ppm)	Depth to product (mbgl)	Depth to water (mbgl)	Depth to Base of well (mbgl)
	Peak	Steady						Peak	Steady					
WS3	-0.1	-0.1	1021	0.0	/	0.5	19.5	1	1	0	4	/	0.99	2.50
WS7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WS10	0.0	0.0	1020	0.0	/	1.0	18.2	2	2	0	0	/	Dry	5.05

WS7 inaccessible at time of site visit.

APPENDIX 6 – CALIFORNIA BERING RATIO TEST RESULTS

CBR Calculation



Jomas Job: 199-207 Henley Road, Reading
Jomas Job No.: P9413J811

Test Location: WS1
Date of test: 04/04/2018

Depth (mm) **Nr Blow** **Cumulative blows**

Calculating Engineer: SRC
Approved by: PS

Date: 01/05/2018

Date: 01/05/2018

50	1	1
100	0	1
150	3	4
200	2	6
250	1	7
300	1	8
350	1	9
400	1	10
450	1	11
500	1	12
550	3	15
600	2	17
650	2	19
700	2	21
750	1	22
800	1	23
850	0	23
900	1	24
950	1	25
1000	1	26

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR* (%)	E (MPa)
WS1-Test 1	200	500	50.0	4.8	48.03
WS1-Test 2	500	700	22.2	11.4	83.55
WS1-Test 3	700	1000	60.0	4	42.74
WS1-Test 4	50	1000	38.0	6.5	58.31

* CBR calculated using method outlined in IAN 73/06

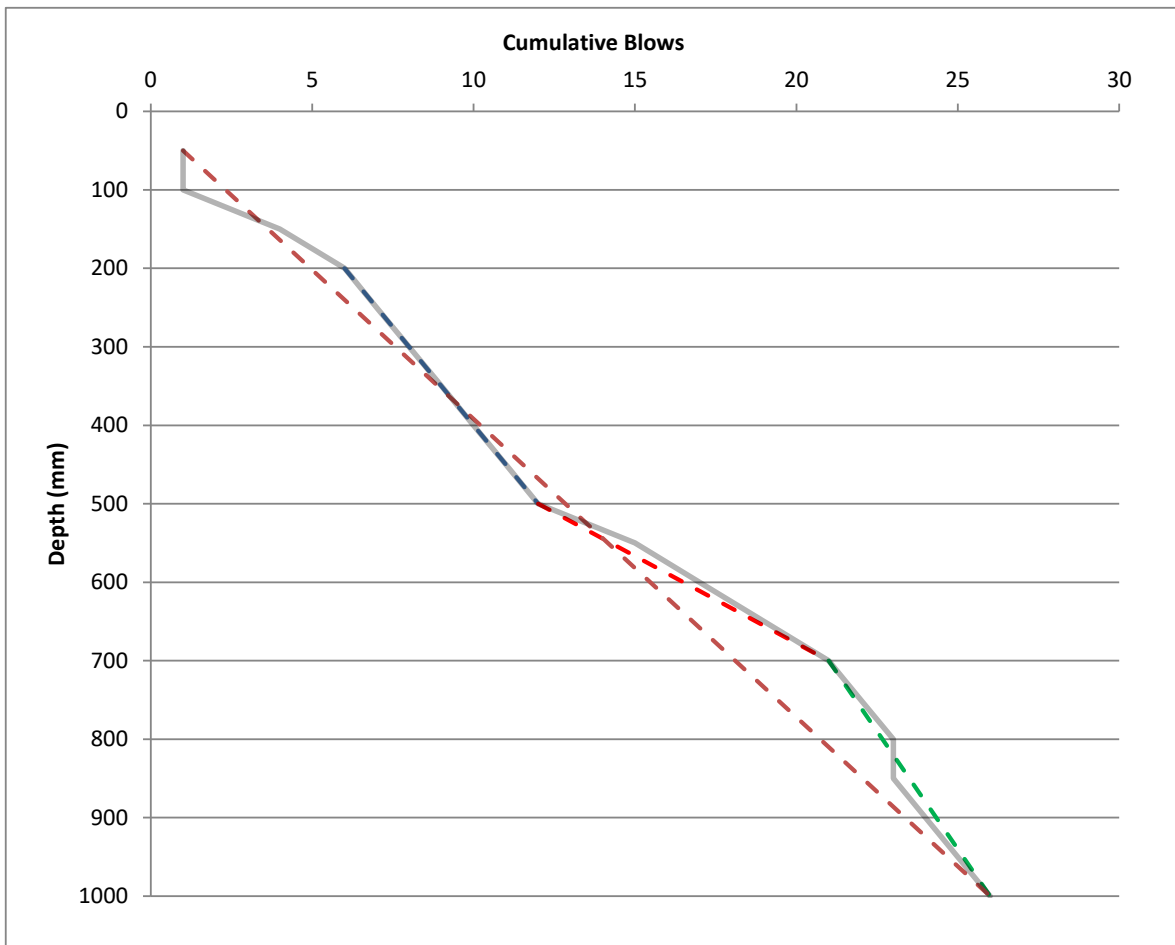
Test Notes:

Test carried out using a Perth Probe type dynamic cone probe consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm

Colour of text refers to the modelled gradient on graph below

0.00m - 0.20m bgl - Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).

0.20m - 2.00m bgl - Brown slightly sandy gravelly CLAY. Gravel consists of fine to medium, sub-rounded to angular flint.



CBR Calculation



Jomas Job: 199-207 Henley Road, Reading
Jomas Job No.: P9413J811

Test Location: WS8
Date of test: 04/04/2018

Depth (mm) **Nr Blow** **Cumulative blows**

Calculating Engineer: SRC
Approved by: PS

Date: 01/05/2018

Date: 01/05/2018

50	1	1
100	1	2
150	0	2
200	0	2
250	1	3
300	0	3
350	0	3
400	0	3
450	2	5
500	2	7
550	3	10
600	2	12
650	2	14
700	1	15
750	2	17
800	2	19
850	1	20
900	1	21
950	1	22
1000	0	22

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR* (%)	E (MPa)
WS8-Test 1	100	400	300.0	0.7	14.01
WS8-Test 2	400	800	25.0	10.1	77.32
WS8-Test 3	800	1000	66.7	3.6	39.95
WS8-Test 4	50	1000	45.2	5.4	51.79

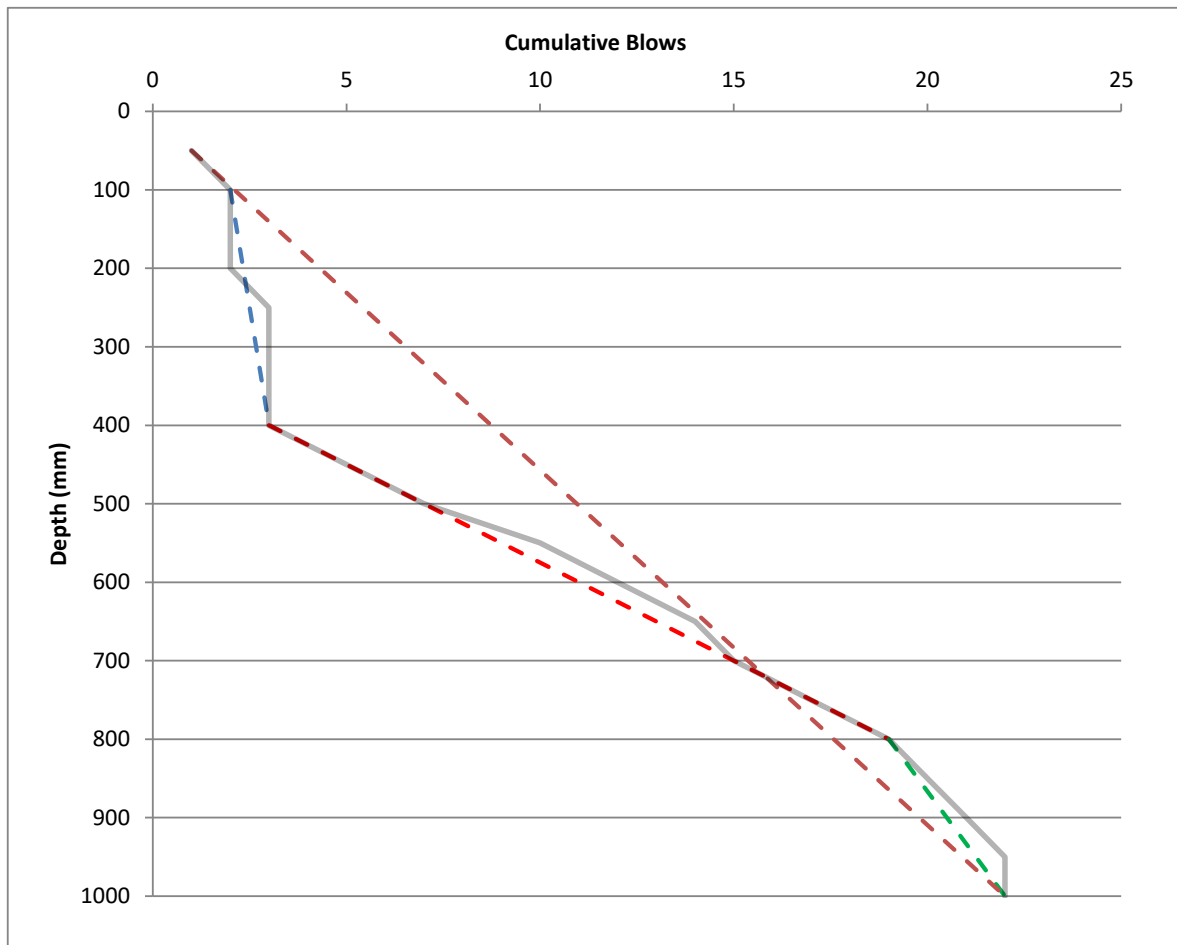
* CBR calculated using method outlined in IAN 73/06

Test Notes:

Test carried out using a Perth Probe type dynamic cone probe consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm

Colour of text refers to the modelled gradient on graph below

0.00m - 1.90m bgl - Brown sandy very gravelly CLAY. Sand is medium. Gravel consists of fine to coarse angular to sub-rounded flint.



CBR Calculation



Jomas Job: 199-207 Henley Road, Reading
Jomas Job No.: P9413J811

Test Location: WS9
Date of test: 04/04/2018

Depth (mm) **Nr Blow** **Cumulative blows**

Calculating Engineer: SRC
Approved by: PS

Date: 01/05/2018

Date: 01/05/2018

50	0	0
100	0	0
150	1	1
200	1	2
250	1	3
300	3	6
350	3	9
400	2	11
450	2	13
500	2	15
550	0	15
600	0	15
650	1	16
700	1	17
750	1	18
800	1	19
850	0	19
900	0	19
950	1	20
1000	1	21

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR* (%)	E (MPa)
WS9-Test 1	250	500	20.8	12.2	87.25
WS9-Test 2	500	800	75.0	3.1	36.31
WS9-Test 3	800	1000	100.0	2.3	29.99
WS9-Test 4	100	1000	42.9	5.7	53.61

* CBR calculated using method outlined in IAN 73/06

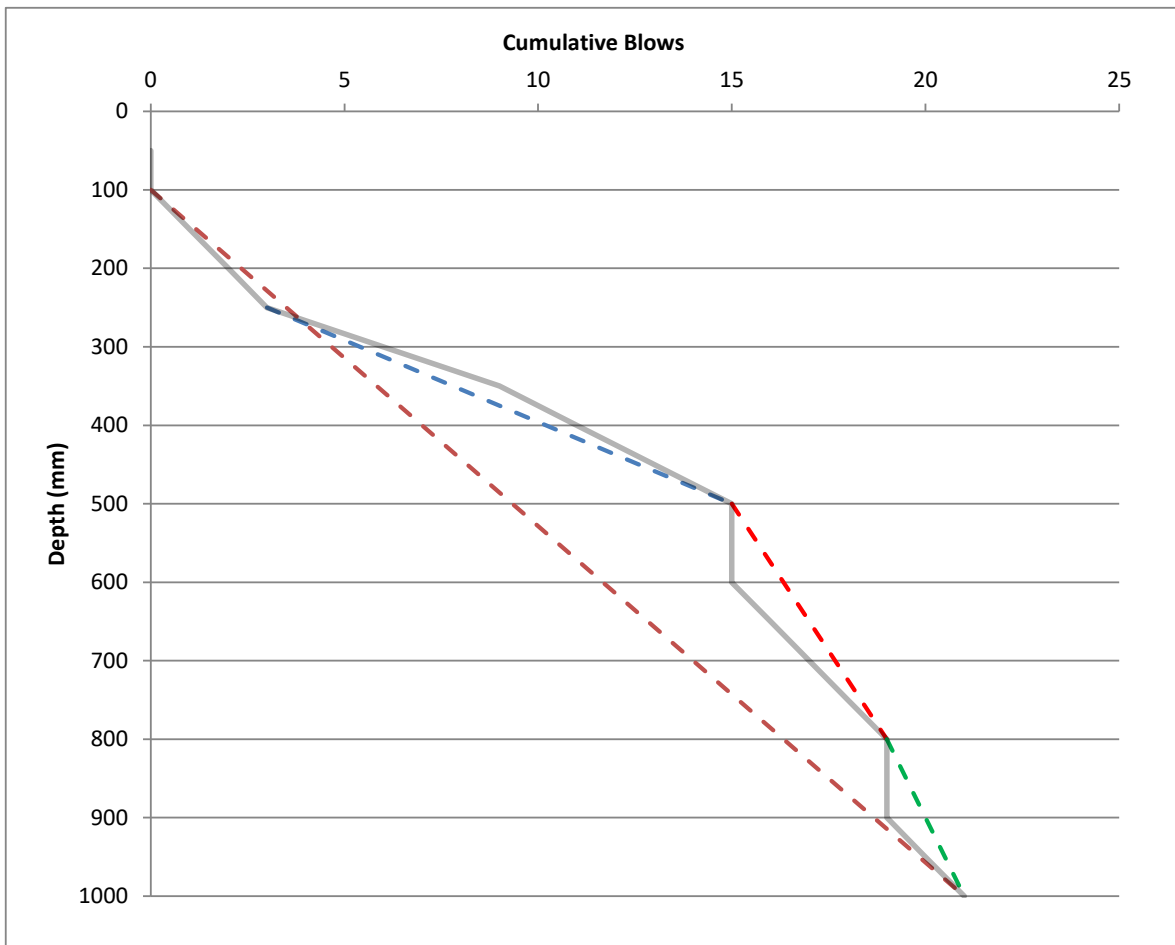
Test Notes:

Test carried out using a Perth Probe type dynamic cone probe consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm

Colour of text refers to the modelled gradient on graph below

0.00m - 0.30m bgl - Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).

0.30m - 1.30m bgl - Brown sandy gravelly CLAY. Gravel consists of fine to medium sub-angular flint.



CBR Calculation



Jomas Job: 199-207 Henley Road, Reading
Jomas Job No.: P9413J811

Test Location: WS10
Date of test: 04/04/2018

Depth (mm) **Nr Blow** **Cumulative blows**

Calculating Engineer: SRC
Approved by: PS

Date: 01/05/2018

Date: 01/05/2018

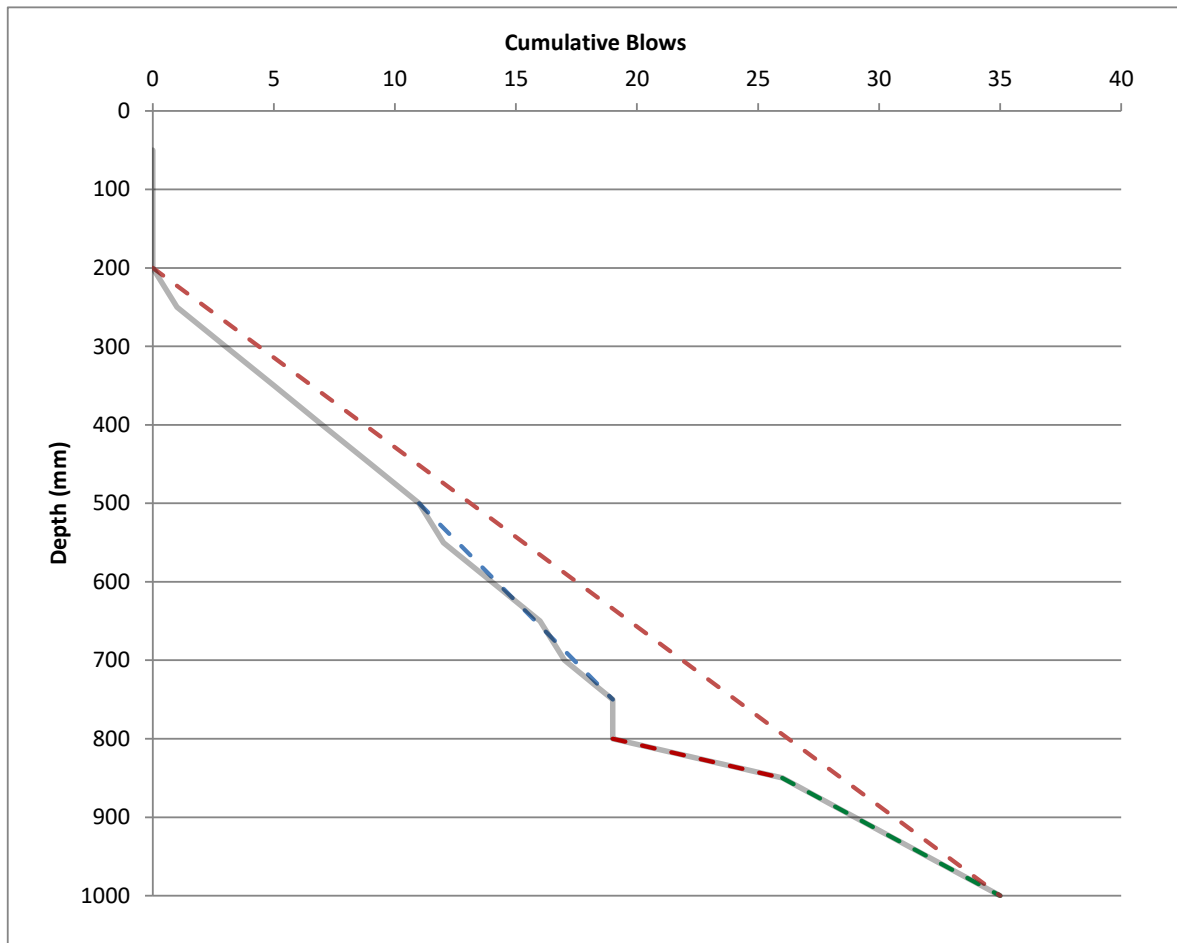
50 0 0
 100 0 0
 150 0 0
 200 0 0
 250 1 1
 300 2 3
 350 2 5
 400 2 7
 450 2 9
 500 2 11
 550 1 12
 600 2 14
 650 2 16
 700 1 17
 750 2 19
 800 0 19
 850 7 26
 900 3 29
 950 3 32
 1000 3 35

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR* (%)	E (MPa)
WS10-Test 1	500	750	31.3	7.9	66.07
WS10-Test 2	800	850	7.1	37.8	179.93
WS10-Test 3	850	1000	16.7	15.4	101.28
WS10-Test 4	200	1000	22.9	11.1	82.13

* CBR calculated using method outlined in IAN 73/06

Test Notes:

Test carried out using a Perth Probe type dynamic cone probe consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm
 Colour of text refers to the modelled gradient on graph below
 0.00m - 0.20m bgl - Dark brown sandy gravelly clay. Gravel consists of fine to medium sub-rounded flint. (TOPSOIL).
 0.20m - 0.50m bgl - Brown sandy chalky gravelly CLAY. Gravel consists of fine to medium sub-angular flint.
 0.50m - 0.80m bgl - Recovered as brown-white clayey CHALK.
 0.80m - 5.00m bgl - Recovered as white gravelly CHALK with medium cobble content. Gravel consists of fine to coarse angular flint. Cobbles consist of flint.



CBR Calculation



Jomas Job: 199-207 Henley Road, Reading
Jomas Job No.: P9413J811

Test Location: CBR1
Date of test: 04/04/2018

Depth (mm)	Nr Blow	Cumulative blows
50	2	2
100	4	6
150	2	8
200	2	10
250	2	12
300	4	16
350	8	24
400	9	33
450	50	83
500		83
550		83
600		83
650		83
700		83
750		83
800		83
850		83
900		83
950		83
1000		83

Calculating Engineer: SRC
Approved by: PS

Date: 01/05/2018
Date: 01/05/2018

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR* (%)	E (MPa)
CBR1-Test 1	50	300	17.9	14.3	96.59
CBR1-Test 2	300	400	5.9	46.4	205.16
CBR1-Test 3	400	450	1.0	302	680.33
CBR1-Test 4	50	450	4.9	55.8	230.87

* CBR calculated using method outlined in IAN 73/06

Test Notes:

Test carried out using a Perth Probe type dynamic cone probe consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm
 Colour of text refers to the modelled gradient on graph below
 No recovery

