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Proposed Redevelopment
The Kennet Centre
Newbury

Ground Investigation Report

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RG14 5EN

GROUND INVESTIGATION REPORT

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Aerial photograph of site

Approximate area of site outlined in red.

Bookmarking

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Report status and format

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2	Introduction		
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		Revision	Comments
01	Site location plan		
02	Plan showing existing site features and location of exploratory points		
03	Section showing construction of combined water & gas monitoring standpipe installed in boreholes.		
04a-b	Sections of drill probes at two pile caps in Multi-Storey Car Park.		

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			Revision	Comments
A	Definitions of geo-environmental terms used in this report			
B1	Insitu testing in boreholes / trial pits	Details of standard penetration tests (SPT) and Pocket Penetrometer results		
B2		Results of infiltration testing in boreholes		
C1	Borehole / probing records	Cable and tool percussion drilling		
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1 Executive summary

General

We recommend the following executive summary is not read in isolation to the main report which follows.

Site description, history and development proposals

The Kennet Shopping Centre is mixed two-storey and three-storey structure, which is internally partitioned into separate retail/commercial units. A multi-storey car park is present to the south-west corner and a cinema is present to the south-east.

The site has been fully developed since the earliest available maps. Buildings on site comprised a mixture of suspected residential and commercial/industrial buildings. The site was partially redeveloped as "The Mall" in 1973 and subsequently "The Kennet Centre" in the 1980s.

We understand the scheme is still in the planning phase but will comprise a mixed-use development.

Ground conditions encountered

The exploratory excavations encountered the following geological profile, in order of superposition:

- Made Ground
- Alluvium/Peat
- Beenham Grange Gravel Member
- Seaford Chalk Formation

Groundwater has been encountered between depths of 2.53m and 3.5m

Chemical and gaseous contamination

Based on our investigations undertaken to date, we have not identified any significant contamination, which would pose a risk to identified receptors. However, it is acknowledged that due to the current site use, investigations were restricted. On this basis, following demolition, should any areas of potential contamination be identified, further investigations will likely be required.

We have identified a potential source of landfill gas and implemented a gas monitoring regime. Gas monitoring has not identified any significant concentrations of gas and the site has been classified as characteristic situation 1 and NHBC traffic light colour Green. On this basis, gas protection measures are not considered necessary.

Landfill classification

Comparison of test data with landfill waste acceptance criteria indicates that Made Ground soils are suitable for disposal as stable non-reactive hazardous waste in non-hazardous landfill site.

Alluvium, Beenham Gravel and Chalk Formation are naturally occurring and can be classified as inert providing they are not impacted by artificial contamination.

2 Introduction

2.1 Objectives

2.1.1 This report describes a ground investigation carried out for the redevelopment of The Kennet Shopping Centre, Market Street, Newbury, RG14 5EN.

2.1.2 The objective of the ground investigation was to establish ground conditions at the site, establish existing pile configurations and provide factual information to allow parameters for foundation design to be determined by others.

2.1.3 The investigation included an evaluation of potential chemical and gaseous contamination of the site leading to the production of a risk assessment in relation to contamination.

2.1.4 The investigation has also been produced to support a planning application for the site by satisfying National Planning Policy Framework (2019) section 178.

2.1.5 Our brief also included investigations and testing to allow classification of soils at the site to be disposed of to landfill.

2.2 Status of this report

2.2.1 This report is final based on our current instructions.

2.3 Client instructions and confidentiality

2.3.1 The investigation was carried out during May and June 2020 and reported in September 2020 acting on instructions received from Lochailort Newbury.

2.3.2 This report has been prepared for the sole benefit of our above named instructing client, but this report, and its contents, remains the property of Soiltechnics Limited until payment in full of our invoices in connection with production of this report.

2.3.3 Our original investigation proposals were outlined in our letter to Lochailort Investments - Newbury. The investigation was subsequently amended on consultation with Robert Bird Group, the structural engineers advising our mutual client. Amendments were made to account for actual ground conditions encountered with laboratory testing schedules again tailored to suit actual soil conditions.

The principal changes were:

i) Additional coring of existing piles
ii) Additional piezometer installations
iii) Reduced SPT frequency within boreholes
iv) Geotechnical Laboratory testing was directed by Robert Bird Group

2.3.4 The investigation process was also determined to maintain as far as possible the original investigation budget costs.

2.4 Site location and scheme proposals

2.4.1 The National Grid reference for the site is 447120, 166970. A plan showing the location of the site is presented on Drawing 01.

2.4.2 We understand the scheme is still in the planning phase but will comprise a mixed-use development.

2.5 Report format and investigation standards

2.5.1 Sections 2 to 6 of this report describe the factual aspects of the investigation with Section 7 providing a risk assessment of chemical contamination based on the previous Phase I report, inspection of the soils and laboratory testing. Section 8 provides a similar risk assessment in relation to gaseous contamination with Section 9 providing a risk assessment relating to construction materials likely to be in contact with the ground. Section 10 provides a classification of waste soils for off-site disposal under the waste acceptance criteria

2.5.2 Geotechnical aspects

2.5.2.1 Geotechnical investigations were carried out generally, and where practical following the recommendations of BS EN 1997:2 2007 '*Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing'*. From a geotechnical viewpoint this is deemed to be a "Factual Ground Investigation Report" and therefore does not constitute a Ground Investigation report as set out in BS EN 1997:2 as it does not include an evaluation of the factual data. We understand that this will be undertaken by Robert Bird Group. This report also does not constitute a Geotechnical Design Report as defined in section 2.8 of BS EN 1997-1:2004+A1:2013 *'Eurocode 7 – Geotechnical Design – Part 1: General Rules'*.

2.5.2.2 The investigation process also followed the principles of BS 10175:2011+A2:2017 *'Investigation of potentially Contaminated Sites – Code of Practice'*. A desk study report for this project was produced in October 2019 (reference STR4882-P01). This report should be read in conjunction with the previous report.

2.5.2.3 The extent and result of the preliminary investigation (desk study) is reported in our report STR4882-P01, although a brief overview is presented in Section 3. Fieldwork combined the exploratory investigation and main investigation stages into one phase with the extent of these works described in Sections 4 and 6 of this report. Any supplementary investigations deemed necessary are identified in Section 11. Based on the results of the investigation Section 7 will identify if any remediation is necessary with respect to chemical contamination. Similarly, Section 8 will identify if any remediation is necessary with respect to gaseous (landfill gas) contamination.

2.5.2.4 This investigation has been carried out and reported based on our understanding of best practice. Improved practices, technology, new information and changes in legislation may necessitate an alteration to the report in whole or part after publication. Hence, should the development commence after expiry of one year from the publication date of this report then we would recommend the report be referred back to Soiltechnics for reassessment. Equally, if the nature of the development changes, Soiltechnics should be advised and a reassessment carried out if considered appropriate.

2.6 Report distribution

2.6.1 This report has been prepared to assist in the design and planning process of the development and normally will require distribution to the following parties, subject to Soiltechnics liabilities defined below, although this list may not be exhaustive:

Table summarising parties likely to require information contained in this report

Party	Reason
Client	For information/reference and cost planning
Developer/Contractor/project manager	To ensure procedures are implemented, programmed and costed
Planning department	Potentially to discharge planning conditions
Environment Agency	If controlled waters are affected and obtain approvals to any remediation strategies
Independent inspectors such as NHBC / Building Control	To ensure procedures are implemented and compliance with building regulations
Project design team	To progress the design
Principal Designer (PD)	To advise in construction risk identification and management under the Construction (Design and Management) Regulations
Waste recycling operators (if appropriate)	For recycling or reducing hazardous properties (if and where appropriate)

Table 2.6.1

2.7 Soiltechnics liability

2.7.1 Soiltechnics disclaims any responsibility to our Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence in accordance with the terms of our contract, taking account of the manpower, resources, investigations and testing devoted to it by agreement with our Client. This report is confidential to our Client and Soiltechnics accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

3 Desk study information and site observations

3.1 General

3.1.1 We have previously carried out a desk study for the site, which was presented in our report ref STR4882-P01 dated October 2019. This section provides a summary of the salient points in the desk study report but should be read in conjunction with our previous report.

3.2 Description of the site

3.2.1 The site comprises the Kennet Shopping Centre, located towards the centre of Newbury, Berkshire. Local topography is relatively flat, with the site located towards the floor of a valley carrying the River Kennet, which merges into the Kennet and Avon Canal and flows west-east some 85m to the north of the site.

3.2.2 The site lies within a predominantly commercial/retail area and is bordered by Bartholomew Street to the west, Market Street to the south and Cheap Street and Market Place to the east. Commercial buildings border the site to the north.

3.2.3 The Kennet Shopping Centre is mixed two-storey and three-storey structure, which is internally partitioned into separate retail/commercial units. A multi-storey car park is present to the south-west corner and a cinema is present to the south-east.

3.2.4 During our site reconnaissance we were made aware of multiple service rooms across the shopping centre, each containing mains breaker switches but no tanks were present. We understand that several substations on site are privately owned and access could not be obtained to these areas. Several tanks were present on site notably a well maintained diesel tank located on the roof, used for refuelling a fork-lift. An old diesel generator was also observed on the roof.

3.2.5 A plan showing observed site features and location of exploratory points is presented on Drawing 02.

3.3 Asbestos

3.3.1 Our investigations exclude surveys to identify the presence or indeed absence of asbestos on site. It should be noted however, that where intrusive investigations were undertaken, we did not observe any obvious evidence of potential asbestos containing materials. This information does not constitute a site-specific risk assessment and we recommend specialists in the identification and control/disposal of asbestos are appointed prior to commencement of any works on site.

3.4 History of the site

3.4.1 Our desk study report attempted to trace the history of the site which can be summarised as follows: the site has been fully developed since the earliest available maps. Buildings on site comprised a mixture of suspected residential and commercial buildings. Notable recorded site uses include Eagle works (iron), which further research indicates constructed diesel engines, Cheap Street Brewery, garages and a builder's yard. The site was partially redeveloped as "The Mall" in 1973 and subsequently "The Kennet Centre" in the 1980s. Further details on the location of previous industrial/commercial activities on the site are presented in our preliminary investigation report.

3.5 Geology and geohydrology of the area

3.5.1 Geology of the area

3.5.1.1 A summary of the recorded geological information for the site is presented in the following table:

Summary of Geology and likely aquifer containing strata

Strata	Bedrock or superficial	Approximate thickness	Typical soil type	Likely permeability	Aquifer designation
Beenham Grange Gravel	Superficial	4-8m	Sands and gravels	Permeable	Secondary A Aquifer
White Chalk Sub-group (Seaford Chalk)	Bedrock	200m	Chalk	Permeable	Principal Aquifer

Table 3.5.1

3.5.1.2 In addition to the recorded geology, boreholes local to the site (presented on the BGS website) indicate a shallow covering of Alluvium/Peat may be present in the area. Peat is also recorded some 50m to the north of the site and may therefore encroach the north of the site.

3.5.1.3 It should also be noted that Envirocheck record dissolution features (sinkhole and solution pipes), located some 104m to the south-east of the site and therefore there appears to be a risk of dissolution features in the area.

3.5.2 Geohydrology and water abstractions

3.5.2.1 There are no water abstractions within 500m of the site. However, the site lies within a Source Protection Zone III. The zone is associated with a number of drinking water abstraction point, the closest of which is located some 819m to the west. The edge of the outer protection zone lies 633m west.

3.6 Landfill and infilled ground

3.6.1.1 The closest landfill to the site is located 448m north-east and was licensed to receive waste including, industrial, commercial and household waste. There are also a number of areas of infilled land in the local area, the closest comprising and infilled quarry 111m south and a backfilled wharf 174m east.

3.7 Flood risk

3.7.1 The site is located within a fluvial flood plain (risk of extreme flooding). In addition, some areas of the site are at low risk of surface water flooding. The site is located in an area at risk of groundwater flooding occurring at surface. The centre of the site is recorded within an area with the potential for groundwater flooding of property below ground level.

4 Fieldwork

4.1 General

4.1.1 Fieldwork carried out between 18th May and 22nd July 2020 comprised of the following activities:

- Excavation of three exploratory boreholes formed using rotary drilling techniques equipment.
- Excavation of five exploratory boreholes using demountable cable and tool percussion drilling techniques.
- Excavation of eight exploratory boreholes formed using driven tube sampling equipment including dynamic probing in two locations.
- Deep concrete coring in three locations to determine existing pile configurations.

4.1.2 A plan of the site showing observed/existing site features and position of exploratory points is presented on Drawing 02. The position of exploratory points shown on this plan is approximate only.

4.1.3 The extent of fieldwork activities and position of exploratory points were determined by Soiltechnics and agreed with the Client's engineer as investigations proceeded.

4.1.4 Exploratory points were positioned to avoid known locations of underground services and to provide a reasonable coverage of the site. Prior to commencement of exploratory excavations independent third party surveyors scanned all locations utilising ground penetrating radar and electronic cable locating tools.

4.1.5 All soils exposed in excavations were described in accordance with BS EN ISO 14688 *'Identification and Classification of soil'* and BS EN ISO 14689 *'Identification and classification of rock'* and for chalk described in accordance with CIRIA C574 *'Engineering in chalk'*.

4.2 Site restrictions

4.2.1 At the time of our investigation the site was an active shopping centre, with a view to remaining active for several years following the investigation itself. Our positions were limited to internal vacant shop floor space and where possible, avoided areas with expensive floor finishing. The shop floor spaces were limited in overhead space with suspended ceiling tiles further limiting internal access for rotary drilling to a single position.

4.3 Abrasive coring

4.3.1 Abrasive coring was undertaken to determine the pile toe depth within the existing multi-storey carpark. Three piles were cored, AB01, AB06, AB07 across two pile groups. Locations AB02, AB03 and AB04 were used to determine the depth of the pile cap and existing floor slab. The location of each pile was determined using drill probe methods. The core was then positioned as centrally as possible and drilled using coal mining barrels to a maximum depth of 17mBGL. Core was recovered in 1m lengths, placed in core boxes and labelled appropriately.

4.3.2 On successfully completing AB06 and AB07 a magnetometer was suspended within each pile on maximum sensitivity until the base of the reinforcement did not induce a signal, at which point a measurement was taken. The sensitivity was then reduced and the base depth re-measured with the process repeated until a definite base depth was determined.

4.3.3 The core was logged by an experienced engineer and sampled for subsequent laboratory testing.

4.3.4 Core records are presented in Appendix C5.

4.4 Parallel seismic survey

4.4.1 In addition the abrasive coring methods described in the above section 4.3, parallel seismic surveying methods were undertaken to check the depth of the piles. The survey used a hydrophone inserted into a 100mm solid standpipe installed in BH04.

4.4.2 A magnetometer survey was undertaken to corroborate the results of the magnetometer measurement described in paragraph 4.3.2.

4.4.3 The results and subsequent report are provided in Appendix J.

4.5 Light cable and tool percussion boring

4.5.1 Boreholes BH01 to BH05 were excavated using light cable percussion boring techniques as described in EN ISO 22475-1:2006 forming 150mm diameter holes. Temporary casing was advanced within the borehole excavation to maintain the stability of the hole. When groundwater was encountered the excavation was temporarily halted to allow for groundwater observations to be made. Following groundwater observations the casing was advanced within the hole and the location/locations of the water strikes recorded. The casing was subsequently advanced to maintain the stability of the borehole and seal off the water to prevent further ingress. Additional records were taken when (and if) the casing produced a seal against water ingress and at the commencement and completion of a days drilling operations. When obstructions were encountered a chisel was employed to break through the obstruction. Time taken to progress the excavation using the chisel is recorded on the borehole logs.

4.5.2 Soil samples for subsequent laboratory determination of concentration of chemical contaminants were taken from 'intact' bulk disturbed samples obtained in the cutting shoe of the drilling rig. A sub sample was obtained discarding soil, which would have been in contact with the drilling rig cutting shoe with samples stored in new plastic containers, which were labelled and sealed. If as a consequence of visual or olfactory evidence, a sample was suspected to be contaminated by organic material, the sample was stored in an amber glass jar with a PTFE sealing washer.

4.5.3 Bulk soil samples for identification or subsequent 'classification' laboratory testing were taken from borehole cutting equipment. The samples were placed in plastic bags and subsequently sealed and labelled. Soil samples were obtained where possible to meet category B quality classes 3 to 5 as described in BS EN 1997-2:2007 (table 3.1).

4.5.4 'Undisturbed' 100mm diameter samples were attempted in cohesive soils obtained with a view to achieve category A sampling methods to meet quality class 1 as described in BS EN ISO 22475-1: 2006 (table 3). However, all but one failed to recover a soil sample. The sample obtained was and sealed with wax prior to labelling. The number of blows of the standard driving hammer required to obtain the sample is recorded on borehole records. The failed attempts are denoted as 'UTF' on the associated logs.

4.5.5 Standard Penetration Testing (SPT) was carried out at regular frequencies in the borehole. The test was carried out in accordance with BS EN ISO 22476-3:2005. Key details of the test, as required by BS EN ISO 22476-3 are recorded in Appendix B1. The drive rods were type AW up to 20m depth and type BW for depths in excess of 20m. Samples taken from the open sampler (SPT) were placed in a plastic bag, sealed and labelled. In coarse granular soils, a solid 60^{o} cone may have been used to replace the SPT cutting shoe. This test is reported as SPT(C). Summary of standard penetration testing is recorded on borehole logs.

4.5.6 The borehole excavations were formed by drillers who are NVQ Level 2 qualified in Land Drilling under the Construction Awards Alliance CAA with samples relogged by an experienced Geotechnical Engineer.

4.5.7 Records of boreholes formed by light cable and tool percussion drilling techniques are presented in Appendix C1.

4.5.8 Combined gas and groundwater monitoring standpipes were installed in boreholes BH01 to BH03. The standpipes were installed following the recommendations of BS EN ISO 22475-1:2006 '*Geotechnical Investigation and Testing – Sampling methods and groundwater measurements – Part 1: Technical Principles for execution'* (figure 6) and BS8576:2013 *'Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)'* (figure 7). Details of the standpipe installations are recorded on Drawing 03.

4.5.9 Borehole BH04 was utilised for seismic survey of the existing pile configuration and was installed with a 100mm plain uPVC pipe to 25mBGL and then filled with water prior to covering.

4.5.10 Water levels in the standpipes have been measured during a return visit to the site. The water level was measured using a measuring tape calibrated in 1mm intervals with an electronic end piece, which emits an alarm sound in contact with water. Water levels are measured from ground levels at the borehole position.

4.5.11 A description of measurement of landfill type gases in gas monitoring standpipes is provided in subsequent report paragraphs below.

4.5.12 Indicative soil infiltration testing was carried out in boreholes BH01 to BH03. The infiltration testing was carried out generally in accordance with the procedure described in Building Research Establishment (BRE) DG 365 (2016) "*Soakaway Design*". Records of test results and calculations to determine a soil infiltration rate are presented in Appendix B2. It should be noted that testing has not been carried out strictly in accordance with the BRE publication, as this does not specifically provide for calculating an infiltration rate in a borehole. We have adapted the BRE method and calculations in order to provide an indicative infiltration rate.

4.6 Rotary drilling

4.6.1 Rotary hollow stem and open holing

4.6.1.1 Rotary borehole RC02 was formed, in part, by open hole drilling using a tricone (rock roller) bit with blown air flushing drill cuttings to the surface. Only the rate of advance of the drill bit, the colour and texture of the cuttings brought to the surface gives any indication of the strata penetrated. No useable geotechnical parameters can be obtained using these methods.

4.6.1.2 Due to the presence of near surface gravel deposits a combination of driven tube sampling methods and hollow stem casing was utilised to penetrate the gravel and was seated into the top of the chalk. The driven tube samples were taken in advance of the hollow stem casing utilising a 1.5m long sampler and associated liner. limited useable geotechnical parameters can be obtained using these methods.

4.6.2 Rotary core drilling

4.6.2.1 Rotary core drilling was carried out using a double tube core barrel fitted with a tungsten or diamond core bit. The double tube barrel consists of two concentric barrels. The outer is rotated by drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the drilling process. The core cut by the coring bit passes up into the inner barrel and at the end of the coring run the core barrel assembly is lifted to the surface. A plastic lining tube was fitted in the inner tube. The core is prevented from dropping out of the core barrel by a catcher mechanism fitted in the lower part of the inner barrel.

4.6.2.2 Lubrication is provided to the coring bit via the annulus between the inner and outer barrels. The lubricant is normally compressed air but can be water or a mixture of both. The lubricant also aids transport of cutting bits to the surface.

4.6.2.3 Coring was carried out using a core barrel to produce a nominal 102mm diameter core.

4.6.3 Core preservation

4.6.3.1 Core samples are normally 1 to 1.5m long reflecting the core barrel length. Every effort was made to maintain the core in a good condition once extracted from the core barrel. The cores were placed in a specially made core box and labelled.

4.6.4 Logging

4.6.4.1 Core samples were logged in accordance with EN ISO 14689-1:2003 *'Identification and classification of rock Part 1: Identification and description'*. Rotary core records are presented in Appendix C2.

4.7 Boreholes formed using driven tube sampling techniques

4.7.1 Boreholes WS01 to WS07 were formed using driven tube sampling equipment. Driven tube sampling comprises driving 1m long steel sample tubes which are screw coupled together or coupled to extension rods and fitted with a screw on cutting edge. The sample tubes are of various diameters, generally commencing with 100mm and reducing, with depth, to 50mm and include a disposable plastic liner which is changed between sampling locations in order to limit the risk of cross contamination. On completion of excavation the liner containing the sample is cut open and the soil sample logged by a geo-environmental engineer. The sample tubes are considered thick walled with reference to BS EN ISO 22475-1:2006 clause 3.3.11.

4.7.2 Soil samples for subsequent laboratory 'classification' testing were taken from samples obtained in the disposable tubes. The sample was placed in a plastic bag and subsequently sealed and labelled. Samples for determination of water content were placed in sealable tubs and appropriately labelled. These samples were obtained with a view to achieve category B sampling methods to meet quality class 3 (for fine grained soils only) as described in BS EN ISO 22475-1: 2006 (table 3). Sample sizes were appropriate for the laboratory test being considered.

4.7.3 In each location, surface concrete was either broken out or cored prior to excavation of the borehole. The concrete surface was reinstated on completion.

4.7.4 Standard Penetration Testing (SPT) was carried out at regular frequencies in the borehole. The test was carried out in accordance with BS EN ISO 22476-3:2005. Key details of the test, as required by BS EN ISO 22476-3 are recorded in Appendix B1. SPTs were carried out using a solid 60° cone. This test is reported as SPT(C). Summary of standard penetration testing is recorded on borehole logs.

4.7.5 Combined gas and groundwater monitoring standpipes were installed in boreholes WS02, WS04 and WS05. The standpipes were installed following the recommendations of BS EN ISO 22475-1:2006 '*Geotechnical Investigation and Testing – Sampling methods and groundwater measurements – Part 1: Technical Principles for execution'* (figure 6) and BS8576:2013 *'Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)'* (figure 7). Details of the standpipe installation are recorded on Drawing 03.

4.7.6 Water levels in the standpipes have been measured during a return visit to the site. The water level was measured using a measuring tape calibrated in 1mm intervals with an electronic end piece, which emits an alarm sound in contact with water. Water levels are measured from ground levels at the borehole position.

4.7.7 A description of measurement of landfill type gases in gas monitoring standpipes is provided in subsequent report paragraphs below.

4.7.8 Records of boreholes formed using driven tube sampling techniques are presented in Appendix C3.

4.8 Dynamic probing

4.8.1 Dynamic probing was carried out in two locations. Dynamic probing consists of driving a 50mm diameter, 90° cone into the ground, via an anvil and extension rods with successive blows of a freefall hammer. The number of blows required to drive the cone each successive 100mm (N100) is recorded.

4.8.2 Dynamic probing was carried out following BS EN ISO 22476-2:2005 and the apparatus used was categorised as 'Super heavy' (DPSH-B) in accordance with the standard.

4.8.3 Dynamic probing results are presented in Appendix C4.

4.9 Measurement of landfill type gases in gas monitoring standpipes

4.9.1 The concentrations of landfill type gases collected within gas monitoring standpipes installed in boreholes RC01, RC02, RC04; BH01 to BH03; WS02 and WS04. The standpipes were measured using a portable infra-red gas analyser (model GA5000, manufactured by Geotechnical Instruments). Initially the gas analyser was connected to the gas valve on the top of the standpipe to allow the flow rate to be measured. Essentially this is a measurement of gas pressure produced in the standpipe, which is compared with atmospheric pressure at the time of measurement to produce an equivalent gas 'flow' in l/hr. The equipment used is capable of measuring to an accuracy of 0.1l/hr; below this the gas analyser records zero flow. Following BS8485:2015 '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* (clause 6.3.4), we assume flows of 0.1l/hr when the gas analyser reads zero, thus producing a pessimistic gas flow rate in our assessment of ground gases.

4.9.2 Following measurement of 'flow' the gas analyser pumps gases contained in the standpipe through the analyser. Initial readings of gas concentrations are noted manually, followed by subsequent recordings at regular time periods until 'steady state' concentrations are achieved. The analyser records 'peak' and 'steady' concentrations of the following gases:

- Methane (CH_4)
- Carbon dioxide (CO_2)
- Oxygen (O_2)

4.9.3 The ambient atmospheric temperature and barometric pressure was also recorded at the site. To determine if the atmospheric pressure is rising or falling we interrogate the internet on a daily basis.

4.9.4 Methane in concentrations of between 5 to 15% in air is potentially explosive. The 5% methane concentration in air is defined as the Lower Explosive Limited (LEL). The gas analyser measures a percentage of the LEL. For example, 10% LEL equates to 10% of 5%, i.e. 0.5% methane concentration in air.

4.9.5 Records of gas monitoring data are presented in Appendix H.

4.10 Sampling strategies

4.10.1 Geotechnical

4.10.1.1 In general we adopted a judgemental sampling strategy in relation to geotechnical aspects of the investigation. The location and frequency of sampling was carried out in consideration of the following:

i) Historical locations of structures
ii) Geology (including Made Ground)
iii) Nature of development proposals

4.10.2 Environmental

4.10.2.1 Details of sampling with respect to contamination issues are described in Section 7.

4.10.3 Sample retention

4.10.3.1 Samples are stored for a period of one month following issue of this report, unless otherwise requested.

5 Laboratory testing

5.1 Classification and physical testing

5.1.1 Laboratory testing was carried out on samples retrieved from site. The method of testing is recorded on the laboratory test certificate. The following table summarises the total number of geotechnical tests undertaken on different soil types below:

Table summarising classification and pysical testing

Geological unit	Testing scheduled (determination of)	Quantity
Made Ground	Atterbergs and water content	1
Alluvium		3
Chalk		7
Beenham Grange Gravel	300mm shear box tests	3
Chalk		3
Chalk	Consolidation	1
Chalk	Saturation moisture contents	14
Chalk	Point load test	13
Concrete	Unconfined compressive strength test	6
Chalk		3
Chalk	Unconfined compressive strength test with strain measurement	5

Table 5.1.1

5.1.2 Laboratory test certificates are presented in Appendices D1 and D2.

5.2 Chemical testing

5.2.1 Chemical testing was carried out based on ground conditions and with reference to the contamination Initial Conceptual Model as presented in Section 8. The test methods are recorded on the chemical test certificates. The following table summarises the chemical testing scheduled;

Table summarising chemical testing		
Geological unit	**Testing scheduled (determination of)**	**Quantity**
Made Ground	Asbestos screening	20
	Suite 1	7
	Suite 2 (leachate)	5
	BRE SD1 suite	1
	Suite 8	4
	Suite 17	4
	Two-stage WAC testing	3
Alluvium	Suite 8	2
Beenham Grange Gravel	Suite 8	3
	BRE SD1 suite	1
Chalk	Suite 8	1
	BRE SD1 suite	1
Table 5.2.1		

5.2.2 Laboratory test certificates for chemical testing are presented in Appendix E.

6 Ground conditions encountered

6.1 Soils / Rocks

6.1.1 The exploratory excavations encountered the following geological profile, in order of superposition:

- Made Ground
- Alluvium/Peat
- Beenham Grange Gravel Member
- Seaford Chalk Formation

6.1.2 Made Ground

6.1.2.1 Surfacing across the site comprised concrete hardstanding in all locations except RC01, which was surfaced with block paving. The concrete varied in thickness but was consistent in make-up across all locations, comprising 10mm nominal gravel size and 6mm reinforcement between 0.07m and 0.28m. In all cases the concrete was directly underlain by a double damp proof membrane and a yellow sand sub-base.

6.1.2.2 Made Ground was encountered beneath the hardstanding in all areas and extended to depths between 1.3m and 2.5m where the full depth was proven. The Made Ground soil was variable in nature and comprised a mixture of sands, clays and gravels. Gravels included brick, ash, clinker, mortar and flint with occasional glass, timber, bituminous coated material, limestone and sandstone. Cobbles of brick and concrete were also encountered in some locations. A concrete obstruction was encountered in WS01 at 1.0m and was proven to at least 1.5m using drill probing.

6.1.3 Alluvium/Peat

6.1.3.1 Alluvium was encountered beneath the Made Ground in the majority of boreholes and extended to depths between 2.5m and 4.1m. Where Alluvium was not present it is likely due to the depth of Made Ground. The Alluvium generally comprised soft to firm, black, brown and grey green slightly gravelly sandy clay. Gravel consisted of flint and chalk. Within BH04, RC01 and RC02, a layer of peat, some 0.5-0.7m thick, was encountered within the Alluvium. The peat was represented by a dark brown slightly clayey organic pseudo-fibrous peat.

6.1.4 Beenham Grange Gravel Member

6.1.4.1 The Beenham Grange Gravel extended to depths of between 6.0m and 9.0m and comprised medium dense yellowish brown to greyish brown slightly sandy gravel of well-rounded flint.

6.1.5 Seaford Chalk Formation

6.1.5.1 The Seaford Chalk Formation, extended beyond the termination depths of the boreholes. The Chalk Formation generally comprised Dm (silt) over Dc (gravel) grade or just Dc grade chalk to depths of between 18.0 and 19.25. Within the rotary boreholes, rock quality grade C2 becoming C3 chalk was encountered. Cable tool boreholes are a disturbed drilling method and recovered chalk between 18m and 25m as Dc grade.

6.2 Geotechnical parameters

6.2.1 The following table summarises test data in the above soils.

Table summarising soil testing and derived geotechnical parameters

Geotechnical parameter	Geological unit	Method	Value range	Characteristic value	Comments	Notes
Weight density (above water table)	Alluvium	Soil descriptions	15-19	16	Derived from BS 8004 figure 1.	
	Beenham Grange Gravel	Soil descriptions	17-20	18		
Weight density (below water table)	Alluvium	Soil descriptions	15-19	16	Derived from BS 8004 figure 2.	
	Beenham Grange Gravel	Soil descriptions	19-22	20		
Plasticity index	Alluvium	Laboratory testing	12-16	-	Modified plasticity index in accordance with NHBC Standards Chapter 4.2	1
	Chalk	Laboratory testing	10-11	-	-	1
Dry density	Chalk	Laboratory testing	1.47-1.56	-	-	1
Uniaxial Compressive strength (MPa)	Chalk	Laboratory testing	1.39-3.17	-	-	1
Point load index (MPa)	Chalk	Laboratory testing	0.05-0.26	-	-	1

Table 6.2.1

1. Laboratory testing presented in Appendix D1-D2

6.3 Groundwater

6.3.1 Groundwater inflows were observed during fieldwork in all borehole which penetrated the Beenham Gravel Formation. A summary of our observations is tabulated below:

Table summarising groundwater observations

Exploratory point	Date of observation	Strike depth (m) below ground levels	Observations
WS01a	18.5.2020	3.6m	Borehole collapsed before standing level observed
WS02	18.5.20	3.45m	Standing at 3.00m
WS03	19.5.20	3.5m	3.10m
WS04	19.5.20	3.5m	Borehole collapsed before standing level observed
WS05	21.5.20	3.5m	Standing at 3.10m
WS06	22.5.20	3.6m	Standing at 2.87m
WS07	22.5.20	3.7m	Borehole collapsed before standing level observed
BH01	29.5.20	3.6m	Standing at 3.1m
BH02	27.5.20	4.0m	Standing at 3.0m
BH03	3.6.20	3.6m	Standing at 3.0m
BH04	8.6.20	3.8m	Standing at 3.2m

Table 6.3.1

6.3.2 It should be noted that water levels will vary depending generally on recent weather conditions and only long-term monitoring of levels in standpipes will provide a measure of seasonal variations in groundwater levels.

6.3.3 We have implemented a programme of water monitoring with records of water levels presented in Appendix I.

6.4 Evidence of contamination

6.4.1 During excavation of our exploratory points, we noted Made Ground to depths of up to 2.5m across the site, which included anthopogenic materials. However, there was no visual or olfactory evidence of gross contamination such as hydrocarbons or solvents.

6.5 Obstructions and instability

6.5.1 General instability was observed during drilling of the Beenham Grange Gravel Member and partial collapse within chalk soil horizons, in each case the collapse occurred prior to surging of casing during drilling.

6.6 Existing foundation arrangements

6.6.1 Foundations within the multi-storey car park were revealed with exploratory boreholes AB01 to AB07 Detailed logs of these excavations are presented in Appendix C5. Three piles were cored with the change in downward pressure marking the suspected pile toe in each case.

7 Chemical contamination

7.1 General

7.1.1 A phase I contamination assessment of the site was presented in our previous report STR4882-P01. This section of the report provides an update to the source-pathway-receptor model following additional information on development proposals and the findings of fieldwork. It then describes the Phase II contamination assessment that has been undertaken, updates the initial conceptual model and provides any recommendations regarding remediation.

7.2 Source-pathway-receptor model

7.2.1 Summary of the site condition and development proposals

7.2.1.1 The site is currently a shopping centre with limited external areas and minimal soft landscaping. We understand development proposals are for a mixed-use development with associated external hardstanding areas. Any vegetation (trees, plants etc.) will be restricted to planters.

7.2.2 Receptors

7.2.2.1 Following fieldwork and revised development proposals, the critical human receptors remain a child for current and future site users and construction operatives. Groundwater and surface water remain potentially sensitive water receptors. Future vegetation was originally considered to be a potentially sensitive receptor. Given this will be restricted to planters, vegetation is no longer considered to be a potential receptor.

7.2.3 Pathways

7.2.3.1 Due to the absence of soft landscaping within the development proposals, pathways to end users are limited to inhalation of vapours. Our pathway assessment to current site users and construction operatives remains unchanged.

7.2.3.2 Excavations encountered near surface soils comprise a mixture of fine-grained and coarse-grained soils and are likely to be variably permeable. However, given the proposed site will be fully surfaced, the likelihood of a potential pathway following redevelopment is reduced.

7.2.3.3 A summary of our updated pathway assessment is presented below.

Table of likely pathways

Receptor group	Critical receptor	Pathway
Current and future site users	Child	Inhalation of vapours
Construction operatives	Adult	Ingestion of air-borne dusts
		Ingestion of soil
		Inhalation of air-borne dusts
		Inhalation of vapours
		Dermal contact with dust
		Dermal contact with soil
Controlled waters	Groundwater	Percolation of water through contaminated soils
		Saturation of contaminated soils by flood waters
	Surface water	Near-surface water run-off through contaminated soils

Table 7.2.3

7.2.4 Sources

7.2.4.1 During fieldwork we confirmed our previous suggestion that Made Ground would be present on site. These soils extended to a maximum depth of 2.5m. While they include anthropogenic materials including ash and clinker, there was no visual or olfactory evidence of significant contamination such as hydrocarbons or solvents.

7.2.4.2 During our site reconnaissance, we did not identify any additional contamination sources to those previously identified in the phase I assessment.

7.3 Updated Conceptual Model

7.3.1 Based on our revised assessment of potential contaminative sources, identified receptors and viable pathways to receptors described in preceding paragraphs, we have produced an updated conceptual model in the form of a table which is presented in Appendix G.

7.3.2 Based on the updated conceptual model there are risks which exceed the low category which in our opinion are unacceptable and require further investigation by laboratory testing of soil/water samples to refine the risk assessment.

7.4 Laboratory testing

7.4.1 Testing regime

7.4.1.1 Based on our source assessment (and our updated conceptual model), there are potential sources of contamination both on and off site although there are limited pathways to identified receptors, both current and future. However, in order to carry out a quantitative assessment, we have scheduled a limited amount of testing (given the size of the site) to measure the concentration of commonly occurring inorganic and organic contaminants.

7.4.1.2 The following table summarises the chemical testing scheduled as well as a rationale for the testing;

Table summarising scheduled testing

Exploratory point	Depth (m)	Strata/ medium	Targeted sampling?	Scheduled testing (refer to Appendix A)	Rationale
BH01	0.50	Made Ground	N	Suite 1	General site coverage
BH03	0.50				
RC02	2.50				
BH02	1.00				
BH04	1.00				
RC01	1.00				
BH01	0.50	Made Ground	N	Asbestos Testing	General site coverage
BH01	1.50				
BH02	0.60				
BH02	1.00				
BH03	0.50				
BH03	1.50				
BH04	1.00				
WS01a	0.50				
WS01a	1.50				
WS02	0.50				
WS03	1.45				
WS03	1.75				
WS04	0.75				
WS04	1.80				
WS05	0.90				
WS05	1.50				
WS06	0.50				
WS06	1.50				
WS07	1.30				
WS07	1.90				
BH04	2.00	Made Ground	Y	Suite 17 (soil)	Historic bus station/garages
WS04	1.50				
WS07	1.90				
WS01a	0.50		Y		Historic engineering works
WS04	1.80	Made Ground	Y	Suite 2 (leachate)	Historic bus station
WS03	1.75				
WS01a	1.50		Y		Historic works
WS06	1.90				
WS05	1.50		N		General site coverage

Table 7.4.1.2

7.4.1.3 Obviously, additional testing (quantity and types) would allow a more accurate risk assessment to be made. The results of laboratory determination of concentration of chemical contaminants are presented in Appendix E.

7.4.2 Criteria for assessment of test data – Human receptors

7.4.2.1 Assessment of laboratory test data has been carried out with reference to current nationally recognised documents listed in the final page of Appendix A. Due to changes in guidance on contaminated land, items 6-8 and item 10 in the document listing above have been withdrawn. In the absence of alternative guidance however we have used these documents. Where new guidance is available, this has been followed in preference to superseded guidance.

7.4.2.2 The Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH) have derived Suitable for Use Levels (S4ULs) which are presented in *'The LQM/CIEH S4ULs for Human Health Risk Assessment'* (2015). S4ULs have been used as a screening tool to assess the risks posed to the health of humans from exposure to soil contamination in relation to appropriate land uses. Where published S4ULs are not available, we have adopted C4SLs (Category 4 Screening Levels) produced by DEFRA or SGVs (Soil Guideline Values) as appropriate. In the absence of any of these criteria we have adopted Soil Screening Values (SSV) derived by Soiltechnics and by Atkins (SSV^{ATK}). The CLEA model used to derive SSVs has been used with toxicology data presented by the EA, LQM/CIEH and Atkins (in that order of preference). SSVs produced by Atkins are presented on their $ATRISK^{SOIL}$ website.

7.4.2.3 S4ULs, C4SLs, SGVs, SSVs and SSV^{ATK}s represent 'intervention values'; indications to an assessor that soil concentrations above these levels might present an unacceptable risk to the health of site users. These guideline values have been produced using conceptual exposure models, which use assumptions and are applied to differing end uses of land. If the values are exceeded, it does not necessarily imply there is an actual risk to health and site-specific circumstances should be taken into account. Conversely, where a critical pathway or chemical form of the contaminant has not been evaluated, a risk may be present even if the adopted guideline value has not been exceeded.

7.4.2.4 For evaluation of test data in relation to polycyclic aromatic hydrocarbon (PAH), phenols and total petroleum hydrocarbon (TPH) contamination, we have compared measured concentrations with corresponding S4ULs. The S4UL fractions are dependent on the Soil Organic Matter (SOM) content of the soils. We have adopted the relevant guideline values based on SOM testing.

7.4.2.5 We have followed procedures outlined by the CIEH to compare measured concentrations of metals and PAH contaminants against guideline values. The guidance presents an approach to data analysis and includes the examination of data for potential outliers, assessment of the normality of the test data and the calculation of a 95% Upper Confidence Limit (UCL). The UCL provides an estimate of the population mean, based on test data, with a 95% confidence that the actual mean does not exceed this value. The UCL is compared to the guideline value for the site.

7.4.2.6 In the absence of guidelines we have adopted industrial guideline values for assessment of construction operatives.

7.4.2.7 Currently, the site is for commercial use although a child is considered the appropriate receptor. However, pathways are restricted to vapours only and therefore we have not undertaken an assessment of test data against site specific guideline values. Consideration of the risk of possible vapours has been undertaken within our assessment.

7.4.2.8 Following redevelopment, the site will be mixed use including residential. However, we understand it will be fully surfaced in buildings/hardstandings and therefore again, all the pathways will be severed with the exception of possible vapours. On this basis, we have not compared concentrations to residential guideline values. However, should a risk of possible vapours be present, this will be considered in our assessment.

7.4.2.9 Should proposals change to include areas of soft landscaping/gardens, the following assessment will need to be revised.

7.4.3 Criteria for assessment of test data – Controlled waters

7.4.3.1 For interpretation of test data in relation to water receptors we have directly compared measured values with relevant screening values. Details of the source data and adopted threshold values are outlined on the summary tables in Appendix F.

7.4.3.2 Following our receptor assessment, and in consideration of the pathways and migration potential for contaminants on site, the critical receptors for the site is considered to be groundwater and surface water (e.g. the underlying secondary and principal aquifer/the nearby River Kennet) and thus we have adopted surface waters and drinking waters as the critical receptor and this has been utilised within our assessment model in Appendix F.

7.4.4 Evaluation of test data – Human receptors

7.4.4.1 Tables summarising and analysing test data are presented in Appendix F. The following table summarises the outcome of the analyses.

Table Summarising assessment of test data for Human receptors

Analysis tables	Receptor group	Critical receptor	CLEA model	Inorganic contaminants	Organic contaminants
1, 2 and 3	Construction operatives	Adult	Industrial / commercial	No exceedances	No exceedances

Table 7.4.4.1

7.4.4.2 Based on the above, laboratory testing has not identified any measured concentrations of contaminants which exceed current guideline values for construction operatives.

7.4.4.3 In addition, four samples were tested to determine the concentrations of VOCs/SVOCs. All of the measured concentrations were below detectable limits with the exception of 2-methylnapthalene, which was measured at the limit of detection in on sample. On this basis, we have not identified any concentrations of VOCs/SVOCs, which could pose a risk to construction operatives.

7.4.4.4 Twenty samples of Made Ground were submitted for asbestos screening. Asbestos was not detected in any of the samples.

7.4.4.5 With regards to the risk to site users from vapours, concentrations of both TPH and VOCs/SVOCs were below/at detectable limits. On this basis, we have not identified a potential source of vapours that could pose a risk to site users.

7.4.4.6 Overall, based on the above evaluation, the concentrations of contaminants measured on soil samples taken from the site are considered unlikely to exhibit significant contamination from a perspective of human receptors

7.4.5 Evaluation of test data – Controlled waters

7.4.5.1 Inorganic contaminants

7.4.5.1.1 The measured values of inorganic contaminants fall well below the relevant guideline (outlined in Section 7.4.3) with the exception of copper, vanadium and zinc.

7.4.5.1.2 Leachable copper was measured at a concentration of 30µg/l in one samples, which exceeds the adopted guideline value of 1µg/l. Vanadium was measured at 21µg/l in one sample, which exceeds the guideline value of 20µg/l. Zinc was measured at 63µg/l in one sample compared to a guideline value of 12.3µg/l.

7.4.5.2 Organic contaminants (polycyclic aromatic hydrocarbons)

7.4.5.2.1 For the analysis of PAH contamination, the sum of the following contaminants has been compared to a UKDWS.

- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(ghi)perylene
- Indeno(1,2,3-cd)pyrene

7.4.5.2.2 The summed concentration of the PAH ‘suite’ do not exceed the UKDWS. In addition, the leachable concentration of benzo(a)pyrene and naphthalene, do not exceed their respective guideline values.

7.4.5.2.3 It should be noted that concentrations of anthracene and fluoranthene were recorded above guideline values. However, the concentrations are considered to be low level and the guideline values, particularly for fluoranthene are highly conservative.

7.4.5.3 Summary

7.4.5.3.1 Based on the above evaluation, although soils do exhibit some elevated leachable concentrations, they are not prevalent throughout the Made Ground and are generally of low level. On this basis, the Made Ground is considered to pose a low risk to controlled waters. In addition, the site is and will remain fully surfaced in buildings/hardstanding, which will restrict percolation of water through the soils, further reducing the likelihood of leachate formation.

7.5 Updated conceptual model

7.5.1 Having now completed analysis of laboratory testing, we can now update our conceptual model which is presented in Appendix G.

7.5.2 Based on the updated conceptual model none of the assessed risks exceed the low category and, on this basis, no remedial action is considered necessary at this stage to render the site fit for purpose.

7.5.3 It should be noted that due to the nature of the site at the time of the investigation, locations of intrusive excavations and subsequent sampling were highly restricted. On this basis, we have not been able to target all the identified historic areas of potential contamination. On this basis, there remains a risk that unidentified contamination may be present in localised areas on the site. Should any such contamination be identified following demolition and construction works, further investigations and a revised assessment may be required.

7.6 Risk assessment summary and recommendations

7.6.1 Based on our assessments described above, we can provide the following summary and recommendations for each identified receptor.

7.6.2 Current and Future site users

7.6.2.1 As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a low risk of causing harm to the health of identified current and future users of the site.

7.6.3 Construction operatives and other site investigators

7.6.3.1 The risk of damage to health of construction operatives and other site investigators is, in our opinion, low. As a precautionary approach, however, we recommend adequate hygiene precautions are adopted on site. Such precautions would be:

- Wearing protective clothing particularly gloves to minimise ingestion from soil contaminated hands.
- Avoiding dust by dampening the soils during the works.
- Wearing masks if processing produce dust.

7.6.3.2 Guidance on safe working practices can be obtained from the following documents

- The Health and Safety Executive Publication *"Protection of Workers and the General Public during the Development of Contaminated Land"* (HMSO) and
- *"A Guide to Safer Working on Contaminated Sites"* (CIRIA Report 132).

7.6.3.3 In addition, reference should be made to the Health and Safety Executive. In all cases work shall be undertaken following the requirements of the Health and Safety at Work Act 1974 and regulations made under the Act including the COSHH regulations.

7.6.3.4 If during the course of excavations hydrocarbon type odours become evident we recommend works are halted, and the air quality measured to determine if the excavation can be safely entered. If the air quality is unacceptable then appropriate personal protective equipment, will be required for human entry into the excavation. If elevated concentrations of airborne hydrocarbons / vapours are detected on site, we recommend Soiltechnics are advised to determine an appropriate course of action with respect to building construction.

7.6.4 Controlled waters

7.6.4.1 As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a low risk of causing harm to water receptors

7.7 Statement with respect to National Planning Policy Framework

7.7.1 Based on investigations completed to date with respect to chemical contamination, we are of the opinion the proposed development will be safe and suitable for use for the purpose for which it is intended (without the need for any remedial action) thus meeting the requirements of the National Planning Policy Framework section 178, and compliant with the Building Regulations Part C, '*Site preparation and resistance to contaminants and moisture'.*

7.8 On Site Monitoring

7.8.1 We have attempted to identify the potential for chemical contamination on the site, however, areas, which have not been investigated at this stage, may exhibit higher levels of contamination. If such areas are exposed at any time during construction we will be pleased to re-attend site to assess what action is required to allow the development of safely proceed.

8 Gaseous contamination

8.1 General

8.1.1 A Phase 1 gas contamination assessment is presented in our preliminary investigation report ref STR4882-P01. This section of the report provides an update to the assessment following the intrusive investigation.

8.2 Initial Conceptual model

8.2.1 Our initial conceptual model, presented in the preliminary investigation report, is tabled below for ease of reference.

Conceptual model		
Potential source origin	**Potential pathway**	**Receptors at risk**
Infilled land Carbonate deposits Made Ground Potential Alluvium	Via potentially granular gravels/Made Ground/Alluvium.	End users Construction operatives Buildings

Table 8.2.1

8.2.2 Based on the conceptual model, intrusive investigations were required to refine the risk and determine whether a monitoring regime would be required.

8.3 Source assessment update

8.3.1 Exploratory excavations identified Made Ground up to 2.5m overlying Alluvium to depths between 2.5m and 4.1m.

8.3.2 The Made Ground did not include any easily degradable material and concentrations of organic matter were generally low although one sample recorded a concentration of 5.6%. The Alluvium generally comprised clays without any obvious organic content. However, in three locations, a layer of peat, some 0.5-0.7m thick, was encountered within the Alluvium. With reference to Figure 6 in BS8576:2013 *'Guidance on investigations for ground gas – permanent gases and volatile organic compounds'*, Made Ground/Alluvium displaying these properties would fall within the 'very low generation potential of source' category.

8.4 Gas migration

8.4.1 Intrusive investigations have confirmed the ground conditions inferred in our preliminary investigation. On this basis, there is no change to our pathway assessment.

8.5 Updated Conceptual model

8.5.1 Based on the findings of our ground investigation, there is no change to our source-pathway-receptor model and therefore our initial conceptual model remains valid.

8.5.2 On this evidence we are of the opinion that the site is at risk of being affected by ground gases (carbon dioxide/methane) sufficient to potentially cause harm to human end users of the site, construction operatives or indeed buildings. On this basis, we have installed monitoring standpipes in boreholes, and implemented a monitoring regime, generally following procedures described in BS8576:2013 to quantify the risk and, if appropriate, identify mitigation measures.

8.6 Development categorisation

8.6.1 Development proposals are still at the planning stage but we understand the development will be of mixed use, likely to be predominantly high rise buildings with commercial units at ground floor and residential apartments above.

8.6.2 On this basis, with reference to BS 8485:2015+A1:2019 (table 3), we have adopted the most sensitive building type of class *'Type A - Private',* for this assessment. This may require amending once proposals are finalised.

8.7 Monitoring observations

8.7.1 Five standpipes have been installed at the site in accordance with BS8576:2013, Section 9 (refer Drawing 03). Following BS8576:2013 (Figure 6) and CIRIA Report C665 (Tables 5.5a and 5.5b) we have provisionally assessed the site as very low risk of generation potential of source ideally requiring six monitoring visits over a three month period. This initial assessment will be reviewed pending the results of further monitoring observations.

8.7.2 We have returned to site for all of the proposed monitoring visits to obtain measurements of landfill type gases at atmospheric conditions in the range of 998 to 1017mb and temperatures in the range of 14°C to 23°C. Essentially, we did not detect any concentrations of methane. Concentrations of carbon dioxide measured in the range of 0.0 to 5.3%. If flows were detected during our monitoring visits then these are recorded, but where no flow is detected then we have assumed flow at the detection limit of the monitoring equipment at 0.1l/s.

8.7.3 Gas monitoring results are summarised in Appendix H.

8.8 Classification of site characteristic gas situation

8.8.1 Using test data obtained to date, and with reference to Table 4 of BS 8485:2015+A1:2019, the site would generally be classified as characteristic gas situation 1 and traffic light colour 'Green' in accordance with NHBC report No 10627-R01(04). However, CIRIA Report C665 states that consideration should be given to increasing the classification to CS2 where CO_2 concentrations exceed 5%. At this site, one reading from BH02 exceeds this value although review of the monitoring date shows the concentration was 4.9% on all previous visits. There is no evidence of significant concentrations of organic matter (Peat/Alluvium) or deeper Made Ground in this location and therefore the source of the elevated CO_2 in BH02 is unknown. Review of the remaining data from across the site shows CO_2 concentrations are all <3% and generally <1% and therefore the elevated CO_2 appears to be localised to the south-west.

8.8.2 Given the size of the site, we recommend that further installations and gas monitoring be undertaken in this area (once access is available) to further assess the extent of elevated CO_2 and if necessary, allow the site to be zoned. However, it should be noted that the requirements for further monitoring and potentially gas protection measures will also depend upon the development proposals (location of buildings, presence of deep basements etc.).

8.8.3 We therefore recommend that once proposals are finalised, this assessment is reviewed to determine if there are any proposed buildings in this area that could be at risk from the identified landfill-type gases. This would enable a suitable supplementary gas monitoring investigation to be undertaken if required once access on site is more widely available.

8.9 Gas protective measures – new buildings

8.9.1 Based on monitoring, development categorisation (section 9.6 above), and the site characteristic gas situation (section 9.8 above) and with reference to Table 4 of BS 8485:2015+A1:2019, generally, the development does not require any gas protective measures. However, in the absence of development proposals and additional monitoring, any buildings in the south-west (extent would require determination) may require protection measures. Again, the required measures will be dependent upon the type and use of the building and an assessment would need to be made once proposals are finalised.

8.10 Statement with respect to National Planning Policy Framework

8.10.1 Based on investigations completed to date with respect to gaseous contamination, we are of the opinion the proposed development will be safe and suitable for use for the purpose for which it is intended (without the need for any remedial action) thus meeting the requirements of the National Planning Policy Framework section 178, and compliant with the Building Regulations Part C, '*Site preparation and resistance to contaminants and moisture*.

9 Effects of ground conditions on building materials

9.1 General

9.1.1 Building materials are often subjected to aggressive environments which cause them to undergo chemical or physical changes. These changes may result in loss of strength or other properties that may put at risk their structural integrity or ability to perform to design requirements. Aggressive conditions include:

- Severe climates
- Coastal conditions
- Polluted atmospheres
- Aggressive ground conditions

9.1.2 This report section only considers aggressive ground conditions in relation to buried concrete and water pipes. Ground conditions may affect other materials but have not been considered here.

9.2 Concrete - Sulphate attack

9.2.1 Hazard

9.2.1.1 Sulphate attack on concrete is characterised by expansion, leading to loss of strength, cracking, spalling and eventual disintegration. There are three principal forms of sulphate attack, as follows:

- Formation of gypsum through reaction of calcium hydroxide and sulphate ions.
- Ettringite formation through reaction of tricalcium alluminate and sulphite ions.
- Thaumasite formation as a result of reactions between calcium silicate hydrates, carbonate ions (from aggregates) and sulphate ions.

9.2.2 Assessment

9.2.2.1 The hazard of sulphide attack is addressed by reference to procedures described in Building Research Establishment (BRE) Special Digest 1: 2005 *'Concrete in Aggressive Ground'* to establish a design sulphate class (DS) and the *'Aggressive Chemical Environment for Concrete'* (ACEC). These procedures have been followed during our investigation and are described in the following paragraphs.

9.2.3 Desk Study Information

9.2.3.1 The first step in the procedure is to consider specific elements of the desk study. These are tabulated below.

Summary of desk study information			
Element	**Interrogation**	**Outcome**	**SD1: 2005 reference**
Geology	Likelihood of soils containing pyrites	**Unlikely**	Box C6
Past industrial uses	Brownfield site?	**Yes**	C2.1.2

Table 9.2.1

9.2.3.2 A brownfield site is defined in SD1: 2005 as a site, or part of a site which has been subject to industrial development, storage of chemicals (including for agricultural use) or deposition of waste, and which may contain aggressive chemicals in residual surface materials, or in ground penetrated by leachates. Where the history of the site is not known, it should be treated as brownfield until there is evidence to classify it as natural.

9.2.3.3 Based on the above it is necessary to follow the procedures described in figure C6 ('*locations on brownfield sites except where soils may contain pyrite*').

9.2.4 Laboratory testing

9.2.4.1 The following table summarises ground conditions and laboratory testing.

Item	Soil type	Outcome
Soil		
Number of samples	Made Ground	5
	Alluvium	2
	Beenham Grange Gravel Member	4
	Seaford Chalk	2
Characteristic w/s sulphate (mg/l)	Made Ground	546
	Alluvium	124
	Beenham Grange Gravel Member	10
	Seaford Chalk	21
Characteristic pH	Made Ground	7.5
	Alluvium	7.3
	Beenham Grange Gravel Member	8.7
	Seaford Chalk	8.7
Characteristic total acid soluble sulphate (%)	Made Ground	0.56
	Alluvium	0.18
	Beenham Grange Gravel Member	0.02
	Seaford Chalk	0.06
Characteristic sulphur (%)	Made Ground	0.17
	Alluvium	0.4
	Beenham Grange Gravel Member	0.02
	Seaford Chalk	0.02

Table 9.2.4

9.2.5 Disturbed ground

9.2.5.1 As potentially pyritic ground has not been identified at the site, disturbed ground is not considered in the following assessment.

9.2.6 Assessment of design sulphate class (DC) and aggressive chemical environment for concrete (ACEC)

9.2.6.1 Based on the design sulphate class, characteristic value of pH and assessment of groundwater mobility, and with reference to table C2 of SDI: 2005, the ACEC class for each soil type is presented in Table 9.2.6.

Summary of concrete classification

Soil type	Disturbed ground?	Consider TPS?	DS class	ACEC class
Made Ground	Y	N	DS-2	AC-2
Alluvium	N	N	DS-1	AC-1
Beenham Grange Gravel	N	N	DS-1	AC-1
Seaford Chalk	N	N	DS-1	AC-1

Table reference 9.2.6

9.2.6.2 Where concrete is in contact with more than one soil/groundwater source, the more onerous of design sulphate class and ACEC class should be adopted.

9.3 Concrete - Chloride attack

9.3.1 Hazards

9.3.1.1 There are a number of ways in which chlorides can react with hydrated cement compounds in concrete. These are as follows:

- Chlorides react with calcium hydroxide in the cement binder to form soluble calcium chloride. This reaction increases the permeability of the concrete reducing its durability.
- Calcium and magnesium chlorides can react with calcium aluminate hydrates to form chloroaluminates which result in low to medium expansion of the concrete.
- If concrete is subject to wetting and drying cycles caused by groundwater fluctuations, salt crystallisation can form in concrete pores. If pressure produced by crystal growth is greater than the tensile strength of the concrete, the concrete will crack and eventually disintegrate.

9.3.2 Risk assessment

9.3.2.1 Chlorides of sodium, potassium, and calcium are generally regarded as being non-aggressive towards mass concrete; indeed, brine containers used in salt mines have been known to be serviceable after 20 years service. Depending upon the type of concrete, and the cement used up to 0.4% chloride is allowed in BS8110: Part 1.

9.3.2.2 We have submitted samples of the Made Ground, Beenham Gravel and Chalk Formation for determination of water soluble chloride. The concentrations were measured at 90mg/kg, 12mg/kg and 27mg/kg respectively.

9.4 Concrete - Acid attack

9.4.1 Hazards

9.4.1.1 Concrete being an alkaline material is vulnerable to attack by acids. Prolonged exposure of concrete structures to acidic solutions can result in complete disintegration.

9.4.2 Risk assessment

9.4.2.1 The rate of acid attack on concrete depends upon the following:

- The type of acid
- The acid concentration (pH)
- The composition of the concrete (cement/aggregate)
- The soil permeability
- Groundwater movement

9.4.2.1 British Standard BS8110: Part 1 classifies extreme environment as one where concrete is exposed to flowing groundwater that has a pH<4.5. The standard also warns that Portland Cement is not suitable for acidic conditions with a pH of 5.5 or lower.

9.4.2.2 The pH of the soil/groundwater was measured exceeding 5.5 and on this basis the risk of concrete being affected by acidic conditions is considered low.

9.5 Concrete - Magnesium attack

9.5.1 Hazards

9.5.1.1 Magnesium salts (excepting magnesium hydrogen carbonate) are destructive to concrete. Corrosion of concrete occurs from cation exchange reactions where calcium in the cement paste hydrates and is replaced with magnesium. The cement loses binding power and eventually the concrete disintegrates.

9.5.2 Risk assessment

9.5.2.1 In practise 'high' concentrations of magnesium will be found in the UK only in ground having industrial residues. Following BRE Special Digest 1:2005, measurement of the concentration of magnesium is recommended if sulphate concentrations in water extract or groundwater exceed 3000mg/l. Once measured the concentration of magnesium is considered further in BRE Special Digest in establishing the concrete mix to resist chemical attack.

9.5.2.2 We are not aware the site has been subject to any manufacturing processes which would have included magnesium containing compounds, and in addition sulphate concentrations did not exceed 3000mg/l. However, as a precaution, we have measured the concentration of magnesium in soils, with the results in Appendix E.

9.6 Concrete - Ammonium attack

9.6.1 Hazards

9.6.1.1 Ammonium salts, like magnesium salts act as weak acids and attack hardened concrete paste resulting in softening and gradual decrease in strength of the concrete.

9.6.2 Risk assessment

9.6.2.1 UK guidance is not available on the concentration of ammonium which may affect concrete. BS EN 206-1: 2000 '*Concrete - Part 1: Specification, performance, production and conformity*' does, however, provide exposure classes for concrete in contact with water with varying concentrations of ammonia for the design/specification for concrete mixes.

9.6.2.2 The site has no obvious history which provides evidence of the uses of ammonia on site, and therefore the risk of concrete being affected by ammonia is considered low.

9.7 Plastic Pipes

9.7.1 Hazards

9.7.1.1 Plastic pipes are predominantly manufactured from PVC and PE but other materials can be used. In general, they perform well but it is known that chemical attack and permeation of contaminants through the pipes can result from use in contaminated land. A published review on plastic pipes reports the following:

- Polyethylene (PE) - good resistance to solvents, acids and alkalis
- Poly vinyl chloride (PVC) - most common form of pipe. Good general resistance to chemical attack but can be attacked by solvents such as ketones, chlorinated hydrocarbons and aromatics.
- Polypropylene (PP) - chemically resistant to acids, alkalis and organic solvents but not recommended for use with storing oxidising acids, chlorinated hydrocarbons and aromatics.
- Poly vinylidene fluoride (PVDF) - inert to most solvents, acids and alkalis as well as chlorine, bromide and other halogens
- Polytetrafluoroethylene (PTFE) - one of the most inert thermoplastics available. PTFE has good chemical resistance to solvents, acids and alkalis

9.7.1.2 A survey carried out by the Water Research Centre (WRc) on reported incidents of permeation (more than 25), only two involved PVC with these incidents relating to spillages of fuel.

9.7.2 Assessment

9.7.2.1 A survey carried out by the Water Research Centre (WRc) on reported incidents of permeation (more than 25), only two involved PVC with these incidents relating to spillages of fuel.

9.7.2.2 The UK Water Industry research (UKWIR) have published a document entitled *'Guidance for the selection of Water supply pipes to be used in Brownfield sites'*. The publication defines brownfield sites as

'Land or premises that have been used or developed. They may also be vacant, or derelict. However, they are not necessarily contaminated'

9.7.2.3 The subject site has previously been developed and on this basis could potentially be considered brownfield in accordance with the UKWIR document.

9.7.2.4 Whilst we have not carried out a full investigation set out in guidance in the UKWIR document, the subject site does exhibit a degree of localised hydrocarbon (PAH) contamination. The UKWIR document advises a trigger concentration of 0.125mg/kg for their 'extended VOC (Volatile Organic Carbons) suite' which includes the PAH suite which we have results for. The measured concentration of individual contaminants forming part of the PAH suite does exceed the trigger value of 0.125mg/kg and, on this basis, it is considered likely that barrier pipes will have to be installed at this site. We recommend Thames Water is consulted on this to gain their opinion and requirements.

10 Waste characterisation

10.1 The Landfill Directive

10.1.1 The Landfill Directive represents an important change in the way we dispose of waste. It encourages waste minimisation by promoting increased levels of recycling and recovery. The Landfill Directive became law in 1999 and was transcribed into the Landfill (England and Wales) Regulations which came into force in 2002. These Regulations were amended in 2005 by introducing criteria to classify soils for disposal to landfill. It is the duty of the waste producer (the client) to classify the soils for this purpose.

10.2 Characterisation of soil types

10.2.1 Our investigations consider two soil types which may be generated as wastes as part of construction operations, potentially contaminated soil and uncontaminated soil. A full hazard assessment and subsequent testing for waste acceptance criteria is undertaken on soils which are not considered to be naturally deposited or are likely to be affected by artificial contamination. For soils that are unlikely to be affected by artificial contamination (such as natural soils), specific testing in relation to the classification process is not necessary.

10.3 Waste characterisation procedure

10.3.1 The Environment Agency publication, *'Waste Sampling and Testing for Disposal to Landfill'* (2013), provides an appropriate procedure for establishing if the soils are hazardous or non-hazardous and for determining the appropriate landfill class. This guidance applies to soils that are identified as potentially contaminated. Uncontaminated, natural soils are considered separately (see Section 10.6).

10.3.2 Hazardous waste classification

10.3.2.1 The first stage for characterising a potentially 'contaminated' soil for disposal to landfill is to establish its chemical status by first identifying potential sources/types of chemical contamination (desk study) followed by intrusive site investigations to obtain samples for undefined testing of soil samples to measure concentrations of chemical contaminants. Such data provides information to partly complete a basic characterisation.

10.3.2.2 Laboratory test data is then compared with the Environment Agency publication '*Guidance on the classification and assessment of waste. Technical Guidance WM3 (2018, version 1.1)'.* With reference to this document a hazard assessment has been carried out to enable classification of the material as hazardous or non-hazardous and to subsequently establish the European Waste Catalogues (EWC) code (ref Section 10.3.4).

10.3.3 Landfill waste acceptance criteria

10.3.3.1 The second stage for characterising a potentially 'contaminated' soil for disposal to landfill is by determining the appropriate landfill class. If the soil is deemed hazardous then measurement of organic contaminants and leachable inorganic contaminants is necessary for comparison with values listed in the Environment Agency publication '*Waste Sampling and Testing for Disposal to Landfill* (2013) Table 5.3. Similarly should the soil be deemed as non-hazardous then such testing may also be undertaken to determine if it is potentially inert. This document also provides guidance on sampling materials and frequency as well as test procedures and quality assurance of testing.

10.3.3.2 The above procedures are described with respect to the subject site in Sections 10.4 (hazardous waste classification) and 10.5 (landfill waste acceptance criteria), leading to the basic characterisation of soils for disposal. Subject to the results of the characterisation and anticipated development methodology, consideration should be given by the developer to reduce volumes of disposal or treatment to allow reclassification.

10.3.4 European Waste Catalogues (EWC) coding

10.3.4.1 The EWC 2002 is a catalogue of all wastes, grouped according to generic industry, process or waste type. It is divided into twenty main chapters, each with a two digit code between 01 and 20. Following the EWC, in our opinion, soils considered as part of this investigation would be categorised within 'Group 17' of the EWC catalogue, which comprises 'Construction and Demolition Wastes (including excavated soils from contaminated sites)'.

10.3.4.2 The Catalogue further categorises the waste, such that soils considered as part of this investigation would be classified as either 17 05 04 defined as *'soil and stones (other than those mentioned in 17 05 03)';* or 17 05 03* defined as soil or stones containing dangerous substances (where hazardous wastes are described by entries followed by an asterisk).

10.4 Hazardous waste classification

10.4.1 Soil types

10.4.1.1 Based on soils exposed in exploratory excavations, in combination with anticipated construction works, we assume soils requiring off-site disposal will comprise Made Ground, Alluvium, Beenham Grange Gravel and Lewes Nodular Chalk Formation derived from general site clearance and foundation/service trench excavations.

10.4.2 Classification as hazardous or non-hazardous waste

10.4.2.1 The Environment Agency publication *'Waste Sampling and Testing for Disposal to Landfill'* (March 2013) provides the following procedure for establishing if the soils are hazardous or non-hazardous. The first stage in classifying a potentially 'contaminated' soil for disposal is to establish its chemical status by first identifying potential sources/types of chemical contamination (desk study) followed by intrusive site investigations to obtain samples for laboratory testing of soil samples to measure concentrations of chemical contaminants.

10.4.2.2 An assessment of potential source of contamination is presented in Section 7 of this report. Laboratory testing has been set as deemed appropriate to our source assessment.

10.4.2.3 We have carried out an analysis of test data for each chemical contaminant considered in this investigation. A conservative approach has been adopted for the analysis whereby the maximum test value for each contaminant has been adopted as a preliminary screening process to determine if the soils are hazardous or non-hazardous. Should the analysis indicate potentially hazardous properties then a process of zoning by further analysing the site history, geological conditions and analytical data may be undertaken.

10.4.2.4 Laboratory test data measures the concentration of anions, which are unlikely to exist in the pure metallic form in the soil, but probably exist as a compound. Following guidance provided in the Environment Agency Technical Guidance WM3 *'Guidance on the classification and assessment of waste'* (2018), we have reviewed a variety of compounds for each of the metallic and semi-metallic elements we have tested.

10.4.2.5 To determine the hazardous waste properties for each element, we have reviewed chemical compounds listed in Table 3.2 of Annex VI of the European Regulation (1272/2008) for Classification, Labelling and Packaging (CLP) of chemicals which has now superseded the Approved Supply List (Published by the Health and Safety Executive) for the classification of hazardous chemicals in the UK. In order to provide a 'worst case' scenario, initially we adopt the most severe hazardous properties (risk phrases) associated with the various compounds for each element under review. If measured concentrations produce a hazardous outcome then the element or elements are reassessed on a site specific basis. For review of organic contamination, we have directly adopted the threshold concentrations for the appropriate organic compounds listed in Table 3.2.

10.4.2.6 The compound or compounds adopted for each element is used to convert the measured metallic concentration to the substance concentration using their respective molecular weights. This derived conversion factor is then used in the threshold concentration spreadsheet (refer paragraph 10.4.2.8).

10.4.2.7 Our assessment of each of the chemical substances is maintained on our files and is available for confidential review/audit by the Environment Agency.

10.4.2.8 A spreadsheet detailing the hazard assessment is presented in Appendix I1.

10.4.2.9 The spreadsheet indicates the soils are **hazardous**.

10.5 Landfill waste acceptance criteria

10.5.1 We have scheduled testing of **three** samples to measure the parameters listed in Table 5.3 (landfill waste acceptance criteria) included in '*Waste Sampling and Testing for Disposal to Landfill*' (2013). A copy of the test result certificate is presented in Appendix E. The source of the composite sample(s) is detailed below:

Composition of soil samples for classification testing

Sample	Source	Soil Type
WAC01	WS01a, WS02, WS06, BH05	Made Ground
WAC02	BH02, WS03, WS04, BH04	
WAC03	RC04, BH01, WS05, RC01	

Table 10.5.1

10.5.2 The samples are deemed representative of Made Ground soils as described in Section 6. Each sample was formed by combining individual samples taken from exploratory excavations within the Made Ground. The combined sample was then quartered in the laboratory to produce a representative sample for subsequent testing.

10.5.3 Laboratory test data has been compared with the landfill waste acceptable criteria to allow the assessment to be completed. A tabulated copy this comparison is presented in Appendix I2.

10.5.4 Comparison of test data with landfill waste acceptance criteria indicates that Made Ground soils are suitable for disposal as **stable non-reactive hazardous waste in non-hazardous landfill site.**

10.6 Naturally deposited soils not affected by artificial contaminants

10.6.1 With reference to the Environment Agency's publications *Waste Sampling and Testing for Disposal to Landfill* (2013) and *Waste acceptance at landfills* (2010), naturally occurring soils not likely to be affected by contamination can be classified as inert waste, with a EWC code of 17 05 04. Should any of the naturally deposited soils be suspected to contain contamination (by virtue of visual of olfactory evidence) upon excavation, then such soils should be stockpiled appropriately and additional testing carried out as considered necessary. Based on evidence obtained during our investigations, we are of the opinion that the Alluvium, Beenham Grange Gravel Member and Lewes Nodular Chalk Formation at the site are not likely to be affected by chemical contamination and thus can be classified as **inert waste.**

10.7 Basic characterisation

10.7.1 Based on the preceding assessment, we have produced four basic characterisation schedules relating to the Made Ground, Alluvium, Beenham Grange Gravel Member and Lewes Nodular Chalk deposits, which are presented in Appendix I3. These schedules should be provided together with a copy of this report to an appropriately licensed landfill facility to demonstrate the material can be deposited at this facility.

10.7.2 We understand that some landfill sites have licences which have restrictions on concentrations of chemical contaminants and thus we recommend this report is provided to the selected landfill facility to confirm (or otherwise) it can accept the waste. Please be aware that landfill sites are obligated to undertake in house quality assurance tests and thus may require further WAC testing for any soils encountered as part of this investigation. There is no obligation on any landfill operator to accept waste if they choose not to and waste operators may require additional testing of untested waste soils prior to acceptance at landfill in accordance with the landfill regulations.

10.8 Treatment of waste

10.8.1 Treatment of wastes prior to disposal is now a requirement of the landfill directive applied by the Landfill (England and Wales) Regulations 2002. Landfill cannot accept untreated waste (be it hazardous or non-hazardous), thus waste producers have the choice of treating it themselves on site or treating it elsewhere prior to disposal to landfill. The regulations require:

> *'10 – (1) The operator of a landfill shall ensure that the landfill is only used for landfilling waste which is subject to prior treatment unless:*
>
> *a) It is inert waste for which treatment is not technically feasible; or*
>
> *b) It is waste other than inert waste and treatment would not reduce its quantity or the hazards which it poses to human health or the environment.'*

10.8.2 Regulation 2 defines treatment as: *'physical, thermal, chemical or biological processes (including sorting) that change the characteristics of waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.'*

10.8.3 A treatment option must comply with the definition of treatment. This involves a 'three point test' against which treatment is assessed i.e.

1. It must be a physical, thermal, chemical or biological process including sorting
2. It must change the characteristics of the waste: and
3. It must do so in order to:
    a) Reduce its volume: or
    b) Reduce its hazardous nature: or
    c) Facilitate its handling: or
    d) Enhance its recovery.

10.8.4 Treatment of inert wastes

10.8.4.1 Inert waste does not need to be treated if it is not technically feasible however treatment should reduce the amount of waste which goes to landfill and enhance its recovery (by re-use or recycling). Inert wastes are often suitable for recycling, for example as an aggregate or an engineering fill material. A fact sheet on treatment of inert wastes is available on the following website www.environment-agency.gov.uk

10.8.4.2 Clearly, excavations in the Alluvium, Beenham Grange Gravel Member and Lewes Nodular Chalk will generate inert wastes which could be reused on site or off site for bulk filling, subject of course to maintenance of an acceptable water content and provided that it is fit for its intended purpose.

10.8.5 Treatment of non-hazardous waste

10.8.5.1 Guidance and indeed examples of treatment is provided in the Environment Agency publication '*Treatment of non-hazardous wastes for landfill – your waste – your responsibility,'* again available on the EA website.

10.8.6 Landfill operators

10.8.6.1 It is a requirement of the landfill operator to check if the waste soils taken to the facility have been treated.

10.9 Reuse of Soils - Materials Management Plans

10.9.1 Where soils are to be moved and reused onsite, or are to be imported to the site, a Waste Exemption or an Environmental Permit is required.

10.9.2 An alternative is the use of a Materials Management Plan (MMP) to determine where soils are and are not considered to be a waste. By following *'The Definition of Waste: Development Industry Code of Practice'* published by CL:AIRE (produced in 2008 and revised in March 2011), soils that are suitable for reuse without the need for remediation (either chemical or geotechnical) and have a certainty of use, are not considered to be waste and therefore do not fall under waste regulations. In addition, following this guidance may present an opportunity to transfer suitable material between sites, without the need for Waste Exemptions or Environmental Permits.

10.9.3 MMPs offering numerous benefits, including maximising the use of soils onsite, minimising soils going to landfill and reducing costs and time involved in liaising with waste regulators.

10.9.4 We can provide further advice on this and provide fees for producing a Materials Management Plan on further instructions.

11 Further investigations

11.1	Further investigations

11.1 At this stage we do not consider further investigations to be necessary. However, due to current site use, this investigation has been relatively restricted. Following demolition, should any areas of potential contamination be identified, further investigations will likely be required.

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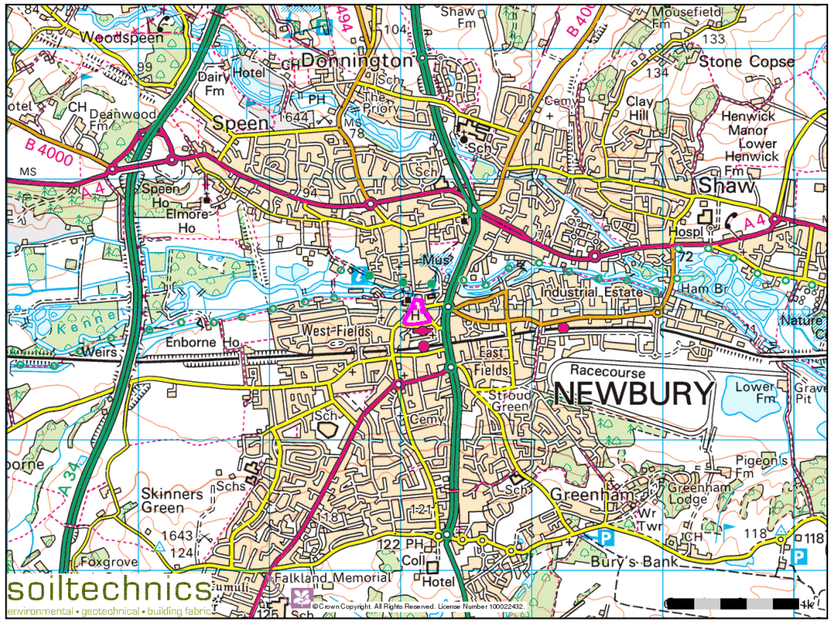
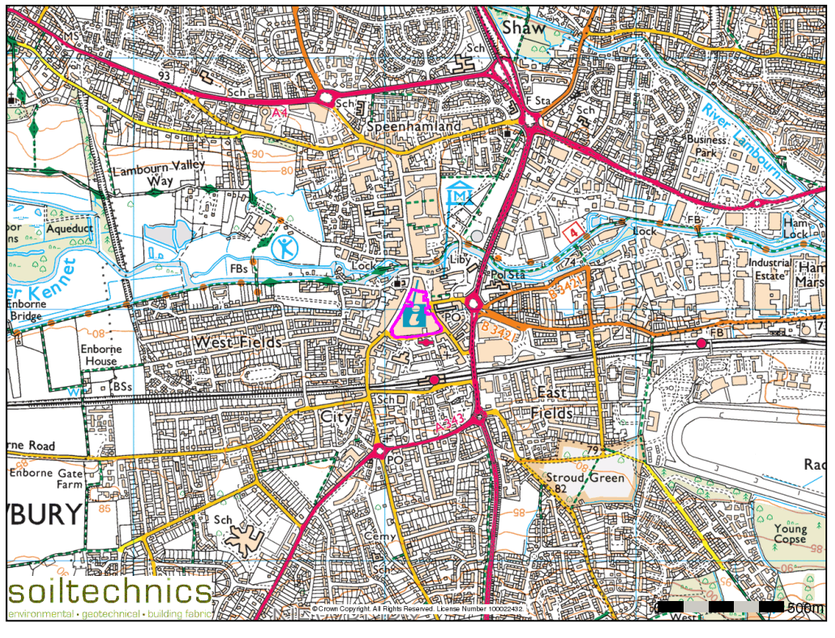
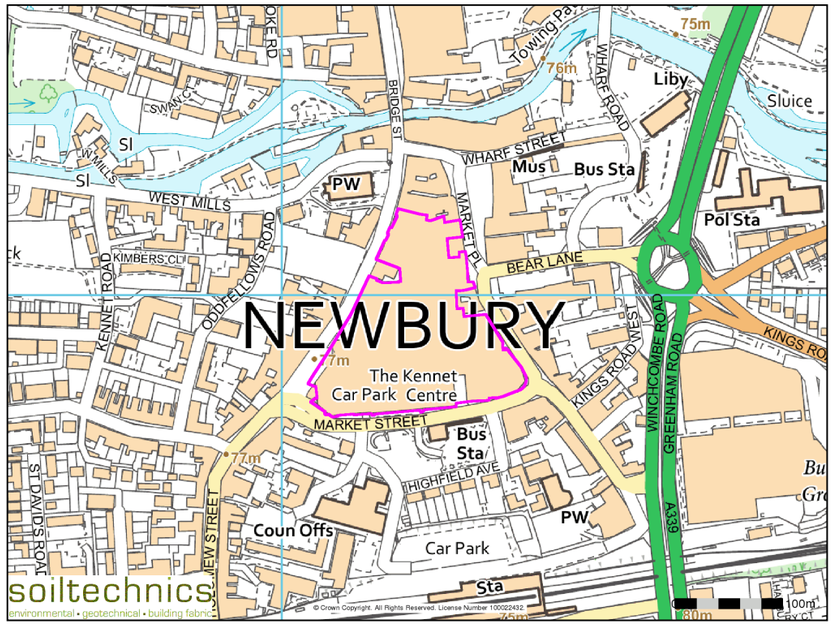


Neighbourhood extract from Ordnance Survey map



Town extract from Ordnance Survey map



Detail extract from Ordnance Survey map

Title	Scale	Drawing number
Site location plan	Not to scale	01

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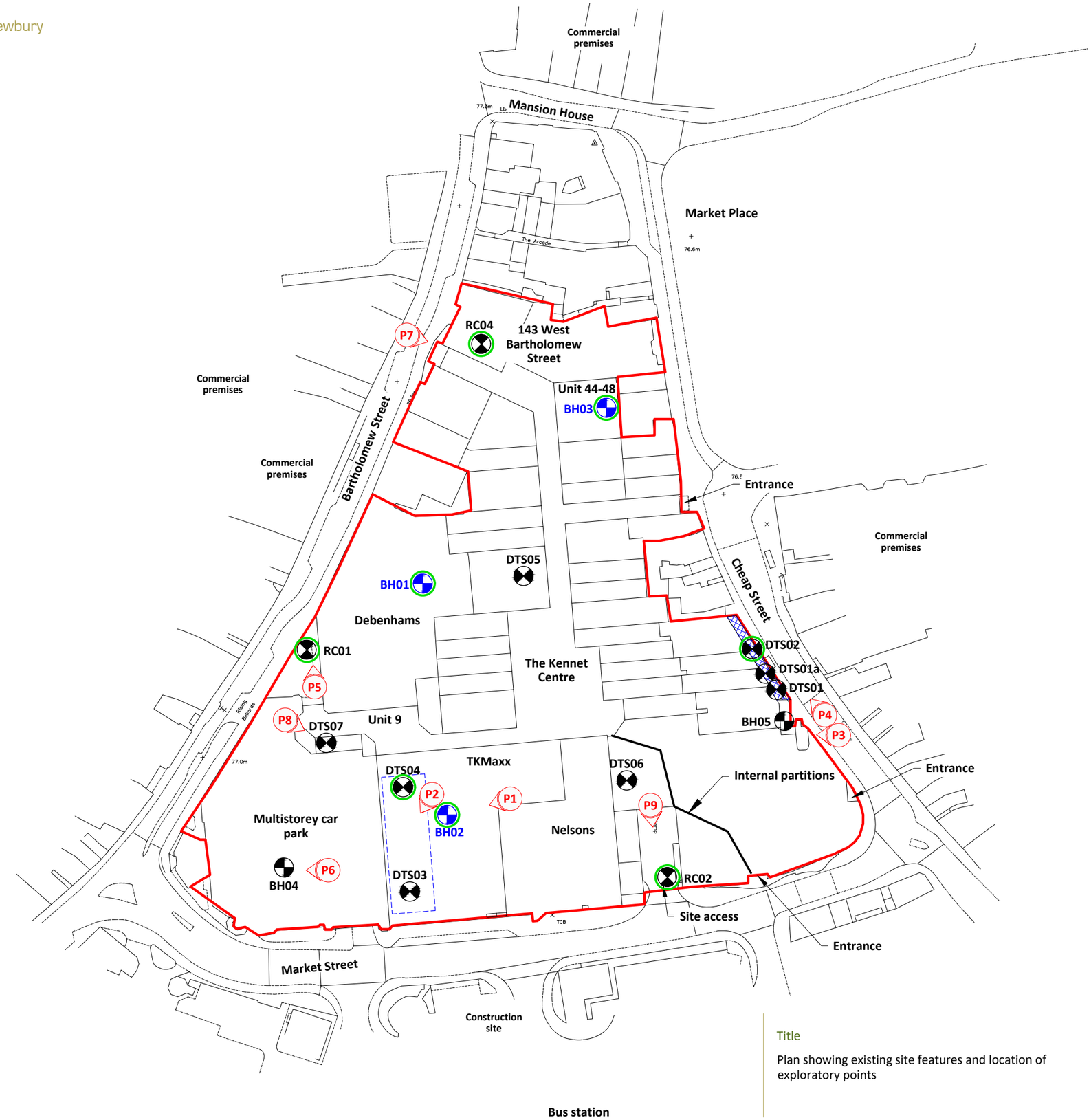

Key

RBH	Approximate location of borehole formed using rotary drilling techniques
BH	Proposed location of borehole formed by Cable and Tool percussive techniques
BH	Proposed location of borehole formed by Cable and Tool percussive techniques with infiltration testing
DTS	Approximate location of borehole formed by Driven Tube Sampling techniques
	Monitoring standpipe installed
	Approximate site boundary
P1	Approximate location and orientation of photographic record

Title	Scale	Drawing number
Plan showing existing site features and location of exploratory points	1:1250 at A3	02

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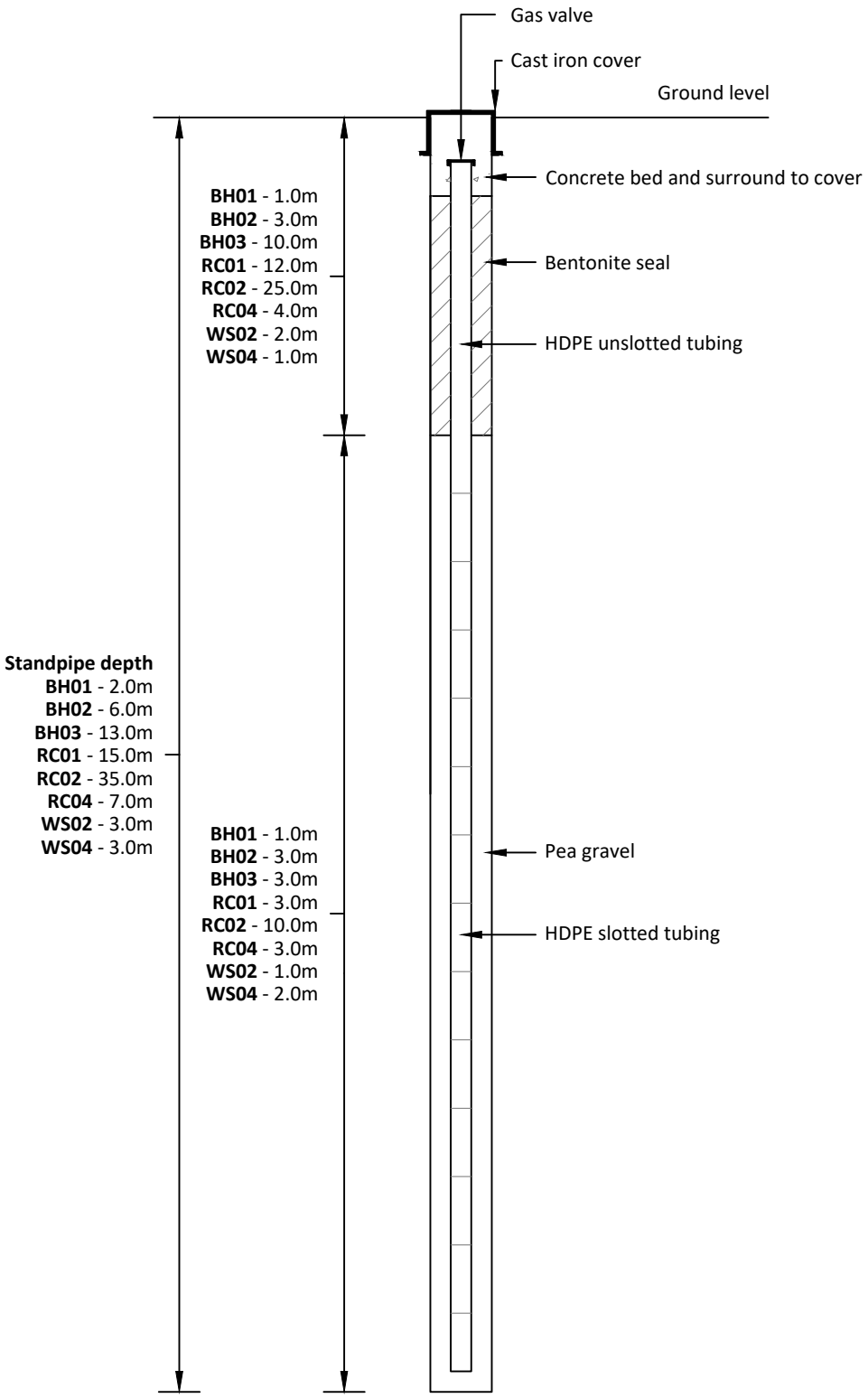

Title	Scale	Drawing number
Section showing construction of monitoring standpipes installed in boreholes	Not to scale	03

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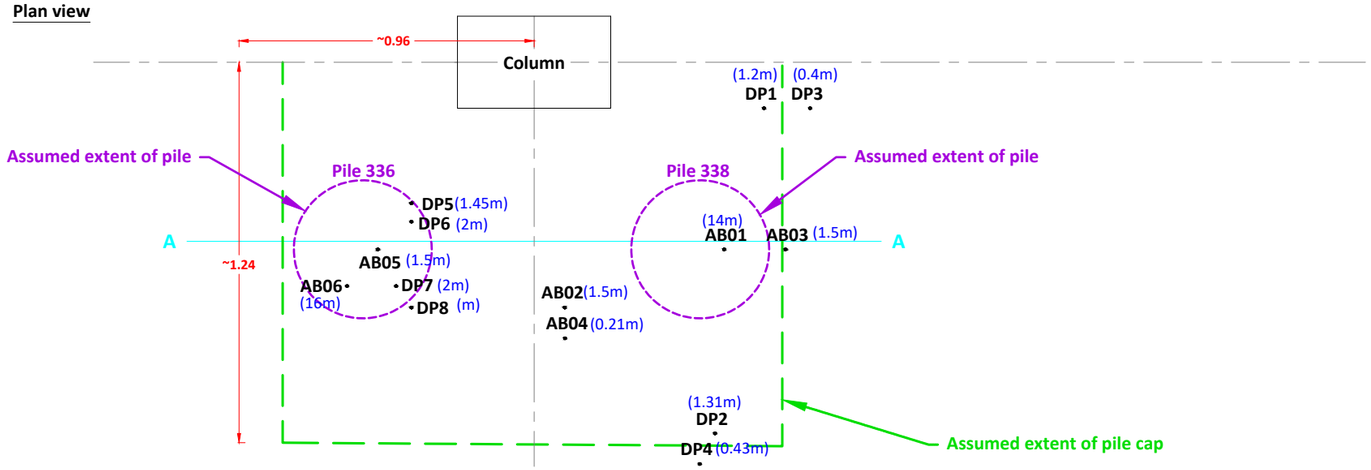
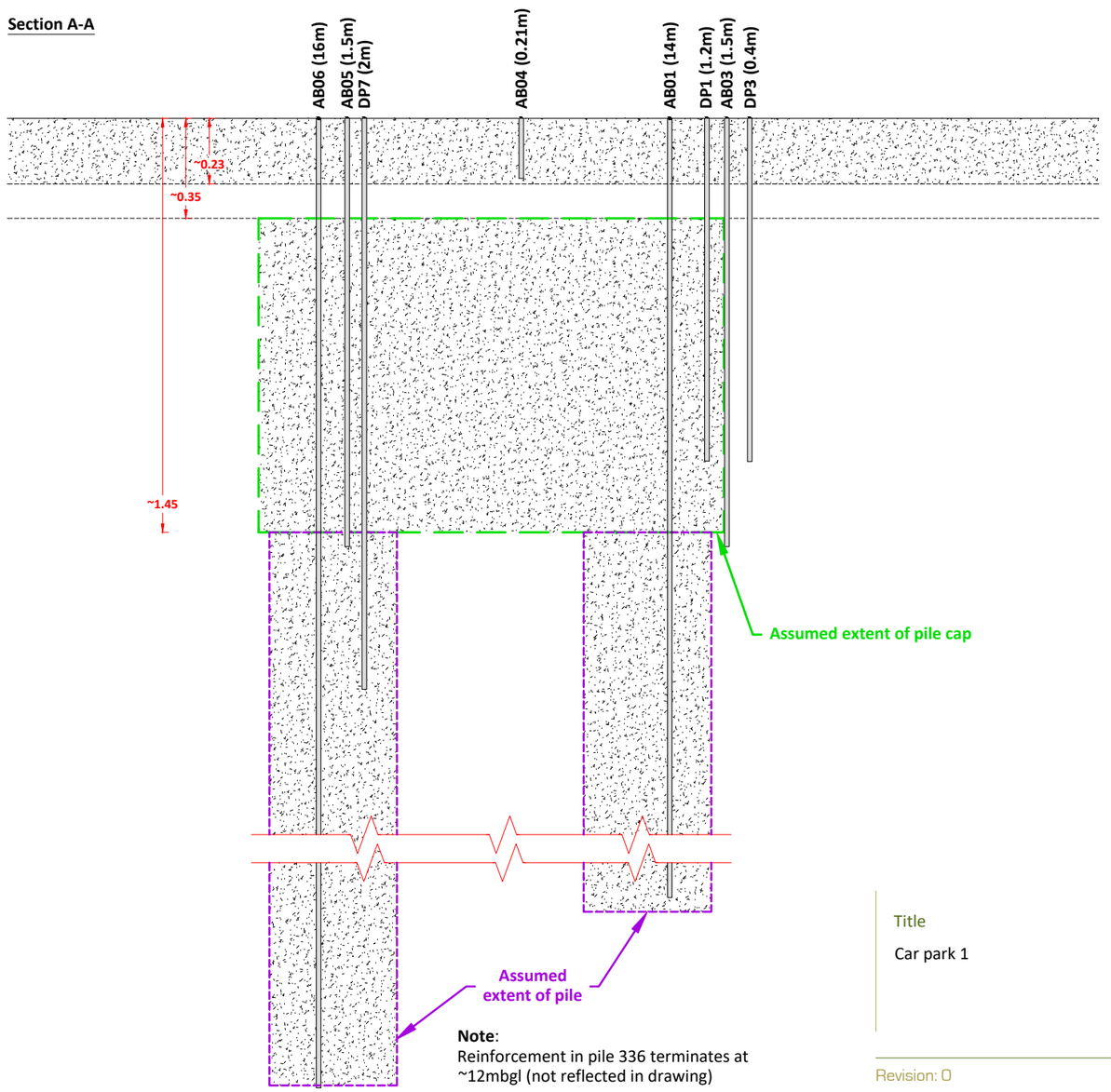
Plan view



Section A-A



Note:
Reinforcement in pile 336 terminates at ~12mbgl (not reflected in drawing)

Key

• DP	Approximate location of drill probe
(0.2m)	Approximate base depth of concrete

Notes

All drill probe (DP) positions drilled to 1.2mBGL minimum

Title	Scale	Drawing number
Car park 1	1:20 at A3	04a

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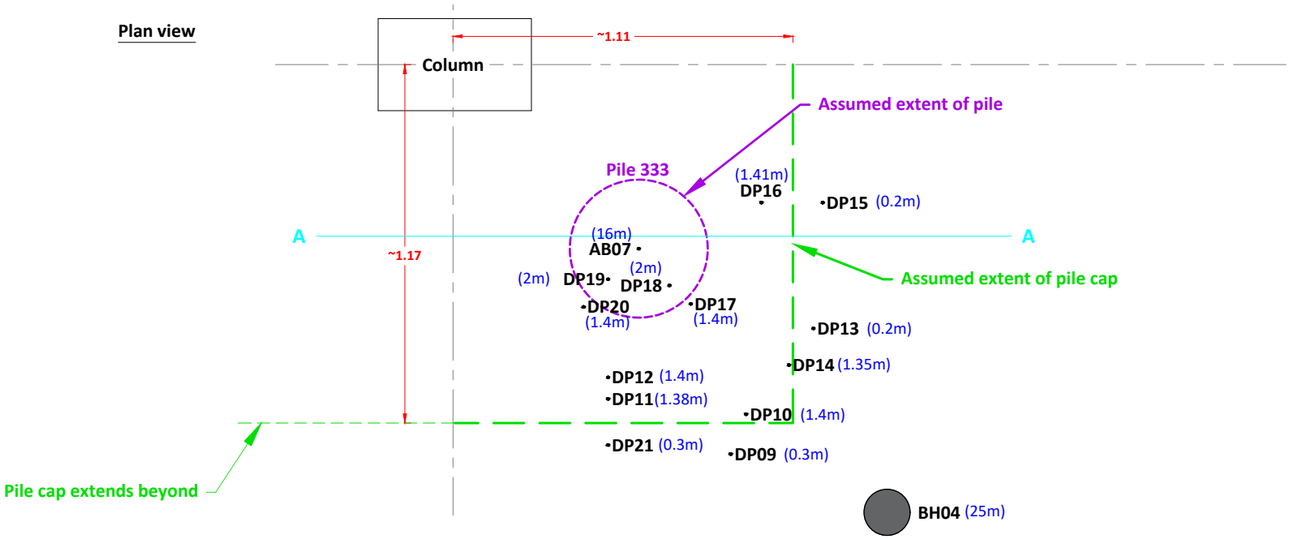
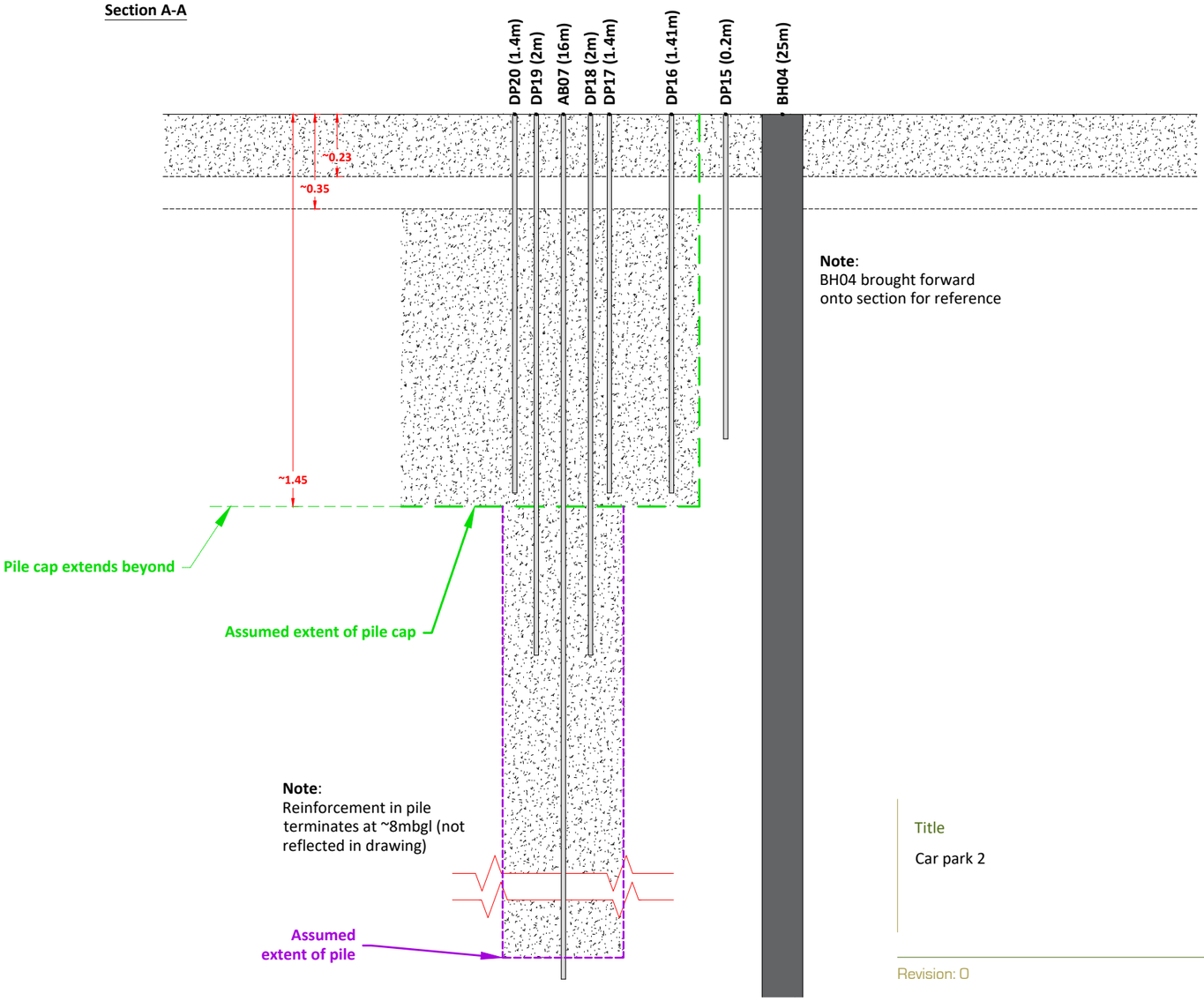
Plan view



Section A-A



Note:
BH04 brought forward onto section for reference

Key

• DP	Approximate location of drill probe
(0.2m)	Approximate base depth of concrete

Notes

All drill probe (DP) positions drilled to 1.2mBGL minimum

Title	Scale	Drawing number
Car park 2	1:20 at A3	04b

Revision: 0

September 2020

Definition of geo-environmental terms used in this report

Conceptual model
Textual and/or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information obtained from the investigatory process.

Contamination
Presence of a substance which is in, on or under land, and which has the potential to cause harm or to cause pollution of controlled water.

Controlled water
Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three mile limit of territorial waters.

Harm
Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of humans, including property.

Pathway
Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.

Receptor
Persons, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).

Risk
Probability of the occurrence of, and magnitude of the consequences of, an unwanted adverse effect on a receptor.

Risk assessment
Process of establishing, to the extent possible, the existence, nature and significance of risk.

Definition of environmental risk/hazard terms used in this report

Based on CIRIA report C552 '*Contaminated land risk assessment – A guide to good practice*'.

Potential hazard severity definition

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species

Probability of risk definition

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

Level of risk for potential hazard definition

Probability of risk	Potential severity			
	Severe	**Medium**	**Mild**	**Minor**
High likelihood	Very high	High	Moderate	Low/Moderate
Likely	High	Moderate	Low/Moderate	Low
Low likelihood	Moderate	Low/Moderate	Low	Very low
Unlikely	Low/Moderate	Low	Very low	Very low

See below for definitions of 'very high' to 'very low'

Definition of environmental risk/hazard terms used in this report

Based on CIRIA report C552 '*Contaminated land risk assessment – A guide to good practice'.*

Risk classifications and likely action required:

Very high risk
High probability that severe harm could arise to a designated receptor from an identified hazard OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised is likely to result in substantial liability. Urgent investigation and remediation are likely to be required.

High risk
Harm is likely to arise to a designated receptor from an identified hazard. This risk, if realised, is likely to result in substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term.

Moderate risk
It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is likely that the harm would be relatively mild. Investigation is normally required to clarify risks and to determine potential liability. Some remedial works may be required in the long term.

Low risk
It is possible that harm could arise to a designated receptor from an identified hazard but it is likely that this harm, if realised, would at worst normally be mild.

Very low risk
It is a low possibility that harm could arise to a designated receptor. On the event of such harm being realised it is not likely to be severe.

List of documents used in assessment of chemical contamination

No.	Title	Publication reference / publisher
1	Human health toxicological assessment of contaminants in soil	EA Science Report – SC050021/SR2
2	Updated technical background to the CLEA model	EA Science Report – SC050021/SR3
3	CLEA Software (Version 1.03 beta) Handbook	EA Science Report - SC050021/SR4
4	Guidance on comparing Soil Contamination Data with a Critical Concentration	CIEH
5	The LQM/CIEH S4ULs for Human Health Risk Assessment (2015)	LQM/CIEH
6	Assessment of Risks to Human Health from Land Contamination: An overview of the development of soil guideline values and related research	R&D Publication, Contaminated Land Report CLR 7
7	Contaminants of Soil: Collation of Toxicological Data and Intake Values for Humans	R&D Publication, Contaminated Land Report CLR 9
8	The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms	R&D Publication, Contaminated Land Report CLR 10
9	Model Procedures for the Management of Land Contamination	R&D Publication, Contaminated Land Report CLR 11
10	Contaminants in Soil: Collection of Toxicological Data and Intake Values for Human Values	R&D Publications, Tox. 6
11	Soil Guideline Values for Contamination (2002)	R&D Publications, SGV 10
12	Soil Guideline Values (2009)	EA Science Reports – SC050021
13	Atkins ATRISK^{SOIL} (2011)	http://www.atrisksoil.co.uk
14	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination (September 2014)	CL:AIRE

CIEH	Chartered institute of Environmental Health
LQM	Land Quality Management
EA	Environment Agency
CL:AIRE	Contaminated Land: Applications in Real Environments

Testing suite summary

Table summarising testing suites		
Suite	**Parameters**	**Medium**
Suite 1	Arsenic, beryllium, boron, cadmium, chromium (total and VI), copper, lead, mercury, nickel, selenium, vanadium zinc, cyanide (free, total and complex), organic matter content, PAH (16 speciated), pH, phenol (total), TOC	Soil
Suite 2	Arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, PAH (16 speciated), pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Leachate
Suite 3	Arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, PAH (16 speciated), pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Water
Suite 4	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated), organic matter	Soil
Suite 5	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated)	Leachate
Suite 6	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated)	Water
Suite 7	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, TOC, organic matter	Soil
Suite 8	Sulphur (total), sulphate (water and acid soluble), pH	Soil
Suite 9	Sulphate, ammoniacal nitrogen, dissolved magnesium, pH	Water
Suite 10	VOC, SVOC, TOC, organic matter	Soil
Suite 11	VOC, SVOC	Leachate
Suite 12	VOC, SVOC	Water
Suite 13	Organotins dibutyltin/ tributyl-tin/tetrabutyltin/triphenyl-tin, tetraethyl-lead/tetramethyl-lead	Soil
Suite 14	Organotin	Leachate
Suite 15	Organotin	Water
Suite 16	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, VOC, SVOC	Soil, water, leachate
Suite 17	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, SVOC, VOC, arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Soil, water, leachate
Concrete BRE suite	pH, sulphate (water and acid soluble), magnesium (water soluble), ammonia (water soluble), chloride, nitrate	Soil

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Table summarising Standard Penetration Test (SPT) results

Location	Start Depth (m)					Penetration (mm)	
		Seating 1-2	Main 1-4	Total Seating	Total Main	Total Seating	Total Main
BH01	1.20	2/3	3/2/2/3	5	10	150	300
BH01	2.00	1/3	4/1/0/1	4	6	150	300
BH01	3.00	2/3	3/4/5/5	5	17	150	300
BH01	4.00	3/5	8/4/3/2	8	17	150	300
BH01	5.50	2/2	3/3/3/4	4	13	150	300
BH01	8.50	1/2	2/3/2/2	3	9	150	300
BH01	10.00	1/0	1/1/1/1	1	4	150	300
BH01	11.00	1/1	0/1/1/1	2	3	150	300
BH01	14.50	2/2	3/3/4/7	4	17	150	300
BH01	17.50	1/3	4/7/8/8	4	27	150	300
BH01	20.50	6/8	21/29	14	50	150	
BH01	22.00	4/6	9/12/20/9	10	50	150	255
BH02	1.20	1/1	0/1/1/0	2	2	150	300
BH02	2.00	3/3	3/3/4/4	6	14	150	300
BH02	3.00	3/4	5/5/6/6	7	22	150	300
BH02	4.00	2/3	4/5/7/7	5	23	150	300
BH02	5.00	2/2	3/3/3/4	4	13	150	300
BH02	6.00	1/2	3/3/3/3	3	12	150	300
BH02	7.00	1/1	1/2/2/3	2	8	150	300
BH02	8.50	3/3	3/2/3/1	6	9	150	300
BH02	9.00	2/1	2/1/2/2	3	7	150	300
BH02	10.50	1/1	2/2/1/2	2	7	150	300
BH02	11.50	1/2	2/2/2/3	3	9	150	300
BH02	12.50	3/3	3/4/4/6	6	17	150	300
BH02	16.00	2/3	4/4/5/8	5	21	150	300
BH02	18.50	3/5	7/8/26/9	8	50	150	235
BH02	22.00	7/8	12/16/22	15	50	150	255
BH03	1.20	1/2	1/1/1/2	3	5	150	300
BH03	2.00	1/2	3/4/4/6	3	17	150	300
BH03	3.00	2/2	3/3/3/4	4	13	150	300
BH03	4.00	1/1	2/2/2/3	2	9	150	300
BH03	5.00	3/3	2/2/3/3	6	10	150	300
BH03	7.00	1/2	3/3/3/4	3	13	150	300
BH03	8.00	2/2	3/3/4/4	4	14	150	300
BH03	9.50	1/1	0/1/0/1	2	2	150	300
BH03	11.00	1/0	1/1/2/0	1	4	150	300
BH03	13.00	1/1	2/3/4/4	2	13	150	300
BH03	14.50	2/2	3/2/4/5	4	14	150	300

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Table summarising Standard Penetration Test (SPT) results

Location	Start Depth (m)					Penetration (mm)	
		Seating 1-2	Main 1-4	Total Seating	Total Main	Total Seating	Total Main
BH03	17.50	3/3	4/5/7/7	6	23	150	300
BH03	19.50	3/5	7/7/8/12	8	34	150	300
BH03	22.50	7/9	23/27	16	50	150	
BH04	1.20	2/2	1/1/1/1	4	4	150	300
BH04	2.00	1/1	1/1/2/2	2	6	150	300
BH04	3.00	2/2	3/3/3/4	4	13	150	300
BH04	4.00	3/3	2/3/3/5	6	13	150	300
BH04	5.00	2/3	3/4/4/3	5	14	150	300
BH04	6.50	2/2	2/1/2/2	4	7	150	300
BH04	9.00	1/1	2/1/2/2	2	7	150	300
BH04	11.00	3/3	2/1/0/1	6	4	150	300
BH04	13.50	4/4	4/5/5/8	8	22	150	300
BH04	16.50	3/8	5/5/8/9	11	27	150	300
BH04	18.50	8/8	10/12/17/11	16	50	150	245
BH04	20.00	6/7	9/16/25	13	50	150	190
BH04	23.00	3/6	17/33	9	50	150	
BH05	1.20	4/50		54	0	75	
BH05	2.00	4/5	5/7/9/18	9	39	150	300
RC01	1.20	1/0	0/0/1/1	1	2	150	300
RC01	2.70	1/0	1/0/2/2	1	5	150	300
RC01	4.20	2/4	4/4/5/5	6	18	150	300
RC01	10.20	0/2	2/3/2/1	2	8	150	300
RC01	14.70	1/2	1/1/1/1	3	4	150	300
RC01	14.75	3/3	3/5/7/7	6	22	150	300
RC01	19.50	3/6	5/5/7/10	9	27	150	300
RC01	23.95	5/5	6/15/19/9	10	49	150	275
RC01	26.95	5/10	9/14/20/7	15	50	150	240
RC01	31.45	2/7	15/26/9	9	50	150	175
RC01	34.45	7/8	12/20/18	15	50	150	220
RC02	2.50	1/0	0/2/2/1	1	5	150	300
RC02	6.00	1/2	1/0/0/1	3	2	150	300
RC02	10.25	1/0	1/0/1/0	1	2	150	300
RC02	14.75	3/4	4/5/8/7	7	24	150	300
RC02	19.25	6/7	13/10/17/10	13	50	150	275
RC02	23.75	7/8	10/26/14	15	50	150	200
RC02	28.25	14/11	12/21/17	25	50	125	175
RC02	31.25	12/9	11/10/14/13	21	48	150	300
RC04	1.50	1/2	1/2/1/2	3	6	150	300

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Table summarising Standard Penetration Test (SPT) results

Location	Start Depth (m)					Penetration (mm)	
		Seating 1-2	Main 1-4	Total Seating	Total Main	Total Seating	Total Main
RC04	3.00	2/3	3/4/4/4	5	15	150	300
RC04	4.00	2/2	4/8/17/17	4	46	150	300
RC04	8.75	1/1	1/0/1/1	2	3	150	300
RC04	13.25	1/1	0/3/2/3	2	8	150	300
RC04	18.00	6/5	4/5/6/10	11	25	150	300
RC04	22.25	6/7	7/10/10/10	13	37	150	300
RC04	28.25	11/15	37/13	26	50	125	
RC04	32.75	11/15	18/32	26	50	150	
RC04	35.25	8/11	14/24/12	19	50	150	195
WS01	1.00	25/25		50	0	10	
WS01a	2.00	1/1	1/2/2/2	2	7	150	300
WS01a	3.50	6/6	6/6/5/5	12	22	150	300
WS02	1.00	1/0	1/0/1/0	1	2	150	300
WS02	3.00	5/6	4/4/4/4	11	16	150	300
WS03	1.00	4/2	3/2/2/3	6	10	150	300
WS03	3.00	5/6	4/5/3/4	11	16	150	300
WS04	2.00	3/4	4/4/5/5	7	18	150	300
WS04	4.00	4/4	3/3/2/2	8	10	150	300
WS05	2.00	1/2	1/2/2/3	3	8	150	300
WS06	1.00	2/2	3/3/3/2	4	11	150	300
WS06	3.00	1/1	1/7/8/7	2	23	150	300
WS07	1.00	2/2	2/2/2/2	4	8	150	300
WS07	3.00	8/8	7/7/7/8	16	29	150	300

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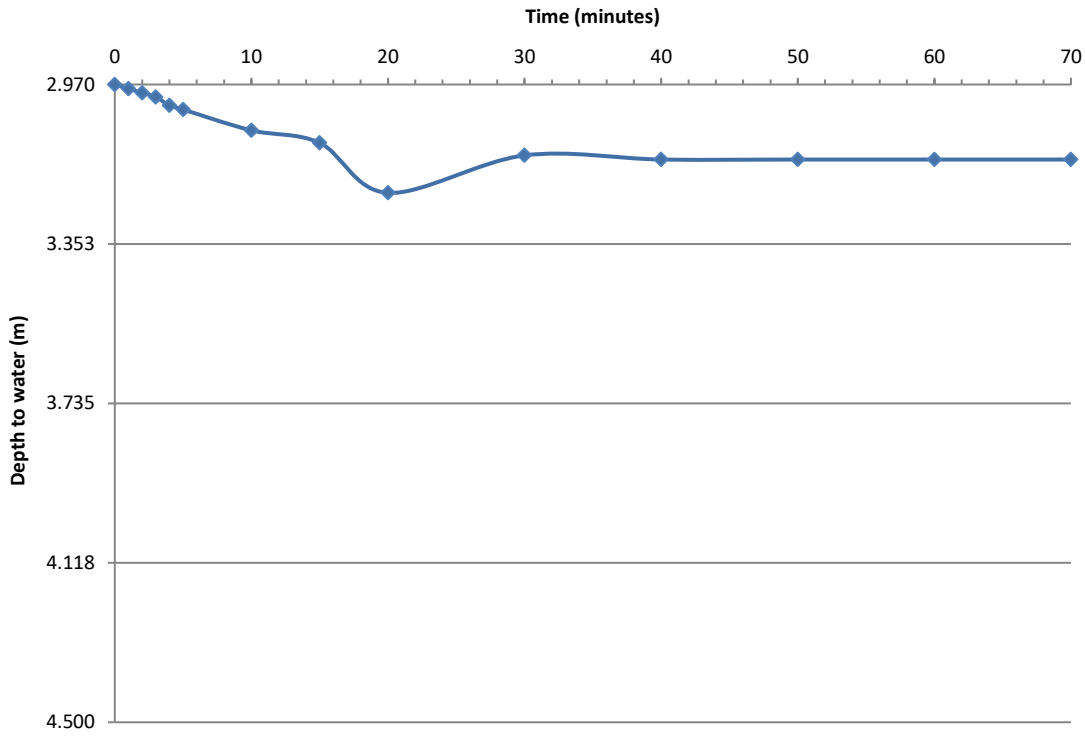
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	2.97		
1	2.98		
2	2.99		
3	3		
4	3.02		
5	3.03		
10	3.08		
15	3.11		
20	3.23		
30	3.14		
40	3.15		
50	3.15		
60	3.15		
70	3.15		

Calculations:

Insufficient infiltration over 70 minutes of monitoring therefore unable to calculate soil infiltration rate.

Groundwater observations

Groundwater strike at 4m depth, filling borehole to 3.6m in 5 minutes, 3.3m in 10 minutes, 3.3m in 15 minutes and 3.2m in 20 minutes.

Geology unit under test

Beenham Grange Gravel Member

Depth of borehole at start of test (m)

4.5

Title

Soil infiltration test (following principles of BRE Digest 365 2016)

Diameter	Co-ordinates	Ground level
0.15m	-	N/A

Borehole no.	Cycle number	Date of excavation
BH01	1	29/05/2020

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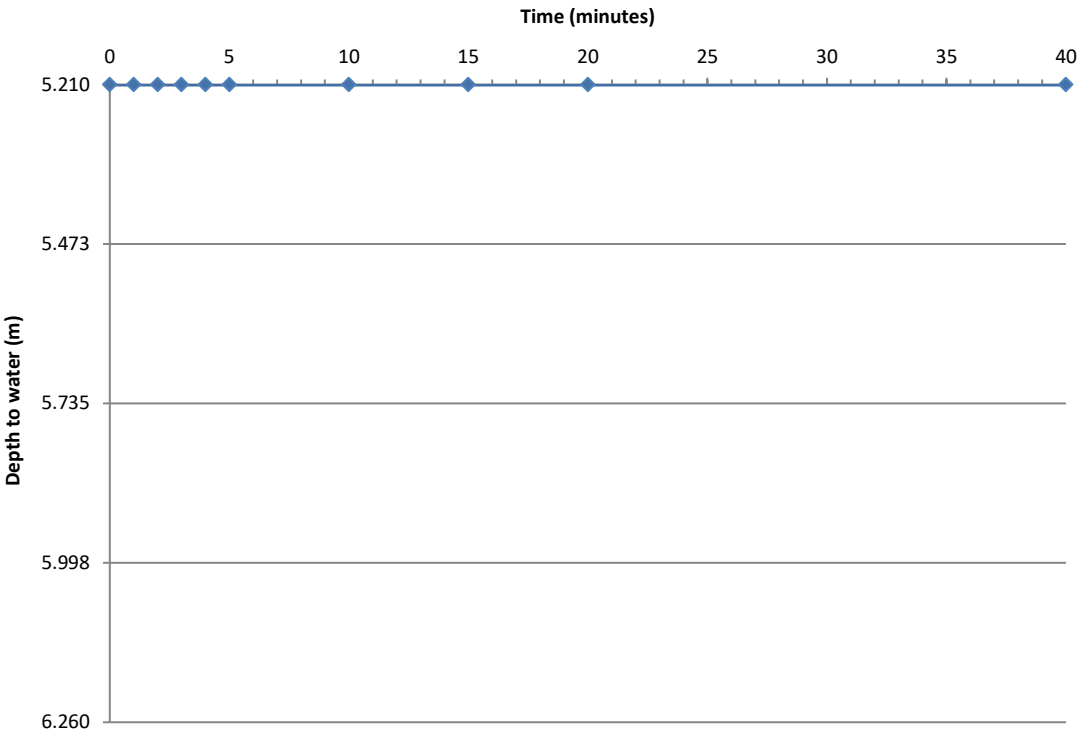
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	5.21		
1	5.21		
2	5.21		
3	5.21		
4	5.21		
5	5.21		
10	5.21		
15	5.21		
20	5.21		
40	5.21		

Calculations:

No movement in water level over 40 minutes of monitoring therefore unable to calculate soil infiltration rate.

Groundwater observations

On 27/05/2020 Groundwater strike at 4m depth, filling borehole to 3.6m in 5 minutes, 3.3m in 10 minutes, 3.3m in 15 minutes and 3.2m in 20 minutes. Groundwater

Geology unit under test

Beenham Grange Gravel Member

Depth of borehole at start of test (m)

6.26

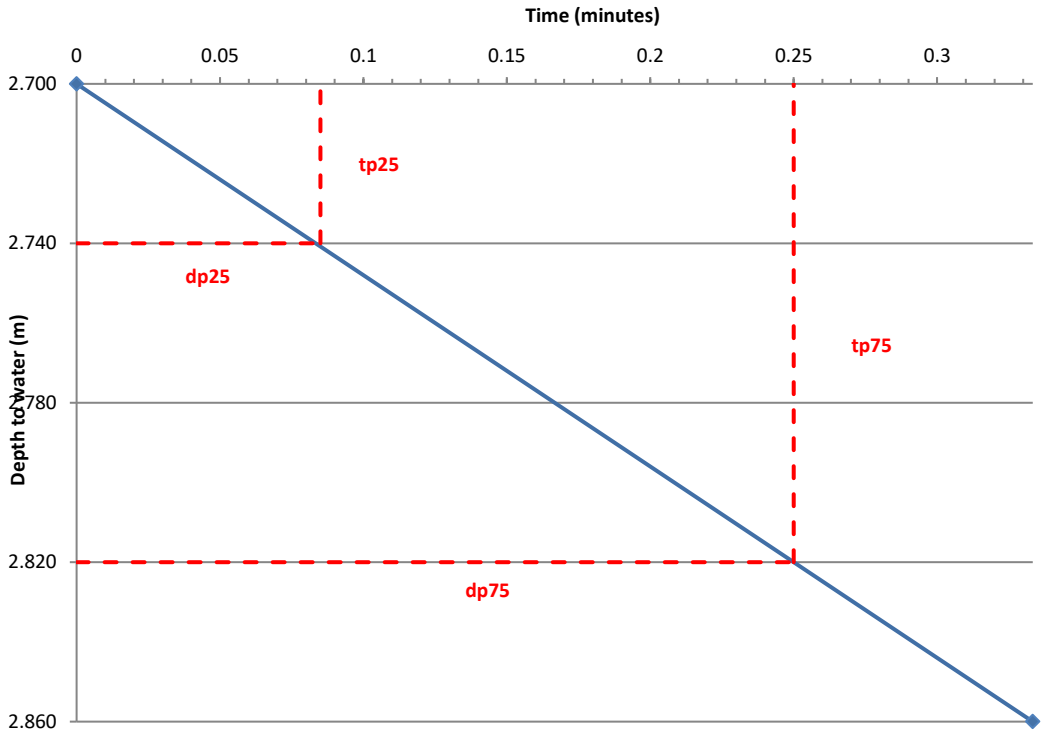
Title

Soil infiltration test (following principles of BRE Digest 365 2016)

Diameter	Co-ordinates	Ground level
0.15m	-	N/A

Borehole no.	Cycle number	Date of excavation
BH02	1	27/05/2020

Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	2.7		
0.33333	2.86		

Calculations:

Soil infiltration rate (SIR), $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = *effective storage volume of water in the borehole between 75% (d_{p75}) and 25% (d_{p25}) effective depth*

= ***0.00251m³***

a_{p50} = *the internal surface area of the borehole up to 50% effective depth and including the base area*

= ***0.08168m²***

$t_{p75} - t_{p25}$ = *the time for the water level to fall from 75% to 25% effective depth*

= ***0.165 (minutes)***

= ***9.9 (seconds)***

f = 3.10E-03 m/s

Groundwater observations

Groundwater strike at 3.5m depth, filling borehole to 3.2m in 5 minutes, 3.2m in 10 minutes, 3.1m in 15 minutes and 3m in 20 minutes.

Geology unit under test

Beenham Grange Gravel Member

Depth of borehole at start of test (m)

2.86

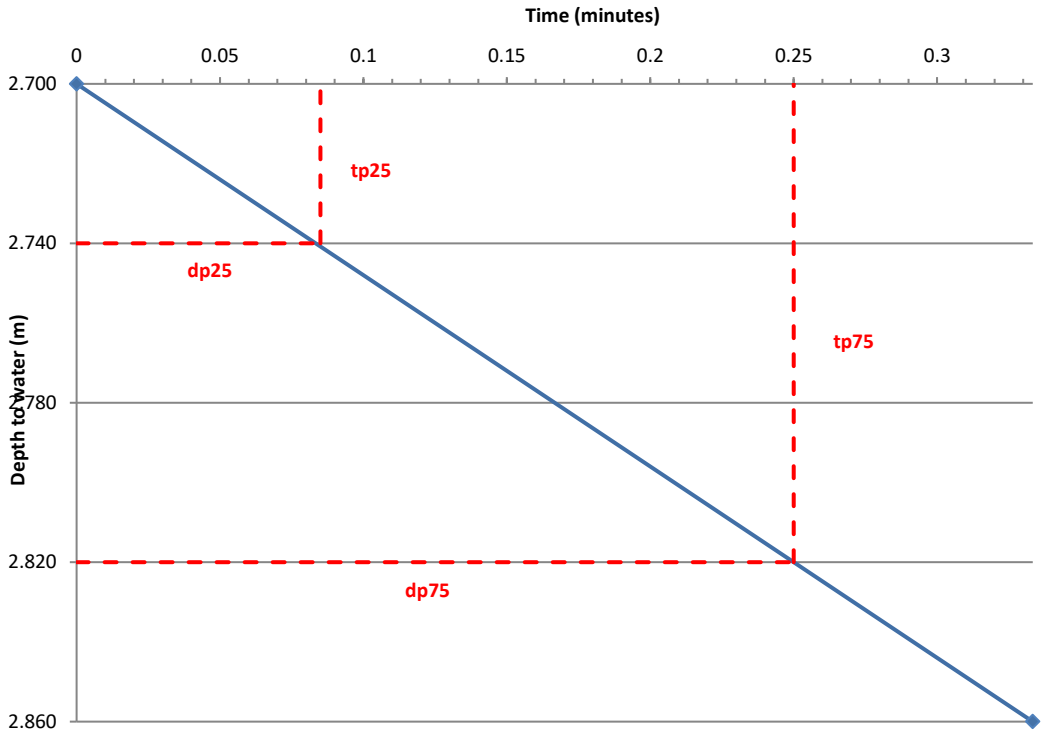
Title

Soil infiltration test (following principles of BRE Digest 365 2016)

Diameter	Co-ordinates	Ground level
0.2m	-	N/A

Borehole no.	Cycle number	Date of excavation
BH03	1	03/06/2020

Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	2.7		
0.33333	2.86		

Calculations:

Soil infiltration rate (SIR), $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = *effective storage volume of water in the borehole between 75% (d_{p75}) and 25% (d_{p25}) effective depth*

= ***0.00251m³***

a_{p50} = *the internal surface area of the borehole up to 50% effective depth and including the base area*

= ***0.08168m²***

$t_{p75} - t_{p25}$ = *the time for the water level to fall from 75% to 25% effective depth*

= ***0.165 (minutes)***

= ***9.9 (seconds)***

***f* = 3.10E-03 m/s**

Groundwater observations

Groundwater strike at 3.5m depth, filling borehole to 3.2m in 5 minutes, 3.2m in 10 minutes, 3.1m in 15 minutes and 3m in 20 minutes.

Geology unit under test

Beenham Grange Gravel Member

Depth of borehole at start of test (m)

2.86

Title

Soil infiltration test (following principles of BRE Digest 365 2016)

Diameter	Co-ordinates	Ground level
0.2m	-	N/A

Borehole no.	Cycle number	Date of excavation
BH03	2	03/06/2020

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Key to legends

Composite materials, soils and lithology							
	Topsoil		Made Ground		Boulders		Chalk
	Clay		Coal		Cobbles		Concrete
	Gravel		Limestone		Mudstone		Peat
	Sand		Sandstone		Silt		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		
Depth		Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)
Result		PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m²) by applying a factor of 50. SV – Hand held shear vane result reported as an undrained shear strength (kN/m²). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.
		SPT – Standard Penetration Test result (N value) (uncorrected)[1,2,3] SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected)[1,2,3]
		UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample

Sampling		
From (m) To (m)		Records depth of sampling
Type	D	Disturbed sample
	B	Bulk disturbed sample
	ES	Environmental sample
	W	Water sample
	U	Undisturbed thick-walled sample 100mm diameter sampler
	UT	Undisturbed thin walled sample 100mm diameter sampler
	UTF	Failed undisturbed sample

Note 1: Seating blows recorded in brackets.

Note 2: Casing depth records depth of casing when SPT or SPT(c) was carried out.

Note 3: Water depth records depth of water when SPT or SPT(c) was carried out.

Water observations

Described at foot of log and shown in the 'water strike' column.

Water level observed after specified delay in drilling

Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	SCREED.	0.11	77.29											
	(MADE GROUND)	0.33	77.07									0.50		D
	Grey reinforced CONCRETE composed of flint aggregate up to 16mm nominal size. 6mm reinforcement bar at 0.26m and 0.32m (possible 0.1x0.1m grid). Approximately 1-3% air voids.	0.75	76.65									0.50		ES
	(MADE GROUND)					C 1.20 - 1.65	(5) 10	1.20				0.80		D
	Soft grey brown slightly sandy gravelly CLAY. Gravel consists of fine to coarse angular to well-rounded flint, brick and limestone.	1.50	75.90									1.50		ES
	(MADE GROUND)					C 2.00 - 2.45	(4) 6	2.00				2.00		D
	Soft brown silty gravelly CLAY. Gravel consists of fine to coarse angular to sub-rounded brick, limestone, and flint.											2.50		ES
	(MADE GROUND)											2.70		D
	Very soft dark grey brown slightly gravelly silty sandy CLAY. Gravel consists of sub-angular to rounded flint, limestone, quartzite and brick.	2.50	74.90			C 3.00 - 3.45	(5) 17	3.00				3.00		D
	(MADE GROUND)											3.00	3.50	B
	Grey brown slightly sandy GRAVEL . Gravel consists of well-rounded to sub-angular fine to medium flint.													
	(BEENHAM GRANGE GRAVEL MEMBER)					C 4.00 - 4.45	(8) 17	4.00	3.30			4.00		D
	...between 4m and 5.5m depth, becoming sandy.											4.00	4.50	B
												5.00		D
						C 5.50 - 5.95	(4) 13	5.50	3.40			5.50	6.00	B
												6.00		D
	...between 7m and 8.5m depth, becoming sandy.											7.00		D
												8.00		D
						C 8.50 - 8.95	(3) 9	8.50				8.50	9.00	B
	Structureless CHALK composed of slightly clayey sub-angular to sub-rounded GRAVEL. Clasts are weak medium density white, occasional gravel of rinded (2mm) black flint with occasional brown staining when broken. Matrix is white.	9.00	68.40									9.00		D
	(SEAFORD CHALK FORMATION - GRADE Dc)										UT=81	9.50	10.00	B
												9.50	9.95	UTF
						S 10.00 - 10.45	(1) 4	9.50	5.30			10.00	10.50	D
						S 11.00 - 11.45	(2) 3	11.00	5.60			11.00	11.50	D

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Groundwater observations
Groundwater strike at 4m depth, filling borehole to 3.2m in 20 minutes.

Chiselling details

Depth (m)	Duration (hh:mm)
2.00 - 2.20	00:30
6.60 - 6.90	00:30

Drilling details

Diameter	Base depth (m)
200	10.00
150	20.00

Water added details

Depth (m)	Water Added (l)

Casing details

Diameter	Base depth (m)
200	9.50
150	19.50

Title
Borehole record

Date(s)
29/05/2020 - 02/06/2020

Method
Cable tool percussion

Logged by
MG

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Level (m OD)
77.40

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KD

Revision
0

Co-ordinates
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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
												12.00		D
												13.00		D
						S 14.50 - 14.95	(4) 17	14.00	6.90			14.50	15.00	D
											UT=91	15.00	15.45	UTF
												15.00	15.50	B
												16.00		D
						S 17.50 - 17.95	(4) 27	15.00	6.80			17.50	18.00	D
												19.00		D
						S 20.50 - 20.74	(14) 50/95mm	19.50	3.30			20.00		D
						S 22.00 - 22.40	(10) 50/255mm	19.50	3.40					

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Chiselling details

Depth (m)	Duration (hh:mm)
18.10 - 18.00	01:00

Drilling details

Diameter	Base depth (m)
200	10.00
150	20.00

Groundwater observations
Groundwater strike at 4m depth, filling borehole to 3.2m in 20 minutes.

Water added details

Depth (m)	Water Added (l)

Casing details

Diameter	Base depth (m)
200	9.50
150	19.50

Title
Borehole record

Date(s)
29/05/2020 - 02/06/2020

Method
Cable tool percussion

Logged by
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Level (m OD)
77.40

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BOREHOLE TERMINATED AT 25.00m	25.00	52.40											

Notes	Chiselling details		Drilling details		Title		Date(s)
Inspection pit excavated from 0.0m to 1.2m depth.	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Borehole record		29/05/2020 - 02/06/2020
			200 150	10.00 20.00	**Method** Cable tool percussion	**Logged by** MG	**Sheet number** Sheet 3 of 3
Groundwater observations	**Water added details**		**Casing details**		**Level (m OD)** 77.40	**Compiled by** KD	**Revision** 0
Groundwater strike at 4m depth, filling borehole to 3.2m in 20 minutes.	Depth (m)	Water Added (l)	Diameter	Base depth (m)	**Co-ordinates** -	**Checked by** KB	**BH01**
			200 150	9.50 19.50			

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	SCREED	0.12	77.28											
	(MADE GROUND)	0.37	77.03											
	Yellow unreinforced CONCRETE composed of flint aggregate up to 18mm nominal size. Approximately <1% air voids.	0.58	76.82									0.60		ES
	(MADE GROUND)											1.00		D
	Yellow grey reinforced CONCRETE composed of rounded flint aggregate up to 10mm nominal size. 4mm reinforcement bar at 0.4m (possible 0.2x0.2m grid). Approximately 1-3% air voids.					S 1.20 - 1.65	(2) 2	1.00				1.50		ES
	(MADE GROUND)													
	Soft dark brown mottled black becoming grey very gravelly becoming gravelly CLAY. Gravel consists of fine to coarse angular brick, concrete, flint, chalk and bone.	2.10	75.30			S 2.00 - 2.45	(6) 14	3.00				2.00		D
	(MADE GROUND)											2.00		ES
												2.10		D
	Soft brown sandy gravelly CLAY. Gravel consists of fine to medium well-rounded flint.	3.00	74.40			S 3.00 - 3.45	(7) 22	3.00				2.10	3.00	B
	(ALLUVIUM)											3.00		ES
	Medium dense light brown slightly sandy GRAVEL. Gravel consists of fine to coarse angular to rounded flint.											3.00	3.50	B
	(BEENHAM GRANGE GRAVEL MEMBER)					S 4.00 - 4.45	(5) 23	4.00				4.00		ES
												4.00	4.50	B
						S 5.00 - 5.45	(4) 13	5.00	3.20			5.00		D
												5.00	5.50	B
						S 6.00 - 6.45	(3) 12	6.00	3.40			6.00		D
						S 7.00 - 7.45	(2) 8	7.00	4.80			7.00		D
	Structureless CHALK composed of white very gravelly CLAY. Gravel is weak medium density white with occasional strong rinded (2mm) black flint gravel.	7.20	70.20									7.20		D
	(SEAFORD CHALK FORMATION - GRADE Dm)											7.20	8.00	B
											UT=68	8.00	8.45	UTF
												8.00	8.50	B
						S 8.50 - 8.95	(6) 9	8.00	5.60			8.50	9.00	B
						S 9.00 - 9.45	(3) 7	10.00	7.20			9.00	9.50	B
											UT=100	10.00	10.45	UTF
												10.00	10.50	B
						S 10.50 - 10.95	(2) 7	11.00	8.10			10.50	10.95	D
												10.50	11.00	B
											UT=71	11.00	11.45	UTF
						S 11.50 -	(3) 9	11.00	8.00			11.00	11.50	B

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Chiselling details

Depth (m)	Duration (hh:mm)

Drilling details

Diameter	Base depth (m)
200	9.00
150	23.00

Groundwater observations
Groundwater strike at 3.5m depth, filling borehole to 3.2m in 20 minutes.

Water added details

Depth (m)	Water Added (l)
2.10 - 4.00	18

Casing details

Diameter	Base depth (m)
200	8.20
150	16.50

Title
Borehole record

Date(s)
27/05/2020 - 29/05/2020

Method
Cable tool percussion

Logged by
MG

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Level (m OD)
77.40

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Co-ordinates
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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
						11.95						11.50	11.95	D
												11.50	12.00	B
						S 12.50 - 12.95	(6) 17	12.00	7.20			12.50	12.95	D
												12.50	13.00	B
	Structureless CHALK composed of slightly clayey sub-angular to sub-rounded GRAVEL. Clasts are weak medium density white, occasional gravel of rinded (2mm) black flint with occasional brown staining when broken. Matrix is white. (SEAFORD CHALK FORMATION - GRADE Dc)	13.00	64.40									13.50		D
												14.50		D
											UT=100	15.50		D
						S 16.00 - 16.45	(5) 21	15.50	8.40			15.50	15.95	UTF
												15.50	16.00	B
												16.00	16.50	B
												16.00	16.50	D
												17.50		D
						S 18.50 - 18.89	(8) 50/235mm	16.50	8.70			18.50	18.95	D
												18.50	19.00	B
												19.50		D
												20.50		D
						S 22.00 - 22.40	(15) 50/255mm	16.70	6.30			22.00	22.45	B
												22.00	22.45	D
	BOREHOLE TERMINATED AT 23.00m	23.00	54.40									23.00		D

Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Groundwater observations
Groundwater strike at 3.5m depth, filling borehole to 3.2m in 20 minutes.

Chiselling details	
Depth (m)	Duration (hh:mm)

Drilling details	
Diameter	Base depth (m)
200	9.00
150	23.00

Water added details	
Depth (m)	Water Added (l)

Casing details	
Diameter	Base depth (m)
200	8.20
150	16.50

Title
Borehole record

Date(s)
27/05/2020 - 29/05/2020

Method
Cable tool percussion

Logged by
MG

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Level (m OD)
77.40

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Co-ordinates
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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	SCREED.	0.10	77.30											
	(MADE GROUND)	0.40	77.00									0.50		D
	Grey reinforced CONCRETE composed of flint aggregate up to 16mm nominal size. 6mm reinforcement bar at 0.26m and 0.36m depth (possible 100mm x 100mm grid). Approximately 1-3% air voids.	0.70	76.70									0.50		ES
	(MADE GROUND)					C 1.20 - 1.65	(3) 5	1.20				0.70		D
	Grey brown slightly gravelly SAND. Gravel consists of angular to sub-rounded fine to coarse limestone and flint.											1.50		D
	(MADE GROUND)											1.50		ES
	Soft dark grey brown slightly gravelly silty sandy CLAY. Gravel consists of fine to coarse angular brick, flint, clay, pipe fragments, sandstone and ash.	2.20	75.20			C 2.00 - 2.45	(3) 17	2.00				1.90		D
	(MADE GROUND)											2.50		D
	Medium dense light grey brown slightly sandy GRAVEL. Gravel consists of fine to coarse sub-angular rounded flint.				▼							2.50		ES
	(BEENHAM GRANGE GRAVEL MEMBER)					C 3.00 - 3.45	(4) 13	3.00				2.50	3.00	B
	...between 2.5m and 3.3m depth, becoming sandy.											3.00	3.50	B
	...from 3.5m depth, becoming orange brown in colour.											3.50		D
						C 4.00 - 4.45	(2) 9	4.00	3.10			4.00		D
												4.00	4.50	B
												4.50		ES
	...from 5m depth, becoming increasing sand content.					C 5.00 - 5.45	(6) 10	5.00	3.20			5.00		D
												5.00	5.50	B
												6.00		D
						C 7.00 - 7.45	(3) 13	7.00	3.40			7.00		D
												7.00	7.50	B
						C 8.00 - 8.45	(4) 14	8.00	3.20			8.00		D
												8.00	8.50	B
												8.60		D
	Structureless CHALK composed of slightly clayey sub-angular to sub-rounded GRAVEL. Clasts are weak medium density white, occasional gravel of rinded (2mm) black flint with occasional brown staining when broken. Matrix is white.	8.60	68.80								UT=67	9.00	9.45	UTF
	(SEAFORD CHALK FORMATION - GRADE Dc)											9.00	9.50	B
	...between 8.6m and 10m depth, flint present in recovery					S 9.50 - 9.95	(2) 2	9.00	4.00			9.50	10.00	D
						S 11.00 - 11.45	(1) 4	11.00	4.10			11.00		D
												11.00	11.50	D

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Groundwater observations
Groundwater strike at 3.5m depth, filling borehole to 3m in 20 minutes.

Chiselling details

Depth (m)	Duration (hh:mm)

Drilling details

Diameter	Base depth (m)
200	9.50
150	25.00

Water added details

Depth (m)	Water Added (l)
2.20 - 3.50	350

Casing details

Diameter	Base depth (m)
200	9.20
150	17.00

Title
Borehole record

Date(s)
03/06/2020 - 05/06/2020

Method
Cable tool percussion

Logged by
MG

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Sheet 1 of 3

Level (m OD)
77.40

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Revision
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Co-ordinates
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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
											UT=37	12.00	12.45	UTF
												12.00	13.00	B
						S 13.00 - 13.45	(2) 13	11.00	4.80			13.00	13.50	D
	...from 13.5m depth, becoming sandy GRAVEL.										UT=46	13.50	13.00	UTF
	...between 14.5m and 16m depth, flint present in recovery					S 14.50 - 14.95	(4) 14	14.00	5.10			14.50	15.00	D
												16.00		D
											UT=100	17.00	17.45	UTF
												17.00	17.50	B
						S 17.50 - 17.95	(6) 23	17.00	3.90			17.50	18.00	D
	...between 19m and 20m depth, flint present in recovery											19.00		D
						S 19.50 - 19.95	(8) 34	17.00	3.70			19.50	20.00	D
												21.00		D
						S 22.50 - 22.76	(16) 50/115mm	17.00	3.90			22.50	23.00	D

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Chiselling details

Depth (m)	Duration (hh:mm)

Drilling details

Diameter	Base depth (m)
200	9.50
150	25.00

Groundwater observations
Groundwater strike at 3.5m depth, filling borehole to 3m in 20 minutes.

Water added details

Depth (m)	Water Added (l)

Casing details

Diameter	Base depth (m)
200	9.20
150	17.00

Title
Borehole record

Date(s)
03/06/2020 - 05/06/2020

Method
Cable tool percussion

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Level (m OD)
77.40

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
												24.00		D
	BOREHOLE TERMINATED AT 25.00m	25.00	52.40									25.00		D

Notes Inspection pit excavated from 0.0m to 1.2m depth.	**Chiselling details**		**Drilling details**		**Title** Borehole record	**Date(s)** 03/06/2020 - 05/06/2020
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)		
			200 150	9.50 25.00	**Method** Cable tool percussion	**Logged by** MG	**Sheet number** Sheet 3 of 3
Groundwater observations Groundwater strike at 3.5m depth, filling borehole to 3m in 20 minutes.	**Water added details**		**Casing details**		**Level (m OD)** 77.40	**Compiled by** KD	**Revision** 0
	Depth (m)	Water Added (l)	Diameter	Base depth (m)			
			200 150	9.20 17.00	**Co-ordinates** -	**Checked by** KB	**BH03**

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	Grey reinforced concrete composed of flint aggregate up to 14mm nominal size. Approximately 1%-3% air voids. 8mm reinforcement bar at 0.1m depth. (MADE GROUND)	0.20	77.00									0.20		D
												0.20		ES
	Dark red brown slightly sandy GRAVEL. Gravel consists of fine to coarse tubular limestone. (MADE GROUND)	1.00	76.20									1.00		D
						C 1.20 - 1.65	(4) 4	1.20				1.00		ES
	Soft mottled dark red brown very sandy gravelly CLAY. Gravel consists of fine to coarse angular to rounded flint, brick and ash. (MADE GROUND)													
	Soft dark brown slightly gravelly very sandy CLAY. Gravel consists of fine rounded flint. (ALLUVIUM)	2.00	75.20			C 2.00 - 2.45	(2) 6	2.00				2.00		D
												2.00		ES
												2.00	2.50	B
												2.70		D
	Very soft dark brown slightly clayey pseudo fibrous PEAT. (ALLUVIUM)	3.00	74.20			C 3.00 - 3.45	(4) 13	3.00				3.00		ES
	...from 3.5m depth, grading into very organic clay.	3.50	73.70									3.00	3.50	B
	Very soft dark grey very organic silty CLAY. (ALLUVIUM)	4.00	73.20			C 4.00 - 4.45	(6) 13	4.00	3.20			4.00		D
												4.00		ES
	Brown slightly clayey slightly sandy GRAVEL. Gravel consists of fine to coarse well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)											4.00	4.50	B
	...at 4.5m depth, reduced sand content.					C 5.00 - 5.45	(5) 14	5.00	3.30			5.00		D
												5.00	5.50	B
	Brown white slightly sandy very clayey GRAVEL. Gravel consists of well-rounded flints and sub-angular to sub-rounded chalk. (BEENHAM GRANGE GRAVEL MEMBER)	5.60	71.60									5.60		D
												5.60	6.00	B
						S 6.50 - 6.95	(4) 7	6.00	3.40			6.50	7.00	D
	Structureless CHALK composed of white very gravelly CLAY. Gravel is weak medium density white when broken occasional strong rinded (2mm) black flint gravel. (SEAFORD CHALK FORMATION - GRADE Dm)	7.00	70.20											
											UT=39	8.00		D
												8.00	8.45	UT
						S 9.00 - 9.45	(2) 7	7.50	4.00			9.00	9.50	D
												10.00		D
	Structureless CHALK composed of slightly clayey sub-angular to sub-rounded GRAVEL. Clasts are weak medium density white, occasional gravel of rinded (2mm) black flint with occasional brown staining when broken. Matrix is white.	11.00	66.20			S 11.00 - 11.45	(6) 4	10.50	3.90			11.00		D

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Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Chiselling details

Depth (m)	Duration (hh:mm)

Drilling details

Diameter	Base depth (m)
200	6.50
150	25.00

Groundwater observations
Groundwater strike at 4m depth, filling borehole to 3.2m in 20 minutes.

Water added details

Depth (m)	Water Added (l)
2.80 - 4.00	180

Casing details

Diameter	Base depth (m)
200	6.20
150	19.50

Title
Borehole record

Date(s)
08/06/2020 - 10/06/2020

Method
Cable tool percussion

Logged by
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Level (m OD)
77.20

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	(SEAFORD CHALK FORMATION - GRADE Dc)											12.00		D
											UT=71	12.50	12.95	UTF
												12.50	13.00	B
						S 13.50 - 13.95	(8) 22	13.00	5.20			13.50	14.00	D
												14.50		D
											UT=100	15.50	15.95	UTF
												15.50	16.00	B
						S 16.50 - 16.95	(11) 27	16.00	9.00			16.50	17.00	D
												17.50		D
											UT=100	18.00	18.45	UTF
												18.00	18.50	B
						S 18.50 - 18.90	(16) 50/245mm	17.50	4.60			18.50	19.00	D
												19.50		D
						S 20.00 - 20.34	(13) 50/190mm	19.50	4.80			20.00	20.50	D
												21.50		D
						S 23.00 - 23.30	(9) 50/150mm	18.50	3.80			23.00	23.50	D

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Notes
Inspection pit excavated from 0.0m to 1.2m depth.

Chiselling details

Depth (m)	Duration (hh:mm)
20.10 - 20.40	00:30
21.10 - 21.50	00:30

Drilling details

Diameter	Base depth (m)
200	6.50
150	25.00

Groundwater observations
Groundwater strike at 4m depth, filling borehole to 3.2m in 20 minutes.

Water added details

Depth (m)	Water Added (l)

Casing details

Diameter	Base depth (m)
200	6.20
150	19.50

Title
Borehole record

Date(s)
08/06/2020 - 10/06/2020

Method
Cable tool percussion

Logged by
MG

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Sheet 2 of 3

Level (m OD)
77.20

Compiled by
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Revision
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Co-ordinates
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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
												24.00		D
	BOREHOLE TERMINATED AT 25.00m	25.00	52.20									25.00		D

Notes Inspection pit excavated from 0.0m to 1.2m depth.	**Chiselling details**		**Drilling details**		**Title** Borehole record	**Date(s)** 08/06/2020 - 10/06/2020
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	**Method** Cable tool percussion	**Logged by** MG	**Sheet number** Sheet 3 of 3
	24.50 - 25.00	04:00	200 150	6.50 25.00			
Groundwater observations Groundwater strike at 4m depth, filling borehole to 3.2m in 20 minutes.	**Water added details**		**Casing details**		**Level (m OD)** 77.20	**Compiled by** MG	**Revision** 0
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	**Co-ordinates** -	**Checked by** KB	**BH04**
			200 150	6.20 19.50			

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	BLOCK PAVING	0.08												
	(MADE GROUND)	0.15										0.50		D
	Yellow SAND	0.27										0.50		ES
	(MADE GROUND)													
	Dense brown sandy GRAVEL. Gravel consists of fine to coarse angular flint, brick and limestone.					C 1.20 - 1.27	(54/75mm)	1.20						
	(MADE GROUND)											1.50		D
	Loose brown slightly clayey slightly sandy GRAVEL with occasional cobbles. Gravel and cobbles consist of fine to coarse angular to rounded brick, concrete and flint.											1.50		ES
	(MADE GROUND)					C 2.00 - 2.45	(9) 39	2.00						
		2.50										2.50		D
	Grey unreinforced CONCRETE nominal 6mm rounded flint aggregate. 3% voids.	2.70										2.50		ES
	(MADE GROUND)											2.50	2.70	B
												2.70		D

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Concrete obstruction at 2.70m depth.

Groundwater observations
No groundwater encountered.

Chiselling details

Depth (m)	Duration (hh:mm)
1.30 - 1.50	01:00
2.50 - 2.70	03:00

Drilling details

Diameter	Base depth (m)
200	2.70

Water added details

Depth (m)	Water Added (l)
2.00 - 2.70	150

Casing details

Diameter	Base depth (m)
200	2.70

Title
Borehole record

Date(s)
11/06/2020 - 12/06/2020

Method
Cable tool percussion

Logged by
MG

Sheet number
Sheet 1 of 3

Level (m OD)
-

Compiled by
MG

Revision
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Co-ordinates
-

Checked by
KB

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Concrete obstruction at 2.70m depth.

Groundwater observations
No groundwater encountered.

Chiselling details		Drilling details	
Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)
		200	2.70

Water added details		Casing details	
Depth (m)	Water Added (l)	Diameter	Base depth (m)
		200	2.70

Title
Borehole record

Date(s)
11/06/2020 - 12/06/2020

Method
Cable tool percussion

Logged by
MG

Sheet number
Sheet 2 of 3

Level (m OD)
-

Compiled by
MG

Revision
0

Co-ordinates
-

Checked by
KB

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BOREHOLE TERMINATED AT 25.00m													

Notes	Chiselling details		Drilling details		Title		Date(s)
Inspection pit excavated from 0.0m to 1.2m depth. Concrete obstruction at 2.70m depth.	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Borehole record		11/06/2020 - 12/06/2020
			200	2.70	**Method** Cable tool percussion	**Logged by** MG	**Sheet number** Sheet 3 of 3
Groundwater observations	**Water added details**		**Casing details**		**Level (m OD)** -	**Compiled by** MG	**Revision** 0
No groundwater encountered.	Depth (m)	Water Added (l)	Diameter	Base depth (m)	**Co-ordinates** -	**Checked by** KB	**BH05**
			200	2.70			

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Key to legends

Composite materials, soils and lithology							
	Topsoil		Made Ground		Boulders		Chalk
	Clay		Coal		Cobbles		Concrete
	Gravel		Limestone		Mudstone		Peat
	Sand		Sandstone		Silt		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sample/core recovery' columns

Test result	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m²) by applying a factor of 50. SV – Hand held shear vane result reported as an undrained shear strength (kN/m²). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.
	SPT – Standard Penetration Test result (N value) (uncorrected)[1,2,3] SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected)[1,2,3]
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample

Sample/core recovery	
Run No.	Records depth and number of the abstracted core[3]
Total Core Recovery (TCR) %	Ratio of core recovered (solid and non-intact) to length of core run
Solid Core Recovery (SCR) %	Ratio of solid, cylindrical, pieces of rock core recovered to length of core run
Rock Quality Designation (RQD) %	Ratio of core pieces longer than 100mm to length of core run
Fracture Index (FI)	Inverse of fracture spacing, per metre, over arbitrary length

Note 1: Seating blows recorded in brackets.

Note 2: Casing depth records depth of casing.

Note 3: The depths of open holing will be recorded in the notes. Method of lubrication of and diameter of drilling tools will be recorded on the log, together with location of circulation loss during drilling.

Water observations

Described at foot of log and shown in the 'water strike' column.

▼ Water level observed after specified delay in drilling

▽ Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES
	BLOCK PAVING.	0.08	77.32		
	(MADE GROUND)	0.15	77.25		
	Yellow SAND. (MADE GROUND)				
	Soft dark grey brown slightly sandy silty gravelly CLAY. Gravel consists of sub-angular to sub-rounded fine to coarse pipe fragments, brick, clinker and ash. (MADE GROUND)				
	...from 1.4m depth, becoming grey in colour.				
	...from 1.9m depth, becoming grey brown in colour and sandy very gravelly.	2.40	75.00		
	Firm brown slightly clayey silty organic pseudo-fibrous PEAT with occasional sub-angular flint. (ALLUVIUM)	3.05	74.35		
	Soft becoming firm brown becoming light grey slightly gravelly sandy SILT. Gravel consists of fine to medium rounded flint. (ALLUVIUM)	3.50	73.90		
	Medium dense grey brown silty very clayey GRAVEL. Gravel consists of fine to coarse sub-angular to well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	4.00	73.40		
	Medium dense yellowish brown GRAVEL. Gravel consists of fine to coarse rounded to well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)				
	...between 4.5m and 5.4m depth, becoming very sandy.				
	...between 5.4m and 7.2m, slightly sandy.				
	...between 7.2m and 8.7m depth, becoming very sandy.				
	Structureless CHALK composed of uncompact white very gravelly CLAY. Gravel is weak medium density white when broken occasional rinded black flint gravel. (SEAFORD CHALK FORMATION - GRADE Dm)	8.70	68.70		
	...between 9.9m and 10m depth, grey in colour.				
	Structureless CHALK composed of slightly clayey fine to coarse sub-angular to sub-rounded GRAVEL. Gravel is weak, medium density white with occasional brown staining when broken. Matrix is uncompact white. Occasional gravel of black flint. (SEAFORD CHALK FORMATION - GRADE Dc)	11.20	66.20		
	...between 11.7m and 11.9m depth, grey sand.				

CORING: DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI
1.20 - 2.70	83	0	0	
2.70 - 4.20	83	0	0	
4.20 - 5.70	66	0	0	
5.70 - 7.20	67	0	0	
7.20 - 8.70	0	0	0	
8.70 - 10.20	67	0	0	
10.20 - 11.70	120	0	0	
11.70 - 13.20	150	0	0	

SPT TESTING: TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)
S 1.20 - 1.65	(1) 2	0.00	
S 2.70 - 3.15	(1) 5	0.00	
S 4.20 - 4.65	(6) 18	0.00	
S 10.20 - 10.65	(2) 8	10.20	

OTHER IN SITU TESTING: TYPE / DEPTH (m)	RESULT

SAMPLING: FROM (m)	TO (m)	TYPE
1.00		ES
1.20		D
1.20		ES
2.00		ES
2.50		ES
3.00		D
3.10	3.50	D
3.70		D
4.20		D
4.20	4.50	D
4.90	5.40	D
5.70		D
6.00	7.00	D
10.20		D
11.50		D
11.70		D
12.10		D
12.50		D

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Water flush used during drilling. Partial collapse noted within gravel during drilling.

Groundwater observations
No groundwater encountered.

Title
Rotary core record

Date(s)
01/06/2020 - 05/06/2020

Method
Rotary core

Logged by
MG

Sheet number
Sheet 1 of 3

Level (m OD)
77.40

Compiled by
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Revision
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Co-ordinates
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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	CORING DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	SPT TESTING TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	RESULT	SAMPLING FROM (m)	TO (m)	TYPE
	...between 13.2m and 13.3m depth, sandy.																13.30		D
	...at 14m depth, matrix becoming compact.					13.20 - 14.70	14	0	0										
											S 14.70 - 15.15	(3) 4 (6) 22	10.20 14.75				14.70 14.75		D D
						14.70 - 16.45	30	0	0		S 14.75 - 15.20						16.00	17.50	D
	...from 17.9m depth, brown and greenish grey staining on gravel with broken flint bands 30mm thick spread over 200mm.	18.00	59.40																
	Weak medium density white mottled grey CHALK. Chalk is white mottled grey when broken. Three fracture sets. set 1: sub-vertical very tight to open low persistence planar rough clean with no staining or strength change to joint faces set 2: Dipping 30°-50° open closely spaced (200mm) undulating (5mm / 50mm) rough filled with greenish grey clay. Grey discolouration to faces. faces reducing to low density. set 3: (bedding) sub-horizontal (0°/5°/15°) wide open planar rough clean no discolouration or strength change to faces. (SEAFORD CHALK FORMATION)					16.45 - 19.95	26	6	0								18.50	18.70	C
						17.95 - 19.45	40	12	0								19.00		D
											S 19.50 - 19.95	(9) 27	19.50				19.50		D
						19.45 - 20.95	110	30	20								20.40	20.60	C
						20.95 - 22.45	80	10	10								22.30		D
											S 23.95 - 24.38	(10) 49/275mm	13.95				23.95		D
		25.50	51.90																

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Water flush used during drilling. Partial collapse noted within gravel during drilling.

Groundwater observations
No groundwater encountered.

Title
Rotary core record

Date(s)
01/06/2020 - 05/06/2020

Method
Rotary core

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Level (m OD)
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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES
	Weak white mottled light grey medium dense. Chalk is white when broken. 3 fracture sets. Set 1: sub-vertical very tight to open low persistence planar rough clean no discolouration or strength change to faces. Set 2: dipping 30°/50° open undulating (5mm/50mm) rough spaced 200mm filled with green grey clay. Green grey discolouration to faces with faces reducing to low density. Set 3: (bedding) sub-horizontal (0°/5/15°) wide-open planar rough spaced every 100mm clean no discolouration or strength change to faces. (SEAFORD CHALK FORMATION)				
	White mottled light grey medium dense CHALK. Chalk is white when broken. 3 fracture sets. Set 1: dipping 60° open planar rough clean occurs once no discolouration or strength change to faces. Set 2: dipping 60° (opposite direction to set 1) open planar rough clean occurs once no discolouration or strength change to faces. Set 3: (bedding) sub-horizontal (0°/5/15°) wide planar rough spaced every100-150mm clean faces discoloured to green grey becoming low density. (SEAFORD CHALK FORMATION)	27.00	50.40		
	...at 29m depth, bedding space 100-200 open clean, plain, strength change to faces, no discolouration (possible waste by drilling) and no flint.				
	...from 30m depth, flint bands 100mm spaced 1000mm.				
	BOREHOLE TERMINATED AT 35.00m	35.00	42.40		

CORING DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI
25.45 - 26.95	145	85	54	
26.95 - 28.45	120	105	64	
28.45 - 29.95	130	90	15	
29.95 - 31.45	140	100	50	
31.45 - 32.95	100	30	20	
32.95 - 35.00	140	90	59	

SPT TESTING TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)
S 26.95 - 27.34	(15) 50/240mm	16.95	
S 31.45 - 31.78	(9) 50/175mm	31.45	
S 34.45 - 34.82	(15) 50/220mm	34.45	

OTHER IN SITU TESTING TYPE / DEPTH (m)	RESULT

SAMPLING FROM (m)	TO (m)	TYPE
25.70		D
25.80		D
26.00		D
26.35	26.55	C
26.55	26.70	C
26.70	26.87	C
26.95		D
27.60	28.00	C
29.00		D
29.10	29.30	C
29.70		D
30.60		D
30.70	32.10	C
31.10		D
31.45		D
32.20		D
32.60	32.80	C
33.00	33.15	C
33.55	33.70	C
34.45		D

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Water flush used during drilling. Partial collapse noted within gravel during drilling.

Groundwater observations
No groundwater encountered.

Title
Rotary core record

Date(s)
01/06/2020 - 05/06/2020

Method
Rotary core

Logged by
MG

Sheet number
Sheet 3 of 3

Level (m OD)
77.40

Compiled by
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Revision
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Co-ordinates
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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	CORING DEPTH (m)	CORING TCR (%)	CORING SCR (%)	CORING RQD (%)	CORING FI	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	ASPHALT. (MADE GROUND)	0.15	77.45																
	CONCRETE. (MADE GROUND)	1.30	76.30																
	Red brown slightly sandy GRAVEL. Gravel consists of sub-angular to sub-rounded limestone. (MADE GROUND)	1.40	76.20																
	Dark grey brown slightly sandy gravelly CLAY. Gravel consists of sub-angular to rounded flint, brick, metal and bone fragments. (MADE GROUND)	2.50	75.10			1.50 - 3.00	0	0	0		S 2.50 - 2.95	(1) 5	2.50				2.50		D
	Very soft black brown very orangic psuedo fibrous PEAT. (ALLUVIUM) *...from 3m depth, becoming clayey with depth.*	3.30	74.30			3.00 - 4.50	73	0	0								3.30 3.80	3.40	D D
	Very soft light brown yellow brown slightly gravelly sandy CLAY. Gravel consists of fine to medium sub-rounded flint. (ALLUVIUM)	4.10	73.50																
	Medium dense yellow brown slightly sandy fine to medium GRAVEL. Gravel consists of well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	6.00	71.60			6.00 - 7.50	93	0	0		S 6.00 - 6.45	(3) 2	6.00				6.00		D
	Structureless CHALK composed of uncompact white very gravelly CLAY. Gravel is weak medium density white. Occasional rinded black flint gravel. (SEAFORD CHALK FORMATION - GRADE Dm)	7.40	70.20																
	Structureless CHALK composed of slightly clayey fine to coarse sub-angular to sub-rounded GRAVEL. Gravel is weak, medium density white with occasional brown staining when broken. Matrix is uncompact white. Occasional gravel of black flint. (SEAFORD CHALK FORMATION - GRADE Dc)										S 10.25 - 10.70	(1) 2	10.25				10.25		D

CONTINUED ON NEXT SHEET

Notes
Open hole with SPTs between 1.3 - 3.0m; 4.5-6.0m; 7.5 - 19.25m. Water flush used during drilling.

Groundwater observations
No groundwater encountered.

Title Rotary core record		**Date(s)** 08/06/2020 - 11/06/2020
Method Rotary core	**Logged by** MG	**Sheet number** Sheet 1 of 3
Level (m OD) 77.60	**Compiled by** KD	**Revision** 0
Co-ordinates -	**Checked by** KB	**RC02**

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	CORING DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	SPT TESTING TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	RESULT	SAMPLING FROM (m)	TO (m)	TYPE
											S 14.75 - 15.20	(7) 24	14.75				14.75		D
	Structureless CHALK composed of very clayey sub-angular to sub-rounded fine to coarse GRAVEL. Gravel is weak, medium density white. Matrix is uncompact, blue. Occasional rinded black flint gravel. (SEAFORD CHALK FORMATION - GRADE Dc)	19.25	58.35								S 19.25 - 19.68	(13) 50/275mm	19.25				19.25		D
	Weak medium density mottled grey CHALK. 3 joint sets. Set 1: (bedding) sub horizontal, tight planar rough spaced 100mm-200mm, clean, orange speckling on faces. Set 2: joints dipping (10°/30°/45°) tight to open planar, rough, spaced 1000mm clean, orange speckling on faces, 3mm aura of softening to low density. Set 3: joints dipping (60°/90°/80°) open, planar, rough spaced 300mm clean orange discolouration on faces, 1mm aura of softening.	20.10	57.50			19.25 - 20.75	67	17	0								20.15		D
																	20.55	20.85	C
						20.75 - 22.25	80	40	33										
																	22.15		D
						22.25 - 23.95	100	87	25										
											S 23.75 - 24.10	(15) 50/200mm	23.75				23.70		D
																	23.75		D
						23.75 - 25.25	87	37	16								24.48	24.71	C
																	25.15		D

...100mm thick flint bands at 20.75, 22.05m, 25.3m, 25.65m

CONTINUED ON NEXT SHEET

Notes
Open hole with SPTs between 1.3 - 3.0m; 4.5-6.0m; 7.5 - 19.25m. Water flush used during drilling.

Groundwater observations
No groundwater encountered.

Title
Rotary core record

Date(s)
08/06/2020 - 11/06/2020

Method
Rotary core

Logged by
MG

Sheet number
Sheet 2 of 3

Level (m OD)
77.60

Compiled by
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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES
	...150mm thick flint bands at 28.65m, 29.20m, 29.45m				
	NO RECOVERY.	29.75	47.85		
	BOREHOLE TERMINATED AT 35.00m	35.00	42.60		

CORING DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI
25.25 - 26.75	87	55	29	
26.75 - 28.25	100	65	25	
28.25 - 29.75	93	30	0	
29.75 - 33.00	0	0	0	

SPT TESTING TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)
S 28.25 - 28.55	(25/125mm) 50/175mm	28.25	
S 31.25 - 31.70	(21) 48	31.25	

OTHER IN SITU TESTING TYPE / DEPTH (m)	RESULT

SAMPLING FROM (m)	TO (m)	TYPE
26.65		D
27.00		D
27.35	27.69	C
27.69	28.10	C
28.15		D
28.25		D
29.25		D
31.25		D

Notes
Open hole with SPTs between 1.3 - 3.0m; 4.5-6.0m; 7.5 - 19.25m. Water flush used during drilling.

Groundwater observations
No groundwater encountered.

Title
Rotary core record

Date(s)
08/06/2020 - 11/06/2020

Method
Rotary core

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Level (m OD)
77.60

Compiled by
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Revision
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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES
	SCREED	0.28	77.12		
	(MADE GROUND)	0.40	77.00		
	Dark yellow brown slightly gravelly very silty SAND. Gravel consists of fine very angular flint. (MADE GROUND)	0.60	76.80		
	Dark grey reinforced CONCRETE composed of flint aggregate up to 10mm nominal size. 6mm reinforcement bar at 0.26m and 0.27m (possible 150mm x 150mm grid). Approximately <1% air voids. (MADE GROUND)	2.40	75.00		
	Firm becoming soft brown becoming dark brown gravelly CLAY. Gravel consists of fine to coarse angular brick, flint, limestone, ash and sandstone. (MADE GROUND)				
	Medium dense yellow brown sandy GRAVEL. Gravel consists of fine to coarse well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	4.50	72.90		
	Medium dense brown gravelly SAND. Gravel consists of fine to coarse well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	5.00	72.40		
	Medium dense brown very gravelly SAND. Gravel consists of fine to medium well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	6.00	71.40		
	Medium dense brown sandy GRAVEL. Gravel consists of fine to medium well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)				
	Structureless CHALK composed of uncompact white very gravelly CLAY. Gravel is weak medium density white when broken with occasional strong rinded (2mm) black flint gravel. broken with occasional fine to coarse angular flint gravel. (SEAFORD CHALK FORMATION - GRADE Dm)	7.80	69.60		
	Structureless CHALK composed of slightly clayey GRAVEL. Gravel is fine to coarse angular to sub-rounded weak medium density white, with occasional brown staining when broken. Occasional gravel of rinded(2mm) black flint. Matrix is uncompact white clay. (SEAFORD CHALK FORMATION - GRADE Dc)	8.50	68.90		

CORING: DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI
0.00 - 1.50	90	0	0	
1.50 - 3.00	75	0	0	
3.00 - 4.50	90	0	0	
4.50 - 5.50	80	0	0	
5.50 - 7.00	40	0	0	
7.00 - 8.50	60	0	0	
8.50 - 10.20	0	0	0	
10.25 - 11.75	10	0	0	
11.75 - 13.25	10	0	0	

SPT TESTING: TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)
S 1.50 - 1.95	(3) 6		
S 3.00 - 3.45	(5) 15	2.80	
S 4.00 - 4.45	(4) 46	4.30	
S 8.75 - 9.20	(2) 3	8.50	

OTHER IN SITU TESTING: TYPE / DEPTH (m)	RESULT

SAMPLING: FROM (m)	TO (m)	TYPE
0.80		ES
1.40		ES
1.50		D
2.10		ES
3.00		D
3.00	3.70	B
4.00	4.50	B
4.50	5.00	B
5.00	5.50	B
5.50	6.00	B
6.00	7.00	B
8.00		D
10.25	11.75	B
11.75	13.25	B

CONTINUED ON NEXT SHEET

Notes

Groundwater observations

Title
Rotary core record

Date(s)
20/05/2020 - 29/05/2020

Method
Rotary core

Logged by
MG

Sheet number
Sheet 1 of 3

Level (m OD)
77.40

Compiled by
MG

Revision
0

Co-ordinates
-

Checked by
KB

RC04

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	CORING DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	SPT TESTING TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	RESULT	SAMPLING FROM (m)	TO (m)	TYPE
						13.25 - 14.75	10	0	0		S 13.25 - 13.70	(2) 8	13.25				13.25	14.75	B
						14.75 - 16.25	20	0	0								14.75	16.27	B
						16.25 - 17.75	10	0	0								16.25	17.25	B
						17.75 - 19.25	50	0	0		S 18.00 - 18.45	(11) 25	17.75				18.00		D
																	18.75		D
																	19.50		D
	Weak medium density white mottled grey with occasional brown staining CHALK. Bedding fractures Sub-horizontal clean open, spaced 200mm - 300mm with depth. No strength change or colour discolouration to faces. Sub-vertical open clean planar fractures with no strength change or discolouration to faces. Flint bands 100mm thick at 800mm spacings. Flint surfaces white with black matrix. (SEAFORD CHALK FORMATION - GRADE C2/C3)	19.75	57.65			19.25 - 20.75	50	50	10										
						20.75 - 22.25	40	25	0								21.00		D
						22.25 - 23.75	90	75	20		S 22.25 - 22.70	(13) 37	22.25				23.00		D
	Medium strong white mottled grey medium density CHALK. Bedding fractures sub-horizontal clean open stepped spaced 200mm black specks and green grey staining on faces with occasional brown staining. Flint bands 100m thick spaced 600mm with depth, flints are white with black matrix. (SEAFORD CHALK FORMATION - GRADE C3)	23.75	53.65			23.75 - 25.25	90	75	20								24.00		D
																	25.00	25.25	C

CONTINUED ON NEXT SHEET

Notes

Groundwater observations

Title
Rotary core record

Date(s)
20/05/2020 - 29/05/2020

Method
Rotary core

Logged by
MG

Sheet number
Sheet 2 of 3

Level (m OD)
77.40

Compiled by
MG

Revision
0

Co-ordinates
-

Checked by
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RC04

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	CORING DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	SPT TESTING TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	RESULT	SAMPLING FROM (m)	TO (m)	TYPE
						25.25 - 26.75	90	90	20										
						26.75 - 28.25	100	90	20								27.00		D
	Medium strong off-white mottled grey with occasional brown staining medium density CHALK. Bedding fractures sub-horizontal open planar clean spaced 300mm, faces show green grey staining of 1mm aura, no strength change to faces. Flint bands 100mm thick spaced 400mm-600mm with depth. (SEAFORD CHALK FORMATION - GRADE C2)	28.25	49.15			28.25 - 29.75	60	50	25		S 28.25 - 28.46	(26/125mm) 50/85mm	28.25				28.25		D
																	29.00	29.30	C
						29.75 - 31.25	90	80	50								30.00		D
						31.25 - 32.75	85	80	60								31.50	31.80	C
						32.75 - 34.25	70	50	25		S 32.75 - 33.02	(26) 50/125mm	32.75				33.00		D
						34.25 - 35.00	70	60	50								34.25	34.55	C
	BOREHOLE TERMINATED AT 35.00m	35.00	42.40								S 35.25 - 35.60	(19) 50/195mm	35.25				35.00		D

Notes	**Title** Rotary core record		**Date(s)** 20/05/2020 - 29/05/2020
	Method Rotary core	**Logged by** MG	**Sheet number** Sheet 3 of 3
Groundwater observations	**Level (m OD)** 77.40	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**RC04**

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Key to legends

Composite materials, soils and lithology							
	Topsoil		Made Ground		Boulders		Chalk
	Clay		Coal		Cobbles		Concrete
	Gravel		Limestone		Mudstone		Peat
	Sand		Sandstone		Silt		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)	
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m^2) by applying a factor of 50. SV – Hand held shear vane result reported as an undrained shear strength (kN/m^2). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.	
	SPT – Standard Penetration Test result (N value) (uncorrected)[1,2,3] SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected)[1,2,3]	
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample	

Sampling		
From (m) To (m)	Records depth of sampling	
Type	D	Disturbed sample
	B	Bulk disturbed sample
	ES	Environmental sample
	W	Water sample
	U	Undisturbed thick-walled sample 100mm diameter sampler
	UT	Undisturbed thin walled sample 100mm diameter sampler
	UTF	Failed undisturbed sample

Water observations

Described at foot of log and shown in the 'water strike' column.

Water level observed after specified delay in drilling

Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

Density

Density recorded in brackets inferred from density testing and soil descriptions from across the site (i.e.: [Medium dense]).

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BLOCK PAVING (MADE GROUND)	0.08												
	Yellow SAND. (MADE GROUND)	0.15												
	Dense brown sandy GRAVEL. Gravel consists of fine to coarse angular flint, brick and limestone. (MADE GROUND)	0.27												
	Loose brown slightly clayey slightly sandy GRAVEL with occasional cobbles. Gravel and cobbles consist of fine to coarse angular to rounded brick, concrete and flint. (MADE GROUND)													
	CONCRETE. (MADE GROUND)	1.00				C 1.00 - 1.01	(50/10mm)							
	BOREHOLE TERMINATED AT 1.50m	1.50												

Notes
Inspection pit excavated from 0.0m to 1.0m depth. Drill probed from 1.00m to 1.50m, base of concrete not found. Concrete obstruction at 1.00m depth
Progressive collapse of trial pit sides from m to m depth widening trial pit by m each side.

Groundwater observations
No groundwater encountered.

Title
Dynamic windowless sampling record

Date(s)
18/05/2020

Recovery details		Method	Logged by	Sheet number
Range (m)	Recovery (%)	Hand excavation	MG	Sheet 1 of 1
		Level (m OD) -	**Compiled by** MG	**Revision** 0
		Co-ordinates -	**Checked by** KB	**WS01**

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	BLOCK PAVING (MADE GROUND)	0.08	77.32											
	Yellow SAND. (MADE GROUND)	0.15	77.25											
	Black sandy GRAVEL. Gravel consists of fine to coarse angular flint, brick and limestone. (MADE GROUND)	0.20	77.20											
	Yellow brown slightly clayey slightly sandy GRAVEL with occasional brick cobbles. Gravel consists of fine to coarse angular to rounded brick, concrete and flint. (MADE GROUND)											0.50		ES
	Very loose brown slightly clayey slightly sandy GRAVEL with occasional cobbles. Gravel and cobbles consist of fine to coarse angular to rounded brick, concrete and flint. (MADE GROUND)	0.60	76.80			S 1.00 - 1.45	(1) 2							
	Very soft alternating black and brown slightly gravelly sandy CLAY. Gravel consists of fine to medium well-rounded flint. (ALLUVIUM)	1.30	76.10							PP 1.30	PP=208	1.50		ES
	Firm green grey mottled black slightly gravelly sandy CLAY. Gravel consists of fine rounded flint. (ALLUVIUM)	1.80	75.60									2.30		ES
	Firm green grey becoming yellow brown sandy very gravelly CLAY. Gravel consists of fine to coarse well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	2.50	74.90											
	Medium dense yellow brown very gravelly SAND. Gravel consists of well-rounded fine to coarse flint. (BEENHAM GRANGE GRAVEL MEMBER)	2.75	74.65											

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Progressive collapse of borehole from 2.5m to 3.0m depth.

Groundwater observations
Groundwater encountered at 3.45m depth, filling borehole to 3.00m on completion of borehole.

Title
Dynamic windowless sampling record

Date(s)
18/05/2020

Recovery details

Range (m)	Recovery (%)
0.00 - 1.00	100
1.00 - 2.00	65
2.00 - 3.00	65

Method
Driven tube sampler

Logged by
MG

Sheet number
Sheet 1 of 2

Level (m OD)
77.40

Compiled by
MG

Revision
0

Co-ordinates
-

Checked by
KB

WS02

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INSTALL	STRATA: DESCRIPTION	STRATA: DEPTH (m)	STRATA: REDUCED LVL (m OD)	STRATA: LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
						S 3.00 - 3.45	(11) 16					3.50	4.00	D
	BOREHOLE TERMINATED AT 4.00m	4.00	73.40											

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Progressive collapse of borehole from 2.5m to 3.0m depth.

Groundwater observations
Groundwater encountered at 3.45m depth, filling borehole to 3.00m on completion of borehole.

Title
Dynamic windowless sampling record

Date(s)
18/05/2020

Recovery details		Method	Logged by	Sheet number
Range (m)	Recovery (%)	Driven tube sampler	MG	Sheet 2 of 2
3.00 - 4.00	65	**Level (m OD)** 77.40	**Compiled by** MG	**Revision** 0
		Co-ordinates -	**Checked by** KB	**WS02**

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	SCREED	0.07	77.33											
	(MADE GROUND)	0.13	77.27											
	Grey red reinforced CONCRETE flint aggregate 6mm nominal size. 4mm reinforcement bar at 0.1m (possible 0.1x0.1m grid). Approximately <1% air voids.													
	(MADE GROUND)	0.37	77.03											
	VOID													
	(MADE GROUND)													
	Grey reinforced CONCRETE composed of flint aggregate up to 14mm nominal size. 4mm reinforcement bar at 0.42m and 0.55m depth. Approximately 1-3% air voids.													
	(MADE GROUND)	0.60	76.80											
	Yellow medium SAND with occasional fine angular flint gravel.	0.70	76.70									0.70		D
	(MADE GROUND)	0.80	76.60											
	Firm brown very gravelly CLAY. Gravel consists of fine to medium angular limestone.	0.90	76.50											
	(MADE GROUND)													
	Orange and yellow slightly clayey very gravelly SAND. Gravel consists of fine to coarse angular to well-rounded flint.					S 1.00 - 1.45	(6) 10							
	(MADE GROUND)													
	Firm dark grey slightly sandy very gravelly CLAY. Gravel consists of fine to coarse very angular to well-rounded flint, brick, concrete, limestone, sandstone and chalk.													
	(MADE GROUND)											1.45		ES
												1.75		ES
	Stiff brown grey CLAY with occasional gravel. Gravel consists of fine to medium well-rounded flint.	2.45	74.95									2.50		D
	(ALLUVIUM)											2.75		D

CONTINUED ON NEXT SHEET

Notes
Progressive collapse of borehole from 3.0m to 3.15m depth.

Groundwater observations
Groundwater encountered at 3.5m depth, filling borehole to 3.10m on completion of borehole.

Title
Dynamic windowless sampling record

Recovery details

Range (m)	Recovery (%)
0.00 - 1.00	100
1.00 - 2.00	70
2.00 - 3.00	70

Method
Driven tube sampler

Logged by
MG

Level (m OD)
77.40

Compiled by
MG

Co-ordinates
-

Checked by
KB

Date(s)
19/05/2020

Sheet number
Sheet 1 of 2

Revision
0

WS03

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
						S 3.00 - 3.45	(11) 16							
	Medium dense yellow brown very gravelly SAND. Gravel consists of well-rounded fine to coarse flint. (BEENHAM GRANGE GRAVEL MEMBER)	3.50	73.90									3.50	3.75	D
	BOREHOLE TERMINATED AT 4.00m	4.00	73.40											

Notes
Progressive collapse of borehole from 3.0m to 3.15m depth.

Groundwater observations
Groundwater encountered at 3.5m depth, filling borehole to 3.10m on completion of borehole.

Title
Dynamic windowless sampling record

Date(s)
19/05/2020

Recovery details		Method	Logged by	Sheet number
Range (m)	Recovery (%)	Driven tube sampler	MG	Sheet 2 of 2
3.00 - 4.00	55	**Level (m OD)** 77.40	**Compiled by** MG	**Revision** 0
		Co-ordinates -	**Checked by** KB	**WS03**

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	SCREED (MADE GROUND)													
	Yellow unreinforced CONCRETE composed of flint aggregate up to 18mm nominal size. Approximately <1% air voids. (MADE GROUND)	0.12	77.28											
	Yellow grey reinforced CONCRETE composed of flint aggregate up to 10mm nominal size. 4mm reinforcement bar at 0.4m depth (possible 200x200mm grid). (MADE GROUND)	0.36	77.04											
	Orange and yellow slightly clayey very gravelly SAND. Gravel consists of fine to coarse angular to well-rounded flint. (MADE GROUND)	0.55	76.85											
	Firm brown becoming grey very gravelly becoming gravelly CLAY. Gravel consists of fine to coarse angular brick, concrete, flint, chalk and bone fragments. (MADE GROUND)	0.80	76.60									0.75		D
												1.50		ES
	Soft grey slightly gravelly sandy CLAY. Gravel consists of fine to coarse angular ash, brick, ceramic and flint. (MADE GROUND)	1.65	75.75			S 2.00 - 2.45	(7) 18					1.80		ES
	Very soft slightly gravelly sandy CLAY. Gravel consists of fine to medium sub-angular to sub-rounded flint and chalk. (ALLUVIUM)	2.50	74.90									2.60		D
	Medium dense yellow brown slightly sandy GRAVEL. Gravel consists of fine to coarse well-rounded to flint. (BEENHAM GRANGE GRAVEL MEMBER)	2.70	74.70											

CONTINUED ON NEXT SHEET

Notes
Progressive collapse of borehole from 2.7m to 3.2m depth.

Groundwater observations
Groundwater encountered at 3.5m depth.

Title
Dynamic windowless sampling record

Recovery details	
Range (m)	Recovery (%)
0.00 - 1.00	100
1.00 - 2.00	70
2.00 - 3.00	80

Method
Driven tube sampler

Logged by
MG

Level (m OD)
77.40

Compiled by
MG

Co-ordinates
-

Checked by
KB

Date(s)
19/05/2020

Sheet number
Sheet 1 of 2

Revision
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WS04

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
					▼							3.45		ES
	BOREHOLE TERMINATED AT 4.00m	4.00	73.40			S 4.00 - 4.45	(8) 10							

Notes
Progressive collapse of borehole from 2.7m to 3.2m depth.

Groundwater observations
Groundwater encountered at 3.5m depth.

Title
Dynamic windowless sampling record

Date(s)
19/05/2020

Recovery details		Method	Logged by	Sheet number
Range (m)	Recovery (%)	Driven tube sampler	MG	Sheet 2 of 2
3.00 - 4.00	60	**Level (m OD)** 77.40	**Compiled by** MG	**Revision** 0
		Co-ordinates -	**Checked by** KB	**WS04**

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT RESULT	SPT CASING DEPTH (m)	SPT WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	SCREED (MADE GROUND)	0.11	77.29											
	Yellow grey reinforced CONCRETE composed of flint aggregate up to 10mm nominal size. 4mm reinforcement bar at 0.24m, 0.26, 0.28 and 0.30m depth (possible 100mm x 100mm grid). (MADE GROUND)	0.34	77.06											
	Soft becoming firm grey sandy very gravelly CLAY. Gravel consists of fine to coarse very angular to well-rounded flint, brick, concrete, mortar, ash, chalk and bituminous coated material. (MADE GROUND)					S 1.00 - 1.45	(4) 11					0.50		ES
	Firm grey brown slightly sandy silty gravelly CLAY. Gravel consists of fine to coarse very angular to rounded brick, ash, clinker, mortar and chalk. (MADE GROUND)	1.50	75.90									1.50		ES
												1.90		ES
	Firm grey brown sandy gravelly CLAY. Gravel consists of fine well-rounded flint and chalk. (ALLUVIUM)	2.45	74.95									2.50		D
	Medium dense yellow brown slightly sandy GRAVEL. Gravel consists of fine to coarse well-rounded to flint. (BEENHAM GRANGE GRAVEL MEMBER)	2.65	74.75											

CONTINUED ON NEXT SHEET

Notes
Progressive collapse of borehole from 2.65m to 3.07m depth.

Groundwater observations
Groundwater encountered at 3.6m depth, filling borehole to 2.87m on completion of borehole.

Title
Dynamic windowless sampling record

Date(s)
21/05/2020

Recovery details

Range (m)	Recovery (%)
0.00 - 1.00	85
1.00 - 2.00	70
2.00 - 3.00	70

Method
Driven tube sampler

Logged by
MG

Sheet number
Sheet 1 of 2

Level (m OD)
77.40

Compiled by
MG

Revision
0

Co-ordinates
-

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WS06

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
						S 3.00 - 3.45	(2) 23					3.50		D
	BOREHOLE TERMINATED AT 4.00m	4.00	73.40											

Notes
Progressive collapse of borehole from 2.65m to 3.07m depth.

Groundwater observations
Groundwater encountered at 3.6m depth, filling borehole to 2.87m on completion of borehole.

Title
Dynamic windowless sampling record

Date(s)
21/05/2020

Recovery details		Method	Logged by	Sheet number
Range (m)	Recovery (%)	Driven tube sampler	MG	Sheet 2 of 2
3.00 - 4.00	50	**Level (m OD)** 77.40	**Compiled by** MG	**Revision** 0
		Co-ordinates -	**Checked by** KB	**WS06**

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	DYNAMIC PROBING (0 10 20 30 40 50)	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	SCREED (MADE GROUND)	0.13	77.27												
	Grey reinforced CONCRETE composed of flint aggregate up to 16mm nominal size. 6mm reinforcement bar at 0.26m and 0.36m depth (possible 100mm x 100mm grid). Approximately 1-3% air voids. (MADE GROUND)	0.37	77.03												
	Soft brown slightly sandy gravelly CLAY. Gravel consists of fine to coarse angular to well-rounded flint, brick and limestone. (MADE GROUND)	0.77	76.63										0.90		ES
	Soft becoming firm dark grey sandy gravelly CLAY. Gravel consists of fine to coarse angular to well-rounded flint, brick, concrete, mortar and ash. (MADE GROUND)						S 2.00 - 2.45	(3) 8					1.50		ES
	Firm grey brown sandy gravelly CLAY. Gravel consists of fine well-rounded flint and chalk. (ALLUVIUM)	2.30	75.10										2.50		D
	Medium dense yellow brown slightly sandy GRAVEL. Gravel consists of fine to coarse well-rounded to flint. (BEENHAM GRANGE GRAVEL MEMBER)	3.00	74.40										3.50	3.75	D
	BOREHOLE TERMINATED AT 4.00m	4.00	73.40												

CONTINUED ON NEXT SHEET

Notes
Progressive collapse of borehole from 3.0m to 3.15m depth.

Groundwater observations
Groundwater encountered at 3.5m depth, filling borehole to 3.0m on completion of borehole.

Recovery details

Range (m)	Recovery (%)
0.00 - 1.00	80
1.00 - 2.00	70
2.00 - 3.00	70
3.00 - 4.00	70

Title
Driven tube sampler record

Method
Driven tube sampler

Logged by
MG

Level (m OD)
77.40

Compiled by
MG

Co-ordinates
-

Checked by
KB

Date(s)
20/05/2020

Sheet number
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Revision
0

WS05

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INSTALL	STRATA				WATER STRIKES	DYNAMIC PROBING	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		0 10 20 30 40 50	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE

Notes Progressive collapse of borehole from 3.0m to 3.15m depth.	**Title** Driven tube sampler record			**Date(s)** 20/05/2020
	Recovery details		**Method** Driven tube sampler	**Logged by** MG	**Sheet number** Sheet 2 of 2
	Range (m)	Recovery (%)	**Level (m OD)** 77.40	**Compiled by** MG	**Revision** 0
Groundwater observations Groundwater encountered at 3.5m depth, filling borehole to 3.0m on completion of borehole.			**Co-ordinates** -	**Checked by** KB	**WS05**

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	SCREED (MADE GROUND)	0.05												
	Grey reinforced CONCRETE composed of flint aggregate up to 18mm nominal size. 4mm reinforcement bar at 0.17m, 0.24 to 0.32, 0.40 to 0.45m and 0.9m depth. Approximately 1-3% air voids. (MADE GROUND)													
	Soft dark grey mottled brown silty sandy very gravelly CLAY. Gravel consists of fine to coarse angular to rounded brick, timber, mortar and chalk. (MADE GROUND)	1.00				S 1.00 - 1.45	(4) 8					1.30		ES
	Loose brown slightly clayey very gravelly SAND. Gravel consists of fine to coarse well-rounded flint. (MADE GROUND)	1.60										1.90		ES
	Soft light grey mottled grey and orange sandy silty CLAY. (ALLUVIUM)	2.30										2.50		ES
	Soft becoming very soft silty very sandy CLAY. (ALLUVIUM)	2.75										2.80		D

CONTINUED ON NEXT SHEET

Notes
Progressive collapse of borehole from m to m depth.

Groundwater observations

Title
Dynamic windowless sampling record

Recovery details	
Range (m)	Recovery (%)
0.00 - 1.00	100
1.00 - 2.00	70
2.00 - 3.00	90

Method
Driven tube sampler

Logged by
MG

Level (m OD)
-

Compiled by
MG

Co-ordinates
-

Checked by
KB

Date(s)
21/05/2020

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WS07

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INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
						S 3.00 - 3.45	(16) 29					3.50		D
	Medium dense light grey brown very gravelly SAND. Gravel consists of fine to medium well-rounded flint. (BEENHAM GRANGE GRAVEL MEMBER)	3.75										3.80		D
	BOREHOLE TERMINATED AT 4.00m	4.00												

Notes
Progressive collapse of borehole from m to m depth.

Groundwater observations

Title
Dynamic windowless sampling record

Recovery details	
Range (m)	Recovery (%)
3.00 - 4.00	50

Method
Driven tube sampler

Logged by
MG

Level (m OD)
-

Compiled by
MG

Co-ordinates
-

Checked by
KB

Date(s)
21/05/2020

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WS07

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INSTALL	STRATA: DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	DYNAMIC PROBING (0 10 20 30 40 50)	SPT TESTING: TYPE / DEPTH (m)	SPT TESTING: RESULT	SPT TESTING: CASING DEPTH (m)	SPT TESTING: WATER LEVEL (m)	OTHER IN SITU TESTING: TYPE / DEPTH (m)	OTHER IN SITU TESTING: RESULT	SAMPLING: FROM (m)	SAMPLING: TO (m)	SAMPLING: TYPE
	BLOCK PAVING	0.08	77.32												
	(MADE GROUND)	0.15	77.25												
	Yellow SAND.	0.20	77.20												
	(MADE GROUND)												0.50		D
	Black sandy GRAVEL. Gravel consists of fine to coarse angular flint, brick and limestone.														
	(MADE GROUND)	0.75	76.65										0.80		D
	Brown slightly clayey slightly sandy GRAVEL with occasional cobbles. Gravel and cobbles consist of fine to coarse angular to rounded brick, concrete and flint.														
	(MADE GROUND)	1.00	76.40												
	Firm green brown sandy gravelly CLAY. Gravel consists of fine to coarse angular flint, brick, concrete and mortar.												1.30		D
	(MADE GROUND)												1.50		ES
	Brown slightly clayey gravelly SAND. Gravel consists of fine to coarse angular to sub-rounded flint, chalk and brick.	1.55	75.85												
	(MADE GROUND)	1.75	75.65												
	Brown slightly clayey slightly sandy GRAVEL with occasional cobbles. Gravel and cobbles consist of fine to coarse angular to rounded brick, concrete and flint.						S 2.00 - 2.45	(2) 7							
	(MADE GROUND)														
	Firm becoming soft green grey mottled black becoming brown sandy silty CLAY.														
	(ALLUVIUM)												2.50		ES
	Medium dense yellow brown very gravelly SAND. Gravel consists of well-rounded fine to coarse flint.	3.50	73.90				S 3.50 - 3.95	(12) 22					3.50	4.00	B
	(BEENHAM GRANGE GRAVEL MEMBER)														
	BOREHOLE TERMINATED AT 4.00m	4.00	73.40												

CONTINUED ON NEXT SHEET

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Progressive collapse of borehole from 1.75m to 2.8m depth.

Groundwater observations
Groundwater encountered at 3.6m depth, filling borehole to 3.15m on completion of borehole.

Title
Driven tube sampler record

Date(s)
18/05/2020

Recovery details	
Range (m)	Recovery (%)
0.00 - 1.00	65
1.00 - 2.00	70
2.00 - 3.00	75
3.00 - 4.00	65

Method
Driven tube sampler

Logged by
MG

Sheet number
Sheet 1 of 2

Level (m OD)
77.40

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MG

Revision
0

Co-ordinates
-

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WS01a

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INSTALL	STRATA				WATER STRIKES	DYNAMIC PROBING	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		0 10 20 30 40 50	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE

Notes
Inspection pit excavated from 0.0m to 1.2m depth. Progressive collapse of borehole from 1.75m to 2.8m depth.

Groundwater observations
Groundwater encountered at 3.6m depth, filling borehole to 3.15m on completion of borehole.

Title
Driven tube sampler record

Date(s)
18/05/2020

Recovery details	
Range (m)	Recovery (%)

Method
Driven tube sampler

Logged by
MG

Sheet number
Sheet 2 of 2

Level (m OD)
77.40

Compiled by
MG

Revision
0

Co-ordinates
-

Checked by
KB

WS01a

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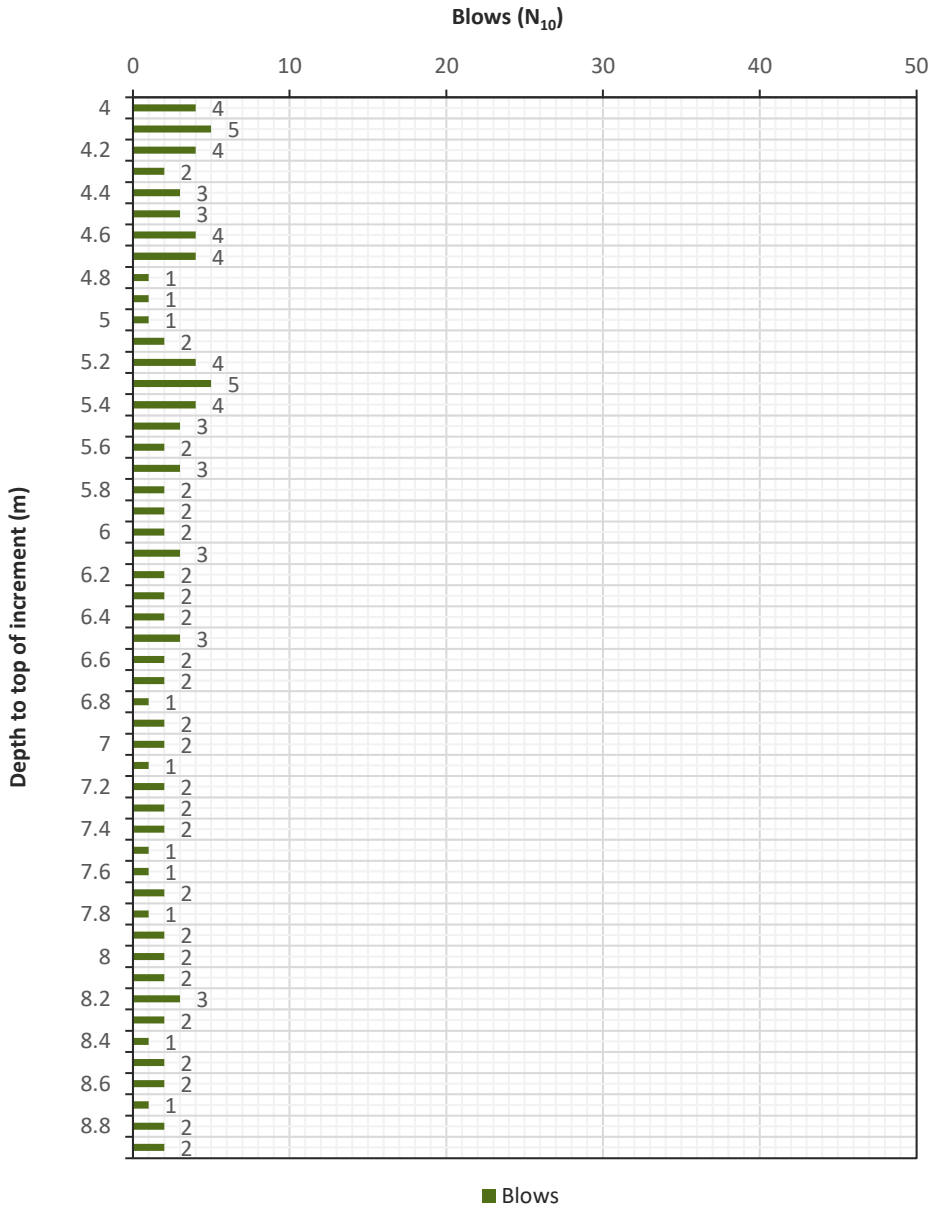
Summary log for dynamic probing

Dynamic Probing Test Number: WS01a

Easting: -
Northing: -
Ground level (mAOD): -
Date of test: 18/05/2020
Cone type: Fixed

Anvil type: Fixed
Type of dynamic probing: DPSH-B
Manufacturer: Global Geotech
Model: Geo 4 Drive Sampling Rig
Model Number: 0027

Equipment checked and in accordance with EN ISO 22476-2, 5.1: Yes



Title	Appendix
Summary of dynamic probing log for location WS01a	C4

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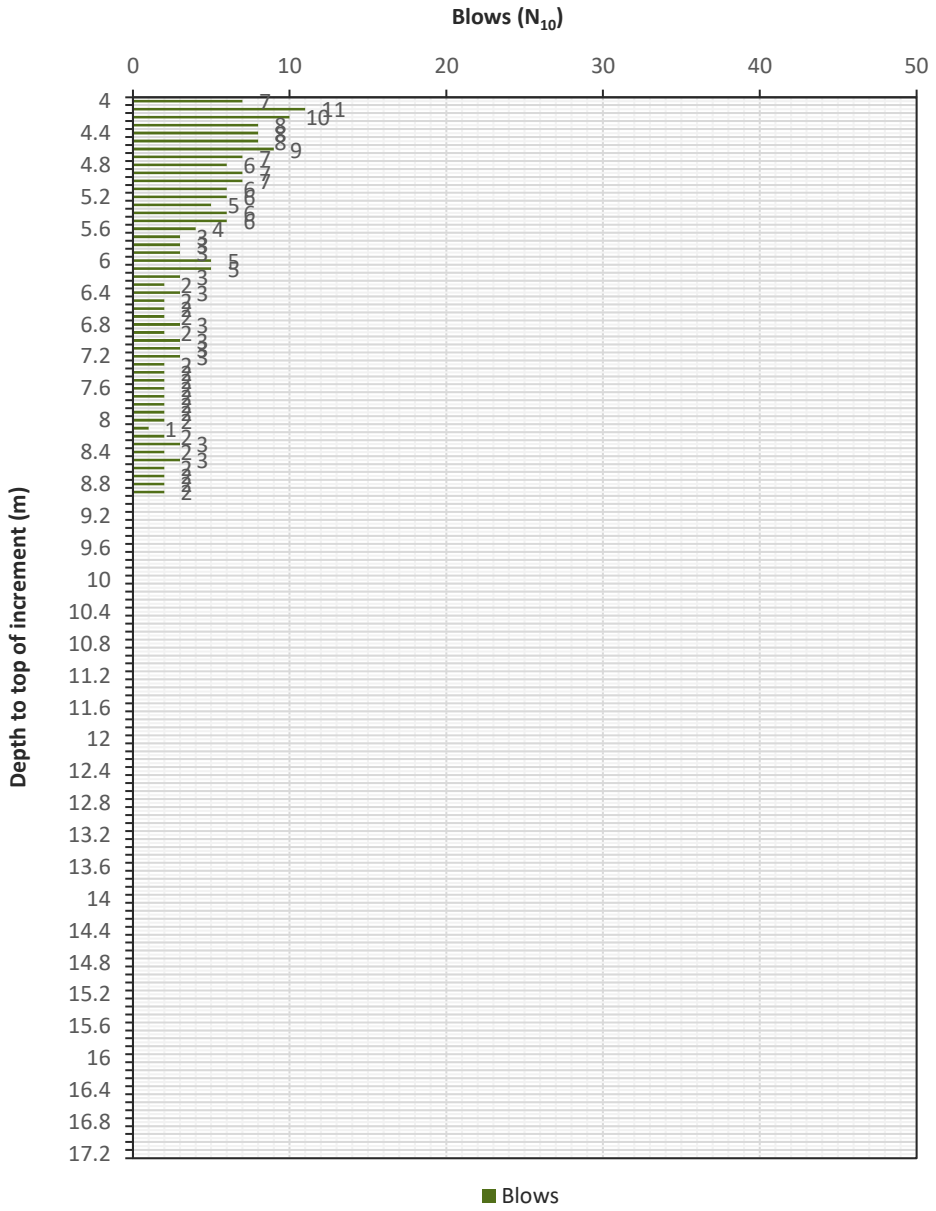
Summary log for dynamic probing

Dynamic Probing Test Number: WS05

Easting: -	Anvil type: Fixed
Northing: -	Type of dynamic probing: DPSH-B
Ground level (mAOD): -	Manufacturer: Global Geotech
Date of test: 20/05/2020	Model: Geo 4 Drive Sampling Rig
Cone type: Fixed	Model Number: 0027

Equipment checked and in accordance with EN ISO 22476-2, 5.1: Yes



Title	Appendix
Summary of dynamic probing log for location WS05	C4

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Key to legends

Composite materials, soils and lithology							
	Topsoil		Made Ground		Boulders		Chalk
	Clay		Coal		Cobbles		Concrete
	Gravel		Limestone		Mudstone		Peat
	Sand		Sandstone		Silt		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sample/core recovery' columns

Test result	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m^2) by applying a factor of 50. SV – Hand held shear vane result reported as an undrained shear strength (kN/m^2). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.
	SPT – Standard Penetration Test result (N value) (uncorrected)[1,2,3] SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected)[1,2,3]
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample

Sample/core recovery	
Run No.	Records depth and number of the abstracted core[3]
Total Core Recovery (TCR) %	Ratio of core recovered (solid and non-intact) to length of core run
Solid Core Recovery (SCR) %	Ratio of solid, cylindrical, pieces of rock core recovered to length of core run
Rock Quality Designation (RQD) %	Ratio of core pieces longer than 100mm to length of core run
Fracture Index (FI)	Inverse of fracture spacing, per metre, over arbitrary length

Note 1: Seating blows recorded in brackets.

Note 2: Casing depth records depth of casing.

Note 3: The depths of open holing will be recorded in the notes. Method of lubrication of and diameter of drilling tools will be recorded on the log, together with location of circulation loss during drilling.

Water observations

Described at foot of log and shown in the 'water strike' column.

Water level observed after specified delay in drilling

Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. Gravel consists of 10mm nominal rounded flint aggregate. 1%-3% air voids. 8mm reinforcement bar at 0.1m depth. (MADE GROUND)	0.20															0.40	0.78	C
	Red brown slightly sandy GRAVEL. Gravel consists of angular to sub-angular limestone. (MADE GROUND)	0.40																	
	Grey reinforced CONCRETE 10mm nominal flint aggregate. 1% air voids. No reinforcement bars directly observed. (MADE GROUND)	1.36															1.36	1.79	C
	...at 1.3m depth, 25mm reinforcement bar.																		
	Light yellow brown CONCRETE 3-6mm sandstone and limestone aggregates. 5% air voids. 6mm reinforcement bar at 1.39m, 1.73m, 2.07m and 2.42m depths and at 1.87m reduced in diameter. (MADE GROUND)	2.68																	
	NO RECOVERY assumed to be: Light yellow brown CONCRETE 6mm nominal sandstone and limestone aggregates. 5% air voids.																		

CONTINUED ON NEXT SHEET

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 1 of 2
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB01**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BOREHOLE TERMINATED AT 16.00m	16.00																	

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 2 of 2
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB01**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE 10mm nominal rounded flint aggregate. 1% to 3% air voids. 8mm reinforcement bar at 0.05m, 0.09m, 0.15m and 0.19m depths. (MADE GROUND)	0.40																	
	Red brown slightly sandy GRAVEL. Gravel consists of angular to sub-angular limestone. (MADE GROUND)	0.45															1.29	1.45	C
	Light yellow brown CONCRETE 6mm nominal sandstone and limestone aggregates. 5% air voids. 18mm horizontal double reinforcement bar at 0.63-0.66m, 0.84-0.87m, 1.04-1.07m and 1.23-1.27m depths. 18mm vertical reinforcement bar (elliptical profile) at 1.07m and 1.17m depths. (MADE GROUND)	1.45																	
	BOREHOLE TERMINATED AT 1.45m																		

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 1 of 1
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB02**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. Gravel consists of 10mm nominal rounded flint aggregate. 1%-3% air voids. 8mm reinforcement bar at 0.095m and 0.195m depths. (MADE GROUND)	0.20																	
	BOREHOLE TERMINATED AT 0.20m																		

Notes	**Title** Rotary core record	**Date(s)**
	Method / **Logged by** MG	**Sheet number** Sheet 1 of 1
Groundwater observations	**Level (m OD)** - / **Compiled by** KD	**Revision** 0
	Co-ordinates - / **Checked by** KB	**AB03**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. Gravel consists of 10mm nominal rounded flint aggregate. 1%-3% air voids. no reinforcement directly observed. (MADE GROUND)	0.21																	
	BOREHOLE TERMINATED AT 0.21m																		

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 1 of 1
Groundwater observations	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB04**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. Gravel consists of 10mm nominal rounded flint aggregate. 1%-3% air voids. 8mm reinforcement bar at 0.19m and 0.31m depths. (MADE GROUND)	0.40																	
	Red brown slightly sandy GRAVEL consists of angular to sub-angular limestone. (MADE GROUND)	1.32															1.32	1.50	C
	Light yellow brown reinforced CONCRETE 6mm nominal sandstone and limestone aggregates. 5% air voids. 25mm reinforcement bar at 1.27m and 1.32m depths. (MADE GROUND)	1.50																	
	Light yellow brown reinforced CONCRETE 6mm nominal sandstone and limestone aggregates. 5% air voids. 1 vertical reinforcement bar tapering into core with depth. (MADE GROUND)	1.51																	
	BOREHOLE TERMINATED AT 1.51m																		

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 1 of 1
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB05**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Light yellow brown reinforced CONCRETE 6mm nominal sandstone and limestone aggregates. No reinforcement directly observed. (MADE GROUND)	11.85																	
	Structureless CHALK composed of uncompact white very gravelly CLAY. Gravel is weak medium density white when broken occasional rinded black flint gravel. (SEAFORD CHALK FORMATION)	14.00															14.00		C
	...at 16m depth, Dm grade chalk as silty CLAY.	16.00																	
	BOREHOLE TERMINATED AT 16.00m																		

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 2 of 2
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB06**

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INSTALL	STRATA DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND	WATER STRIKES	CORING DEPTH (m)	CORING TCR (%)	CORING SCR (%)	CORING RQD (%)	CORING FI	SPT TESTING TYPE / DEPTH (m)	SPT TESTING RESULT	SPT TESTING CASING DEPTH (m)	SPT TESTING WATER LEVEL (m)	OTHER IN SITU TESTING TYPE / DEPTH (m)	OTHER IN SITU TESTING RESULT	SAMPLING FROM (m)	SAMPLING TO (m)	SAMPLING TYPE
	Grey reinforced CONCRETE. Gravel consists of 10mm nominal rounded flint aggregate. 1%-3% air voids. 8mm reinforcement bar at 0.07m and 0.19m depths. (MADE GROUND)	0.40																	
	Red brown slightly sandy GRAVEL consists of angular to sub-angular limestone. (MADE GROUND)	0.70																	
	Grey reinforced CONCRETE 10mm nominal rounded flint aggregate. 1% air voids. no reinforcement directly observed. (MADE GROUND)	1.55																	
	Light yellow brown reinforced CONCRETE 6mm nominal sandstone and limestone aggregates. 5% air voids. Horizontal 4mm reinforcement at 1.62, 2.02, 2.39, 2.73, 3.04, 3.36, 3.84. 1 vertical 18mm reinforcement bar tapering into core section at 1.4m - 1.56m depths exiting at 5.00m (MADE GROUND)																2.35	2.55	C
																	4.04	4.24	C
																	5.90	6.00	C
																	6.00	6.20	C
	...at 7.76m depth, profile of core incomplete, chalk progressively edging into core.																		
	...from 8m progressively tapering to a half diameter core.																		
	...at 8.57m depth, medium gravel (43mm) of chalk in core.																8.57	8.73	C
	...from 10m depth, half diameter core.																9.78	10.10	C
	...between 10.74m and 11.2m depth, medium angular gravel flint in core.																10.84	10.97	C

CONTINUED ON NEXT SHEET

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 1 of 2
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB06**

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INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Grey reinforced CONCRETE. Gravel consists of 10mm nominal rounded flint aggregate. 1%-3% air voids. 8mm reinforcement bar at 0.1m depth. (MADE GROUND)	0.20															0.00	0.20	C
	Red brown slightly sandy GRAVEL consists of angular to sub-angular limestone. (MADE GROUND)	0.40																	
	Grey reinforced CONCRETE 10mm nominal rounded flint aggregate. 1% air voids. no reinforcement directly observed. (MADE GROUND)	1.42																	
	Light yellow brown CONCRETE 6mm nominal sandstone and limestone aggregates. 5% air voids. No reinforcement directly observed. Suspected to be at 8m depth based on magnetometer. (MADE GROUND)																6.00	6.30	C

CONTINUED ON NEXT SHEET

Notes	**Title** Rotary core record		**Date(s)**
	Method	**Logged by** MG	**Sheet number** Sheet 1 of 2
Groundwater observations	**Level (m OD)** -	**Compiled by** MG	**Revision** 0
	Co-ordinates -	**Checked by** KB	**AB07**

soiltechnics
environmental ▪ geotechnical ▪ building fabric

INSTALL	STRATA				WATER STRIKES	CORING					SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		DEPTH (m)	TCR (%)	SCR (%)	RQD (%)	FI	TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	...from 13m progressively tapering to a half diameter core.																14.00	14.20	C
																	15.70	16.00	C
	BOREHOLE TERMINATED AT 16.00m	16.40																	

Notes	**Title** Rotary core record	**Date(s)**
	Method / **Logged by** MG	**Sheet number** Sheet 2 of 2
Groundwater observations	**Level (m OD)** - / **Compiled by** MG	**Revision** 0
	Co-ordinates - / **Checked by** KB	**AB07**

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

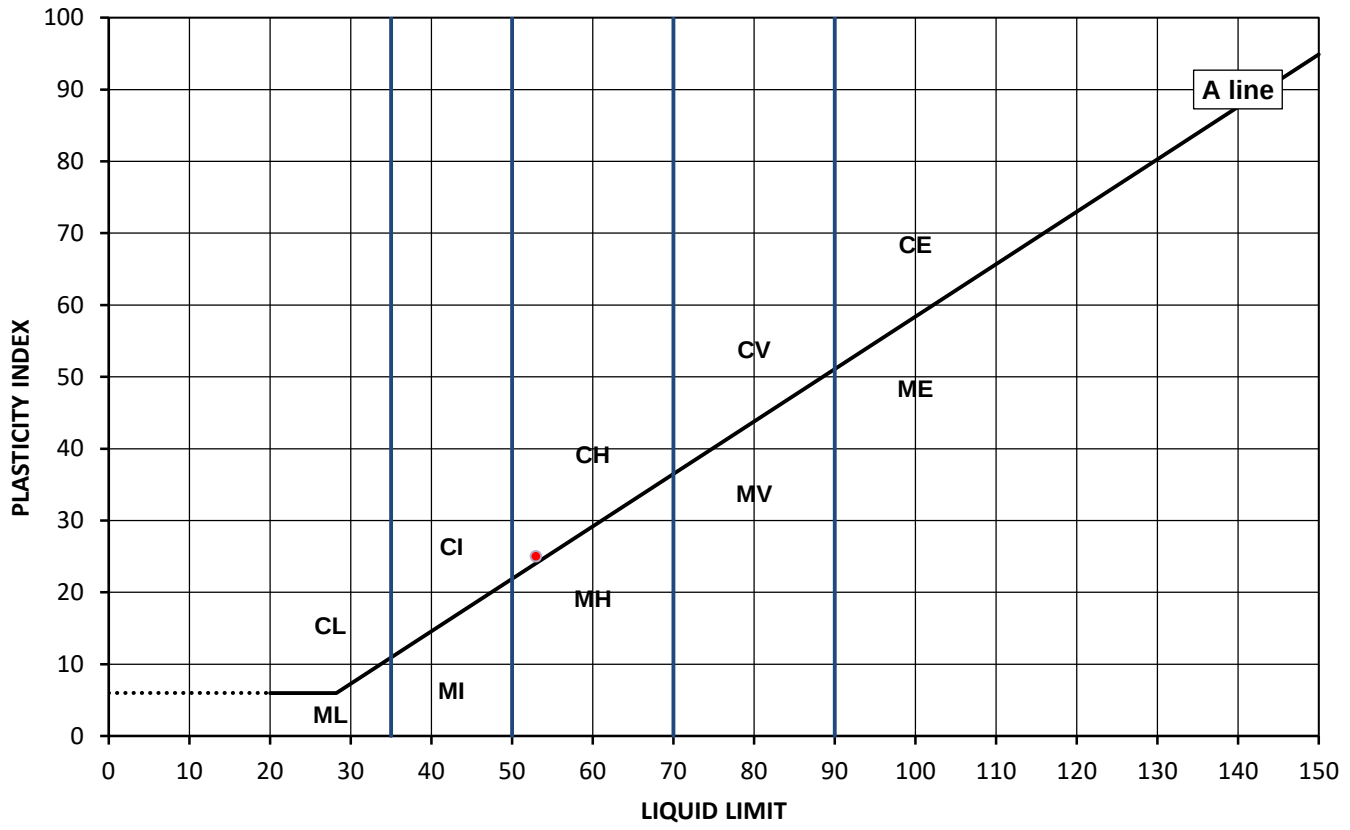
Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	29/05/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1552256	Depth Top [m]:	2.00
Hole No.:	BH01	Depth Base [m]:	Not Given
Sample Reference:	5	Sample Type:	D
Soil Description:	Brownish grey gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	53	28	25	47



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	27/05/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	07/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

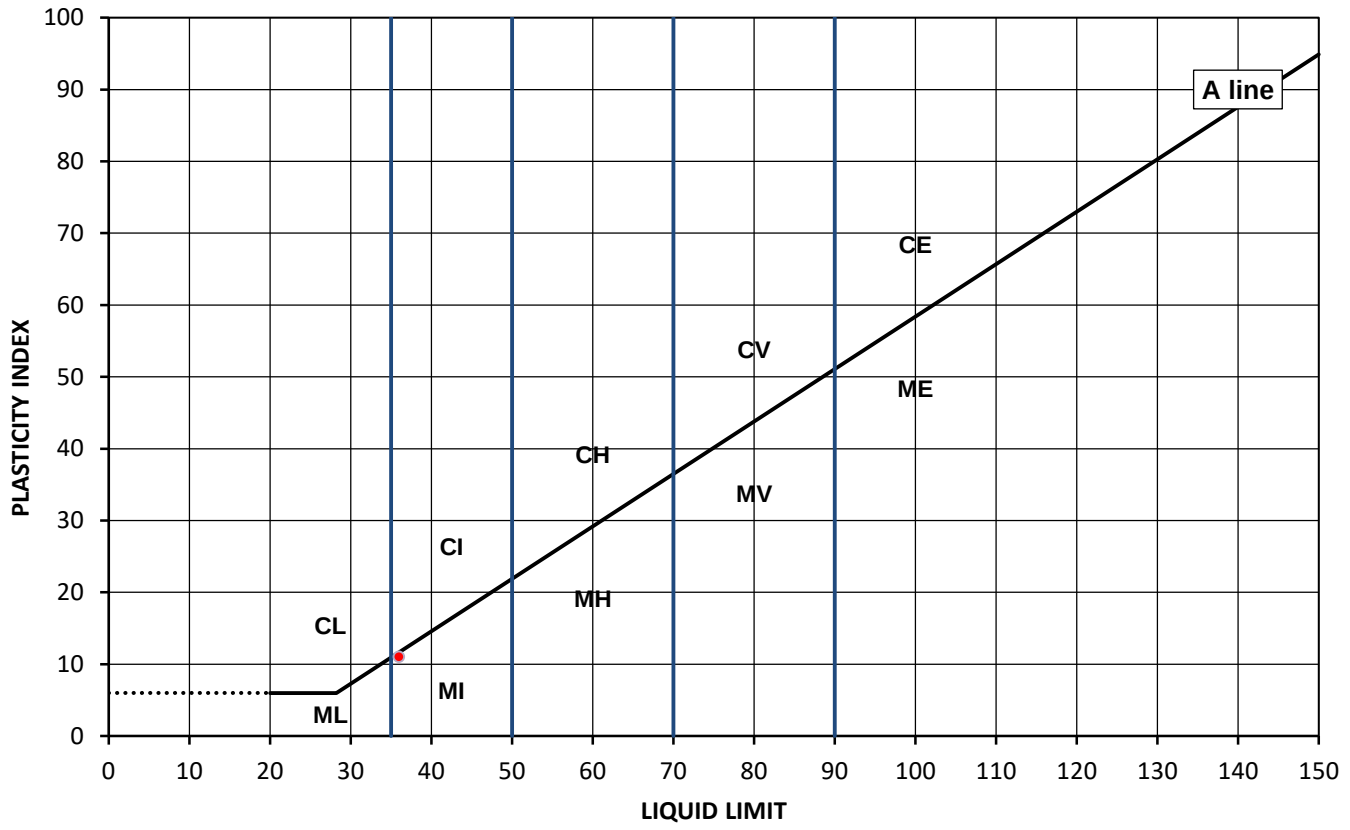
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1552260	Depth Top [m]:	8.00
Hole No.:	BH02	Depth Base [m]:	8.50
Sample Reference:	18	Sample Type:	B
Soil Description:	White CHALK		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
31	36	25	11	100



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	27/05/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	07/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

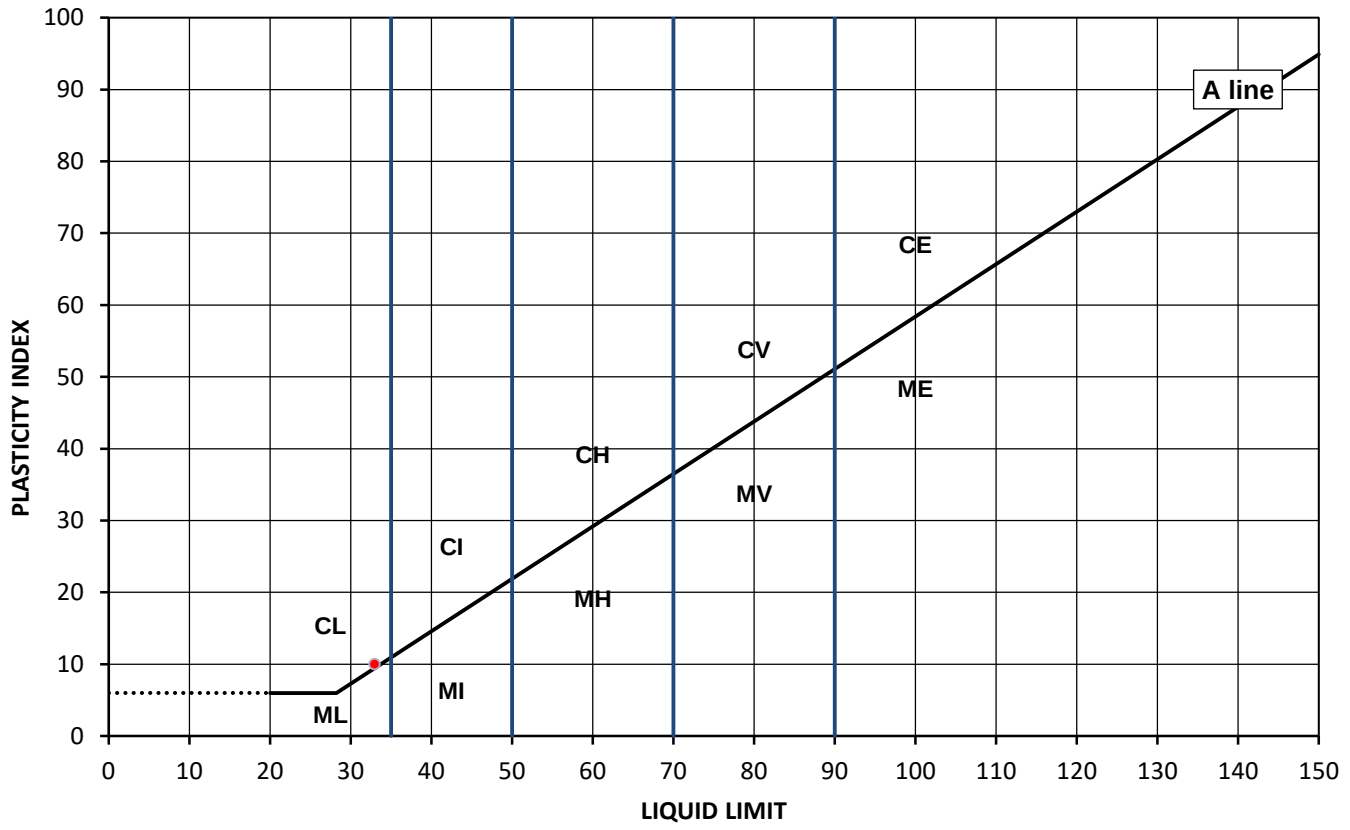
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1552262	Depth Top [m]:	11.00
Hole No.:	BH02	Depth Base [m]:	11.50
Sample Reference:	23	Sample Type:	B
Soil Description:	White CHALK		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
29	33	23	10	100



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	08/06/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

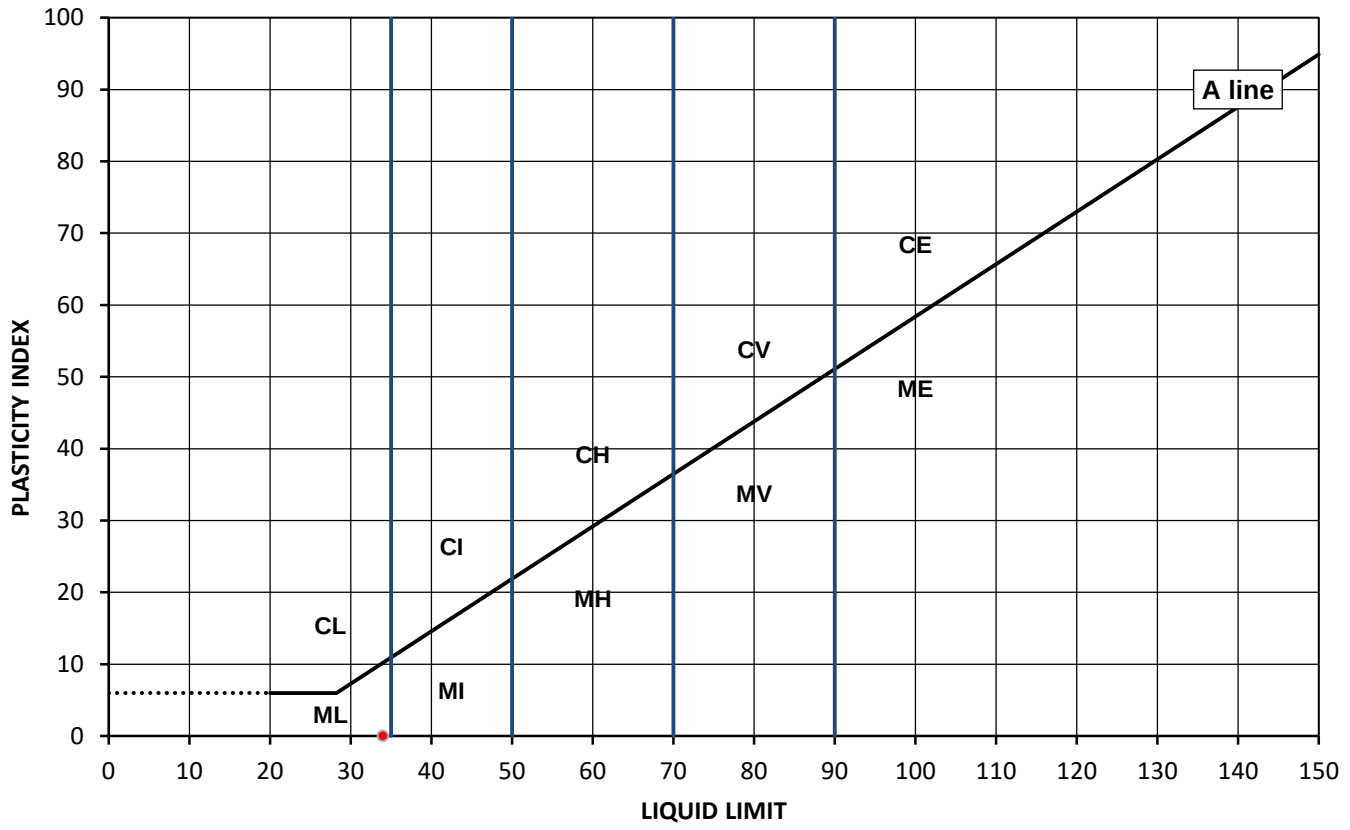
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1552271	Depth Top [m]:	9.00
Hole No.:	BH04	Depth Base [m]:	9.50
Sample Reference:	21	Sample Type:	D
Soil Description:	White slightly gravelly CHALK		

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
26	34	NP	NP	98



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

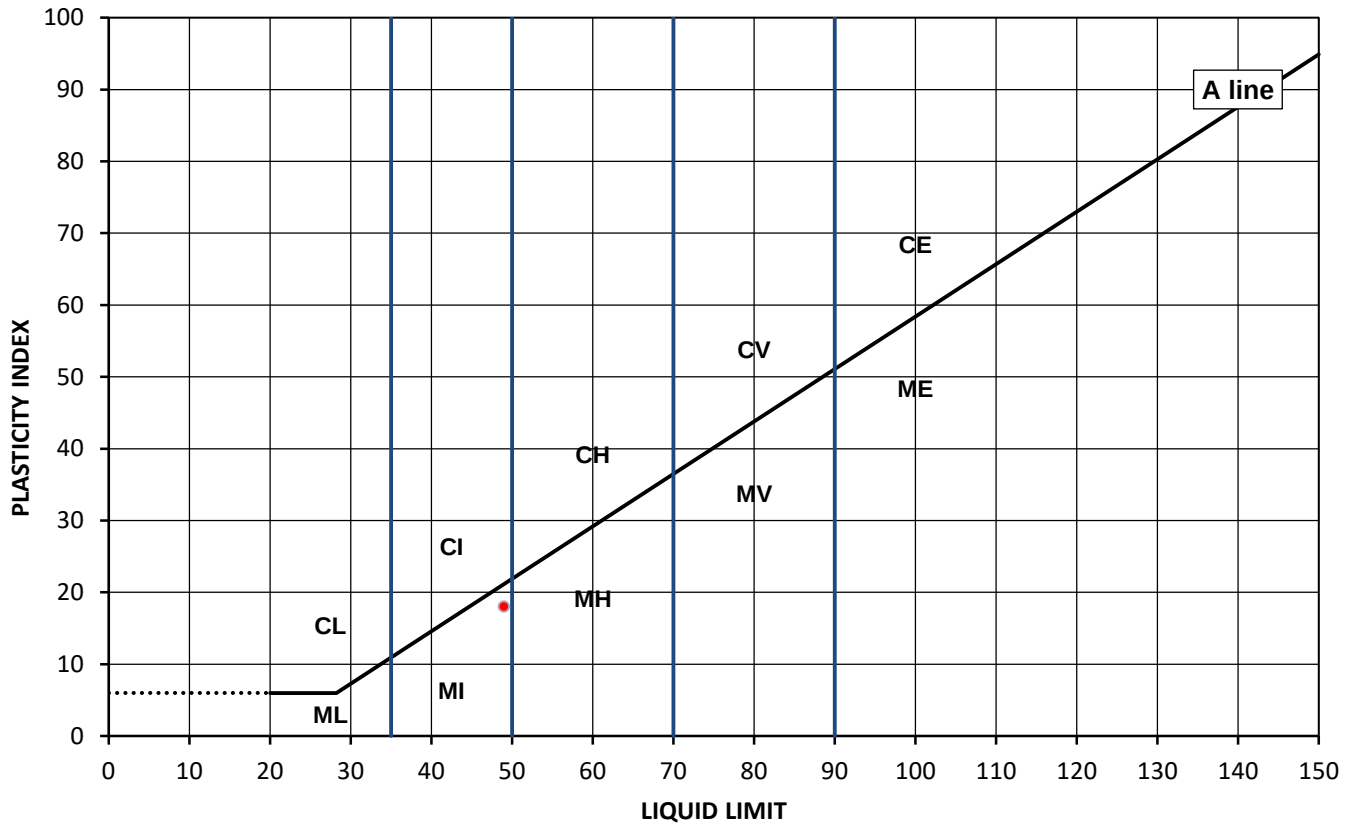
Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	01/06/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1552275	Depth Top [m]:	3.10
Hole No.:	RC01	Depth Base [m]:	3.50
Sample Reference:	6	Sample Type:	D
Soil Description:	Greyish brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
39	49	31	18	87



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

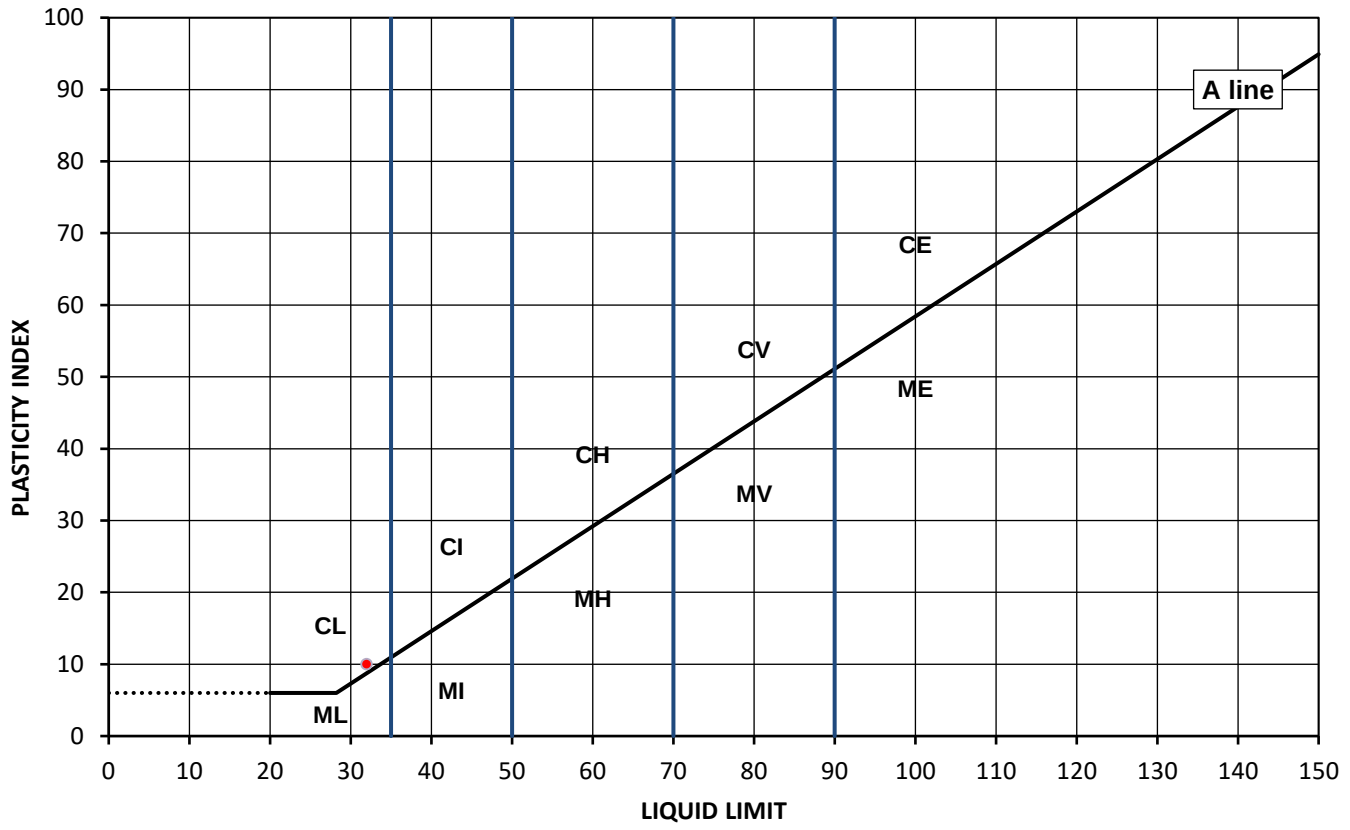
Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	01/06/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1552276	Depth Top [m]:	10.20
Hole No.:	RC01	Depth Base [m]:	Not Given
Sample Reference:	39	Sample Type:	D
Soil Description:	White slightly gravelly clayey CHALK		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	32	22	10	95



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

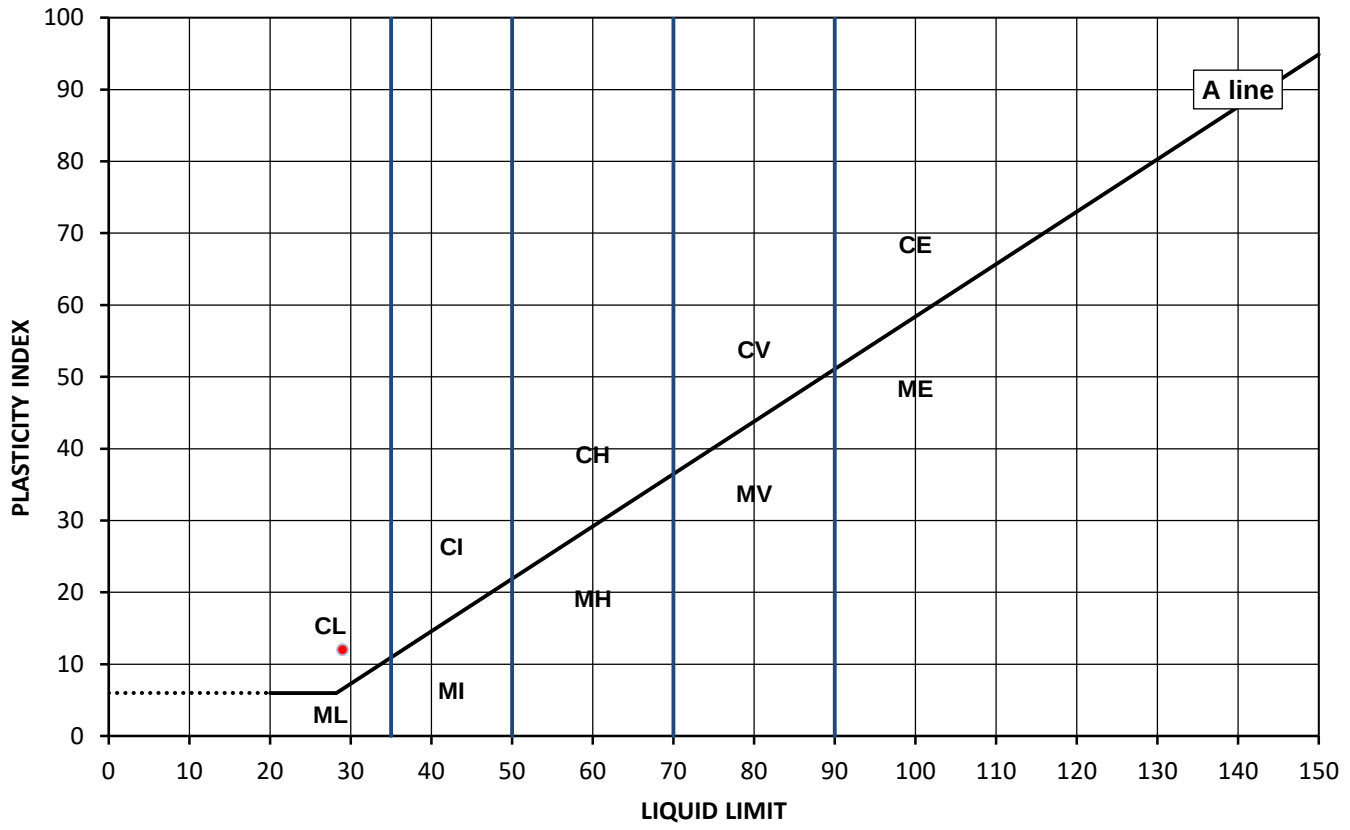
Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	Not Given
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1552279	Depth Top [m]:	3.80
Hole No.:	RC02	Depth Base [m]:	Not Given
Sample Reference:	2	Sample Type:	D
Soil Description:	Brown very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	29	17	12	100



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

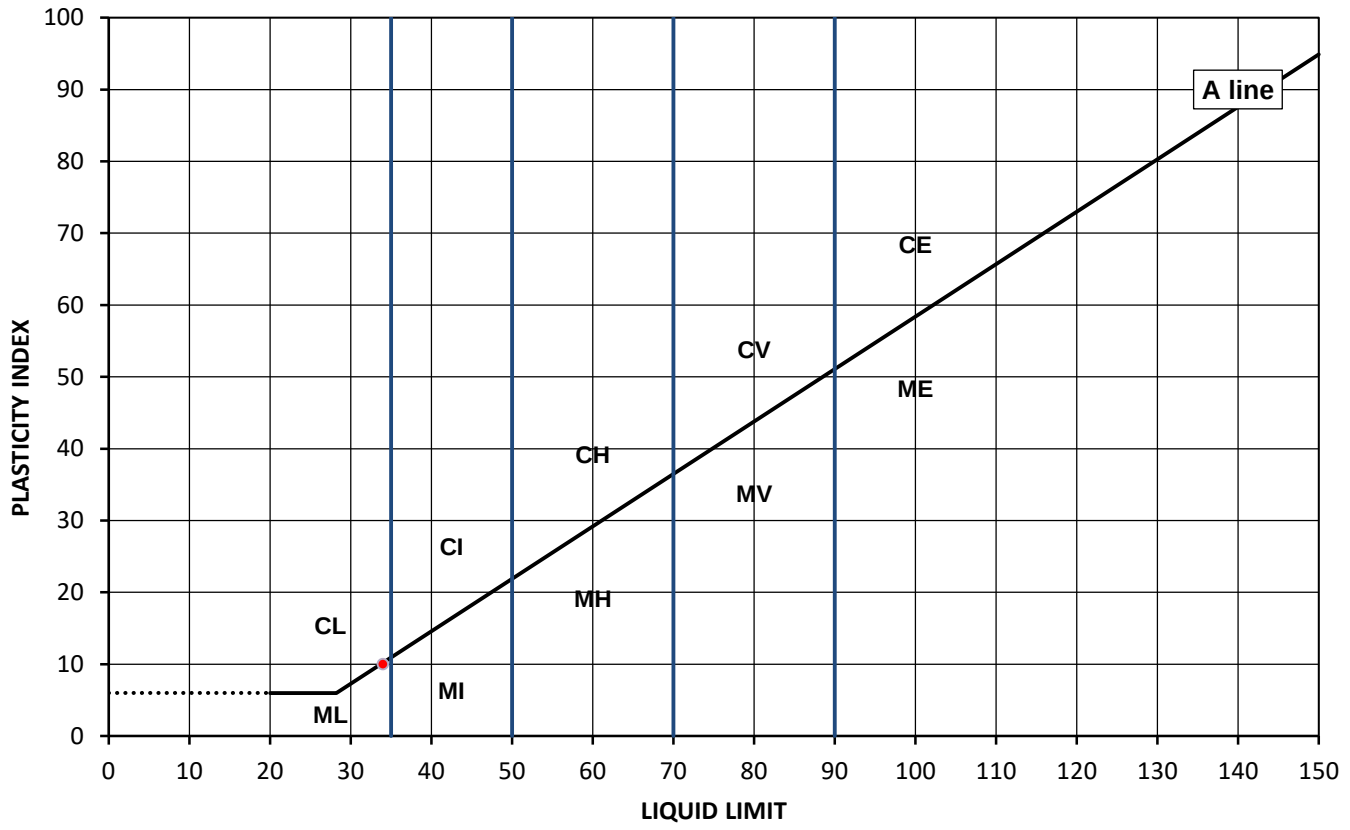
Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	08/06/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1552280	Depth Top [m]:	6.00
Hole No.:	RC02	Depth Base [m]:	Not Given
Sample Reference:	4	Sample Type:	D
Soil Description:	White slightly gravelly clayey CHALK		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
30	34	24	10	77



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

TEST CERTIFICATE

Liquid and Plastic Limits

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

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

Client:	Soiltechnics Limited	Client Reference:	STS5074
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-17611
		Date Sampled:	20/05/2020
		Date Received:	30/06/2020
Contact:	Lauren Wenham	Date Tested:	10/07/2020
Site Address:	Kennet Centre, Newbury	Sampled By:	Not Given

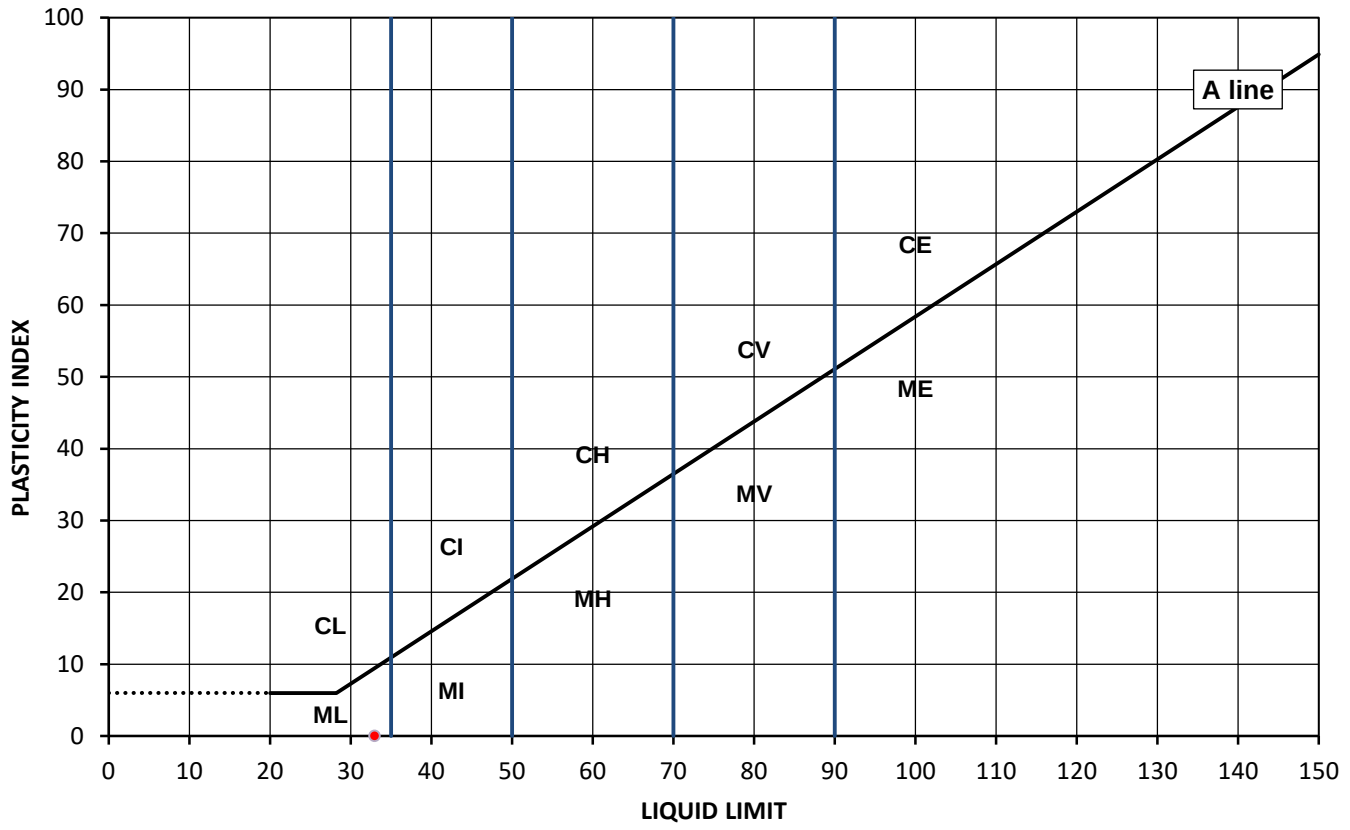
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1552282	Depth Top [m]:	8.00
Hole No.:	RC04	Depth Base [m]:	Not Given
Sample Reference:	12	Sample Type:	D
Soil Description:	White slightly gravelly CHALK		

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
23	33	NP	NP	79



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

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	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)	

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

Remarks:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 232.9

SUMMARY REPORT

Summary of Classification Test Results

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

4041

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Soiltechnics Limited

Client Address: Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY

Contact: Lauren Wenham

Site Address: Kennet Centre, Newbury

Client Reference: STS5074
Job Number: 20-17611
Date Sampled: 27/05 - 08/06/2020
Date Received: 30/06/2020
Date Tested: 07/07 - 10/07/2020
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	LL	PL	PI	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1552256	BH01	5	2.00	Not Given	D	Brownish grey gravelly slightly sandy CLAY	Atterberg 1 Point	28		47	53	28	25						
1552260	BH02	18	8.00	8.50	B	White CHALK	Atterberg 1 Point	31		100	36	25	11						
1552262	BH02	23	11.00	11.50	B	White CHALK	Atterberg 1 Point	29		100	33	23	10						
1552264	BH02	33	19.50	Not Given	D	Multicolour FLINTSTONE with fragments of chalk		11											
1552269	BH04	9	3.00	Not Given	ES	Multicolour very sandy GRAVEL		7.3											
1552271	BH04	21	9.00	9.50	D	White slightly gravelly CHALK	Atterberg 1 Point	26		98	34	NP	NP						
1552275	RC01	6	3.10	3.50	D	Greyish brown slightly gravelly slightly sandy CLAY	Atterberg 1 Point	39		87	49	31	18						
1552276	RC01	39	10.20	Not Given	D	White slightly gravelly clayey CHALK	Atterberg 1 Point	27		95	32	22	10						
1552279	RC02	2	3.80	Not Given	D	Brown very sandy CLAY	Atterberg 1 Point	22		100	29	17	12						
1552280	RC02	4	6.00	Not Given	D	White slightly gravelly clayey CHALK	Atterberg 1 Point	30		77	34	24	10						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 234.11

SUMMARY REPORT

Summary of Classification Test Results

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

4041

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Soiltechnics Limited

Client Address: Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY

Contact: Lauren Wenham

Site Address: Kennet Centre, Newbury

Client Reference: STS5074
Job Number: 20-17611
Date Sampled: 20/05/2020
Date Received: 30/06/2020
Date Tested: 10/07/2020
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	LL	PL	PI	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1552282	RC04	12	8.00	Not Given	D	White slightly gravelly CHALK	Atterberg 1 Point	23		79	33	NP	NP						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 234.11

SUMMARY REPORT

Summary of Saturation Moisture Content Test Results

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

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

UKAS TESTING 4041

Environmental Science

Client: Soiltechnics Limited

Client Address: Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY

Contact: Lauren Wenham

Site Address: Kennet Centre, Newbury

Client Reference: STS5074
Job Number: 20-17611
Date Sampled: 27/05 - 08/06/2020
Date Received: 30/06/2020
Date Tested: 10/07/2020
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC								
		Reference	Depth Top m	Depth Base m	Type			%	Mg/m3	Mg/m3	%								
1552257	BH01	22	11.00	11.50	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	27	1.96	1.56	26								
1552258	BH01	24	13.00	Not Given	D	White CHALK		29	1.95	1.51	30								
1552259	BH01	30	19.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	29	1.95	1.52	28								
1552261	BH02	21	10.00	10.50	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	28	1.95	1.55	26								
1552263	BH02	27	14.50	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.94	1.49	30								
1552267	BH03	33	16.00	Not Given	D	White CHALK with fragments of flintstone	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	28	1.96	1.54	28								
1552272	BH04	22	10.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.94	1.48	31								
1552273	BH04	24	12.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	28	1.95	1.53	28								
1552274	BH04	35	18.50	19.00	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	28	1.97	1.54	28								
1552277	RC01	15	13.30	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.94	1.50	29								

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 132.13

SUMMARY REPORT

Summary of Saturation Moisture Content Test Results

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

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

UKAS TESTING 4041

Environmental Science

Client: Soiltechnics Limited

Client Address: Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY

Contact: Lauren Wenham

Site Address: Kennet Centre, Newbury

Client Reference: STS5074
Job Number: 20-17611
Date Sampled: 20/05 - 08/06/2020
Date Received: 30/06/2020
Date Tested: 10/07/2020
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC								
		Reference	Depth Top	Depth Base	Type														
			m	m				%	Mg/m3	Mg/m3	%								
1552278	RC01	20	19.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	28	1.94	1.54	26								
1552281	RC02	5	10.25	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	31	1.92	1.47	30								
1552284	RC04	21	21.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	29	1.95	1.52	28								
1552285	RC04	23	24.00	Not Given	D	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	27	1.94	1.56	25								

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments:

Signed:

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 27/07/2020

GF 132.13

ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Sample details						Density		Uniaxial Compression Test (LF0879C (1000kN) compression frame used)							
								Mean after prep.							
Borehole Ref.	Sample Ref.	Depth (m)	Description	MC (%)	Degree of Saturation (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Diameter (mm)	Height (mm)	H/D Ratio	Load at Failure (kN)	UCS (MPa) 3 sig. fig.	Failure Sketch	D. Tested	Remarks
AB01	1	0.40-0.78	CONCRETE	5.7	61.7	2.29	2.16	103.40	276.70	2.7	387.4	46.1		23/07/20	
AB06	5	8.57-8.73	CONCRETE	7.1	61.4	2.20	2.06	86.30	189.80	2.2	200.7	34.3		23/07/20	
AB06	6	9.78-10.10	CONCRETE	8.4	48.1	1.99	1.83	86.20	231.80	2.7	245.8	42.1		23/07/20	
AB07	1	0.00-0.20	CONCRETE	5.1	53.4	2.25	2.14	98.60	197.80	2.0	300.8	39.4		23/07/20	
AB07	2	6.00-6.30	CONCRETE	7.6	55.3	2.12	1.97	86.40	236.80	2.7	108.1	18.4		23/07/20	
AB07	4	14.00-14.20	CONCRETE	6.9	68.8	2.27	2.12	86.30	230.90	2.7	225.9	38.6		23/07/20	
RC01	21	26.35-26.55	White CHALK	28	98.0	1.96	1.53	100.20	234.60	2.3	19.9	2.52		27/07/20	
RC01	33	30.70-32.10	White CHALK	28	98.9	1.96	1.54	100.70	250.80	2.5	11.1	1.39		23/07/20	
RC02	3	20.55-20.85	White CHALK	27	94.0	1.93	1.52	99.00	209.50	2.1	24.4	3.17		23/07/20	
RC02	4	24.48-24.71	White CHALK	28	95.8	1.93	1.50	98.20	229.50	2.3	16.0	2.11		27/07/20	

Note: The dimensional requirements of flatness (<0.02 mm), perpendicularity (<0.05 / 50 mm) and straightness (0.3 mm deviation) are not met. Specific Gravity used for Degree of Saturation is assumed unless specified by the client.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

GEOLABS®

UKAS TESTING 1982

ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Sample details				Density				Uniaxial Compression Test (LF0879C (1000kN) compression frame used)							
								Mean after prep.							
Borehole Ref.	Sample Ref.	Depth (m)	Description	MC (%)	Degree of Saturation (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Diameter (mm)	Height (mm)	H/D Ratio	Load at Failure (kN)	UCS (MPa) 3 sig. fig.	Failure Sketch	D. Tested	Remarks
RC02	6	27.69-28.10	White CHALK	27	95.1	1.94	1.53	96.80	261.50	2.7	22.5	3.06		23/07/20	
RC04	24	25.00-25.25	White CHALK	24	96.0	1.99	1.60	99.80	229.60	2.3	15.6	1.99		23/07/20	
RC04	27	29.00-29.30	White CHALK	28	97.8	1.95	1.53	99.60	268.80	2.7	22.9	2.94		23/07/20	
RC04	29	31.50-31.80	White CHALK	28	100	1.97	1.55	97.60	219.70	2.3	14.6	1.95		23/07/20	

Note: The dimensional requirements of flatness (<0.02 mm), perpendicularity (<0.05 / 50 mm) and straightness (0.3 mm deviation) are not met. Specific Gravity used for Degree of Saturation is assumed unless specified by the client.

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	AB01
Sample Ref.:	1
Depth (m):	0.40-0.78

Description:
CONCRETE

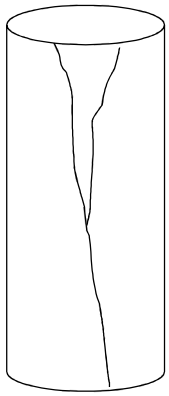
LF0879C (1000kN) compression frame used

Diameter	103.40 mm
Height	276.70 mm
Bulk Density	2.29 Mg/m³
Dry Density	2.16 Mg/m³
Water Content	5.7 %

Degree of Saturation: 61.7 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Axial splitting



Solid lines for material failures.
Dashed lines for apparent weakness failure.

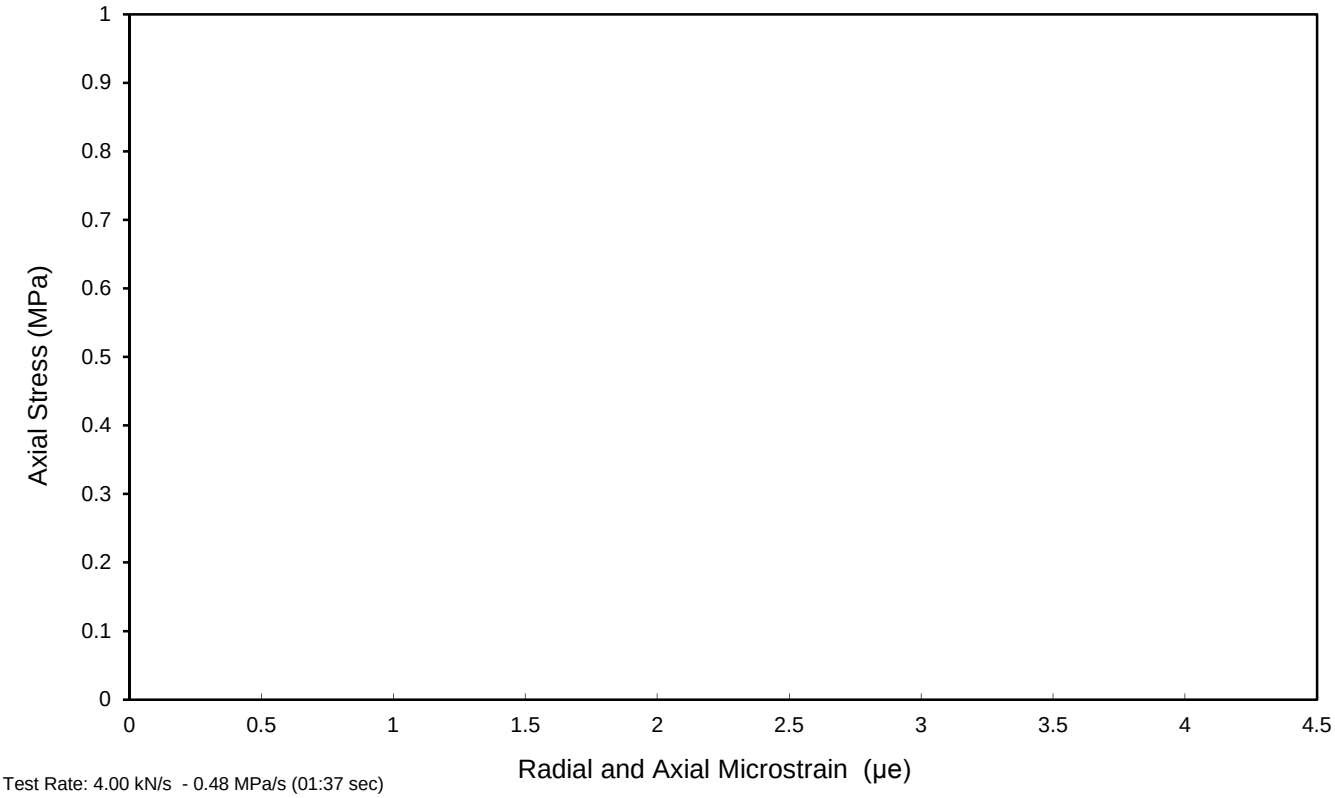
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 85°

Sample type	C

Test results

Unconfined Compressive Strength	46.1 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 4.00 kN/s - 0.48 MPa/s (01:37 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	AB06
Sample Ref.:	5
Depth (m):	8.57-8.73

Description:
CONCRETE

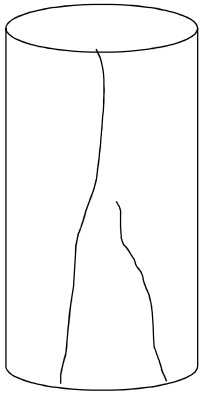
LF0879C (1000kN) compression frame used

Diameter	86.30 mm
Height	189.80 mm
Bulk Density	2.20 Mg/m³
Dry Density	2.06 Mg/m³
Water Content	7.1 %

Degree of Saturation: 61.4 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Axial splitting



Solid lines for material failures.
Dashed lines for apparent weakness failure.

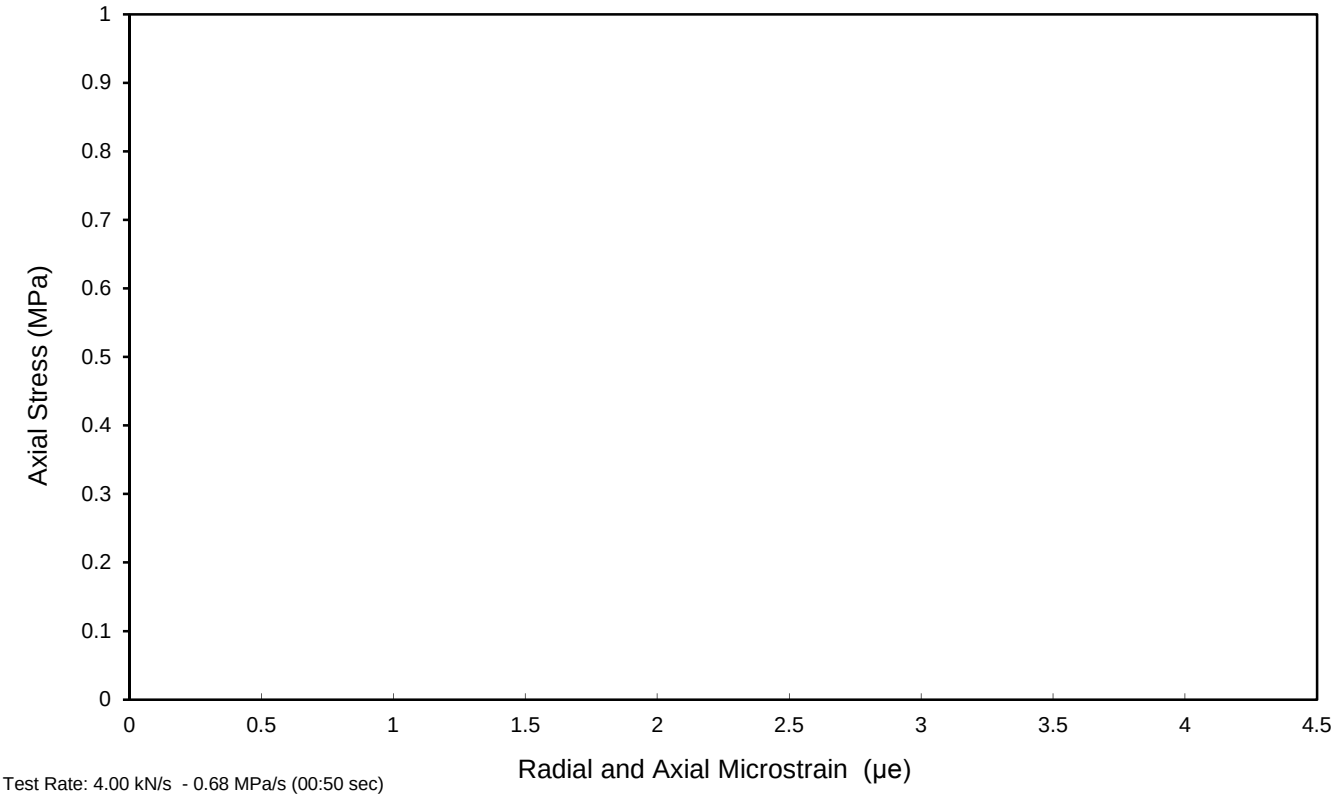
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 85°

Sample type	C

Test results

Unconfined Compressive Strength	34.3 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 4.00 kN/s - 0.68 MPa/s (00:50 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

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KENNET CENTRE, NEWBURY
STS5074

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	AB06
Sample Ref.:	6
Depth (m):	9.78-10.10

Description:
CONCRETE

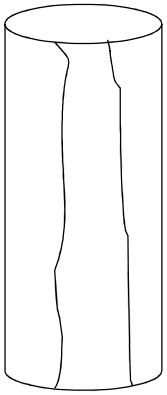
LF0879C (1000kN) compression frame used

Diameter	86.20 mm
Height	231.80 mm
Bulk Density	1.99 Mg/m³
Dry Density	1.83 Mg/m³
Water Content	8.4 %

Degree of Saturation: 48.1 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Axial splitting



Solid lines for material failures.
Dashed lines for apparent weakness failure.

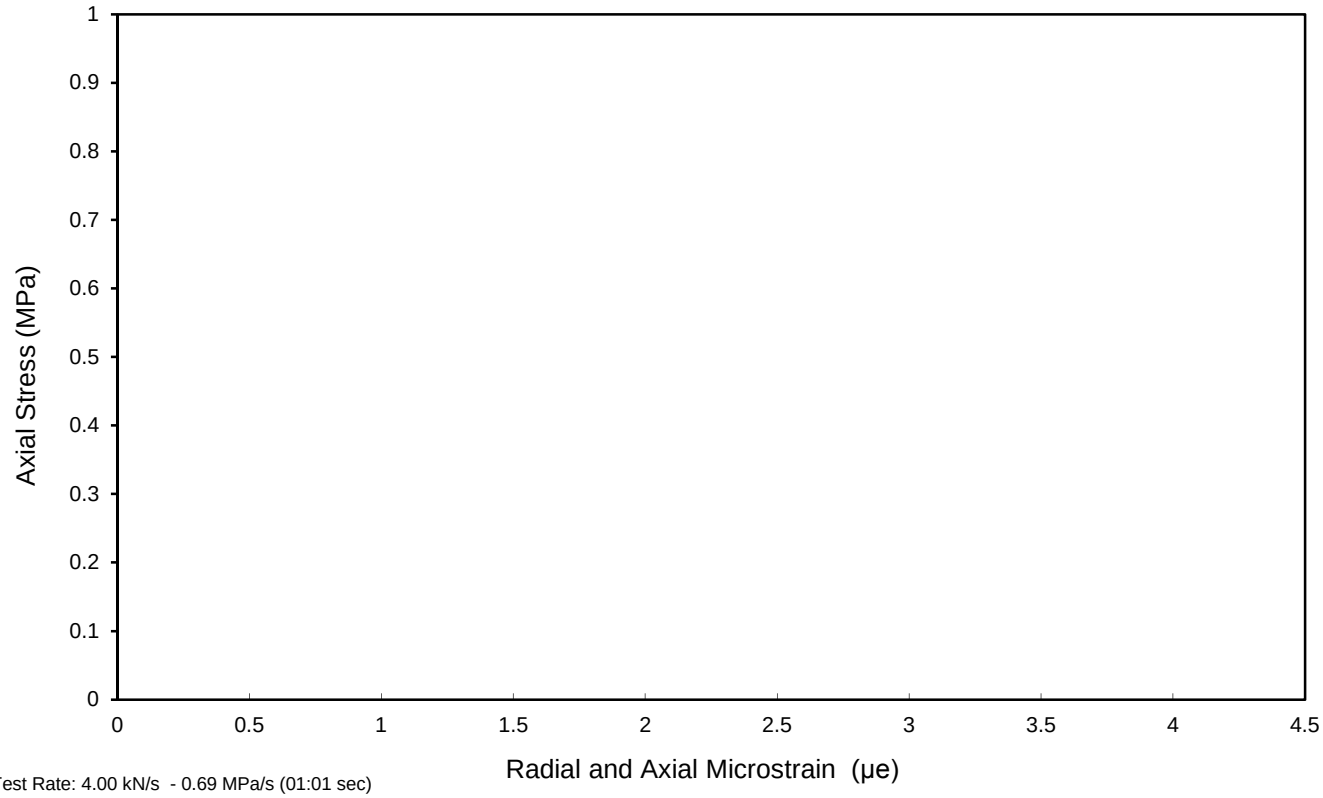
Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 85°

Sample type	C

Date tested: 23/07/2020

Test results

Unconfined Compressive Strength	42.1 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 4.00 kN/s - 0.69 MPa/s (01:01 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	AB07
Sample Ref.:	1
Depth (m):	0.00-0.20

Description:
CONCRETE

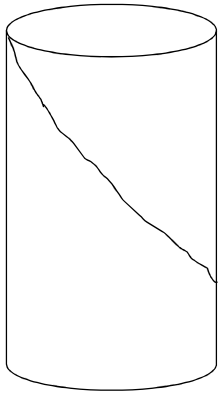
LF0879C (1000kN) compression frame used

Diameter	98.60 mm
Height	197.80 mm
Bulk Density	2.25 Mg/m³
Dry Density	2.14 Mg/m³
Water Content	5.1 %

Degree of Saturation: 53.4 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

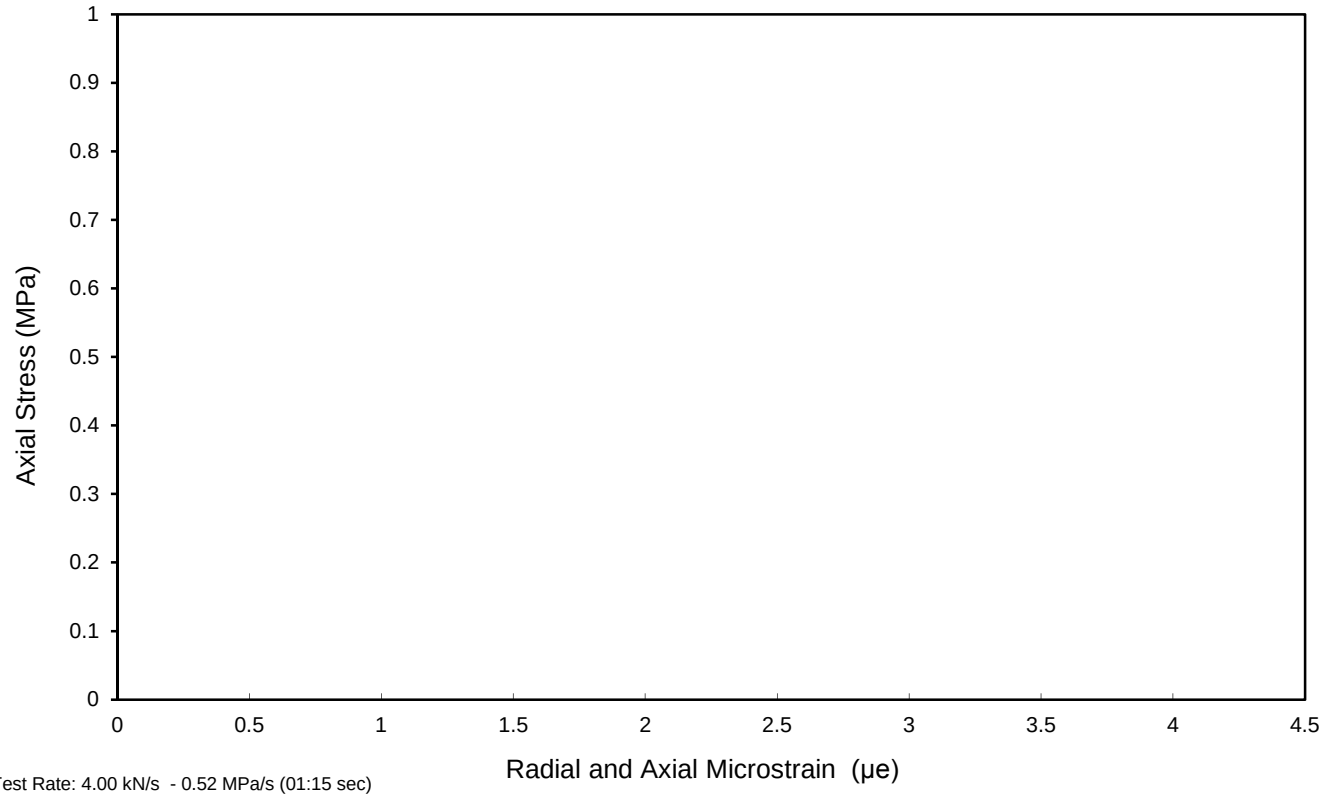
Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 62°

Date tested: 23/07/2020

Test results

Unconfined Compressive Strength	39.4 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a

Sample type	**C**



Test Rate: 4.00 kN/s - 0.52 MPa/s (01:15 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

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UKAS TESTING 1982

ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	AB07
Sample Ref.:	2
Depth (m):	6.00-6.30

Description:
CONCRETE

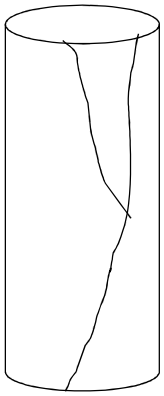
LF0879C (1000kN) compression frame used

Diameter	86.40 mm
Height	236.80 mm
Bulk Density	2.12 Mg/m³
Dry Density	1.97 Mg/m³
Water Content	7.6 %

Degree of Saturation: 55.3 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

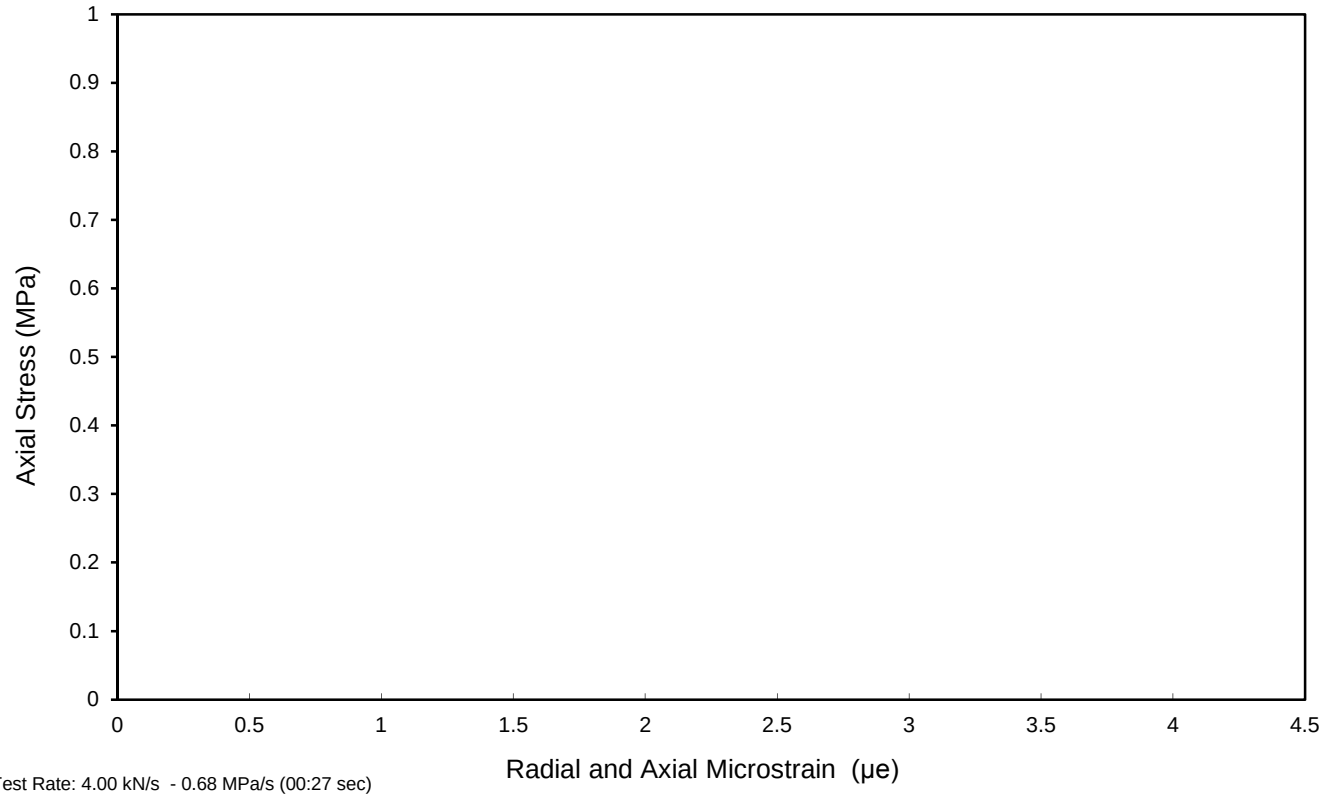
Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 95°

Date tested: 23/07/2020

Test results

Unconfined Compressive Strength	18.4 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a

Sample type	**C**



Test Rate: 4.00 kN/s - 0.68 MPa/s (00:27 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

GEOLABS

UKAS TESTING 1982

ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	AB07
Sample Ref.:	4
Depth (m):	14.00-14.20

Description:
CONCRETE

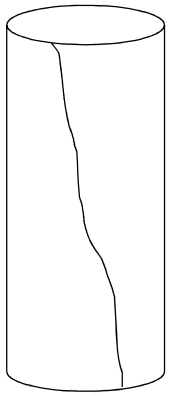
LF0879C (1000kN) compression frame used

Diameter	86.30 mm
Height	230.90 mm
Bulk Density	2.27 Mg/m³
Dry Density	2.12 Mg/m³
Water Content	6.9 %

Degree of Saturation: 68.8 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Axial splitting



Solid lines for material failures.
Dashed lines for apparent weakness failure.

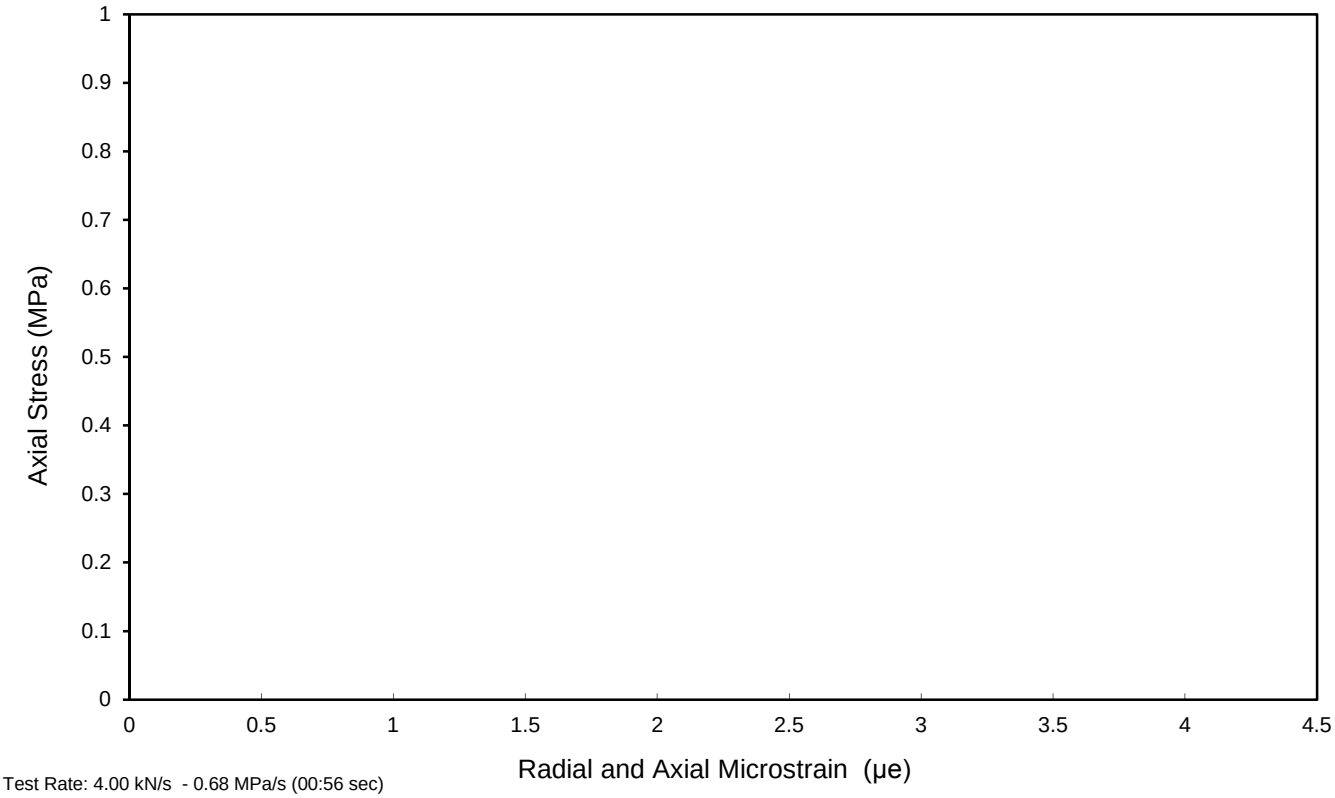
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 85°

Sample type	C

Test results

Unconfined Compressive Strength	38.6 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 4.00 kN/s - 0.68 MPa/s (00:56 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

GEOLABS

UKAS TESTING 1982

ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNCONFINED COMPRESSIVE STRENGTH WITH YOUNG'S MODULUS

Borehole Ref.:	RC01
Sample Ref.:	21
Depth (m):	26.35-26.55

Description:
White CHALK

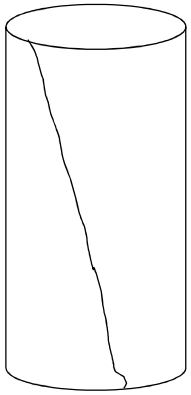
LF0879C (1000kN) compression frame used

Diameter	100.20 mm
Height	234.60 mm
Bulk Density	1.96 Mg/m³
Dry Density	1.53 Mg/m³
Water Content	28 %

Degree of Saturation: 98.0 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

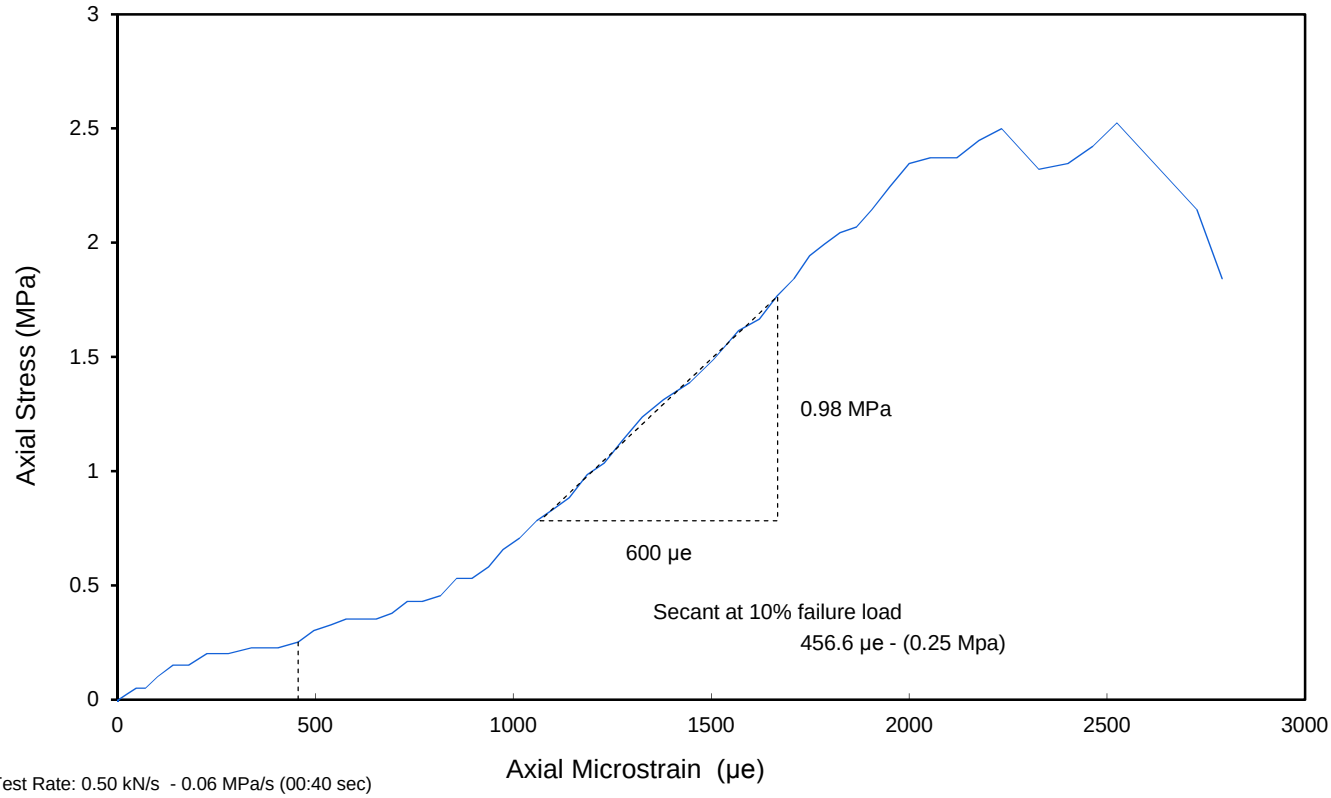
Date tested: 27/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 80°

Sample type	C

Test results

Unconfined Compressive Strength	2.52 MPa
Young's Modulus (tangential at 50% failure load)	1.64 GPa
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	0.553 GPa
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 0.50 kN/s - 0.06 MPa/s (00:40 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNCONFINED COMPRESSIVE STRENGTH WITH YOUNG'S MODULUS

Borehole Ref.:	RC01
Sample Ref.:	33
Depth (m):	30.70-32.10

Description:
White CHALK

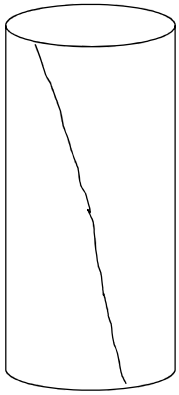
LF0879C (1000kN) compression frame used

Diameter	100.70 mm
Height	250.80 mm
Bulk Density	1.96 Mg/m³
Dry Density	1.54 Mg/m³
Water Content	28 %

Degree of Saturation: 98.9 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

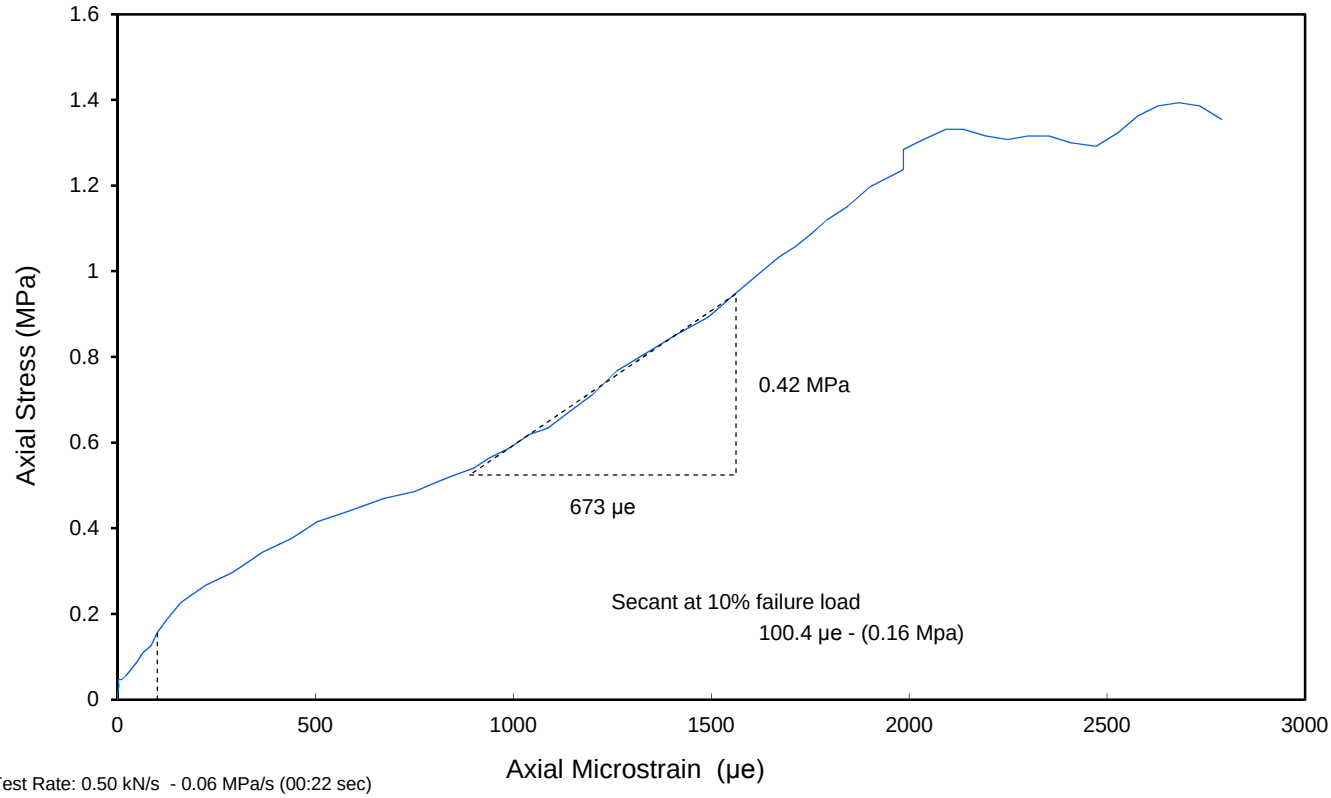
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 75°

Sample type	C

Test results

Unconfined Compressive Strength	1.39 MPa
Young's Modulus (tangential at 50% failure load)	0.629 GPa
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	1.56 GPa
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 0.50 kN/s - 0.06 MPa/s (00:22 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	RC02
Sample Ref.:	3
Depth (m):	20.55-20.85

Description:
White CHALK

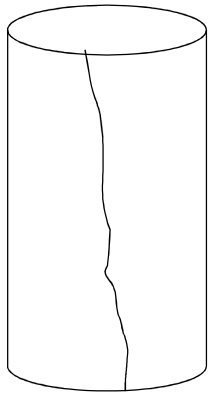
LF0879C (1000kN) compression frame used

Diameter	99.00 mm
Height	209.50 mm
Bulk Density	1.93 Mg/m³
Dry Density	1.52 Mg/m³
Water Content	27 %

Degree of Saturation: 94.0 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Axial splitting



Solid lines for material failures.
Dashed lines for apparent weakness failure.

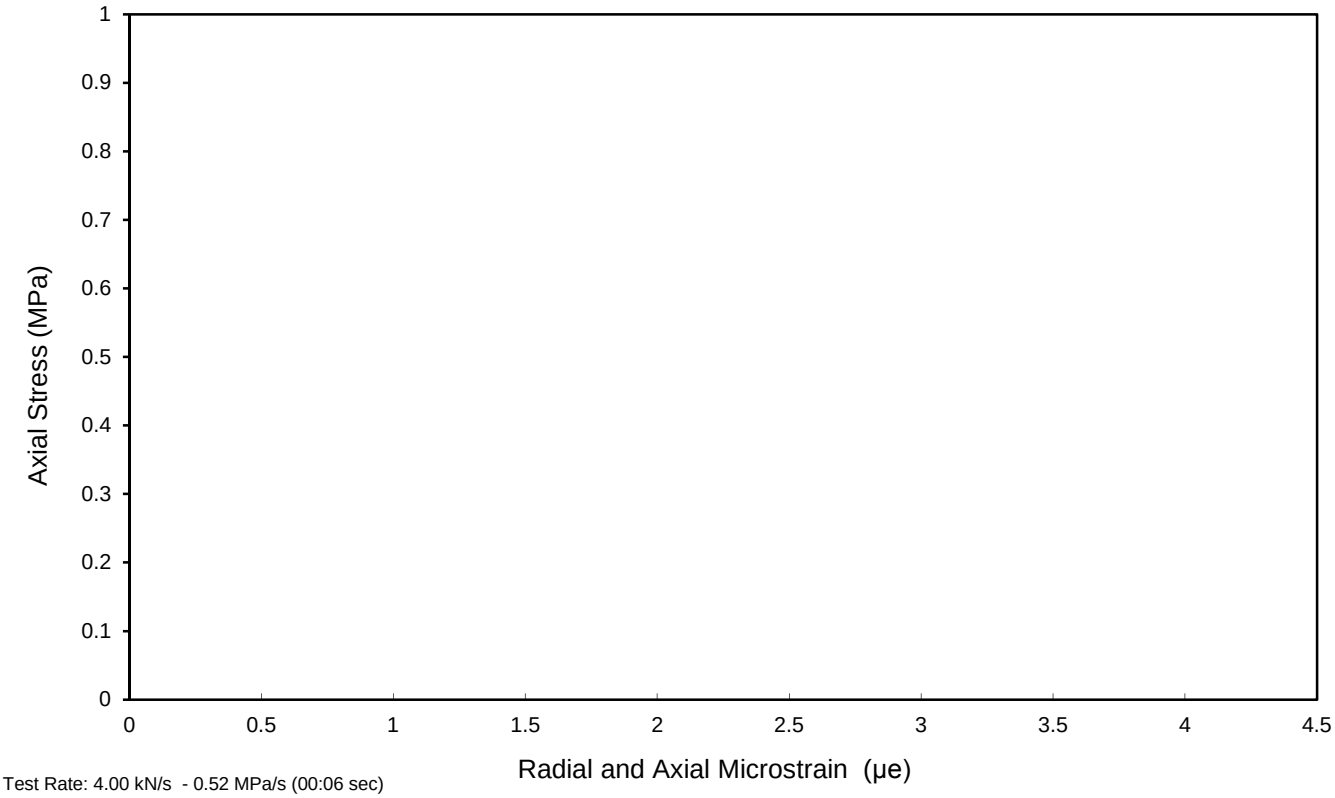
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 95°

Sample type	C

Test results

Unconfined Compressive Strength	3.17 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 4.00 kN/s - 0.52 MPa/s (00:06 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	RC02
Sample Ref.:	4
Depth (m):	24.48-24.71

Description:
White CHALK

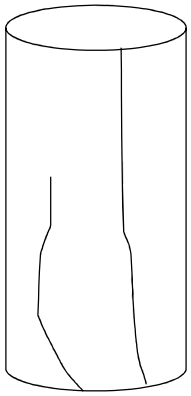
LF0879C (1000kN) compression frame used

Diameter	98.20 mm
Height	229.50 mm
Bulk Density	1.93 Mg/m³
Dry Density	1.50 Mg/m³
Water Content	28 %

Degree of Saturation: 95.8 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

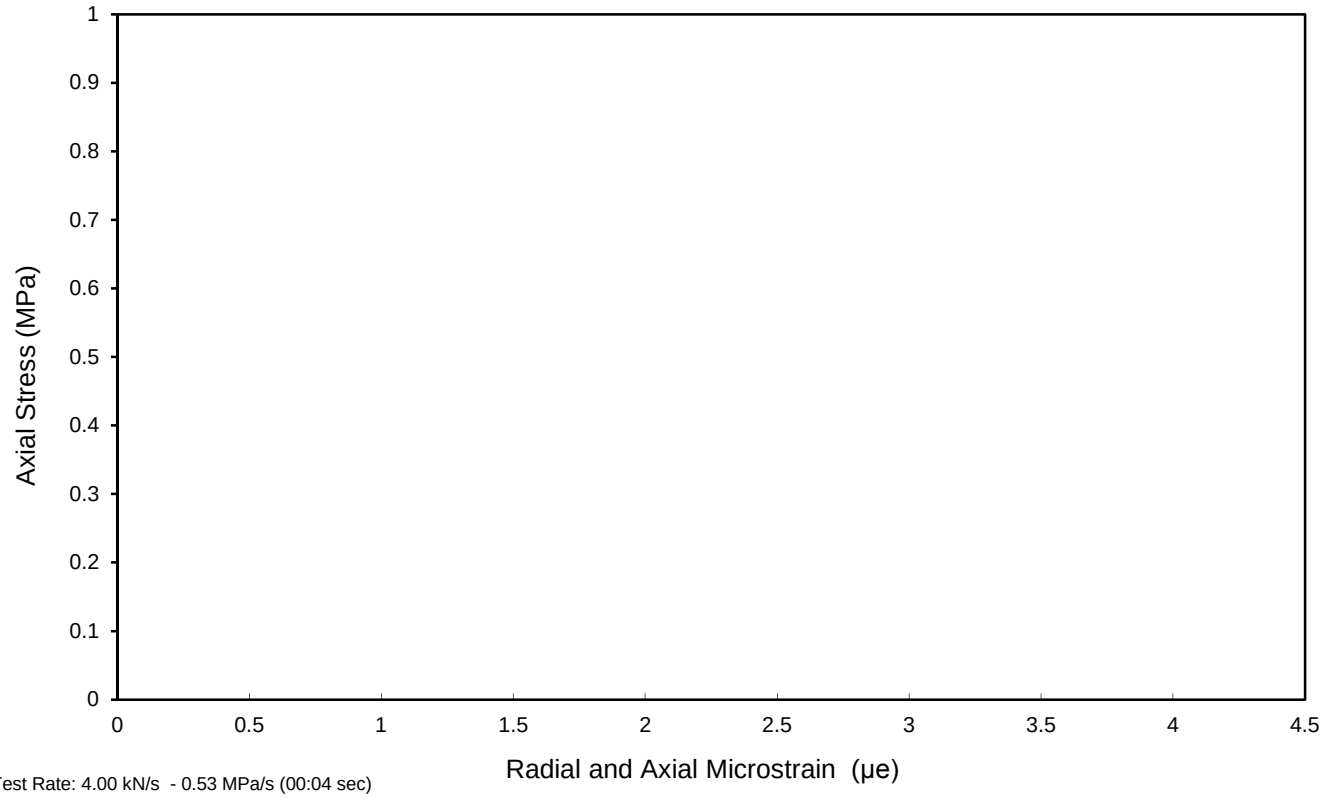
Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 85°

Date tested: 27/07/2020

Test results

Unconfined Compressive Strength	2.11 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a

Sample type	**C**



Test Rate: 4.00 kN/s - 0.53 MPa/s (00:04 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

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STS5074

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UKAS TESTING 1982

ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNCONFINED COMPRESSIVE STRENGTH WITH YOUNG'S MODULUS

Borehole Ref.:	RC02
Sample Ref.:	6
Depth (m):	27.69-28.10

Description:
White CHALK

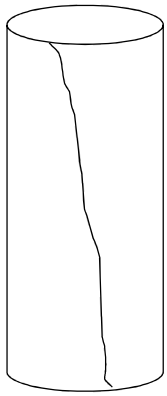
LF0879C (1000kN) compression frame used

Diameter	96.80 mm
Height	261.50 mm
Bulk Density	1.94 Mg/m³
Dry Density	1.53 Mg/m³
Water Content	27 %

Degree of Saturation: 95.1 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

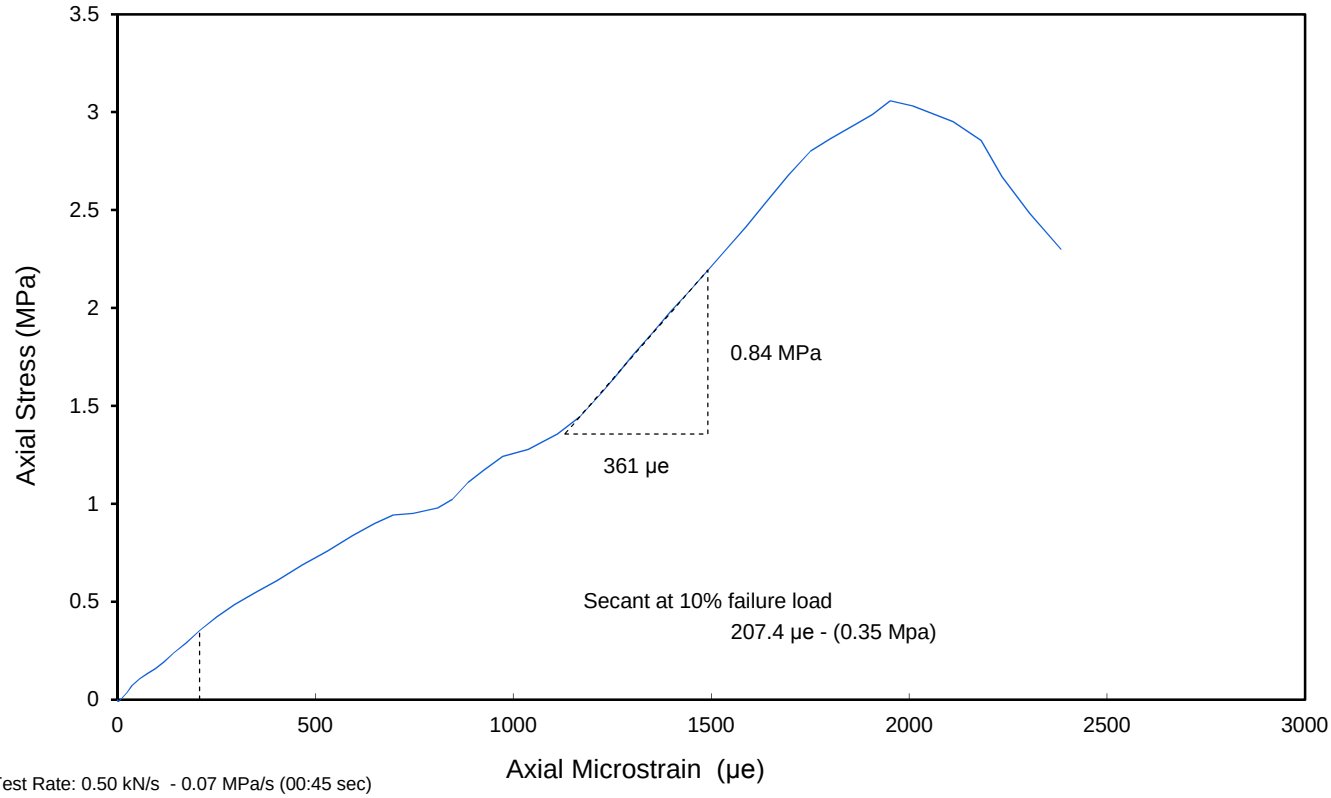
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 80°

Sample type	C

Test results

Unconfined Compressive Strength	3.06 MPa
Young's Modulus (tangential at 60% failure load)	2.32 GPa
Poisson's Ratio (tangential at 60% failure load)	n/a
Young's Modulus (secant at 10% failure load)	1.7 GPa
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 0.50 kN/s - 0.07 MPa/s (00:45 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNCONFINED COMPRESSIVE STRENGTH WITH YOUNG'S MODULUS

Borehole Ref.:	RC04
Sample Ref.:	24
Depth (m):	25.00-25.25

Description:
White CHALK

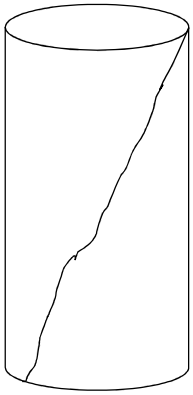
LF0879C (1000kN) compression frame used

Diameter	99.80 mm
Height	229.60 mm
Bulk Density	1.99 Mg/m³
Dry Density	1.60 Mg/m³
Water Content	24 %

Degree of Saturation: 96.0 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

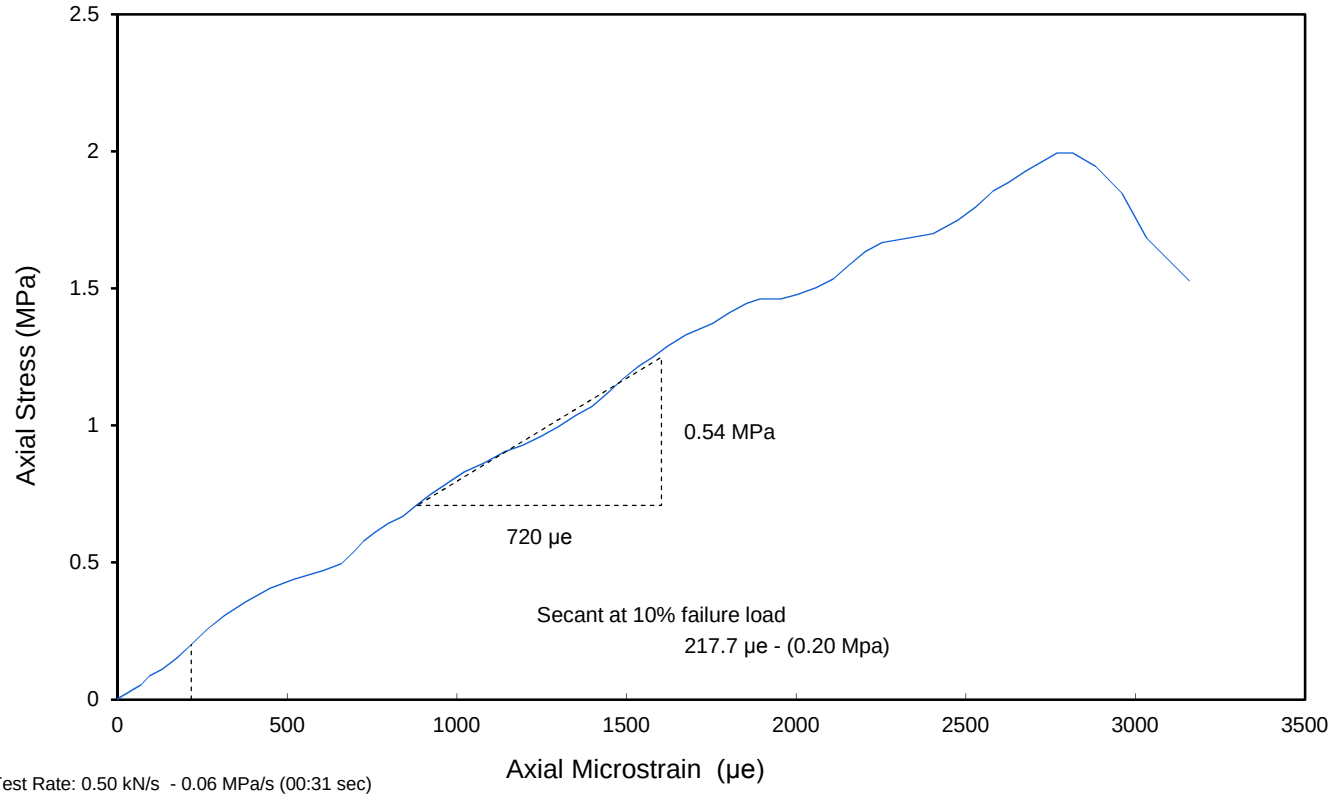
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 100°

Sample type	C

Test results

Unconfined Compressive Strength	1.99 MPa
Young's Modulus (tangential at 50% failure load)	0.751 GPa
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	0.922 GPa
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 0.50 kN/s - 0.06 MPa/s (00:31 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	RC04
Sample Ref.:	27
Depth (m):	29.00-29.30

Description:
White CHALK

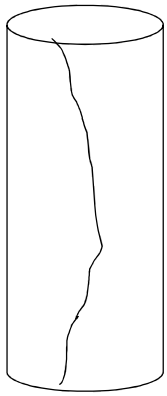
LF0879C (1000kN) compression frame used

Diameter	99.60 mm
Height	268.80 mm
Bulk Density	1.95 Mg/m³
Dry Density	1.53 Mg/m³
Water Content	28 %

Degree of Saturation: 97.8 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Axial splitting



Solid lines for material failures.
Dashed lines for apparent weakness failure.

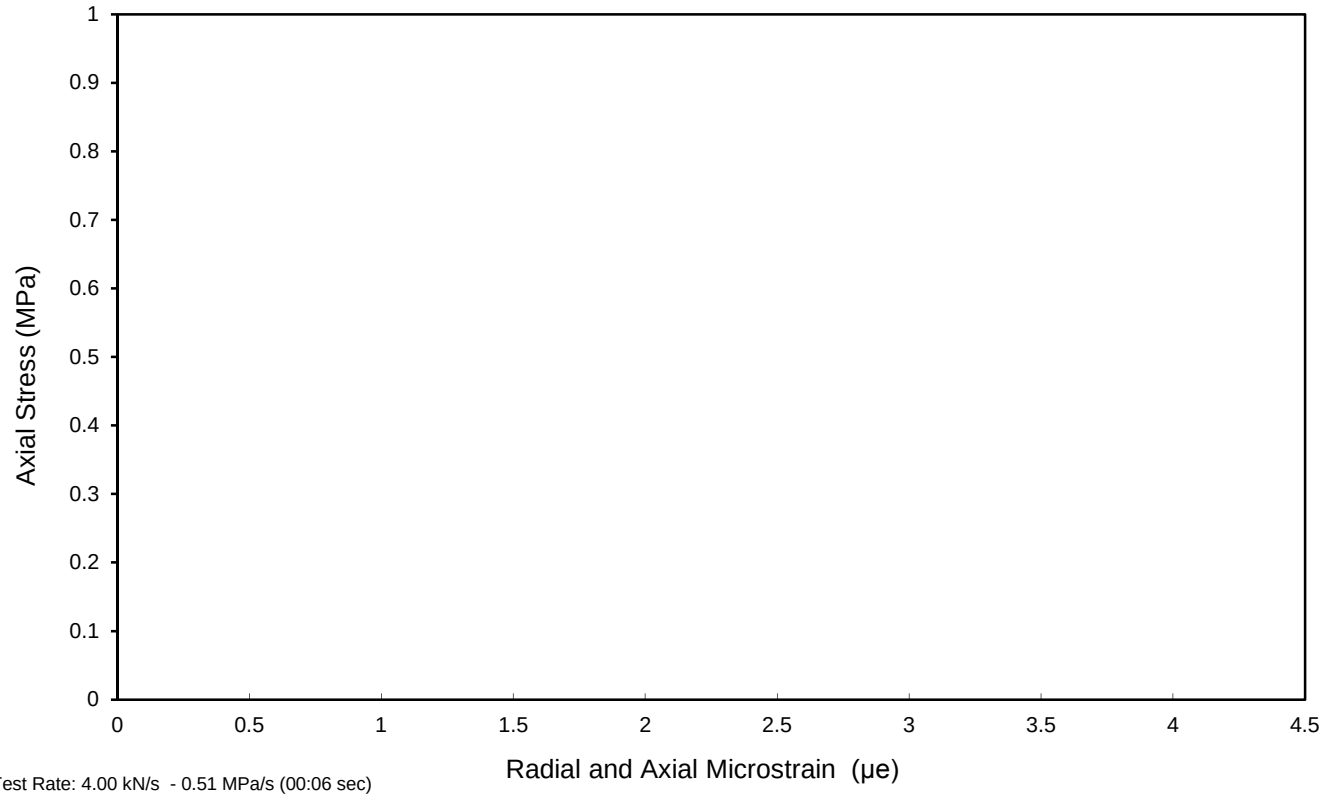
Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 85°

Date tested: 23/07/2020

Test results

Unconfined Compressive Strength	2.94 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a

Sample type	**C**



Test Rate: 4.00 kN/s - 0.51 MPa/s (00:06 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

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Project Name:

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STS5074

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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006

UNCONFINED COMPRESSIVE STRENGTH WITH YOUNG'S MODULUS

Borehole Ref.:	RC04
Sample Ref.:	29
Depth (m):	31.50-31.80

Description:
White CHALK

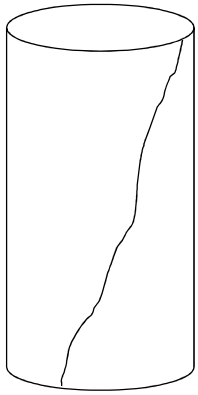
LF0879C (1000kN) compression frame used

Diameter	97.60 mm
Height	219.70 mm
Bulk Density	1.97 Mg/m³
Dry Density	1.55 Mg/m³
Water Content	28 %

Degree of Saturation: 100 % Specific Gravity: 2.7 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

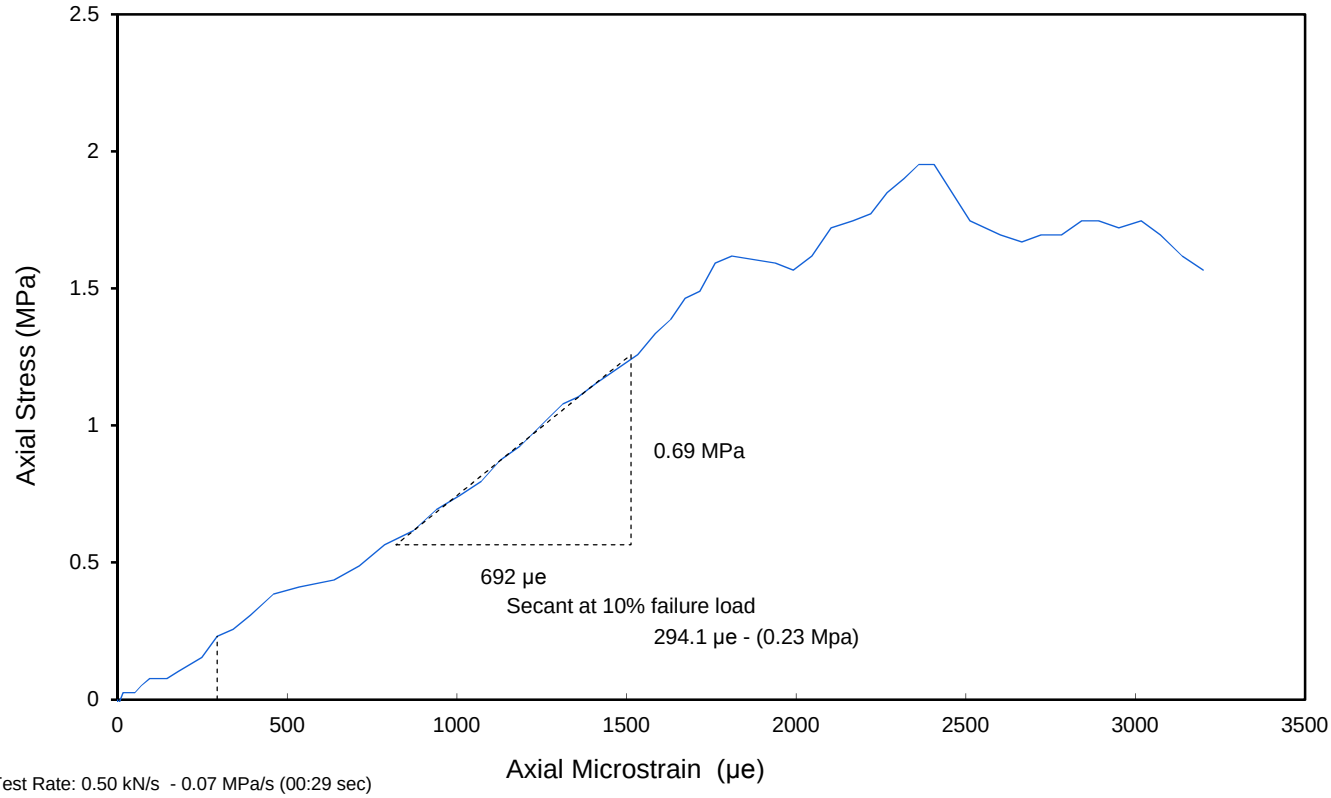
Date tested: 23/07/2020

Angle of foliation/Horizontal: n/a
Angle of shear plane/Horizontal: 100°

Sample type	C

Test results

Unconfined Compressive Strength	1.95 MPa
Young's Modulus (tangential at 50% failure load)	1 GPa
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	0.786 GPa
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 0.50 kN/s - 0.07 MPa/s (00:29 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are not met.

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 29/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006 In-house Technical Procedure TP35

DETERMINATION OF POINT LOAD STRENGTH ON ROCK

Sample details				Point Load test											
Borehole Ref.	Sample Ref.	Depth (m)	Description	D. Tested	Test type & Direction		Sample width W (mm)	Platen separation (mm) Start D	Platen separation (mm) End D'	Water Content (%)	Equiv. Diameter D_e (mm)	Failure Load P (kN)	I_s P/De^2 (MPa)	Correction Factor F	Point Load Index $I_{s(50)}$ (MPa)
RC01	17	18.50-18.70	White CHALK	22/07/20	D	R	100.8	100.5	95.8		98.1	0.52	0.05	1.35	0.07
RC01	23	26.70-26.87	White CHALK	22/07/20	D	R	100.8	100.3	96.7		98.5	0.86	0.09	1.36	0.12
RC01	32	29.10-29.30	White CHALK	22/07/20	D	R	97.5	96.6	92.4		94.5	0.46	0.05	1.33	0.07
RC01	34	32.60-32.80	White CHALK	22/07/20	D	R	98.8	100.0	96.3		98.1	1.05	0.11	1.35	0.15
RC01	58	33.55-33.70	White CHALK	22/07/20	D	R	100.6	100.0	95.8		97.9	1.13	0.12	1.35	0.16
RC02	3	20.55-20.85	White CHALK	22/07/20	A	R	100.2	37.8	34.9		66.7	0.75	0.17	1.14	0.19
RC02	4	24.48-24.71	White CHALK	22/07/20	L	R	74.2	33.2	26.4		49.9	0.25	0.10	1.00	0.1
RC02	5	27.35-27.69	White CHALK	22/07/20	D	R	95.7	96.6	92.8		94.7	1.18	0.13	1.33	0.17
RC02	6	27.69-28.10	White CHALK	22/07/20	D	R	97.5	96.5	92.8		94.6	0.92	0.10	1.33	0.13
RC04	24	25.00-25.25	White CHALK	22/07/20	A	R	99.8	76.0	72.5		96.0	0.33	0.04	1.34	0.05

(*) Sample failed on weakness

Test type and direction: **D** - Diametral **A** - Axial **B** - Block **L** - Irregular lump **Pd** - Perpendicular to planes of weakness **R** - Random or unknown orientation **Pl** - Parallel to planes of weakness

Checked and Approved by

CC

C Clergeaud (Snr. Geologist)

Date: 27/07/2020

Project Number:

GEO / 31397

Project Name:

KENNET CENTRE, NEWBURY
STS5074

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ISRM Suggested Methods – Rock Characterization Testing and Monitoring 1974 - 2006 In-house Technical Procedure TP35

DETERMINATION OF POINT LOAD STRENGTH ON ROCK

Sample details				Point Load test											
Borehole Ref.	Sample Ref.	Depth (m)	Description	D. Tested	Test type & Direction		Sample width W (mm)	Platen separation (mm) Start D	Platen separation (mm) End D'	Water Content (%)	Equiv. Diameter D_e (mm)	Failure Load P (kN)	I_s P/De^2 (MPa)	Correction Factor F	Point Load Index $I_{s(50)}$ (MPa)
RC04	27	29.00-29.30	White CHALK	22/07/20	A	R	98.2	36.5	28.5		59.7	0.57	0.16	1.08	0.17
RC04	29	31.50-31.80	White CHALK	22/07/20	A	R	97.5	47.7	41.0		71.3	1.11	0.22	1.17	0.26
RC04	31	34.25-34.55	White CHALK	22/07/20	A	R	98.4	86.7	80.5		100.4	0.41	0.04	1.37	0.05

(*) Sample failed on weakness

Test type and direction: **D** - Diametral **A** - Axial **B** - Block **L** - Irregular lump **Pd** - Perpendicular to planes of weakness **R** - Random or unknown orientation **Pl** - Parallel to planes of weakness

Checked and Approved by

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Date: 27/07/2020

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KENNET CENTRE, NEWBURY

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UKAS TESTING 1982

Alexa Band
Soiltechnics Ltd
White Lodge
Cedar Barn
Walgrave
NN6 9PY

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

DETS Report No: 20-07033

Site Reference:	Kennet Centre, Newbury
Project / Job Ref:	STS5074-D-1
Order No:	POR008177
Sample Receipt Date:	30/06/2020
Sample Scheduled Date:	30/06/2020
Report Issue Number:	1
Reporting Date:	06/07/2020

Authorised by:

Kevin Old
General Manager

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

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

4480

Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	29/05/20	29/05/20	29/05/20	29/05/20	27/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH010.501	BH011.504	BH017.0015	BH018.0016	BH020.601
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH01	BH01	BH01	BH01	BH02
Order No: POR008177	**Depth (m)**	0.50	1.50	7.00	8.00	0.60
Reporting Date: 06/07/2020	**DETS Sample No**	483775	483776	483777	483778	483779

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected			Not Detected
pH	pH Units	N/a	MCERTS	8.9		8.7	8.9	11.1
Total Cyanide	mg/kg	< 2	NONE	< 2				
Complex Cyanide	mg/kg	< 2	NONE	< 2				
Free Cyanide	mg/kg	< 2	NONE	< 2				
Total Sulphate as SO_4	mg/kg	< 200	NONE	1667		< 200	< 200	1397
Total Sulphate as SO_4	%	< 0.02	NONE	0.17		< 0.02	< 0.02	0.14
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	222		< 10	< 10	208
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.22		< 0.01	< 0.01	0.21
Total Sulphur	%	< 0.02	NONE	0.08		< 0.02	< 0.02	0.04
Sulphide	mg/kg	< 5	NONE					
Organic Matter	%	< 0.1	MCERTS	5.6				
Loss on Ignition @ 450°C	%	< 0.01	NONE	2.40				
Ammonium as NH_4	mg/kg	< 0.5	NONE			< 0.5		
Ammonium as NH_4	mg/l	< 0.05	NONE			< 0.05		
W/S Chloride (2:1)	mg/kg	< 1	MCERTS			12		
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS			5.8		
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS			< 3		
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS			< 1.5		
Arsenic (As)	mg/kg	< 2	MCERTS	9				
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4				
Chromium (Cr)	mg/kg	< 2	MCERTS	9				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	13				
Lead (Pb)	mg/kg	< 3	MCERTS	36				
W/S Magnesium	mg/l	< 0.1	NONE			0.4		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	7				
Selenium (Se)	mg/kg	< 2	MCERTS	< 3				
Vanadium (V)	mg/kg	< 1	MCERTS	9				
Zinc (Zn)	mg/kg	< 3	MCERTS	62				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				

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

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

4480

Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	27/05/20	27/05/20	03/06/20	03/06/20	03/06/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH021.002	BH025.0012	BH030.501	BH031.504	BH037.0018
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH02	BH02	BH03	BH03	BH03
Order No: POR008177	**Depth (m)**	1.00	5.00	0.50	1.50	7.00
Reporting Date: 06/07/2020	**DETS Sample No**	483780	483781	483783	483784	483785

Determinand	Unit	RL	Accreditation					(n)
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected		Not Detected	Not Detected	
pH	pH Units	N/a	MCERTS	8.9	8.9	12.2		10.0
Total Cyanide	mg/kg	< 2	NONE	< 2		< 2		
Complex Cyanide	mg/kg	< 2	NONE	< 2		< 2		
Free Cyanide	mg/kg	< 2	NONE	< 2		< 2		
Total Sulphate as SO_4	mg/kg	< 200	NONE		< 200	5609		< 200
Total Sulphate as SO_4	%	< 0.02	NONE		< 0.02	0.56		< 0.02
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		< 10	< 10		< 10
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		< 0.01	< 0.01		< 0.01
Total Sulphur	%	< 0.02	NONE		< 0.02	0.17		< 0.02
Sulphide	mg/kg	< 5	NONE					
Organic Matter	%	< 0.1	MCERTS	2.8		1.4		
Loss on Ignition @ 450°C	%	< 0.01	NONE	2.20		2.40		
Ammonium as NH_4	mg/kg	< 0.5	NONE					
Ammonium as NH_4	mg/l	< 0.05	NONE					
W/S Chloride (2:1)	mg/kg	< 1	MCERTS					
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS					
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS					
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	6		11		
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5		< 0.5		
W/S Boron	mg/kg	< 1	NONE	1		< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2		< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	15		14		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	36		20		
Lead (Pb)	mg/kg	< 3	MCERTS	100		5		
W/S Magnesium	mg/l	< 0.1	NONE					
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	14		33		
Selenium (Se)	mg/kg	< 2	MCERTS	< 3		< 3		
Vanadium (V)	mg/kg	< 1	MCERTS	21		22		
Zinc (Zn)	mg/kg	< 3	MCERTS	63		28		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		< 2		

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	08/06/20	08/06/20	01/06/20	01/06/20	01/06/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH041.003	BH042.005	RC011.001	RC013.005	RC013.106
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH04	BH04	RC01	RC01	RC01
Order No: POR008177	**Depth (m)**	1.00	2.00	1.00	3.00	3.10 - 3.50
Reporting Date: 06/07/2020	**DETS Sample No**	483786	483787	483788	483789	483790

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected				
pH	pH Units	N/a	**MCERTS**	9.2	7.9	7.8	7.3	8.5
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Total Sulphate as SO_4	mg/kg	< 200	NONE	307			1785	294
Total Sulphate as SO_4	%	< 0.02	NONE	0.03			0.18	0.03
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	50	39		124	59
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.05	0.04		0.12	0.06
Total Sulphur	%	< 0.02	NONE	< 0.02			0.40	0.03
Sulphide	mg/kg	< 5	NONE		< 5			
Organic Matter	%	< 0.1	**MCERTS**	0.2	2.3	1.9		
Loss on Ignition @ 450°C	%	< 0.01	NONE	0.60		3		
Ammonium as NH_4	mg/kg	< 0.5	NONE					
Ammonium as NH_4	mg/l	< 0.05	NONE					
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**					
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**					
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**		9			
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**		4.4			
Arsenic (As)	mg/kg	< 2	**MCERTS**	6	5	10		
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	< 0.5	< 0.5	0.5		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	< 0.2	< 0.2		
Chromium (Cr)	mg/kg	< 2	**MCERTS**	28	8	16		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	**MCERTS**	18	18	20		
Lead (Pb)	mg/kg	< 3	**MCERTS**	11	11	138		
W/S Magnesium	mg/l	< 0.1	NONE					
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	**MCERTS**	24	11	13		
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 3	< 3	< 3		
Vanadium (V)	mg/kg	< 1	**MCERTS**	42	12	18		
Zinc (Zn)	mg/kg	< 3	**MCERTS**	55	35	79		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	08/06/20	08/06/20	20/05/20	18/05/20	18/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	RC022.503	RC0231.2510	RC040.801	WS01a0.501	WS01a1.504
Project / Job Ref: STS5074-D-1	**Additional Refs**	RC02	RC02	RC04	WS01a	WS01a
Order No: POR008177	**Depth (m)**	2.50	31.25	0.80	0.50	1.50
Reporting Date: 06/07/2020	**DETS Sample No**	483791	483792	483793	483794	483795

Determinand	**Unit**	**RL**	**Accreditation**	(n)				
Asbestos Screen (S)	N/a	N/a	**ISO17025**				Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**	8.1	8.3	7.7	8.8	
Total Cyanide	mg/kg	< 2	NONE	< 2		< 2	< 2	
Complex Cyanide	mg/kg	< 2	NONE	< 2		< 2	< 2	
Free Cyanide	mg/kg	< 2	NONE	< 2		< 2	< 2	
Total Sulphate as SO_4	mg/kg	< 200	NONE		502	838		
Total Sulphate as SO_4	%	< 0.02	NONE		0.05	0.08		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**		16	121	< 10	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**		0.02	0.12	< 0.01	
Total Sulphur	%	< 0.02	NONE		< 0.02	0.03		
Sulphide	mg/kg	< 5	NONE				< 5	
Organic Matter	%	< 0.1	**MCERTS**	2.6		1.8	0.3	
Loss on Ignition @ 450°C	%	< 0.01	NONE	4.80		3.70		
Ammonium as NH_4	mg/kg	< 0.5	NONE			3.2		
Ammonium as NH_4	mg/l	< 0.05	NONE			0.32		
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**			90		
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**			45.1		
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**			290	6	
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**			145	3	
Arsenic (As)	mg/kg	< 2	**MCERTS**	3		4	< 2	
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	< 0.5		< 0.5	< 0.5	
W/S Boron	mg/kg	< 1	NONE	< 1		< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2		< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	**MCERTS**	5		10	8	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2	
Copper (Cu)	mg/kg	< 4	**MCERTS**	11		25	4	
Lead (Pb)	mg/kg	< 3	**MCERTS**	4		112	6	
W/S Magnesium	mg/l	< 0.1	NONE			2.3		
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1		< 1	< 1	
Nickel (Ni)	mg/kg	< 3	**MCERTS**	9		12	3	
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 3		< 3	< 3	
Vanadium (V)	mg/kg	< 1	**MCERTS**	6		13	4	
Zinc (Zn)	mg/kg	< 3	**MCERTS**	18		68	7	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		< 2	< 2	

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	19/05/20	19/05/20	19/05/20	19/05/20	19/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS020.501	WS031.452	WS031.753	WS040.751	WS041.502
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS02	WS03	WS03	WS04	WS04
Order No: POR008177	**Depth (m)**	0.50	1.45	1.75	0.75	1.50
Reporting Date: 06/07/2020	**DETS Sample No**	483797	483798	483799	483801	483802

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected	Not Detected	
pH	pH Units	N/a	**MCERTS**					7.3
Total Cyanide	mg/kg	< 2	NONE					< 2
Complex Cyanide	mg/kg	< 2	NONE					< 2
Free Cyanide	mg/kg	< 2	NONE					< 2
Total Sulphate as SO_4	mg/kg	< 200	NONE					
Total Sulphate as SO_4	%	< 0.02	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**					108
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**					0.11
Total Sulphur	%	< 0.02	NONE					
Sulphide	mg/kg	< 5	NONE					< 5
Organic Matter	%	< 0.1	**MCERTS**					4.1
Loss on Ignition @ 450°C	%	< 0.01	NONE					
Ammonium as NH_4	mg/kg	< 0.5	NONE					
Ammonium as NH_4	mg/l	< 0.05	NONE					
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**					
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**					
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**					685
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**					343
Arsenic (As)	mg/kg	< 2	**MCERTS**					12
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**					0.6
W/S Boron	mg/kg	< 1	NONE					1.4
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**					< 0.2
Chromium (Cr)	mg/kg	< 2	**MCERTS**					14
Chromium (hexavalent)	mg/kg	< 2	NONE					< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**					108
Lead (Pb)	mg/kg	< 3	**MCERTS**					1990
W/S Magnesium	mg/l	< 0.1	NONE					
Mercury (Hg)	mg/kg	< 1	**MCERTS**					2.8
Nickel (Ni)	mg/kg	< 3	**MCERTS**					19
Selenium (Se)	mg/kg	< 2	**MCERTS**					< 3
Vanadium (V)	mg/kg	< 1	**MCERTS**					22
Zinc (Zn)	mg/kg	< 3	**MCERTS**					126
Total Phenols (monohydric)	mg/kg	< 2	NONE					< 2

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	19/05/20	20/05/20	20/05/20	21/05/20	21/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS041.803	WS050.901	WS051.502	WS060.501	WS061.502
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS04	WS05	WS05	WS06	WS06
Order No: POR008177	**Depth (m)**	1.80	0.90	1.50	0.50	1.50
Reporting Date: 06/07/2020	**DETS Sample No**	483803	483805	483806	483808	483809

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**					
Total Cyanide	mg/kg	< 2	NONE					
Complex Cyanide	mg/kg	< 2	NONE					
Free Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE					
Total Sulphate as SO_4	%	< 0.02	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**					
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**					
Total Sulphur	%	< 0.02	NONE					
Sulphide	mg/kg	< 5	NONE					
Organic Matter	%	< 0.1	**MCERTS**					
Loss on Ignition @ 450°C	%	< 0.01	NONE					
Ammonium as NH_4	mg/kg	< 0.5	NONE					
Ammonium as NH_4	mg/l	< 0.05	NONE					
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**					
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**					
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**					
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**					
Arsenic (As)	mg/kg	< 2	**MCERTS**					
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**					
Chromium (Cr)	mg/kg	< 2	**MCERTS**					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	**MCERTS**					
Lead (Pb)	mg/kg	< 3	**MCERTS**					
W/S Magnesium	mg/l	< 0.1	NONE					
Mercury (Hg)	mg/kg	< 1	**MCERTS**					
Nickel (Ni)	mg/kg	< 3	**MCERTS**					
Selenium (Se)	mg/kg	< 2	**MCERTS**					
Vanadium (V)	mg/kg	< 1	**MCERTS**					
Zinc (Zn)	mg/kg	< 3	**MCERTS**					
Total Phenols (monohydric)	mg/kg	< 2	NONE					

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	21/05/20	21/05/20			
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS071.301	WS071.902			
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS07	WS07			
Order No: POR008177	**Depth (m)**	1.30	1.90			
Reporting Date: 06/07/2020	**DETS Sample No**	483811	483812			

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected			
pH	pH Units	N/a	**MCERTS**		9.6			
Total Cyanide	mg/kg	< 2	NONE		< 2			
Complex Cyanide	mg/kg	< 2	NONE		< 2			
Free Cyanide	mg/kg	< 2	NONE		< 2			
Total Sulphate as SO_4	mg/kg	< 200	NONE					
Total Sulphate as SO_4	%	< 0.02	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**		869			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**		0.87			
Total Sulphur	%	< 0.02	NONE					
Sulphide	mg/kg	< 5	NONE		< 5			
Organic Matter	%	< 0.1	**MCERTS**		1.3			
Loss on Ignition @ 450°C	%	< 0.01	NONE					
Ammonium as NH_4	mg/kg	< 0.5	NONE					
Ammonium as NH_4	mg/l	< 0.05	NONE					
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**					
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**					
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**		235			
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**		118			
Arsenic (As)	mg/kg	< 2	**MCERTS**		16			
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**		0.7			
W/S Boron	mg/kg	< 1	NONE		1			
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**		< 0.2			
Chromium (Cr)	mg/kg	< 2	**MCERTS**		26			
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2			
Copper (Cu)	mg/kg	< 4	**MCERTS**		159			
Lead (Pb)	mg/kg	< 3	**MCERTS**		179			
W/S Magnesium	mg/l	< 0.1	NONE					
Mercury (Hg)	mg/kg	< 1	**MCERTS**		< 1			
Nickel (Ni)	mg/kg	< 3	**MCERTS**		22			
Selenium (Se)	mg/kg	< 2	**MCERTS**		< 3			
Vanadium (V)	mg/kg	< 1	**MCERTS**		30			
Zinc (Zn)	mg/kg	< 3	**MCERTS**		246			
Total Phenols (monohydric)	mg/kg	< 2	NONE		< 2			

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Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 20-07033	**Date Sampled**	29/05/20	27/05/20	03/06/20	08/06/20	08/06/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH010.501	BH021.002	BH030.501	BH041.003	BH042.005
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH01	BH02	BH03	BH04	BH04
Order No: POR008177	**Depth (m)**	0.50	1.00	0.50	1.00	2.00
Reporting Date: 06/07/2020	**DETS Sample No**	483775	483780	483783	483786	483787

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.26	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	1.63	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	3.53	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.06	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	2.03	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	8.13	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.36	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	6.74	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	6.25	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	1.35	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	6.02	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	38.5	< 1.6	< 1.6	< 1.6	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 20-07033	**Date Sampled**	01/06/20	08/06/20	20/05/20	18/05/20	19/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	RC011.001	RC022.503	RC040.801	WS01a0.501	WS041.502
Project / Job Ref: STS5074-D-1	**Additional Refs**	RC01	RC02	RC04	WS01a	WS04
Order No: POR008177	**Depth (m)**	1.00	2.50	0.80	0.50	1.50
Reporting Date: 06/07/2020	**DETS Sample No**	483788	483791	483793	483794	483802

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.28	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	0.24	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.18	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.21	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 20-07033	**Date Sampled**	21/05/20				
Soiltechnics Ltd	**Time Sampled**	None Supplied				
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS071.902				
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS07				
Order No: POR008177	**Depth (m)**	1.90				
Reporting Date: 06/07/2020	**DETS Sample No**	483812				

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	0.21				
Pyrene	mg/kg	< 0.1	MCERTS	0.19				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 20-07033	**Date Sampled**	08/06/20	18/05/20	19/05/20	21/05/20	
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH042.005	WS01a0.501	WS041.502	WS071.902	
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH04	WS01a	WS04	WS07	
Order No: POR008177	**Depth (m)**	2.00	0.50	1.50	1.90	
Reporting Date: 06/07/2020	**DETS Sample No**	483787	483794	483802	483812	

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 20-07033	Date Sampled	08/06/20	18/05/20	19/05/20	21/05/20	
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kennet Centre, Newbury	TP / BH No	BH042.005	WS01a0.501	WS041.502	WS071.902	
Project / Job Ref: STS5074-D-1	Additional Refs	BH04	WS01a	WS04	WS07	
Order No: POR008177	Depth (m)	2.00	0.50	1.50	1.90	
Reporting Date: 06/07/2020	DETS Sample No	483787	483794	483802	483812	

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

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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 20-07033	Date Sampled	08/06/20	18/05/20	19/05/20	21/05/20	
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kennet Centre, Newbury	TP / BH No	BH042.005	WS01a0.501	WS041.502	WS071.902	
Project / Job Ref: STS5074-D-1	Additional Refs	BH04	WS01a	WS04	WS07	
Order No: POR008177	Depth (m)	2.00	0.50	1.50	1.90	
Reporting Date: 06/07/2020	DETS Sample No	483787	483794	483802	483812	

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	

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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 20-07033	**Date Sampled**	08/06/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH042.005
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH04
Order No: POR008177	**Depth (m)**	2.00
Reporting Date: 06/07/2020	**DETS Sample No**	483787

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 20-07033	**Date Sampled**	18/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS01a0.501
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS01a
Order No: POR008177	**Depth (m)**	0.50
Reporting Date: 06/07/2020	**DETS Sample No**	483794

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 20-07033	**Date Sampled**	19/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS041.502
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS04
Order No: POR008177	**Depth (m)**	1.50
Reporting Date: 06/07/2020	**DETS Sample No**	483802

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 20-07033	**Date Sampled**	21/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS071.902
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS07
Order No: POR008177	**Depth (m)**	1.90
Reporting Date: 06/07/2020	**DETS Sample No**	483812

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)						
DETS Report No: 20-07033	**Date Sampled**	08/06/20	18/05/20	19/05/20	21/05/20	
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH042.005	WS01a0.501	WS041.502	WS071.902	
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH04	WS01a	WS04	WS07	
Order No: POR008177	**Depth (m)**	2.00	0.50	1.50	1.90	
Reporting Date: 06/07/2020	**DETS Sample No**	483787	483794	483802	483812	

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

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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 20-07033	**Date Sampled**	08/06/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH042.005
Project / Job Ref: STS5074-D-1	**Additional Refs**	BH04
Order No: POR008177	**Depth (m)**	2.00
Reporting Date: 06/07/2020	**DETS Sample No**	483787

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 20-07033	**Date Sampled**	18/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS01a0.501
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS01a
Order No: POR008177	**Depth (m)**	0.50
Reporting Date: 06/07/2020	**DETS Sample No**	483794

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 20-07033	**Date Sampled**	19/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS041.502
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS04
Order No: POR008177	**Depth (m)**	1.50
Reporting Date: 06/07/2020	**DETS Sample No**	483802

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%

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Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 20-07033	**Date Sampled**	21/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS071.902
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS07
Order No: POR008177	**Depth (m)**	1.90
Reporting Date: 06/07/2020	**DETS Sample No**	483812

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%

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Leachate Analysis Certificate						
DETS Report No: 20-07033	**Date Sampled**	18/05/20	19/05/20	19/05/20	20/05/20	21/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS01a1.504	WS031.753	WS041.803	WS051.502	WS061.903
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS01a	WS03	WS04	WS05	WS06
Order No: POR008177	**Depth (m)**	1.50	1.75	1.80	1.50	1.90
Reporting Date: 06/07/2020	**DETS Sample No**	483796	483800	483804	483807	483810

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	9.0	8.3	8.0	8.1	8.2
Total Cyanide	ug/l	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Complex Cyanide	ug/l	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Free Cyanide	ug/l	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Sulphate as SO_4	mg/l	< 1	ISO17025	7	19	13	6	5
Sulphide	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate as NO_3	mg/l	< 0.5	ISO17025	1.7	16.3	61.6	30.4	5.3
Arsenic	ug/l	< 5	ISO17025	< 5	5	9	< 5	7
Beryllium	ug/l	< 3	ISO17025	< 3	< 3	< 3	< 3	< 3
Boron	ug/l	< 5	ISO17025	37	32	52	41	24
Cadmium	ug/l	< 0.4	ISO17025	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Copper	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	30
Lead	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Mercury	ug/l	< 0.05	ISO17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Selenium	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Vanadium	ug/l	< 5	ISO17025	9	7	21	15	12
Zinc	ug/l	< 2	ISO17025	< 2	< 2	< 2	< 2	63
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10

Subcontracted analysis [S]

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Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 20-07033	**Date Sampled**	18/05/20	19/05/20	19/05/20	20/05/20	21/05/20
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WS01a1.504	WS031.753	WS041.803	WS051.502	WS061.903
Project / Job Ref: STS5074-D-1	**Additional Refs**	WS01a	WS03	WS04	WS05	WS06
Order No: POR008177	**Depth (m)**	1.50	1.75	1.80	1.50	1.90
Reporting Date: 06/07/2020	**DETS Sample No**	483796	483800	483804	483807	483810

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	0.09	< 0.01	0.02	0.03	0.02
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	0.11	0.03	0.03	0.02	0.08
Fluorene	ug/l	< 0.01	NONE	0.18	0.05	0.05	0.08	0.12
Phenanthrene	ug/l	< 0.01	NONE	0.85	0.33	0.30	0.23	0.50
Anthracene	ug/l	< 0.01	NONE	0.26	0.07	0.09	0.06	0.19
Fluoranthene	ug/l	< 0.01	NONE	0.26	0.18	0.14	0.07	0.17
Pyrene	ug/l	< 0.01	NONE	0.15	0.10	0.12	0.04	0.08
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	< 0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.01	NONE	1.90	0.76	0.75	0.53	1.16

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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 20-07033
Soiltechnics Ltd
Site Reference: Kennet Centre, Newbury
Project / Job Ref: STS5074-D-1
Order No: POR008177
Reporting Date: 06/07/2020

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 483775	BH010.501	BH01	0.50	4.9	Brown sandy gravel with stones and concrete
$ 483777	BH017.0015	BH01	7.00	5.1	Light grey sandy gravel with stones
$ 483778	BH018.0016	BH01	8.00	3.3	Light grey sandy gravel
$ 483779	BH020.601	BH02	0.60	12.7	Brown sandy clay with stones
$ 483780	BH021.002	BH02	1.00	13.7	Brown loamy sand with stones and concrete
$ 483781	BH025.0012	BH02	5.00	4.8	Brown sandy gravel with stones
$ 483783	BH030.501	BH03	0.50	5	Brown sandy clay with stones and plastic
$ 483785	BH037.0018	BH03	7.00	3.4	Light grey gravel with stones
$ 483786	BH041.003	BH04	1.00	4.6	Brown sandy gravel with stones
$ 483787	BH042.005	BH04	2.00	12.6	Brown sandy clay with stones
$ 483788	RC011.001	RC01	1.00	10.1	Brown loamy sand with brick and concrete
$ 483789	RC013.005	RC01	3.00	66.6	Black loamy clay
$ 483790	RC013.106	RC01	3.10 - 3.50	9.9	Brown sandy clay with stones
$ 483791	RC022.503	RC02	2.50	22.6	Light grey sandy clay with chalk
$ 483792	RC0231.2510	RC02	31.25	17.2	White chalk with stones
$ 483793	RC040.801	RC04	0.80	15.3	Brown loamy sand with stones
$ 483794	WS01a0.501	WS01a	0.50	4.4	Brown sandy gravel with stones
$ 483802	WS041.502	WS04	1.50	16.1	Black loamy sand with brick and concrete
$ 483812	WS071.902	WS07	1.90	10	Brown sandy clay with stones

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

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-07033
Soiltechnics Ltd
Site Reference: Kennet Centre, Newbury
Project / Job Ref: STS5074-D-1
Order No: POR008177
Reporting Date: 06/07/2020

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

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AR As Received

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-07033
Soiltechnics Ltd
Site Reference: Kennet Centre, Newbury
Project / Job Ref: STS5074-D-1
Order No: POR008177
Reporting Date: 06/07/2020

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

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-07073

Site Reference:	Kennet Centre, Newbury
Project / Job Ref:	STS5074-D-2
Order No:	POR008185
Sample Receipt Date:	01/07/2020
Sample Scheduled Date:	01/07/2020
Report Issue Number:	1
Reporting Date:	07/07/2020

Authorised by:

Dave Ashworth
Technical Manager

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

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 20-07073	**Date Sampled**	29/05/20		**Landfill Waste Acceptance Criteria Limits**		
Soiltechnics Ltd	**Time Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WAC010.0001				
Project / Job Ref: STS5074-D-2	**Additional Refs**	WAC01				
Order No: POR008185	**Depth (m)**	0.00 - 2.00				
Reporting Date: 07/07/2020	**DETS Sample No**	483936				

Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.7			3%	5%	6%
Loss on Ignition	%	< 0.01	1.68			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	8.0			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2.1			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	< 0.02	< 0.02		< 0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum[U]	0.011	0.007		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	< 0.005	< 0.005		< 0.05	0.06	0.7	5
Selenium[U]	0.007	< 0.005		< 0.05	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	16	1		28	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	53	8		122	1000	20000	50000
TDS	237	124		1351	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	4.6	6.4		61.8	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.20						
Dry Matter (%)	88.3						
Moisture (%)	13.4						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.17						

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

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 20-07073	**Date Sampled**	29/05/20		**Landfill Waste Acceptance Criteria Limits**		
Soiltechnics Ltd	**Time Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WAC020.0001				
Project / Job Ref: STS5074-D-2	**Additional Refs**	WAC02				
Order No: POR008185	**Depth (m)**	0.00 - 2.00				
Reporting Date: 07/07/2020	**DETS Sample No**	483937				

Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.8			3%	5%	6%
Loss on Ignition	%	< 0.01	1.95			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	5.8			100	--	--
pH[MU]	pH Units	N/a	7.9			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.8			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	< 0.02	< 0.02		< 0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	0.01	0.01		< 0.5	2	50	100
Mercury[U]	< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum[U]	0.013	0.004		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	< 0.005	< 0.005		< 0.05	0.06	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.05	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	15	4		46	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	68	10		156	1000	20000	50000
TDS	278	151		1629	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	5.4	10.2		97.1	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.19						
Dry Matter (%)	91.3						
Moisture (%)	9.6						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.16						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 20-07073	**Date Sampled**	29/05/20		**Landfill Waste Acceptance Criteria Limits**		
Soiltechnics Ltd	**Time Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Kennet Centre, Newbury	**TP / BH No**	WAC030.0001				
Project / Job Ref: STS5074-D-2	**Additional Refs**	WAC03				
Order No: POR008185	**Depth (m)**	0.00 - 2.00				
Reporting Date: 07/07/2020	**DETS Sample No**	483938				

Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.5			3%	5%	6%
Loss on Ignition	%	< 0.01	2.30			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	8.7			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.6			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	< 0.02	< 0.02		0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	0.006	< 0.005		< 0.20	0.5	10	70
Copper[U]	< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum[U]	0.007	0.005		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	< 0.005	< 0.005		< 0.05	0.06	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.05	0.1	0.5	7
Zinc[U]	< 0.005	< 0.005		< 0.2	4	50	200
Chloride[U]	26	8		101	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	116	17		283	1000	20000	50000
TDS	276	133		1499	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	4.3	19.9		180	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.20						
Dry Matter (%)	88.8						
Moisture (%)	12.6						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.21						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 20-07073	
Soiltechnics Ltd	
Site Reference: Kennet Centre, Newbury	
Project / Job Ref: STS5074-D-2	
Order No: POR008185	
Reporting Date: 07/07/2020	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 483936	WAC010.0001	WAC01	0.00 - 2.00	11.7	Brown loamy sand with chalk and stones
$ 483937	WAC020.0001	WAC02	0.00 - 2.00	8.7	Brown loamy sand with stones and concrete
$ 483938	WAC030.0001	WAC03	0.00 - 2.00	11.2	Brown loamy sand with brick and concrete

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

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-07073
Soiltechnics Ltd
Site Reference: Kennet Centre, Newbury
Project / Job Ref: STS5074-D-2
Order No: POR008185
Reporting Date: 07/07/2020

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

D Dried
AR As Received

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	13.49	%
Loss on Ignition	Soil	BS EN 12457	17	%
BTEX	Soil	BS EN 12457	14	%
Sum of PCBs	Soil	BS EN 12457	23	%
Mineral Oil	Soil	BS EN 12457	9	%
Total PAH	Soil	BS EN 12457	20	%
pH	Soil	BS EN 12457	0.399	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18	%
Arsenic	Leachate	BS EN 12457	16.63	%
Barium	Leachate	BS EN 12457	14.29	%
Cadmium	Leachate	BS EN 12457	14.44	%
Chromium	Leachate	BS EN 12457	18.06	%
Copper	Leachate	BS EN 12457	21.27	%
Mercury	Leachate	BS EN 12457	24.13	%
Molybdenum	Leachate	BS EN 12457	12.55	%
Nickel	Leachate	BS EN 12457	20.08	%
Lead	Leachate	BS EN 12457	13.43	%
Antimony	Leachate	BS EN 12457	18.85	%
Selenium	Leachate	BS EN 12457	18.91	%
Zinc	Leachate	BS EN 12457	13.71	%
Chloride	Leachate	BS EN 12457	16	%
Fluoride	Leachate	BS EN 12457	19.4	%
Sulphate	Leachate	BS EN 12457	19.63	%
TDS	Leachate	BS EN 12457	12	%
Phenol Index	Leachate	BS EN 12457	14	%
DOC	Leachate	BS EN 12457	10	%
Clay Content	Soil	BS 3882: 2015	15	%
Silt Content	Soil	BS 3882: 2015	14	%
Sand Content	Soil	BS 3882: 2015	13	%
Loss on Ignition	Soil	BS 3882: 2015	17	%
pH	Soil	BS 3882: 2015	0.399	Units
Carbonate	Soil	BS 3882: 2015	16	%
Total Nitrogen	Soil	BS 3882: 2015	12	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24	%
Potassium (Extractable)	Soil	BS 3882: 2015	20	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23	%
Available Calcium	Soil	BS 3882: 2015	23	%
Electrical Conductivity	Soil	BS 3882: 2015	10	%

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DETS Report No: 20-08308

Site Reference:	Kennet Centre, Newbury
Project / Job Ref:	STS5074-D-3
Order No:	POR008354
Sample Receipt Date:	27/07/2020
Sample Scheduled Date:	27/07/2020
Report Issue Number:	1
Reporting Date:	31/07/2020

Authorised by:

Dave Ashworth
Technical Manager

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

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Soil Analysis Certificate						
DETS Report No: 20-08308	**Date Sampled**	27/05/20				
Soiltechnics Ltd	**Time Sampled**	None Supplied				
Site Reference: Kennet Centre, Newbury	**TP / BH No**	BH0210.5022				
Project / Job Ref: STS5074-D-3	**Additional Refs**	BH02				
Order No: POR008354	**Depth (m)**	10.50 - 11.00				
Reporting Date: 31/07/2020	**DETS Sample No**	489173				

Determinand	Unit	RL	Accreditation	(n)				
pH	pH Units	N/a	MCERTS	8.7				
Total Sulphate as SO_4	mg/kg	< 200	NONE	555				
Total Sulphate as SO_4	%	< 0.02	NONE	0.06				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	21				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.02				
Total Sulphur	%	< 0.02	NONE	< 0.02				
Ammonium as NH_4	mg/kg	< 0.5	NONE	< 0.5				
Ammonium as NH_4	mg/l	< 0.05	NONE	< 0.05				
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	27				
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	13.4				
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS	< 3				
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS	< 1.5				
W/S Magnesium	mg/l	< 0.1	NONE	0.7				

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

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

4480

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 20-08308	
Soiltechnics Ltd	
Site Reference: Kennet Centre, Newbury	
Project / Job Ref: STS5074-D-3	
Order No: POR008354	
Reporting Date: 31/07/2020	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 489173	BH0210.5022	BH02	10.50 - 11.00	20.3	White chalk

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

$ samples exceeded recommended holding times

DETS Ltd
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Rose Lane
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Kent ME17 2JN
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mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-08308
Soiltechnics Ltd
Site Reference: Kennet Centre, Newbury
Project / Job Ref: STS5074-D-3
Order No: POR008354
Reporting Date: 31/07/2020

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

D Dried
AR As Received

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Analysis of test data in relation to concentrations of inorganic chemical contaminants

Adopted Model: Industrial/Commercial
Receptor: Construction operative

Test procedure			Summary of test data					Initial comparison	Outlier test					Normality test			UCL	
Contaminant	Guideline source	Guideline value mg/kg	No. of tests	Min. mg/kg	Max. mg/kg	Mean mg/kg	No. of tests above guideline value	Initial screening	Pass outlier test?	Number of outliers	Location of outlier	Depth	Concentration mg/kg	Shapiro-Wilk Normality test	Probability plot test	Data normally distributed?	95% UCL of mean mg/kg	Contaminant
Arsenic	S4UL	640	11	2.0	16.0	7.6	0	Mean value below guideline	y					normal	normal	y	10.0	**Arsenic**
Beryllium	S4UL	12	11	0.5	0.7	0.5	0	Mean value below guideline	n					not normal	not normal	n	0.6	**Beryllium**
Boron	S4UL	240000	11	1.0	1.4	1.0	0	Mean value below guideline	n					not normal	not normal	n	1.2	**Boron**
Cadmium	S4UL	190	11	0.2	0.4	0.2	0	Mean value below guideline	n					not normal	not normal	n	0.3	**Cadmium**
Chromium (III)	S4UL	8600	11	5.0	28.0	13.9	0	Mean value below guideline	y					normal	normal	y	17.9	**Chromium (III)**
Copper	S4UL	68000	11	4.0	159.0	39.3	0	Mean value below guideline	n					not normal	not normal	n	103.2	**Copper**
Cyanide (total)	ATK	34	11	2.0	2.0	2.0	0	Mean value below guideline	y					not normal	not normal	n	2.0	**Cyanide (total)**
Lead	C4SL	6000	11	4.0	1990.0	235.6	0	Mean value below guideline	n					not normal	not normal	n	1004.9	**Lead**
Mercury#	S4UL	1100	11	1.0	2.8	1.2	0	Mean value below guideline	n					not normal	not normal	n	1.9	**Mercury#**
Nickel	S4UL	980	11	3.0	33.0	15.2	0	Mean value below guideline	y					normal	normal	y	19.9	**Nickel**
Selenium	S4UL	12000	11	3.0	3.0	3.0	0	Mean value below guideline	y					not normal	not normal	n	3.0	**Selenium**
Vanadium	S4UL	9000	11	4.0	42.0	18.1	0	Mean value below guideline	y					normal	normal	y	24.2	**Vanadium**
Zinc	S4UL	730000	11	7.0	246.0	71.5	0	Mean value below guideline	n					not normal	not normal	n	158.9	**Zinc**

S4UL	Suitable for Use Level as published by LQM/CIEH
C4SL	Category 4 Screening Level
C4SL (lower) (upper)	Category 4 Screening Level for Lead at lower or upper bound of range
ATK	Soil Screening Value derived by Atkins
BPG5	Guideline from BPG Note 5 as published by Forest Research
#	Assumed to be inorganic mercury as initial screening value

Title	Table number
Analysis of test data in relation to concentrations of inorganic chemical contaminants.	1

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Analysis of test data in relation to concentrations of organic chemical contaminants

Adopted model: Industrial/Commercial
Receptor: Construction operative

Test procedure			Summary of test data					Initial Screening	Outlier test					Normality test			UCL	
Contaminant	Guideline source	Guideline value* mg/kg	No. of tests	Min. mg/kg	Max. mg/kg	Mean mg/kg	No. of tests above guideline value	Initial screening	Pass outlier test?	Number of outliers	Location of outlier	Depth	Concentration mg/kg	Shapiro-Wilk Normality test	Probability plot test	Data normally distributed?	95% UCL of mean mg/kg	Contaminant
Acenaphthene	S4UL	84000	11	0.1	0.1	0.1	0	Mean value below guideline	y					not normal	not normal	n	0.1	**Acenaphthene**
Acenaphthylene	S4UL	83000	11	0.1	0.1	0.1	0	Mean value below guideline	y					not normal	not normal	n	0.1	**Acenaphthylene**
Anthracene	S4UL	520000	11	0.1	0.1	0.1	0	Mean value below guideline	n					not normal	not normal	n	0.1	**Anthracene**
Benzo(a)anthracene	S4UL	170	11	0.1	1.1	0.2	0	Mean value below guideline	n					not normal	not normal	n	0.6	**Benzo(a)anthracene**
Benzo(a)pyrene	S4UL	35	11	0.1	6.7	0.7	0	Mean value below guideline	n					not normal	not normal	n	3.3	**Benzo(a)pyrene**
Benzo(b)fluoranthene	S4UL	44	11	0.1	8.1	0.8	0	Mean value below guideline	n					not normal	not normal	n	4.0	**Benzo(b)fluoranthene**
Benzo(g,h,i)perylene	S4UL	3900	11	0.1	6.0	0.6	0	Mean value below guideline	n					not normal	not normal	n	3.0	**Benzo(g,h,i)perylene**
Benzo(k)fluoranthene	S4UL	1200	11	0.1	1.4	0.2	0	Mean value below guideline	n					not normal	not normal	n	0.7	**Benzo(k)fluoranthene**
Chrysene	S4UL	350	11	0.1	2.0	0.3	0	Mean value below guideline	n					not normal	not normal	n	1.0	**Chrysene**
Dibenzo(a,h)anthracene	S4UL	3.5	11	0.1	1.4	0.2	0	Mean value below guideline	n					not normal	not normal	n	0.7	**Dibenzo(a,h)anthracene**
Fluoranthene	S4UL	23000	11	0.1	1.6	0.3	0	Mean value below guideline	n					not normal	not normal	n	0.9	**Fluoranthene**
Fluorene	S4UL	63000	11	0.1	0.1	0.1	0	Mean value below guideline	y					not normal	not normal	n	0.1	**Fluorene**
Indeno(1,2,3-cd)pyrene	S4UL	500	11	0.1	6.3	0.7	0	Mean value below guideline	n					not normal	not normal	n	3.1	**Indeno(1,2,3-cd)pyrene**
Naphthalene	S4UL	190	11	0.1	0.1	0.1	0	Mean value below guideline	y					not normal	not normal	n	0.1	**Naphthalene**
Phenanthrene	S4UL	22000	11	0.1	0.3	0.1	0	Mean value below guideline	n					not normal	not normal	n	0.2	**Phenanthrene**
Phenols	S4UL	760	11	2.0	2.0	2.0	0	Mean value below guideline	y					not normal	not normal	n	2.0	**Phenols**
Pyrene	S4UL	54000	11	0.1	3.5	0.4	0	Mean value below guideline	n					not normal	not normal	n	1.8	**Pyrene**

Notes

S4UL	Suitable for Use Level as published by LQM/CIEH
C4SL	Category 4 Screening Level
SGV	Soil Guideline Value as published by the Environment Agency 2009
SSV	Soil Screening Value as derived by Soiltechnics
ATK	Soil Screening Value derived by Atkins
*	Assuming a SOM of 1%

Title	Table number
Analysis of test data in relation to concentrations of organic chemical contaminants.	2

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Summary of petroleum hydrocarbon test results

Model: **Industrial/Commercial**

BTEX (Red highlights indicate exceedance of guideline value)

Indicator	unit	S4UL (mg/kg)	Concentration BH04 2.00	WS01a 0.50	WS04 1.50	WS07 1.90
Benzene	mg/kg	27	< 0.002	< 0.002	< 0.002	< 0.002
Toluene	mg/kg	56000	< 0.005	< 0.005	< 0.005	< 0.005
Ethylbenzene	mg/kg	5700	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	mg/kg	6600	< 0.002	< 0.002	< 0.002	< 0.002
m,p-Xylene	mg/kg	5900	< 0.002	< 0.002	< 0.002	< 0.002

Hydrocarbon banding (Red highlights indicate exceedance of guideline value)

Fraction	unit	S4UL (mg/kg)	Concentration BH04 2.00	WS01a 0.50	WS04 1.50	WS07 1.90
Aliphatic						
EC 5 - 6	mg/kg	3200	< 0.01	< 0.01	< 0.01	< 0.01
EC >6 - 8	mg/kg	7800	< 0.05	< 0.05	< 0.05	< 0.05
EC >8 - 10	mg/kg	2000	< 2	< 2	< 2	< 2
EC >10 - 12	mg/kg	9700	< 2	< 2	< 2	< 2
EC >12 - 16	mg/kg	59000	< 3	< 3	< 3	< 3
EC >16 - 35	mg/kg	1600000	0	0	0	0
EC >35 - 44	mg/kg	1600000	<21	<21	<21	<21
Aromatic						
EC 5 - 7 (benzene)	mg/kg	26000	< 0.01	< 0.01	< 0.01	< 0.01
EC >7 - 8 (toluene)	mg/kg	56000	< 0.05	< 0.05	< 0.05	< 0.05
EC >8 - 10	mg/kg	3500	< 2	< 2	< 2	< 2
EC >10 - 12	mg/kg	16000	< 2	< 2	< 2	< 2
EC >12 - 16	mg/kg	36000	< 2	< 2	< 2	< 2
EC >16 - 21	mg/kg	28000	< 3	< 3	< 3	< 3
EC >21 - 35	mg/kg	28000	< 10	< 10	< 10	< 10
EC >35 - 44	mg/kg	28000	<42	<42	<42	<42
Total petroleum hydrocarbons			< 42	< 42	< 42	< 42

Title	Table number
Comparison of measured concentrations of petroleum hydrocarbons with guideline values.	3

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Controlled water screening sheet

Scenario

Receptor	Surface water and drinking water
Surface water type	Inland freshwater
Hydrometric Area	English and Welsh freshwaters
Are bioavailability parameters known?	No

Contaminant	Guideline source	Guideline value (µg/l)	Maximum recorded value (µg/l)	Location	WS01a	WS03	WS04	WS05	WS06
				Depth (m)	1.5	1.75	1.8	1.5	1.9
				Sample Type	ES	ES	ES	ES	ES
				Type	Leachate	Leachate	Leachate	Leachate	Leachate
Inorganics - Metals									
Arsenic	UK DWS	10	9		< 5	5	9	< 5	7
Boron	UK DWS	1000	52		37	32	52	41	24
Cadmium	AA-EQS	0.08	<LoD		< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium (III)	AA-EQS	4.7	<LoD		< 5	< 5	< 5	< 5	< 5
Copper	AA-EQS	1	30		< 5	< 5	< 5	< 5	30
Lead	AA-EQS	1.2	<LoD		< 5	< 5	< 5	< 5	< 5
Mercury	MAC-EQS	0.07	<LoD		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	AA-EQS	4	<LoD		< 5	< 5	< 5	< 5	< 5
Selenium	UK DWS	10	<LoD		< 5	< 5	< 5	< 5	< 5
Vanadium	AA-EQS	20	21		9	7	21	15	12
Zinc	AA-EQS	12.3	63		< 2	< 2	< 2	< 2	63
Inorganics - Miscellaneous									
pH	N/A	N/A	9		9	8.3	8	8.1	8.2
Cyanide - Total	UK DWS	50	<LoD		< 5	< 5	< 5	< 5	< 5
Cyanide - Free	AA-EQS	1	<LoD		< 5	< 5	< 5	< 5	< 5
Nitrate (as NO3)	UK DWS	50000	61600		1700	16300	61600	30400	5300
Sulphate	UK DWS	250000	19000		7000	19000	13000	6000	5000
Organics - PAH & Phenol									
Naphthalene	AA-EQS	2	0.09		0.09	< 0.01	0.02	0.03	0.02
Acenaphthylene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	N/A	N/A	0.11		0.11	0.03	0.03	0.02	0.08
Fluorene	N/A	N/A	0.18		0.18	0.05	0.05	0.08	0.12
Phenanthrene	N/A	N/A	0.85		0.85	0.33	0.3	0.23	0.5
Anthracene	AA-EQS	0.1	0.26		0.26	0.07	0.09	0.06	0.19
Fluoranthene	AA-EQS	0.0063	0.26		0.26	0.18	0.14	0.07	0.17
Pyrene	N/A	N/A	0.15		0.15	0.1	0.12	0.04	0.08
Benzo(a)anthracene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	AA-EQS	0.00017	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	N/A	N/A	<LoD		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	N/A	N/A	<LoD		< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
PAH (sum of 4)	UK DWS	0.1	<LoD		<LoD	<LoD	<LoD	<LoD	<LoD
Phenol	AA-EQS	7.7	<LoD		< 10	< 10	< 10	< 10	< 10

Key
EQS = Environmental Quality Standards, from "*The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015*", supplemented by operational values from the Environment Agency, updated online 2017. **AA** = Annual average, **MAC** = Maximum allowable concentration.
PNEC = Predicted no effect concentration. Obtained using the UKTAG Metals Bioavaibiltiy Assessment Tools (M-BAT), 2013 (Cu, No, Mn, Zn) & 2015 (Pb).
EA = "*Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrogeological Risk Assessment*", Environment Agency, 2009.
USEPA = "*Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites*". USEPA, 2015.

UK DWS = UK drinking water standards, from "*The Water Supply (Water Quality) Regulations 2018*".
Int. DWS = International "*Guidelines for drinking water quality*", World Health Organisation, 2017.
WHO = "*Petroleum products in drinking-water*", World Health Organisation, 2008.
ST = Soiltechnics value based on 80% of aqueous solubility limit, to a minimum of 10µg/l.
EA, USEPA and **ST** values are indicative values only and not harm related.

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Updated Conceptual Model (based on source-pathway-receptor model)

Current site use commercial/industrial
Proposed site use residential

Source	Pathway										Receptor		Risk assessment to CIRIA C552	
	Humans						Vegetation	Water					Consequence of risk occurring via most likely pathway	Risk
	Ingestion of air-borne dusts	Ingestion of soil	Ingestion of vegetables and soil attached to vegetables	Inhalation of air-borne dusts	Inhalation of vapours	Dermal contact with soil and dust	Root uptake, deposition to shoots and foliage contact	Percolation of water through contaminated soils	Near-surface water run-off through contaminated	Saturation of contaminated soils by flood waters				
Soils														
Historical on site commercial activities	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Medium	Low/moderate
	Unlikely	Unlikely	Unlikely	Unlikely	Likely	Unlikely	-	-	-	-	Proposed site users	Child	Medium	Moderate
	Likely	Likely	Unlikely	Likely	Likely	Likely	-	-	-	-	Construction operatives	Adult	Medium	Moderate
	-	-	-	-	-	-	Unlikely	-	-	-	Vegetation (proposed)	-	Medium	Low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (current)	-	Medium	Low/moderate
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (proposed)	-	Medium	Low/moderate
Made Ground	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Medium	Low/moderate
	Unlikely	Unlikely	Unlikely	Unlikely	Likely	Unlikely	-	-	-	-	Proposed site users	Child	Medium	Moderate
	Likely	Likely	Unlikely	Likely	Likely	Likely	-	-	-	-	Construction operatives	Adult	Medium	Moderate
	-	-	-	-	-	-	Unlikely	-	-	-	Vegetation (proposed)	-	Medium	Low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (current)	-	Medium	Low/moderate
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (proposed)	-	Medium	Low/moderate
Existing site use (boiler rooms, sub-station etc.)	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Mild	Low
	Unlikely	Unlikely	Unlikely	Unlikely	Likely	Unlikely	-	-	-	-	Proposed site users	Child	Mild	Low/moderate
	Likely	Likely	Unlikely	Likely	Likely	Likely	-	-	-	-	Construction operatives	Adult	Mild	Low/moderate
	-	-	-	-	-	-	Unlikely	-	-	-	Vegetation (proposed)	-	Mild	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (current)	-	Mild	Low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (proposed)	-	Mild	Low
Historical commercial activities within 50m of the site.	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Mild	Low
	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Proposed site users	Child	Mild	Low
	Low-likelihood	Low-likelihood	Unlikely	Low-likelihood	Low-likelihood	Low-likelihood	-	-	-	-	Construction operatives	Adult	Mild	Low
	-	-	-	-	-	-	Low-likelihood	-	-	-	Vegetation (proposed)	-	Mild	Low
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (current)	-	Mild	Low/moderate
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (proposed)	-	Mild	Low/moderate
Infilled ground to the south	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Mild	Low
	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Proposed site users	Child	Mild	Low
	Low-likelihood	Low-likelihood	Unlikely	Low-likelihood	Low-likelihood	Low-likelihood	-	-	-	-	Construction operatives	Adult	Mild	Low
	-	-	-	-	-	-	Low-likelihood	-	-	-	Vegetation (proposed)	-	Mild	Low
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (current)	-	Mild	Low/moderate
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (proposed)	-	Mild	Low/moderate

Title	Table number
Updated Conceptual Site Model	1

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Final Conceptual Model (following laboratory testing)

Current site use commercial/industrial
Proposed site use residential

Source	Pathway										Receptor		Risk assessment to CIRIA C552	
	Humans						Vegetation	Water					Consequence of risk occurring via most likely pathway	Risk
	Ingestion of air-borne dusts	Ingestion of soil	Ingestion of vegetables and soil attached to vegetables	Inhalation of air-borne dusts	Inhalation of vapours	Dermal contact with soil and dust	Root uptake, deposition to shoots and foliage contact	Percolation of water through contaminated soils	Near-surface water run-off through contaminated	Saturation of contaminated soils by flood waters				
Soils														
Historical on site commercial activities	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Minor	Very low
	Unlikely	Unlikely	Unlikely	Unlikely	Likely	Unlikely	-	-	-	-	Proposed site users	Child	Minor	Low
	Likely	Likely	Unlikely	Likely	Likely	Likely	-	-	-	-	Construction operatives	Adult	Minor	Low
	-	-	-	-	-	-	Unlikely	-	-	-	Vegetation (proposed)	-	Minor	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (current)	-	Minor	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (proposed)	-	Minor	Very low
Made Ground	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Minor	Very low
	Unlikely	Unlikely	Unlikely	Unlikely	Likely	Unlikely	-	-	-	-	Proposed site users	Child	Minor	Low
	Likely	Likely	Unlikely	Likely	Likely	Likely	-	-	-	-	Construction operatives	Adult	Minor	Low
	-	-	-	-	-	-	Unlikely	-	-	-	Vegetation (proposed)	-	Minor	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (current)	-	Minor	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (proposed)	-	Minor	Very low
Existing site use (boiler rooms, sub-station etc.)	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Minor	Very low
	Unlikely	Unlikely	Unlikely	Unlikely	Likely	Unlikely	-	-	-	-	Proposed site users	Child	Minor	Low
	Likely	Likely	Unlikely	Likely	Likely	Likely	-	-	-	-	Construction operatives	Adult	Minor	Low
	-	-	-	-	-	-	Unlikely	-	-	-	Vegetation (proposed)	-	Minor	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (current)	-	Minor	Very low
	-	-	-	-	-	-	-	Low likelihood	Low likelihood	Low likelihood	Water (proposed)	-	Minor	Very low
Historical commercial activities within 50m of the site.	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Minor	Very low
	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Proposed site users	Child	Minor	Very low
	Low-likelihood	Low-likelihood	Unlikely	Low-likelihood	Low-likelihood	Low-likelihood	-	-	-	-	Construction operatives	Adult	Minor	Very low
	-	-	-	-	-	-	Low-likelihood	-	-	-	Vegetation (proposed)	-	Minor	Very low
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (current)	-	Minor	Low
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (proposed)	-	Minor	Low
Infilled ground to the south	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Current site users	Adult	Minor	Very low
	Unlikely	Unlikely	Unlikely	Unlikely	Low-likelihood	Unlikely	-	-	-	-	Proposed site users	Child	Minor	Very low
	Low-likelihood	Low-likelihood	Unlikely	Low-likelihood	Low-likelihood	Low-likelihood	-	-	-	-	Construction operatives	Adult	Minor	Very low
	-	-	-	-	-	-	Low-likelihood	-	-	-	Vegetation (proposed)	-	Minor	Very low
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (current)	-	Minor	Low
	-	-	-	-	-	-	-	Likely	Likely	Likely	Water (proposed)	-	Minor	Low

Title	Table number
Final Conceptual Site Model	2

soiltechnics
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Record of in-situ gas and water level monitoring results

Date / Time	Instrument Used	Location	Atmospheric pressure (mB)	Temperature (°C)	Methane, CH_4 (%v/v) *Chg*		Carbon Dioxide, CO_2 (%v/v) *Chg*		Oxygen, O_2 (%v/v)		Balance	Lower Explosive Limit	Gas Flow (q)	Peak hazardous gas flow rate *Qhgs*		Steady hazardous gas flow rate *Qhgs*		NHBC Guideline	NHBC Guideline	Characteristic gas situation	Potentially Explosive	Water Level (m)
					Peak	Steady	Peak	Steady	Minimum	Average	(%v/v)	(% LEL)	(l/Hr)	CH_4	CO_2	CH_4	CO_2	(Peak)	(Steady)			
22/06/2020	15:04 GA5000	BH01	1017	20.0	0.0	0.0	0.1	0.0	16.4	16.4	83.6	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	DRY
08/07/2020	11:29 GA2000+	BH01	1005	16.0	0.0	0.0	0.8	0.0	16.2	16.2	83.8	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	DRY
23/07/2020	12:47 GA5000	BH01	1016	22.0	0.0	0.0	0.3	0.0	15.9	15.9	84.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
06/08/2020	10:14 GA2000+	BH01	1007	18.0	0.0	0.0	0.6	0.0	15.9	15.9	84.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
17/08/2020	09:50 GA2000+	BH01	998	15.0	0.0	0.0	0.0	0.0	16.0	16.0	84.0	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
04/09/2020	10:44 GA2000+	BH01	1012	14.0	0.0	0.0	0.0	0.0	16.0	16.0	84.0	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
22/06/2020	14:17 GA5000	BH02	1019	20.0	0.0	0.0	4.2	4.2	13.2	13.2	82.6	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.09
08/07/2020	10:24 GA2000+	BH02	1005	16.0	0.0	0.0	0.0	0.0	20.9	20.9	79.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.15
23/07/2020	13:15 GA5000	BH02	1016	22.0	0.0	0.0	4.9	4.9	12.8	12.8	82.3	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.23
06/08/2020	09:38 GA2000+	BH02	1007	18.0	0.0	0.0	4.9	4.9	12.6	12.6	82.5	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.27
17/08/2020	09:35 GA2000+	BH02	998	15.0	0.0	0.0	4.9	4.9	12.7	12.7	82.4	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.28
04/09/2020	10:08 GA2000+	BH02	1011	14.0	0.0	0.0	5.3	5.3	11.8	11.8	82.9	0.0	0.0	0.00	0.01	0.00	0.01	AMBER 1	AMBER 1	TWO	NO	3.28
22/06/2020	11:53 GA5000	BH03	1018	20.0	0.0	0.0	0.2	0.1	20.9	20.9	79.0	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.8
08/07/2020	10:59 GA2000+	BH03	1005	16.0	0.0	0.0	0.0	0.0	20.6	20.6	79.4	0.0	0.1	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.87
23/07/2020	13:38 GA5000	BH03	1016	22.0	0.0	0.0	0.4	0.1	20.1	20.6	79.3	0.0	-0.1	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.93
06/08/2020	10:38 GA2000+	BH03	1007	19.0	0.0	0.0	1.8	1.5	17.2	17.7	80.8	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.95
04/09/2020	11:38 GA2000+	BH03	1012	17.0	0.0	0.0	1.8	1.5	17.7	18.0	80.5	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.95
22/06/2020	15:39 GA5000	RC01	1017	20.0	0.0	0.0	0.1	0.1	20.8	21.0	78.9	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.53
08/07/2020	10:46 GA2000+	RC01	1005	16.0	0.0	0.0	0.1	0.0	19.6	20.9	79.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.65
23/07/2020	13:25 GA5000	RC01	1016	23.0	0.0	0.0	0.2	0.1	21.0	21.1	78.8	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.67
06/08/2020	10:49 GA2000+	RC01	1008	19.0	0.0	0.0	0.5	0.3	19.9	20.5	79.2	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.71
17/08/2020	10:44 GA2000+	RC01	998	15.0	0.0	0.0	0.2	0.0	20.8	21.2	78.8	0.0	0.1	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.69
04/09/2020	11:10 GA2000+	RC01	1012	16.0	0.0	0.0	0.8	0.1	20.2	20.9	79.0	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.7
22/06/2020	14:30 GA5000	RC02	1017	20.0	0.0	0.0	0.2	0.1	20.3	20.5	79.4	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.28
08/07/2020	10:10 GA2000+	RC02	1005	16.0	0.0	0.0	0.1	0.0	20.6	20.7	79.3	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.32
23/07/2020	12:22 GA5000	RC02	1016	22.0	0.1	0.0	0.2	0.1	20.6	20.7	79.2	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.41
06/08/2020	09:02 GA2000+	RC02	1007	18.0	0.0	0.0	0.2	0.0	20.5	20.8	79.2	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.5
17/08/2020	10:21 GA2000+	RC02	998	15.0	0.0	0.0	0.3	0.1	20.3	21.0	78.9	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.45
04/09/2020	09:57 GA2000+	RC02	1011	14.0	0.0	0.0	0.4	0.1	20.4	20.7	79.2	0.0	0.1	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	3.52
22/06/2020	15:20 GA5000	RC04	1017	20.0	0.0	0.0	2.2	2.2	16.3	16.3	81.5	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.69
08/07/2020	11:44 GA2000+	RC04	1005	16.0	0.0	0.0	2.5	2.5	16.6	16.6	80.9	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.67
23/07/2020	12:35 GA5000	RC04	1016	22.0	0.0	0.0	2.7	2.7	15.2	15.2	82.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.72
06/08/2020	09:54 GA2000+	RC04	1007	18.0	0.0	0.0	2.8	2.8	15.7	15.7	81.5	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.73
17/08/2020	10:07 GA2000+	RC04	998	15.0	0.0	0.0	2.8	2.8	15.2	15.2	82.0	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	2.72
22/06/2020	14:43 GA2000+	WS02	1017	20.0	0.0	0.0	0.6	0.6	18.6	18.6	80.8	0.0	0.1	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	DRY
08/07/2020	11:12 GA2000+	WS02	1005	16.0	0.0	0.0	0.8	0.8	19.4	19.4	79.8	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	DRY
23/07/2020	13:50 GA5000	WS02	1015	22.0	0.0	0.0	0.5	0.5	20.1	20.2	79.3	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
06/08/2020	11:02 GA2000+	WS02	1008	19.0	0.0	0.0	0.7	0.7	19.8	19.8	79.5	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry

Date / Time	Instrument Used	Location	Atmospheric pressure (mB)	Temperature (°C)	Methane, CH_4 (%v/v) *Chg*		Carbon Dioxide, CO_2 (%v/v) *Chg*		Oxygen, O_2 (%v/v)		Balance	Lower Explosive Limit	Gas Flow (q)	Peak hazardous gas flow rate *Qhgs*		Steady hazardous gas flow rate *Qhgs*		NHBC Guideline	NHBC Guideline	Characteristic gas situation	Potentially Explosive	Water Level (m)
					Peak	Steady	Peak	Steady	Minimum	Average	(%v/v)	(% LEL)	(l/Hr)	CH_4	CO_2	CH_4	CO_2	(Peak)	(Steady)			
17/08/2020	10:31 GA2000+	WS02	998	15.0	0.0	0.0	0.7	0.7	20.2	20.2	79.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
04/09/2020	10:58 GA2000+	WS02	1012	16.0	0.0	0.0	0.7	0.7	19.6	19.6	79.7	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
22/06/2020	14:05 GA5000	WS04	1018	20.0	0.1	0.0	0.3	0.3	19.7	20.1	79.6	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	DRY
08/07/2020	10:33 GA2000+	WS04	1005	16.0	0.0	0.0	0.4	0.1	20.0	20.6	79.3	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	DRY
23/07/2020	13:07 GA5000	WS04	1016	22.0	0.0	0.0	0.7	0.7	18.9	19.2	80.1	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
06/08/2020	09:29 GA2000+	WS04	1007	18.0	0.0	0.0	0.4	0.3	20.0	20.5	79.2	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
17/08/2020	09:22 GA2000+	WS04	998	15.0	0.0	0.0	0.6	0.3	19.2	20.0	79.7	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
04/09/2020	10:24 GA2000+	WS04	1012	14.0	0.0	0.0	0.7	0.3	19.0	20.2	79.5	0.0	0.0	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	NO	Dry
					0.1	0.0	5.3	5.3	11.8	11.8	84.1	0.0	0.10	0.00	0.01	0.00	0.01	AMBER 1	AMBER 1	TWO	**Worst case scenario**	
					0.0	0.0	1.2	1.0	18.2	18.4	80.6	0.0	0.10	0.00	0.00	0.00	0.00	GREEN	GREEN	ONE	**Average site scenario**	

Additonal considerations:

Notes:

1) Gas Screening Value (GSV) derived by multiplying the peak gas concentration (%) by the peak flow rate (l/h).

2) The gas analyser is capable of measuring flow to an accuracy of 0.1l/h. Below this value the analyser records zero flow. Adopting a precautionary approach we have used a flow rate of 0.1l/h when the analyser records zero with this flow rate used to determine the gas screening value.

Title	Revision
Record of in-situ gas monitoring results	Final

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Table comparing cumulative compound concentrations with hazardous waste threshold values

Category of danger		Irritant	Harmful	Toxic		Carcinogenic		Corrosive		Toxic for reproduction		Mutagenic		Ecotoxic		
														∑N : R50-53/0.25 +∑N : R51-53/2.5 +∑N : R52-53/25	∑N : 50-53 +∑N : R50	∑N : 50-53 +∑N : 51-53 +∑N : 52-53 +∑N : R53
Risk Phrase		Xi	Xn	T+	T	Carc Cat 1 or 2	Carc Cat 3	C R34	C R35	Repr Cat 1 or 2	Repr Cat 3	Muta Cat 2	Muta Cat 3			
Contaminant	Highest concentration	H4 (%)	H5 (%)	H6 (%)	H6 (%)	H7 (%)	H7 (%)	H8 (%)	H8 (%)	H10 (%)	H10 (%)	H11 (%)	H11 (%)	H14	H14	H14
Metals																
Arsenic	16.00			0.0021	0.0024	0.0024								1.1973	0.0024	0.0024
Beryllium	0.70	0.0002		0.0002	0.0002	0.0002										0.0002
Copper	159.00	0.0398	0.0398												0.0398	0.0398
Cadmium	0.40		0.0000		0.0000	0.0000										
Chromium	28.00					0.0045									0.0045	0.0045
Lead	1990.00		0.2145							0.2145	0.2145				0.2145	0.2145
Mercury	2.80			0.0003											0.0003	0.0003
Nickel	33.00		0.0042				0.0042				0.0042				0.0042	0.0042
Selenium	3.00				0.0003										0.0003	0.0003
Zinc	246.00	0.1784	0.1784			0.0681		0.0513					0.1156		0.0305	0.1784
Vanadium	42.00	0.0062			0.0062						0.0062		0.0062			0.0062
PAH																
Naphthalene	0.00		0.0000												0.0000	0.0000
Benzo(a)anthracene	1.06				0.0001	0.0001									0.0001	0.0001
Chrysene	2.03				0.0002	0.0002							0.0002		0.0002	0.0002
Benzo(b)fluoranthene	8.13				0.0008	0.0008									0.0008	0.0008
Benzo(k)fluoranthene	1.36				0.0001	0.0001									0.0001	0.0001
Benzo(a)pyrene	6.74					0.0007				0.0007		0.0007			0.0007	0.0007
Dibenzo(a,h)anthracene	1.35				0.0001	0.0001									0.0001	0.0001
TPH																
Benzene	2.00				0.0002	0.0002										
1,2,4-trimethylbenzene	0.00	0.0000	0.0000													0.0000
Hydrocarbon (C6 to C35)	42.00		0.0042			0.0042					0.0000	0.0042				0.0042
Total (or greatest)		0.2245	0.4411	0.0026	0.0108	(0.0681)	(0.0042)	0.0513	0.0000	(0.2145)	(0.2145)	(0.0042)	(0.1156)	1.1973	0.2986	0.4570
Threshold		1%	1%	0.10%	3%	0.10%	1%	5%	1%	0.50%	3%	0.10%	1%	1	25%	25%
Exceeded Y/N		N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N

Title	Table number
Hazard assessment spreadsheet	1 of 1

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Landfill Waste Acceptance Criteria

Parameter	Inert waste landfill	Stable non-reactive hazardous waste in non-hazardous landfill	Hazardous waste landfill	Laboratory test data		
				WAC01	WAC02	WAC03
				0	0	0
Parameters determined on the waste						
Total organic carbon (w/w %)	3%	5%	6%*	0.7	0.8	0.5
Loss on ignition			10%*	1.68	1.95	2.3
BTEX (mg kg^{-1})	6			< 0.05	< 0.05	< 0.05
PCBs (7 congeners) (mg kg^{-1})	1			< 0.1	< 0.1	< 0.1
Mineral oil C_{10} - C_{40} (mg kg^{-1})	500			< 10	< 10	< 10
PAH (17 congeners)	100			< 1.7	5.8	< 1.7
pH		>6		8	7.9	8.7
Acid neutralisation capacity pH 6 (mol kg^{-1})		To be evaluated	To be evaluated	2.1	1.8	1.6
Acid neutralisation capacity pH 4 (mol kg^{-1})		To be evaluated	To be evaluated			
Limit values (mg kg^{-1}) for compliance test using BN 12457-3 at L/S 10 l kg^{-1}						
As (arsenic)	0.5	2	25	< 0.2	< 0.2	< 0.2
Ba (barium)	20	100	300	< 0.1	< 0.1	0.1
Cd (cadmium)	0.04	1	5	< 0.02	< 0.02	< 0.02
Cr (chromium (total))	0.5	10	70	< 0.20	< 0.20	< 0.20
Cu (Copper)	2	50	100	< 0.5	< 0.5	< 0.5
Hg (mercury)	0.01	0.2	2	< 0.005	< 0.005	< 0.005
Mo (molybdenum)	0.5	10	30	< 0.1	< 0.1	< 0.1
Ni (nickel)	0.4	10	40	< 0.2	< 0.2	< 0.2
Pb (lead)	0.5	10	50	< 0.2	< 0.2	< 0.2
Sb (antimony)	0.06	0.7	5	< 0.05	< 0.05	< 0.05
Se (selenium)	0.1	0.5	7	< 0.05	< 0.05	< 0.05
Zn (zinc)	4	50	200	< 0.2	< 0.2	< 0.2
Cl (chloride)	800	15,000	25,000	28	46	101
F (fluoride)	10	150	500	< 1	< 1	< 1
SO_4 (sulphate)	1000#	20,000	50,000	122	156	283
Total Dissolved Solids (TDS)+	4,000	60,000	100,000	1351	1629	1499
Phenol index	1			< 0.5	< 0.5	< 0.5
Dissolved organic carbon at own pH or pH 7.5-8.0@	500	800	1000	61.8	97.1	180

Primary classification	HAZARDOUS	HAZARDOUS	HAZARDOUS
Secondary classification	x STABLE NON-REACTIVE	x STABLE NON-REACTIVE	x STABLE NON-REACTIVE

Key

* Either TOC or LOI must be used for hazardous waste.

If an inert waste does not meet the SO4 L/S10 limit, alternative limit values of 1500 mg l-1 SO4 at Co (initial eluate from the percolation test (prCEN/TS 14405:2003)) AND 6000 mg kg-1 SO4 at L/S10 (either from the

+ The value for TDS can be used instead of the values for Cl and SO4.

@ DOC at pH 7.5-8.0 abd L/S10 can be determined or eluate derived from a modified version of the pH dependence Test, prEN 14429, if the limit value at own pH (BS EN 12457 eluate) is not met.

Title

Comparison of test data to landfill waste acceptance criteria

Table number

1 of 1

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Basic characterisation schedule for Beenham Grange Gravel soils

Produced following the requirements of The Landfill (England and Wales) (Amendment) Regulations 2004 Part 2 (5)

(a) *Source and origin of waste*

Proposed development at The Kennet Centre, Market Street, Newbury, RG14 5EN

(b) *Process producing the waste*

Foundation and service trench excavations

(c) *Statement on waste treatment*

Refer to pre-treatment confirmation form

(d) *Composition of the waste*

Brown sandy gravel. Gravel of fine to coarse well rounded flint

(e) *Appearance of the waste*

As above

(f) *European waste catalogue code*

17-05-04 *(for non-hazardous waste)*

(g) *Hazardous waste properties*

None

(h) *Is the waste prohibited under regulation 9?*

No

(i) *Landfill class*

Inert based on soils being of natural origin and unlikely to be affected by artificial contamination

(j) *Additional precautions required at landfill*

None

(k) *Can waste be recycled or recovered?*

Yes

(l) *Name and address of waste producer*

To be confirmed

(m) *Name and address of consultant*

Soiltechnics Limited, Cedar Barn, White Lodge, Walgrave, Northampton. NN6 9PY.
Tel: (01604) 781877 **E-mail: mail@soiltechnics.net**
Fax: (01604) 781007 **Website: www.soiltechnics.net**

Schedule Date:

September 2020

Soiltechnics reference:

STS5074-G01

signed

Martin Gill B.Sc. (Hons)., FGS., AMIEnvSc
Geo-environmental Engineer, Soiltechnics Limited

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Basic characterisation schedule for Natural Lewes Nodular Chalk soils

Produced following the requirements of The Landfill (England and Wales) (Amendment) Regulations 2004 Part 2 (5)

(a) *Source and origin of waste*

Proposed development at The Kennet Centre, Market Street, Newbury, RG14 5EN

(b) *Process producing the waste*

Foundation excavations

(c) *Statement on waste treatment*

Refer to pre-treatment confirmation form

(d) *Composition of the waste*

White slightly clayey GRAVEL. Gravel is fine to coarse angular chalk with occasional coarse well rounded flint.

(e) *Appearance of the waste*

As above

(f) *European waste catalogue code*

17-05-04 *(for non-hazardous waste)*

(g) *Hazardous waste properties*

None

(h) *Is the waste prohibited under regulation 9?*

No

(i) *Landfill class*

Inert based on soils being of natural origin and unlikely to be affected by artificial contamination

(j) *Additional precautions required at landfill*

None

(k) *Can waste be recycled or recovered?*

Yes

(l) *Name and address of waste producer*

To be confirmed

(m) *Name and address of consultant*

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Martin Gill B.Sc. (Hons)., FGS., AMIEnvSc
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Basic characterisation schedule for Made Ground soils

Produced following the requirements of The Landfill (England and Wales) (Amendment) Regulations 2004 Part 2 (5)

(a) *Source and origin of waste*

Proposed development at The Kennet Centre, Market Street, Newbury, RG14 5EN

(b) *Process producing the waste*

Foundation and service trench excavations / general site clearance

(c) *Statement on waste treatment*

Refer to pre-treatment confirmation form

(d) *Composition of the waste*

Darky grey or brown slightly gravelly sandy clay. Gravel of fine to coarse angular, flint, brick and concrete

(e) *Appearance of the waste*

As above

(f) *European waste catalogue code*

17-05-03* (*for hazardous waste*)

(g) *Hazardous waste properties*

Combined metals

(h) *Is the waste prohibited under regulation 9?*

No

(i) *Landfill class*

Stable non-reactive hazardous waste in non-hazardous landfill

(j) *Additional precautions required at landfill*

None

(k) *Can waste be recycled or recovered?*

Yes

(l) *Name and address of waste producer*

To be confirmed

(m) *Name and address of consultant*

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Geo-environmental Engineer, Soiltechnics Limited

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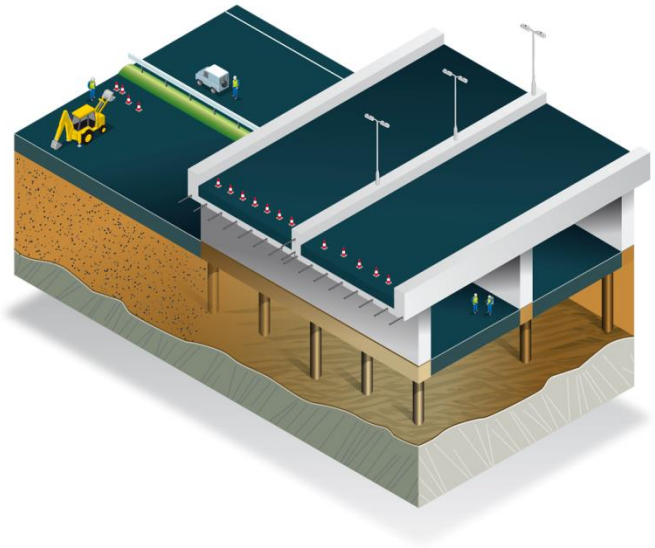

engineering

Client:	Soiltechnics
Site:	Kennet Centre, Newbury
Ref:	P9699-20-R1-A
Date:	3rd July 2020

Zetica Limited
Zetica House, Southfield Road
Eynsham, OX29 4JB
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Tel: 01993-886682
Email: projects@zetica.com
Website: www.zetica.com

SUMMARY REPORT

Location: Kennet Centre, Newbury
Client: Soiltechnics
Reference: P9699-20-R1-A

1. INTRODUCTION

Scope

Zetica Ltd was commissioned by Soiltechnics (the Client) to carry out a geophysical survey to determine the depth of a pile supporting the Kennet Centre, Newbury (the Site).

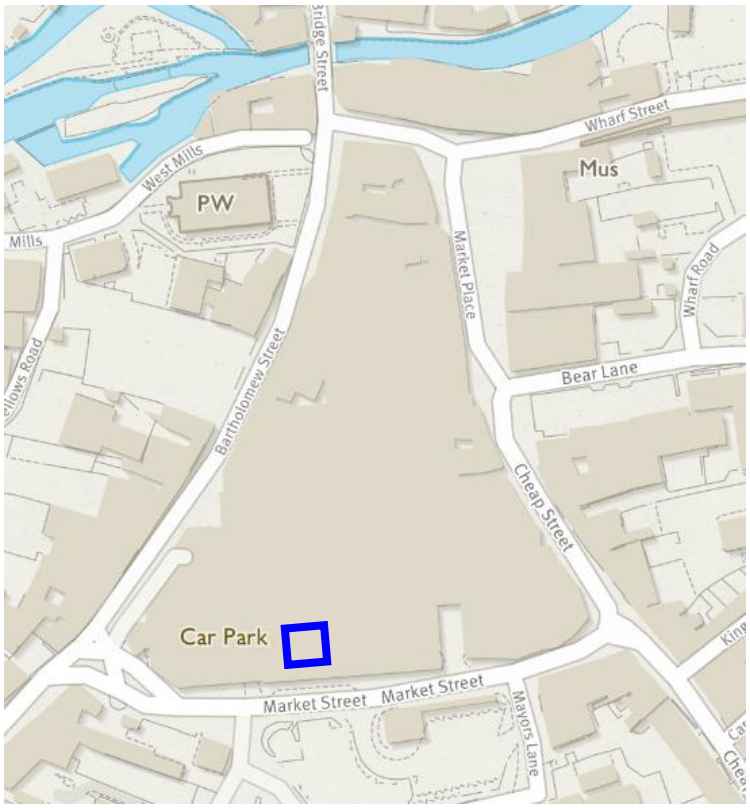
The survey utilised parallel seismic and downhole magnetometer methods to investigate depths and structure of the pile.

The survey was undertaken on the 19th June 2020.

The Site

The Site was situated on the ground floor of the Kennet Centre multi-storey car park in Newbury. The surveyed pile was one of multiple piles associated with a concrete support column. A borehole was drilled in close proximity to the column to allow investigation of the underlying pile structure. From core samples observed on Site the bedrock is known to be chalk at a depth of 17m.

The borehole was located adjacent to the pile, ~1.7 m north west of the support column and extended to ~24 m bgl (below ground level).



Source: OS Maps

Figure 1: Site location plan

Scale: NTS

2. METHODOLOGY

Summary of techniques

The survey utilised two techniques to investigate pile depth.

Parallel seismic profiling was used to detect the base of the pile structure. The method relies on generating compression waves by hammering the surface above the pile and measuring travel times of the refracted wave to a geophone lowered in the adjacent borehole. The velocity of the refracted wave is higher than the direct wave arriving at the geophone below the base of the pile, so the base of the structure can be detected by a change in the propagation velocity of the signal. A plastic plate was placed on the pile cap and hammered to generate the required seismic energy. Readings were taken with a borehole geophone every 0.5 m down to 23.5 m bgl.

Borehole magnetic profiling was used to investigate the presence of reinforcement or other ferrous material in the pile. This method relies on measuring the vertical gradient of the magnetic field in a borehole in close proximity to the pile. Ferrous items adjacent to the borehole cause changes in the vertical gradient of the measured field which can be used to determine the presence of a reinforced foundation or structure. A borehole magnetometer was lowered down the target borehole and the recorded values for magnetic gradient were used to interpret the presence of potential reinforcement.

Useful Links

https://www.zetica.com/resources/method-descriptions/methods/

Table 1: Summary of survey design

Method	Configuration	Source offset	Station interval
Magnetic profiling	Vertical gradient	N/A	~0.025 m
Parallel seismic	7-component geophone	Directly above the pile structure at ground level	0.5 m
Limitations	The following clarifies some of the limitations relevant to the survey: • Noise associated with human activities or machinery in close proximity to the Site may have an adverse effect on the signal-to-noise ratio of the seismic data. • The detection of a pile structure by parallel seismics relies on a contrast in the physical properties (e.g. seismic velocity) between the pile and the surrounding geology. • The detection of a pile structure by magnetic profiling relies on the presence of ferrous metal reinforcing in the pile. • The success of the survey may be influenced by the position of the measurement borehole. For example, if the borehole is more than a 2-3 m from a pile structure the presence of reinforcing may not be determined by the magnetometer survey.		

3. DATA

Data Presentation

The geophysical survey results are presented in Figures 2 to 4 referenced below.

Reference	Title
Figure 1	Site location plan
Figure 2	Example parallel seismic data
Figure 3	Parallel seismic interpretation
Figure 4	Measured downhole magnetometer results

Data Quality

The seismic data were of good quality showing a high signal to noise ratio, enabling the first arrival signal to be identified on all traces along the full depth of the borehole. An example of the parallel seismic data is shown in Figure 2.

The quality of the magnetic data was good. The magnetic profiling survey was repeated with 3 No. profiles showing good repeatability. An example of measured magnetometer results can be seen in Figure 4.

4. Results

Parallel Seismics

An example of parallel seismic data is shown in Figure 2. The first arrivals are highlighted in orange.

At depths between 1.0 m bgl to 10.0 m bgl showed an inconsistent velocity trend, likely caused by made ground or variations in pile structure at these depths. Between 10.0 m bgl and 18.0 m bgl a relatively constant signal velocity of ~3090 m/s is observed. This velocity is consistent with concrete materials in a pile structure. Below this, a transition to a lower signal velocity of ~2120 m/s is observed between 18.0 m bgl and 23.5 m bgl. This velocity is consistent with chalk bedrock. This velocity decrease is believed to be caused by the transition from pile to bedrock.

A pile depth of ~18 m bgl has been interpreted from this velocity change. A velocity profile of the data can be seen in Figure 3.

The orange line identifies the first arrival of seismic signal.

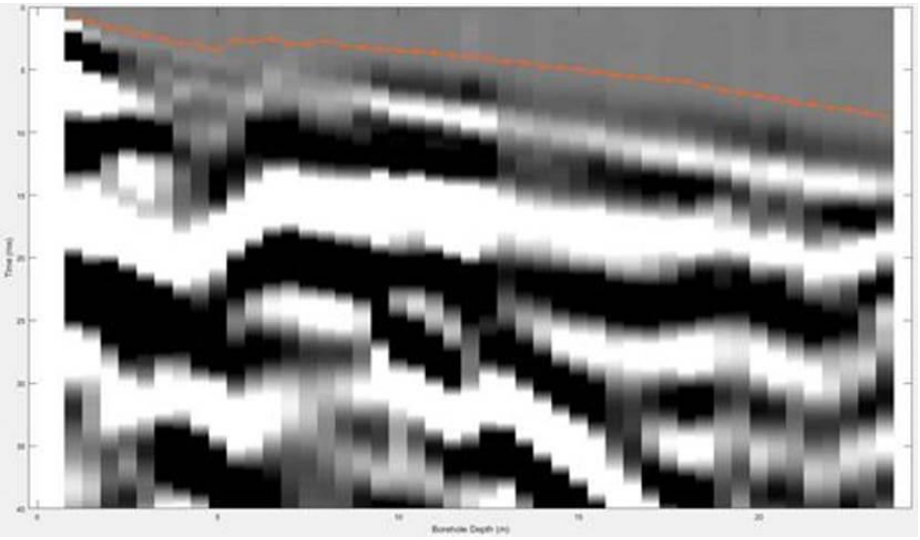


Figure 2: Parallel seismic data

Plot of first arrival time vs. depth showing a break in slope located between 18.0 m.bgl and 18. 5 m.bgl.

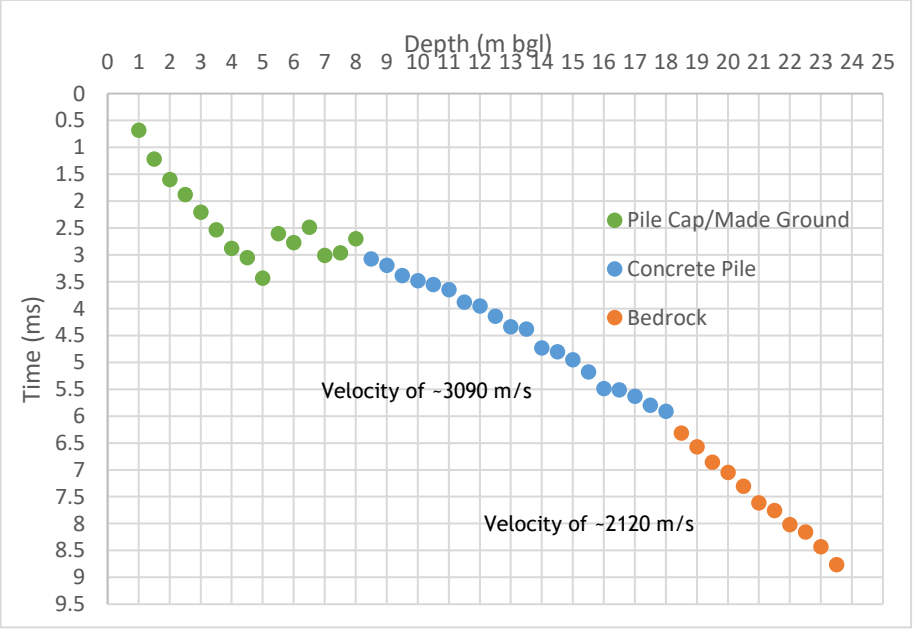


Figure 3: Parallel seismic interpretation

Downhole Magnetometer
An anomaly consistent with a reinforced pile structure was observed in the magnetometer data. The reinforced pile structure is believed to extend to only ~8.0 m bgl (Figure 4). This is significantly shallower than the inferred depth of the pile from the parallel seismic survey, suggesting that the majority of the pile is unreinforced.
Magnetometer profile showing the recorded values, with repeat readings. Recorded values suggest that the limit of reinforcement is between 5.5 m bgl and 6.0 m bgl.

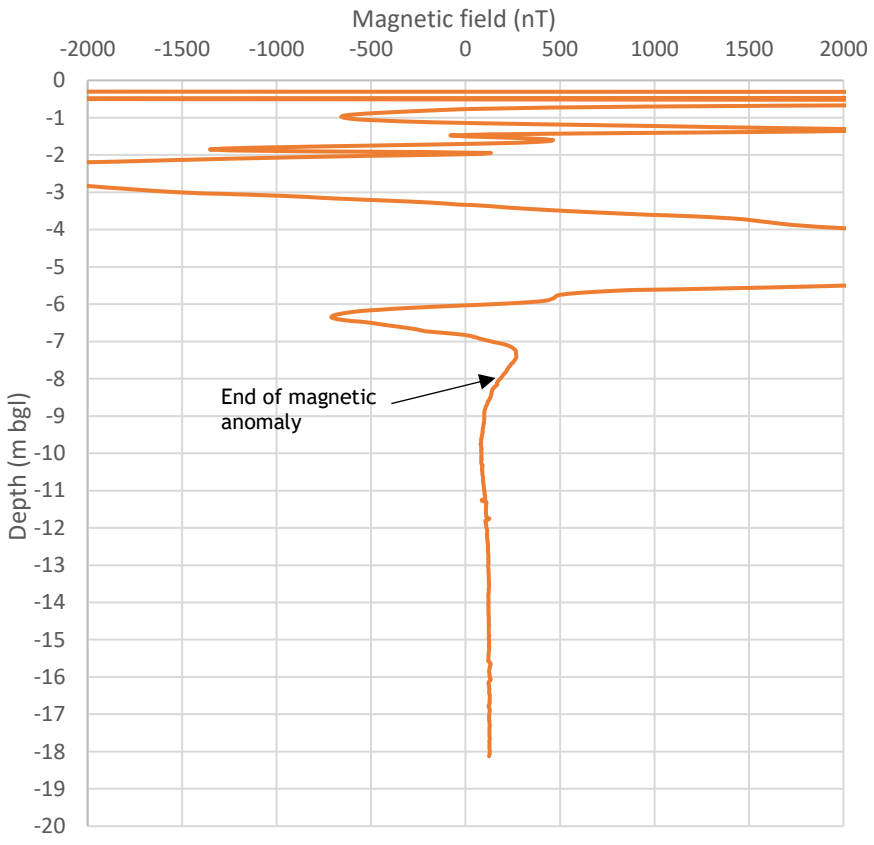


Figure 4: Measured magnetometer data

5. SUMMARY	
Summary	Zetica have undertaken a parallel seismic survey of 1 No. borehole in order to determine the pile depth. Downhole magnetics was also employed to identify any ferrous reinforcement in the pile. Interpretation of the parallel seismic data identified a decrease in seismic velocity at ~18.0 m bgl. This decrease has been interpreted as the base of the pile. Borehole magnetometer data from the same borehole showed reinforcement is present to a depth of ~8.0 m bgl in the pile.

Appendix 1	
General Notes	1. This report has been prepared in relation to the specific requirement of the contract or commission. The report should not be used by third parties without prior consultation with Zetica Ltd. Any advice, recommendations, or statements within the report should be addressed only in the context of the report as a whole. 2. The copyright for this report remains with Zetica Ltd. No part of this report may be reproduced, published or amended without prior written consent from Zetica Ltd. 3. The report refers to the conditions of the property at the time of investigation. Zetica Ltd cannot accept liability for subsequent changes of Property conditions. 4. Zetica Ltd may have relied on externally provided information. Under no circumstances does Zetica Ltd accept responsibility for the accuracy of such information or data supplied. 5. By their nature, exploratory points, such as boreholes or trial pits, can only provide information on a relatively limited area or volume of a Property. In general, the conditions encountered may vary between exploratory points. 6. It should be noted that the detection performance is dependent on a measurable physical contrast between the item for detection and host materials. Where significant noise is present sufficient detection may not be possible. 7. Interpretation relies largely on experience of similar conditions. Site-specific conditions can create variations that may not be detectable by non-intrusive investigation techniques. It should be noted that the detail of an interpretation might vary from that identified by later intrusive investigation, although the general identification of a feature should not vary. 8. The report has been written in Line with relevant guidance and legislation in use at the time of report compilation. Subsequent improvement in techniques, changes in legislation, or changes in Site conditions, may render parts of this report obsolete. After a significant period (i.e. a year) it may be prudent to discuss the report and findings with us.

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