PROPOSED ANAEROBIC DIGESTION FACILITY

SPRING GROVE GREEN POWER

Ground Investigation Report

Prepared for: Acorn Bioenergy

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1.0 Introduction

1.1 Appointment

SLR Consulting Limited (SLR) was commissioned by Acorn Bioenergy Ltd to undertake a ground investigation to support the construction of a proposed new anaerobic digestion facility located at Bowsey Field, Spring Grove Farm (Spring Grove Green Power), Withersfield, Haverhill, South Cambridgeshire CB9 7SW (the Site). The Site boundary and location plan is provided as Drawing 01.

This report documents the factual results from the ground investigation and consideration of the ground conditions to inform an outline geotechnical assessment, alongside an assessment of the land quality risks prior to development.

1.2 Proposed Development

The proposed development comprises the construction of a new anaerobic digestion facility which will comprise:

- A new hard surfaced access road from the adjacent A1307 Cambridge Road
- 5no. fermentor tanks 34m in diameter and 9.45m in height
- 6no. slurry, pre-water and dirty water tanks three which are 8m in diameter, three which are 6m diameter and 8.745m in height
- Ancillary equipment and plant area that includes propane tanks, carbon dioxide tanks, chiller, biogas upgrading unit, grid entry unit, heat exchangers, compressors, CHP units and gas flare
- 3no. lagoons to hold 10,000m3 each of process water and a rainwater lagoon to hold 2,000m3
- 3no. large bays for raw silage feedstock clamps to hold volume capacities of 22,507 m3 each
- A separator building, straw bunker, straw building and chicken shed
- Areas for admin block and welfare, car parking, trailer bays and weighbridge, and
- Hard surfaced road and pavement access within the main central site area.

Due to the site being located on a slope an earthworks cut and fill exercise will be required across the site to create a level platform for the development. There will be an excess cut volume of material which will be placed on an adjacent area to the east.

In addition to this, due to height changes, a retaining wall is proposed to wrap around to the rear, east and west of the tank farm up to a maximum height of 5m tapering down to approx. 2m. A separate section of retaining wall is also proposed along the southern extent of the western area of the site where height changes occur due to placement of fill material to raise the levels required for access.

The development proposals are presented in Appendix 01.

The biogas generated at the Site will be road tankered to an off-site hub location where it will be injected directly into the grid network.

1.3 Background and Objectives

The objective of the report is to characterise the ground conditions beneath the Site and allow preliminary design advice for the proposed development. Analysis of field observations and laboratory test results will determine the ground conditions and geotechnical parameters to inform the design.

The secondary objective of the investigation was also to collect appropriate data on the geo-environmental conditions at the Site to allow further assessment of potential contaminant linkages identified within the PLQRA and associated potential development risks associated with the Site.

1.4 Scope of Works

The scope of works required to meet the objectives above are detailed further within Section 3.0, but in summary comprised the following as outlined below;

- review of the current and historic uses of the Site and surrounding area;
- assessment of sensitivity and environmental setting through a review of geological and hydrogeological data and records regarding the quality of nearby surface waters and underlying groundwater;
- preparation of relevant health and safety documentation including a detailed Health & Safety Plan, Risk Assessments and Method Statements for the proposed works;
- clearance of all exploratory locations by an on-site survey utilising a Ground Penetrating Radar (GPR), and Cable Avoidance Tool (C.A.T) and Genny;
- excavate 7no. trial pits to enable characterisation of the shallow ground conditions;
- advance 4no. window sample locations to a target depth of 6m below ground level (bgl) or refusal to enable characterisation of shallow soil deposits;
- the drilling of a single intrusive cable percussion borehole to enable characterisation of soils to a target depth of 15m bgl or refusal;
- undertake an intrusive dynamic probing investigation;
- undertake intrusive in-situ plate load bearing tests;
- installation of gas and groundwater monitoring wells;
- collection of soil samples for geotechnical and geo-environmental laboratory analysis;
- preliminary groundwater monitoring of installed monitoring wells to support further assessment of the Site;
- chemical and geotechnical laboratory testing to support the Land Quality Risk Assessments and Geotechnical Assessment; and,
- produce a factual and interpretive report detailing the findings of the investigation with recommendations for further work.

1.5 Previous Work

This Ground Investigation Report follows on from a desk based Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) for the Site undertaken by SLR:

- Preliminary Land Quality Risk Assessment (PLQRA) Thurlow Estate – Anaerobic Digestion Facility. SLR Ref: 404.11923.00002 Version No: Final. SLR Consulting Ltd, April 2022.

The PLQRA should be referred to for more detailed site walkover and desk study review information.

2.0 Site Details

2.1 Site Details

The Site details taken from the PLQRA are summarised in Table 2-1 and presented within the Site Location Plan provided in Drawing 01.

Table 2-1:
Site Details

Site Details		
Location	Bowsey Field, Spring Grove Farm, Withersfield, Haverhill, South Cambridgeshire CB9 7SW. Grid Reference 564167 246912 identifies the approximate location (Drawing 01).	
Current Site Use	The Site is in use for arable cropland, at the time of the investigation the western field had been cut and left with dead crop stubble, the eastern field was open and ploughed. The field margins consist of grass.	
Existing Buildings & Hardstanding	There has been no previous development within either the eastern or western fields. However, Spring Grove Farm is located in the southern part of the Site, consisting of a farmhouse and various barns and outbuildings.	
Gas Supply Assets	There is a Cadent gas main asset located inside, and running parallel to, the northern boundary of the site. This comprises an Intermediate Pressure (IP) gas main (6-inch steel pipe) which poses a constraint to the development. The easement for this asset is located within the site boundary. It is noted there is also an 8-inch steel Intermediate Pressure (IP) gas main also running parallel further to the north, however this is off-site and the site boundary is not within the easement of this asset.	
Drainage System	The Site is arable cropland and therefore surface water drainage is direct to ground.	
Surrounding Land Use	North-east	A strip of woodland containing thick mature trees runs along the site's northern boundary beyond which are arable fields.
	South-east	Ploughed arable fields.
	South-west	Stour Brook runs immediately adjacent to the south boundary of the site. An embankment covered with overgrown bushes and mature trees is formed by a disused railway line which roughly follows the same route along the southern boundary of the eastern part of the site. The A1307 Cambridge Road also runs adjacent to the south boundary, at a proximity of around 90m.
	North-west	Grassed arable fields
Site History	From first available maps dated 1886 onwards the site is undeveloped land with field boundaries. A footpath runs centrally across the site from north to south until the 1951 map. Spring Grove Farm is present within the plot of land in the southern part of the site including various small buildings. A strip of woodland and a footpath	

Site Details		
	labelled Roman Road runs along the northern site boundary until the 1926 map. A drain is noted running north south across the site between the two fields from 1972. Offsite land to the north, west and east is similar open undeveloped agricultural land from first available maps. A railway line on an embankment runs along the southern boundary of the eastern part of the site. By 1972 the railway line is noted as a Dismantled Railway although the embankment remains in place where it runs adjacent to the south of the eastern part of the site. The embankment is no longer present beyond the southeast of the site and to the south of the far western part of the site where the route of the A604 has been straightened and improved. The Stour Brook runs in an easterly direction parallel to the southern boundary from the 1800s. A road (labelled as A604 by 1960) crosses under the railway line beyond the Stour Brook approximately 80m south of the site from 1972.	
Geography	Topography and gradient	The Site is undulating with the local topography generally sloping down in a south easterly direction. The north-western corner of the site is at the highest elevation of 90m AOD and the south-eastern corner is at 83m AOD. Both fields also slope down towards the Stour Brook to the south and dip towards the ditch which separates them.
	Elevation	Average 86m above Ordnance Datum.
	Surface waters	The Stour Brook flows in an easterly direction adjacent to the southern boundary of the site before it turns south and away from the site approximately halfway along Spring Grove Field. A ditch runs in a southerly direction through the centre of the site between the two fields. Ditches also form the western boundary and run through the woodland along the northern boundary.
Geology and Hydrogeology	Superficial	Lowestoft Formation – glacial till diamicton (clay, silt, sand and gravel).
	Solid	Lewes Nodular Chalk Formation
	Aquifer status	Secondary undifferentiated aquifer (Superficial deposits) Principal aquifer (Mudstone)
	SPZ / Groundwater abstractions	The Site is located within a source protection zone 3 (SPZ3). No current groundwater abstractions are recorded within 2km of the site.
Ecological Receptors	The Site is not within an area with statutory ecological designations.	

2.2 Previous Assessment

The previous Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) qualitatively assessed potential land contamination risks associated with the Site for a commercial/light industrial use.

The assessment did not identify any potential contaminant sources at the site. Fuel stored at the farmhouse was not considered a significant source of contamination due to it being contained within an integrally bunded tank and because there was no evidence of bulk storage of oils, fuels or chemicals in the outbuildings.

Made ground associated with the former railway embankment adjacent to the south of the site was not considered as a potential significant off-site source of contamination given its age since construction (1800s) and last use as a railway line (1960s) and that it is covered with well-established trees and bushes. Given the lack of potential sources of contamination there was no requirement at the PLQRA stage to assessment potential pathways and sensitive receptors. A summary of the findings from the PLQRA are provided below.

2.2.1 Preliminary Land Quality Risk Assessment (PLQRA) Findings

UK contaminated land statutory guidance and associated supporting guidance documents including LCRM[1] and R&D66[2] recommend that a qualitative assessment of risk should be provided for each identified PPL to determine any risk management actions. Given the lack of potential contamination sources we have not identified any viable PPLs which require further consideration.

[1] Land Contamination Risk Management (LCRM), EA 2020
[2] Guidance for the Safe Development of Housing, R&D66, DEFRA, EA, CIEH 2008

3.0 Ground Investigation

3.1 Rationale

A ground investigation scope was developed by Acorn Bioenergy's consulting engineers GGP Consult to provide geotechnical information for the proposed development design and to baseline the land quality contamination status of the Site.

The rationale for the investigation was therefore to:

- confirm the nature of the ground and collect soil samples for both chemical and geotechnical analysis;
- undertake in-situ testing for both land quality and geotechnical purposes;
- install groundwater and ground gas monitoring wells across the Site;
- confirm the depth and elevation of groundwater;
- complete a round of groundwater monitoring;
- develop an updated understanding of the Ground Model and subsequently the Conceptual Site Model (CSM) to inform site characterisation; and
- obtain sufficient data to provide preliminary geotechnical and land quality recommendations for development design.

3.2 Fieldwork Summary

SLR conducted an intrusive ground investigation at the Site in September 2022. The scope of the investigation included the following:

- excavation of 7No. trial pits (TP1 – TP7) to depths of between 2.5m and 3.0m bg[3]l;
- advancement of 4No shallow boreholes (SBH1 to SBH4) to depths of between 5.0m and 6.0m bgl utilising a terrier rig;
- drilling of 1No. deep borehole (DBH1) to a depth of 15m bgl utilising a cable percussion rig;
- in-situ testing including Standard Penetration Tests (SPTs);
- intrusive dynamic probing investigation (DP1 – DP16) to 6m bgl utilising a terrier rig;
- in-situ plate load tests using a 14 tonne excavator (PBT1 – PBT10);
- field screening of soil samples for volatile organic compounds (VOC's) utilising a photo-ionisation detector (PID);
- supervision and logging of all exploratory locations in accordance with BS5930:2015 +A1:2020[4] by a suitability qualified engineer;
- recovery of soil samples for geotechnical and chemical laboratory analysis;
- installation of dual purpose 50mm diameter gas and groundwater monitoring wells in 4No locations.

The locations of all exploratory locations are shown on Drawing 02a, which shows the site in its current layout. Drawing 02b shows the exploratory hole locations in relation to the proposed development.

[3] metres below ground level (m bgl)
[4] British Standards Institution (2020). BS 5930:2015+A1: 2020 BSI Standards Publication Code of Practice for Ground Investigations

Chemical laboratory analysis was undertaken by Element Laboratories, Deeside.

Geotechnical laboratory analysis was undertaken by Geolabs Limited.

3.3 Utility Mapping and Exploratory Location Clearance

Prior to intrusive works, SLR procured buried service plans and also carried out a survey utilising a CAT and Genny, and a Ground Penetrating Radar (GPR) to identify any buried objects at all proposed exploratory locations. The position of the intermediate pressure (IP) gas main was identified along the northern boundary of the Site on review of the service plans. On site, the service survey located and marked out the exact position of the gas main. All exploratory hole locations were placed outside the easement of the gas main.

The service survey and clearance was undertaken by Ground Scan Ltd on 12th September 2022.

3.4 Ground Conditions

Detailed descriptions of the underlying geology are provided within the borehole and trial pit logs in Appendix 02. A summary of site observations are provided within Table 3-1.

A total of 4No. window samples (SBH1-SBH4) were advanced to a maximum depth of 6m bgl, 1No. cable percussion borehole (DBH1) was drilled to a depth of 15m bgl and 7No. trial pits (TP1-TP7) were excavated to depths between 2.50 and 3.00m between 12th and 15th September 2022.

3.4.1 Site Geology

Table 3-1 below shows a summary of the encountered geology during the intrusive investigation.

Table 3-1:
Summary of Strata Encountered

Ground Type	Strata	Description	Depth Range (m bgl)
Topsoil	Topsoil	Soft brown gravelly sandy clay.	0.0 – 0.45
Superficial Deposits	Lowestoft Formation – glacial till diamicton (clay, silt, sand and gravel)	Predominantly encountered as firm to very stiff light brown, brownish grey, light grey and dark grey silty sandy gravelly clays. Occasional sandy and gravelly stratums. Occasional to frequent cobbles of chalk.	0.2 – 15

No Made Ground was identified on-site, all encountered soils were deemed to be natural.

Topsoil was found in all exploratory locations, to a maximum depth of 0.45m bgl (in TP6). The topsoil was consistent across the site generally comprising of soft brown gravelly sandy clay, with frequent rootlets.

The Lowestoft Formation was found in all locations and was found to extend beneath the depth extent of all exploratory holes. Two broad geological strata have been recognised within the glacial till. Between 0.2m and 5.8m bgl a firm to stiff clay with a varying composition of silt, gravels and sands which was broadly grey and brown in colour was found. The gravels encountered comprised both flint and chalk. The second broad geological

strata was encountered between depths of 0.85m and 14.70m bgl, this consisted of stiff to very stiff grey gravelly clay. The gravel consisted predominantly of chalk with rare flint.

Occasional to frequent cobbles of chalk were present throughout the soil profile to the base of the deepest borehole at 15m.

A small clast of chalk was encountered in one location (SBH4), this was between 2.35m and 2.90m bgl and was described as soft white chalk with chalk gravel. This stratum was also noted to be damp. Although the encountered strata comprised of chalk it is not considered to represent the mapped bedrock geology of the Lewes Nodular Chalk Formation.

3.1 Field / Visual Observations of Contamination

Topsoil was identified within each exploratory location, however no made ground was present. No evidence of any visual contamination, staining and/ or olfactory indications of possible contamination was encountered within any of the exploratory hole locations.

Field screening of soil samples from all the exploratory hole locations was undertaken using a Photo Ionisation Detector (PID) with no organic vapour concentrations recorded throughout (<0.1ppm). Results are presented on the borehole logs in Appendix 02.

3.2 Groundwater and Ground Gas monitoring visit

SLR returned to site on the 6th October 2022 to undertake 1No. round of groundwater and ground gas monitoring of the installed monitoring wells (SBH1 – SBH4 and DBH1) so as to ascertain water and gas levels post investigation. The encountered groundwater levels are provided in Table 3-2. The encountered ground gas concentrations are provided in Table 3-3. The datasheet is presented in Appendix 03.

Table 3-2:
Groundwater Levels

Monitoring Well	Screened Interval (m)	Groundwater Level (m bgl)	Ground Level (mAOD)
SBH1	3.00 – 6.00	3.46	85.33
SBH2	3.00 – 6.00	3.50	83.19
SBH3	3.00 – 6.00	Dry	81.31
SBH4	2.50 – 5.00	4.31	80.42
DBH1	12.00 – 15.00	10.48	84.39

No significant water strikes were observed during the advancement of the boreholes although soils encountered in SBH4 between 2.35m and 2.90m were described as damp; however, groundwater was recorded during the return monitoring visit. Groundwater was recorded at similar depths in SBH1 and SBH2 (3.46m and 3.50mbgl), and at a greater depth in DBH1 (10.48m bgl). No groundwater was recorded in SBH3. Given the absence of groundwater observed during drilling, it is likely that these groundwater levels are representative of slow seepages of groundwater observed from thin water bearing lenses and horizons of more permeable units within the Lowestoft Formation.

Table 3-3:
Ground Gas Concentrations

Monitoring Well	Barometric Pressure (mbar)	Methane Steady State (% v/v)	Carbon Dioxide Steady State (% v/v)	Oxygen Steady State (% v/v)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Flow (l/hr)	Gas Pressure (mbar)
SBH1	1005	<0.1	1.8	20.0	1	<0.1	<0.1	-0.09
SBH2	1006	<0.1	2.8	18.3	2	<0.1	-0.2	0
SBH3	1006	<0.1	0.9	19.2	1	<0.1	<0.1	0.02
SBH4	1006	<0.1	0.1	18.2	<1	<0.1	<0.1	0.02
DBH1	1006	<0.1	1.5	17.5	25	<0.1	<0.1	-0.16

Generally, the recorded ground gas concentrations across the site were low. No methane was detected in any of the locations, with the highest concentration of carbon dioxide being found in SBH2 with a concentration of 2.8% v/v. No significant flows were detected.

Low levels of carbon monoxide (25ppm) were recorded in DBH1. There is chalk recorded in the logs which can result in a low-level carbonate source that can impact on CO/CO2 readings. Given that the slotted section of the well at this location is beneath groundwater, then the results are not considered representative of ground gas concentrations and have therefore not been discussed further.

3.3 In-situ testing

3.3.1 Standard Penetration Tests (SPTs)

A total of thirty-two in-situ SPTs were conducted in all borehole locations (DBH1, SHB1 – SBH4) from 1.2m to a maximum depth of 15.0m bgl. Results are presented on the borehole logs in Appendix 02 and presented in Figure 3-1.

Tests were conducted within the Lowestoft Formation comprising sandy gravelly clay and resulted in N- values of between 11 and 50. **Error! Reference source not found.** displays an increase in SPT N-value with depth.

A correlation between undrained strength and SPT N-value is proposed by Stroud[5] (1989). N-values indicate that the clay is a medium to very high strength material, comparable with field descriptions. However, the relationship is not considered to be as reliable as laboratory testing and alternative in-situ methods.

Undrained shear strength values correlated from the SPT N-values are presented in Figure 3-2 ranging between 55kPa and 250kPa and show a general increase with depth.

[5] Stroud, M.A. (1989). The Standard Penetration Test – its application and interpretation. Penetration testing in the UK, Thomas Telford.

Figure 3-1
SPT N-value with Depth

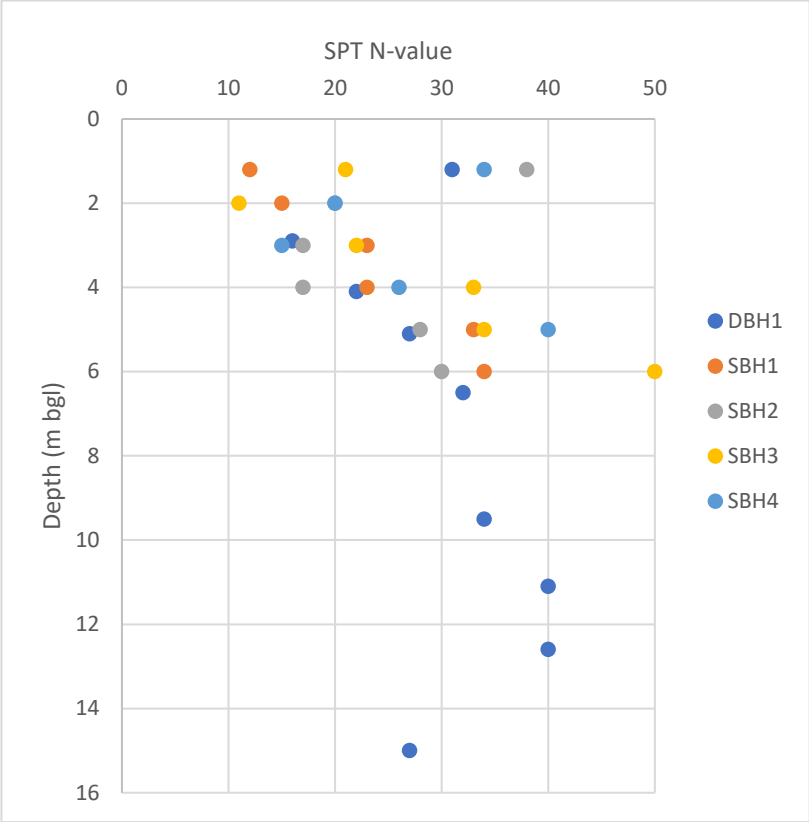
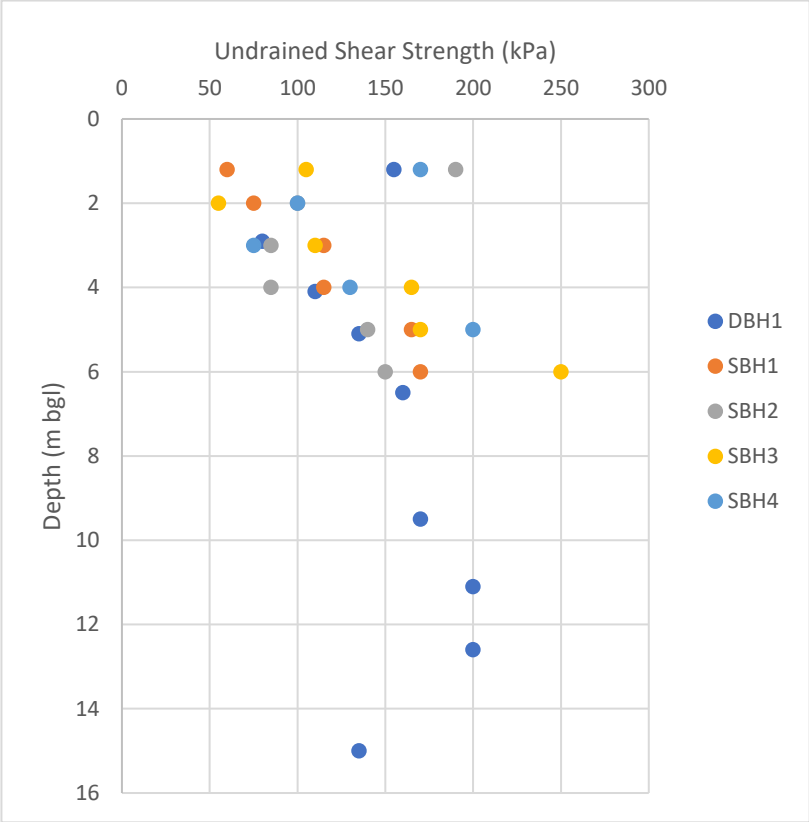


Figure 3-2
Correlated Undrained Shear Strength with Depth



3.3.2 Plate Bearing Tests

In-situ plate bearing tests were undertaken at PBT1-PBT10 across the Site and along the proposed access road, using a 455mm diameter plate and an 8-tonne excavator as the kentledge.

Equivalent CBR values are summarised in Table 3-4 with full results presented in Appendix 04. Testing was conducted within yellowish brown slightly gravelly slightly sandy silty clay at 0.5m bgl. CBR values ranged from 3.8% and 44%. However, the value of 44% from PBT8 was derived from an interpolation to 1.25mm. Discounting this result, the equivalent CBR values ranged between 3.8% and 16%.

Table 3-4: Equivalent CBR Values %

Exploratory Location	Depth (m bgl)	Equivalent CBR (%)
PBT1	0.5	16
PBT2	0.5	9.2
PBT3	0.5	15
PBT4	0.5	4.3
PBT5	0.5	8.9
PBT6	0.5	6.7
PBT7	0.5	6.2

Exploratory Location	Depth (m bgl)	Equivalent CBR (%)
PBT8	0.5	44*
PBT9	0.5	3.8
PBT10	0.5	3.8

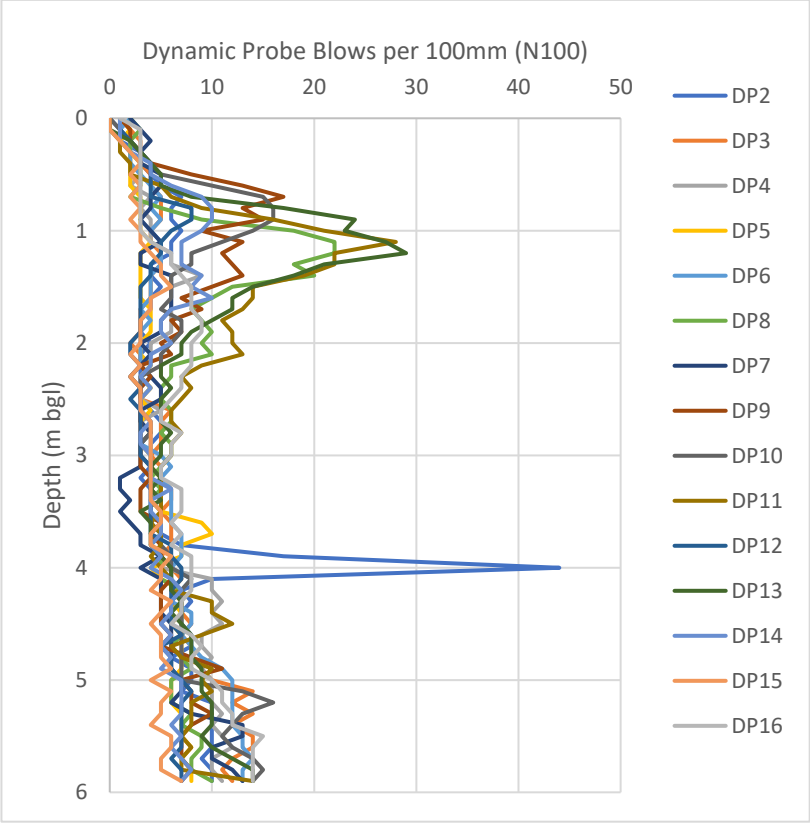
*CBR value calculated from an interpolation to 1.25mm

3.3.3 Dynamic Probe Testing (DPT)

Dynamic Probing was conducted utilising a Terrier Rig from ground level to 6.0m bgl in sixteen locations across the Site (DP2 – DP16).

The results of the DPTs are presented in Appendix 05 and Figure 3-3 presents the N100 (number of blows per 100mm increment) with depth. The figure shows that the material across the Site is relatively consistent at each test location and shows a general increase in the N100 with depth. The figure shows a significant increase in the N100 from between 0.5m and 1.5m bgl in several locations and in DP12 at 4m bgl. This is likely due to the presence of gravels and cobbles of chalk and flint within the clay.

Figure 3-3
Dynamic Probe Blows with Depth



4.0 Chemical Laboratory Results

4.1 Soil Analysis

4.1.1 Soil Analysis Schedule

Table 4-1 summarises the soil chemical analysis scheduled during SLR's ground investigation. A total of 29No. soil samples were submitted for laboratory analysis and 8No. were scheduled for analysis.

Table 4-1:
Soil Chemical Analysis Schedule

Contaminants	Number of Samples	
	Topsoil	Lowestoft Formation
pH	4	4
Metals	4	4
Speciated PAHs (Poly-aromatic Hydrocarbons)	4	4
Speciated TPH (TPH-CWG inc BTEX)	4	4
Total Cyanide	4	4
Total Organic Carbon (TOC)	4	4
Asbestos Screening	4	0

All soil samples were stored in cool boxes and transported by courier under chain of custody protocol to Element Materials Technology.

4.1.2 Soil Analytical Results

Laboratory certificates are presented in Appendix 06. The data trends and key points are summarised below:

- the concentration of metals across the site are generally low and consistent with background concentrations for the area where available, as indicated by BGS Geoindex mapping. However, there were greater concentrations noted in the samples for barium, chromium, lead, nickel, vanadium and zinc. The highest total metal concentration was recorded in SBH4 (0.15m).
- PAH concentrations were typically below the laboratory limits of detection (LOD);
- petroleum hydrocarbons (TPH) were not detected in any of the samples tested, with all the concentrations recorded being below the LOD and indicative of natural humic soils;
- PCBs and cyanide were recorded below the LOD in all instances; and,
- asbestos fibres were not detected within any of the 4 samples tested.

4.2 Summary of Laboratory Results

Based on the above, the following qualitative conclusions have been made with respect to assessment of contaminants:

- concentrations of contaminants in soils are low and metal concentrations are consistent with background concentrations for the area;
- no visible asbestos or asbestos fibres have been recorded within any of the samples or investigation locations;
- TPH, PAHs, PCBs, and cyanide were recorded below the LOD across the site.

Table 4-2 below shows the recorded levels of Total Organic Carbon (TOC). TOC can be an indicator of the potential for a degradable fraction to be present in the soil which could result in decomposition to generate ground gases such as carbon dioxide and methane.

Table 4-2:
Total Organic Carbon Results

Sample	Total Organic Carbon (%)
SBH1 @ 0.1m	1.40
SBH1 @ 1.90m	0.47
SBH2 @ 0.9m	0.27
SBH4 @ 0.15m	1.80
TP2 @ 0.2m	1.40
TP4 @ 0.2m	1.40
TP5 @ 0.6m	0.82
TP6 @ 1.80m	0.16

Concentrations of TOC are generally low (<2 %) in all samples, the highest being recorded in SBH4 at 0.15m with a concentration of 1.80% which is a topsoil sample. During construction all topsoil will be excavated and stockpiled. The recorded concentrations of TOC across the site do not indicate a potential gas risk to human health or property from carbon dioxide or methane, there were no indications of significant organic material being observed in natural material during the ground investigation and no hydrocarbon/organic made ground contamination has been observed and on this basis the risks from ground gas are not considered to require further assessment.

5.0 Generic Quantitative Risk Assessment (GQRA)

5.1 Human Health Risk Assessment

5.1.1 Assessment Methodology

Generic Assessment Criteria (GAC) have been used to assess the significance of soil contaminant concentrations recorded. The generic assessment criteria are drawn from several sources of guidance, some from non-statutory guidance and some informal. SLR uses a combination of assessment criteria that are currently available to assist in the screening of soil data prior to determining whether further action is required. The following assessment criteria (known as generic assessment criteria or GAC) have been used for the assessment of contaminant levels in soil:

- Category 4 Screening Levels (C4SLs) (DEFRA) where available. In 2014 DEFRA commissioned CL:AIRE to produce screening values that would allow an assessment land within Category 4 under Part 2A of the Environmental Protection Act (1990), under the planning regime and the DCLG's Planning Practice Guidance on Land Affected by Contamination, which includes a reference to the use of C4SLs under planning. C4SL's are available for the following contaminants: arsenic, benzene, benzo(a)pyrene (BaP), cadmium, chromium VI and lead; and,
- LQM/CIEH Suitable for Use Levels (S4ULs) – in 2015 Land Quality Management and the Chartered Institute of Environmental Health published S4ULs derived following CLEA technical guidance and using the Environment Agency's CLEA UK model, with updated toxicological and exposure parameters and land uses following the publication of the C4SLs. Whilst S4ULs utilise the same exposure parameters as C4SLs, the toxicological data utilised comprises the use of benchmark doses (BMDs) where has the C4SLs utilise low levels of toxicological concern (LLTCs).

If the concentrations recorded on site are lower than the GAC it is generally accepted that the contaminants in question are present at acceptable concentrations which are not capable of putting human health at significant risk - as long as the humans make use of the site in a relatively standard and normal way. An exceedance of these values indicates to an assessor that soil contaminant concentrations need to be considered further. Generic assessment criteria combine both authoritative science and policy judgements.

The S4ULs / C4SLs used have been derived using the CLEA model according to several typical land uses:

- residential (with and without vegetable growth);
- allotments;
- commercial/industrial;
- Public Open Space residential (POS1); and,
- Public Open space park (POS2).

The proposed development at the site is considered a commercial/industrial land use. Therefore, GAC for commercial land use was selected.

A soil organic matter (SOM) content of 1% has been used in the assessment, to be suitably conservative.

5.1.2 Risks to Human Health – Soil

General Contaminants

The laboratory analysis recorded no exceedances relating to commercial GACs protective of human health. Screening sheets are attached as Appendix 07.

Asbestos

In summary of the field and laboratory results SLR would comment that:

- ACMs have not been visually identified at the locations investigated; and
- No asbestos fibres have been detected within any of the 4 soil samples tested.

The results indicate that the short-term and long-term risks from asbestos in soils are likely to be very low.

5.1.3 Risks to Human Health – Groundwater & Ground Gas

No groundwater was sampled as part of these works, however given the greenfield nature of the Site and the absence of any identified contamination during the site investigation or within the subsequent soil laboratory analysis results it is considered that risks to human health from groundwater are negligible.

A preliminary round of ground gas monitoring has indicated gas screening values in line with CIRIA (C665)[6] Characteristic Situation 1 (CS1) – very low risk.

5.1.4 Summary – Risks to Human Health

No exceedances of the screening criteria protective of human health were recorded in the soils sampled at the site in relation to a commercial land use. The concentrations of contaminants in soil on-site are not considered to present an unacceptable risk to human health for the proposed land.

No visual and/ or olfactory indications of contamination were recorded in soils or groundwater.

As indicated, asbestos has not been recorded at the Site.

Potential risk from ground gas is considered very low.

Potential short-term risks to human health during construction and longer-term risks under the proposed future commercial use of the site are considered to be low due to the background levels of contamination recorded and the absence of any asbestos being detected. However, future site construction and maintenance workers should ensure that appropriate personal protective equipment (PPE) is worn and that risk assessments ensure the protection against exposure to potential contamination. The future commercial/industrial development is likely to comprise hard cover that will further mitigate any risks.

5.2 Controlled Waters Risk Assessment

5.2.1 Assessment Methodology

In order to assess the potential significance of dissolved phase concentrations of contamination in groundwater, results would be screened against the SoBRA groundwater Generic Assessment Criteria[7] protective of human health under a commercial/industrial end use which are considered appropriate based on the proposed development.

The Site is in a location which has a moderate to high risk to groundwater and moderate to high risk to surface water. Screening would be undertaken using the most conservative environmental quality standard (EQS) or drinking water standard (DWS) value for any particular contaminant to ensure that a protective approach to the water environment has been undertaken.

[6] CIRIA (C665) Assessing risks posed by hazardous ground gases to buildings, December 2007
[7] SoBRA, Development of Generic Assessment Criteria for assessing vapour risks to human health from volatile contaminants in groundwater, Version 1.0, February 2017.

5.2.2 Risks to Controlled Waters

No groundwater was sampled as part of these works, and therefore such a water quality screening assessment cannot be completed. Given the greenfield nature of the site and the absence of any identified contamination during the site investigation or within the subsequent soil laboratory analysis results it is considered that risks to groundwater or surface water receptors are negligible. It is considered that should contaminant concentrations be detected within groundwater present beneath the site that it would likely be representative of background water quality.

5.2.3 Summary of Risks to Controlled Waters

No visual and / or olfactory indications of contamination were recorded during the ground investigation. Whilst no groundwater samples were collected as part of these works, given the background concentrations detected in soils and the absence of any known potential sources given the greenfield nature of the Site it is not considered that controlled waters receptors are at risk from potential site derived contamination.

It is considered that concentrations that could be detected in groundwater are likely to be representative of background water quality.

As such, risks to groundwater and surface water receptors are therefore not considered to be significant.

6.0 Revised Conceptual Site Model

As discussed in Section 2.0 the Phase 1 PLQRA did not identify any potential contaminant source-pathway-receptor linkages. This report supports this conclusion. During the site investigation no visual or olfactory evidence of contamination was observed. Laboratory analysis was carried out on selected soil samples, in which the majority of the recorded concentrations for most contaminants were found to be below the laboratory limit of detection. The recorded concentrations have been screened against conservative generic assessment criteria (GACs) for a commercial land use and no exceedances were found.

For a PPL to be present a source, pathway and receptor must be present and need to be linked. In the absence of any identified sources of contamination the site a negligible risk to human health and controlled waters is considered to be present.

7.0 Outline Geotechnical Assessment

7.1 Geotechnical Laboratory Data

On completion of the fieldwork, recovered samples were submitted to an accredited Geotechnical Laboratory for the following testing:

- water content;
- Atterberg (plasticity) limits;
- Particle Size Distribution (PSD);
- moisture content / dry density relationship;
- oedometer consolidation (settlement);
- unconsolidated undrained triaxial compression; and,
- pH and sulphate content by 2:1 aqueous.

The results are summarised in Table 7-1 to 7-5 and the laboratory reports are included in Appendix 08.

Table 7-1:
Geotechnical Laboratory Test Results; Classification Testing

Location ID	Depth (m)	Type	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing <425µm sieve	Chemical Tests	
								pH	2:1 WS SO_4 (g/L)
DBH1	2.50	D	22.4	48	20	28	89	-	-
DBH1	4.10	D	-	-	-	-	-	8.5	<0.010
DBH1	5.10	D	17.7	28	17	11	91	-	-
DBH1	8.60	D	19.2	30	17	13	90	-	-
DBH1	9.50	D	-	-	-	-	-	8.0	0.086
DBH1	12.60	D	17.4	38	16	22	80	-	-
DBH1	13.20	D	-	-	-	-	-	7.9	0.33
DBH1	14.90	D	12.3	33	10	23	89	-	-
SBH1	1.20-1.65	D	16.6	43	17	26	94	8.2	0.022
SBH1	4.00-4.45	D	18.5	29	17	12	92	7.4	0.010
SBH2	2.00-2.45	D	-	-	-	-	-	8.6	0.018

Location ID	Depth (m)	Type	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing <425µm sieve	Chemical Tests	
								pH	2:1 WS SO_4 (g/L)
SBH2	4.00-4.45	D	20.4	32	16	16	85	-	-
SBH2	6.00-6.45	D	18.6	33	17	16	81	-	-
SBH3	1.20-1.65	D	-	-	-	-	-	8.6	<0.010
SBH3	2.00-2.45	D	18.3	36	17	19	89	-	-
SBH3	5.00-5.45	D	17.7	38	17	21	89	-	-
SBH4	3.00-3.45	D	23.4	32	18	14	73	8.6	<0.010
TP1	1.00-1.50	B	18.6	50	19	31	91	-	-
TP2	2.50	D	15.5	27	18	9	73	8.8	<0.010
TP3	2.00	D	17.8	32	17	15	85	8.2	<0.010
TP4	1.00	D	15.0	42	20	22	89	8.3	<0.010
TP5	0.60	D	14.8	40	16	24	88	8.3	<0.010
TP6	1.30-2.00	B	8.9	29	13	16	47	-	-
TP6	1.80	D	14.2	44	20	24	22	8.5	<0.010
TP7	1.50-2.50	B	-	-	-	-	-	8.5	<0.010

Table 7-2:
Geotechnical Laboratory test Results; Particle Size Distribution

Location ID	Depth (m)	Type	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
DB1	5.9 – 6.3	B	35.2	48.4	9.5	6.9	0
TP1	2.5	B	30.7	41.9	7.9	11.4	8.1
TP7	1.5 – 2.5	B	28.3	42.4	13.4	15.9	0

Table 7-3:
Geotechnical Laboratory Test Results; Strength and Density Tests

Location ID	Depth (m)	Type	Water Content (%)	Density Tests		Undrained Triaxial Compression		
				Bulk (Mg/m^3)	Dry (Mg/m^3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)
DBH1	2.00	U	20.3	2.15	1.79	40	320	160
DBH1	8.10	U	17.4	2.16	1.84	162	745	373
DBH1	14.10	U	17.6	2.13	1.81	282	640	320

Table 7-4:
Geotechnical Laboratory Test Results; Compaction Tests

Location ID	Depth (m bgl)	Natural Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density (Mg/m3)	Degree of Compaction at NMC (%)
DBH1	3.1 – 3.4	22.4	15.0	1.73	90
DBH1	5.9 – 6.3	17.1	14.3	1.76	97
TP7	1.5 – 2.5	14.2	15.0	1.77	100

Table 7-5:
Geotechnical Laboratory Test Results; Oedometer Consolidation

Location ID	Depth (m)	Pressure Range (kPa)	M_v (m^2/MN)	C_v (m^2/year)
DBH1	8.1	0.0 – 40.5	0.26	5.3
		40.5 – 81	0.14	6.5
		81 – 162	0.10	6.0
		162 – 324	0.065	7.3
		324 – 648	0.041	9.6

8.0 Discussion of Geotechnical Results

8.1 Classification testing

The ground investigation encountered the Lowestoft Formation (glacial till) comprising sandy gravelly clay in all exploratory locations.

Three samples of the Lowestoft Formation were submitted for Particle Size Distribution (PSD) testing at depths of between 1.5m and 6.3m bgl. Testing classified the samples as slightly sandy slightly gravelly very silty clay, comparable with the field descriptions.

Water content testing was carried out on twenty-two samples of the Lowestoft Formation. Analysis returned water content values of between 8.9% to a maximum of 23.4%, with an average of 17.4% at depths of between 0.6m and 14.9m bgl. Figure 8-1, shows a variable water content at shallow depths, with a slight decrease in water content with depth.

Eighteen samples of the Lowestoft Formation were submitted for plasticity testing to determine Atterberg Limits. Seventeen of the samples plot above the 'A-line' and display clay like behaviour. One sample, TP6 at 1.5m bgl, plots below the 'A-line' and display silt like behaviour when considering the modified plasticity (% passing <425 µm sieve). As shown in Figure 8-2, the samples are considered to have a low to intermediate plasticity and a low to medium volume change potential.

Figure 8-1
Water Content with Depth

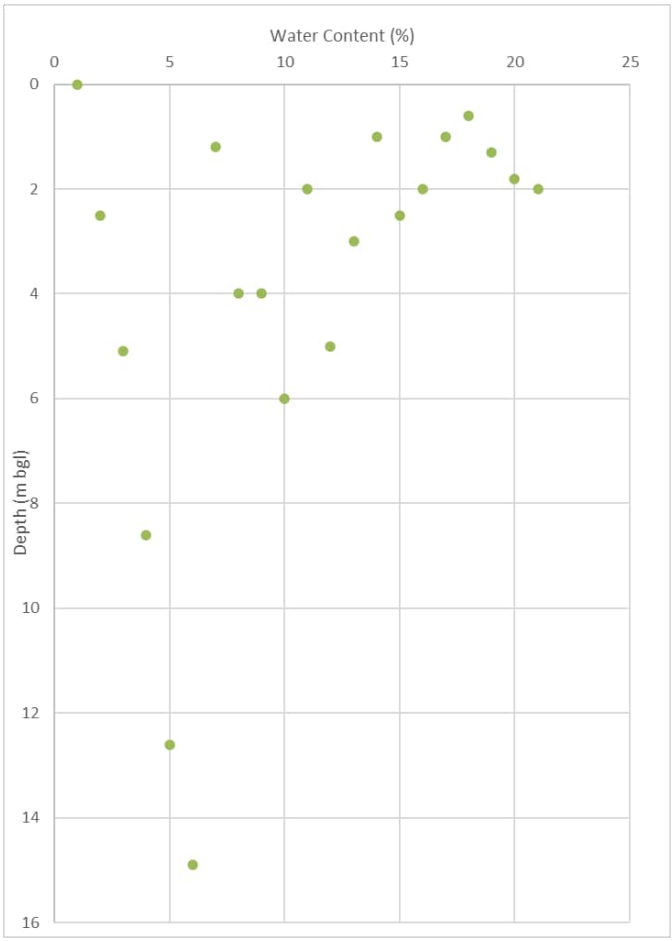
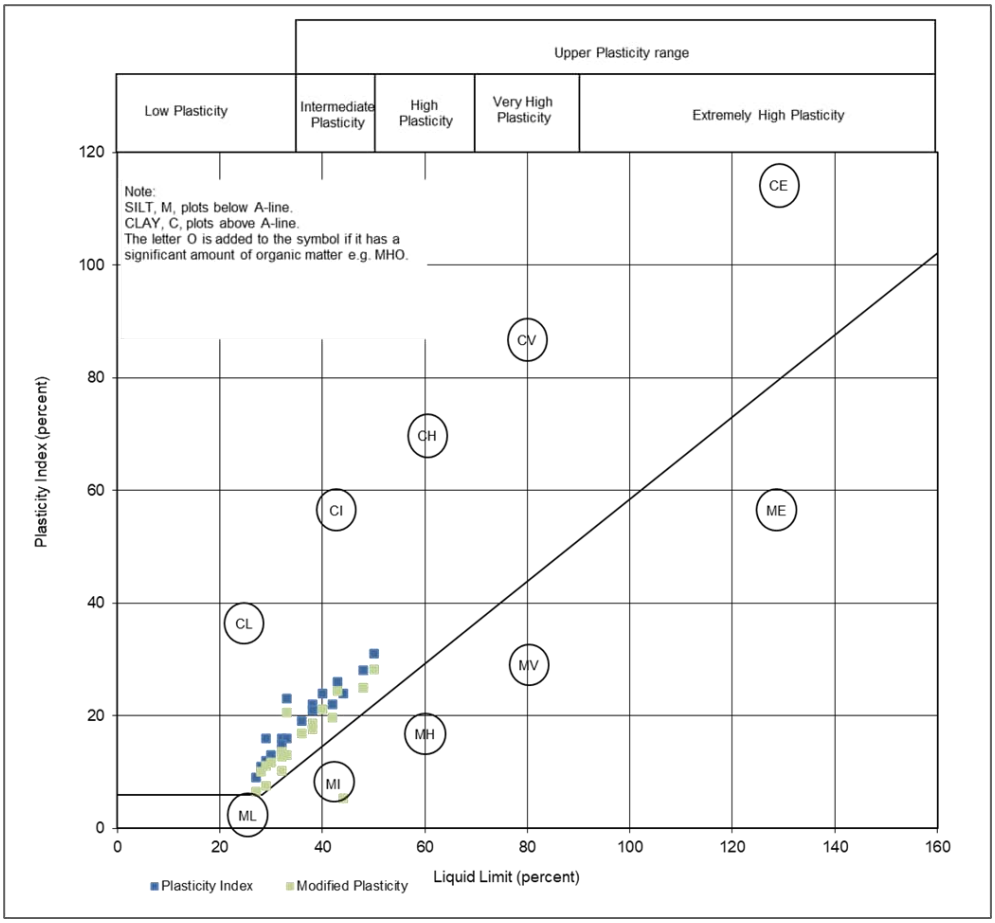


Figure 8-2
Atterberg Classification Chart



8.2 Strength Test

Three undisturbed samples were submitted for unconsolidated undrained triaxial testing; from DBH1 at depths of 2.0m, 8.1m and 14.1m bgl. Testing returned undrained shear strength values of between 160kPa and 373kPa and indicates an increase in shear strength with depth. The results indicate a very high to extremely high strength material, comparable with the observations determined in the field that identified the clay as stiff to very stiff.

8.1 Settlement

One undisturbed sample was submitted for oedometer consolidation analysis. The sample was taken from DBH1 at 8.1m bgl which resulted in a maximum coefficient of volume compressibility (M_v) of 0.26 m^2/MN at a pressure range of 0-40.5kPa, indicative of a medium compressibility. Coefficient of consolidation (C_v) at the applied test pressure was recorded as 9.60m^2/yr at 324 – 648kPa, indicative of a low rate of consolidation.

8.2 Moisture Content / Dry Density Relationship

Compaction testing was undertaken on three samples to determine the Optimum Moisture Content (OMC) and maximum dry density relationship. Two samples from DBH1 are wet of OMC, and one sample from TP7 is dry of OMC. The majority of samples were found to be very close to OMC with a degree of compaction of 90-100% achievable at NMC.

8.3 Chemical Testing

Fourteen samples were submitted for chemical testing at depths ranging from 0.6m to 13.2 bgl in the Lowestoft Formation. The pH testing recorded slightly alkaline values of between 7.4 and 8.8.

Testing to determine the soluble sulphate content returned values between <0.010g/l and 0.33g/l 2:1 WS SO_4 within the Lowestoft Formation.

This needs to be taken into account when selecting the concrete qualities for construction. Based on BRE guidelines[8] the Site is classified as Design Sulphate class DS-1 and as ACEC (aggressive chemical environment for concrete) AC-1s

8 BRE Construction Division. Special Digest 1: Concrete in Aggressive Ground. Third edition 2005

9.0 Geotechnical Conclusions & Recommendations

The proposed development comprises the construction of a new anaerobic digestion facility as detailed in Section 1.

The development proposals are presented in Appendix 01.

The topography across the Site varies between 88m and 79m AOD, decreasing in topography to the south and southeast; due to this, an earthworks cut and fill exercise will be required across the Site to create a level platform for the development. Additionally, earthworks need to be considered for the construction of the covered process and rainwater lagoons, which are approximately 2m deep, and the construction of the bunds and clamps. A cut and fill drawing is provided in Appendix 01.

There will be an excess volume of material which will be placed on an adjacent area to the east.

In addition to this, due to height changes, a retaining wall is proposed to wrap around the sides and rear of the tank farm up to a maximum height of 5m in the northwest corner, with the wall reducing down either side of the tank farm to approx. 2m to the south as the slope tapers down to ground level. Whilst the design has not been confirmed at this stage, it is understood the structure is likely to be a sheet pile wall solution.

A separate section of retaining wall is also proposed along the southern extent of the western area of the site where height changes occur due to placement of fill material to raise the levels required for access.

The extent of the retaining walls are shown on drawings in Appendix 01.

9.1 Geotechnical Parameters

Error! Reference source not found. details the geotechnical parameters for the Lowestoft Formation encountered onsite, comprising sandy gravelly clay. Values are derived from laboratory and in-situ test results, relevant published literature, and adapted from similar work undertaken by SLR.

Table 9-1:
Geotechnical Parameters

Structure	Material Parameter	Value
Shallow Foundations	Unit Weight (γ) (kN/m^3)	18
	Undrained Shear Strength (Su, kPa)	150
Retaining Wall	Unit Weight (γ) (kN/m^3)	18
	Effective Cohesion (c', kPa)	1
	Angle of Internal Friction (ϕ', °)	30
	Undrained Shear Strength (Su, kPa)	150
Slope Stability	Unit Weight (γ) (kN/m^3)	18
	Undrained Shear Strength (Su, kPa)	Top of Layer: 100 Maximum: 400 Rate of change: ((30kN/m2)/m

Structure	Material Parameter	Value
	Effective Cohesion (c', kPa)	1
	Angle of Internal Friction (ϕ', °)	30

9.2 Hardstanding Design

The proposed development includes the construction of new hardstanding across the Site, therefore, equivalent CBR values were derived from ten plate bearing tests across the development.

Testing was conducted within yellowish brown slightly gravelly slightly sandy silty clay at 0.5m bgl. CBR values ranged from 3.8% and 44%. However, the value of 44% from PBT8 was derived from an interpolation to 1.25mm. Discounting this result, the equivalent CBR values ranged between 3.8% and 16%. The client has recommended a design CBR value of 3.5% for the Site.

National Highways recently withdrew the Design Guidance for Road and Pavement Foundations[9], which estimates a CBR value of between 2% and 6% for clay. Although, this document has been withdrawn, the recommendations on CBR values are considered to remain valid and relevant.

Despite the sufficient CBR values, in-situ plate bearing or CBR tests should be conducted at formation level in areas of hardstanding structures immediately prior to construction. Tests should be carried out immediately following excavation with no significant delay between excavation and testing. Similarly, the final 100mm of excavation to formation level should be carried out immediately prior to commencing placement of the road construction materials.

9.3 Earthworks

The topography across the Site varies between 88m and 79m AOD, decreasing in topography to the south and southeast. Across the Site, to ensure a level topography for the development, a total of 58236.89m^3 will be cut, and 22604.51m^3 of material will be placed.

Three covered lagoons have been proposed in the east of the Site to hold process water and one lagoon to hold rainfall water is proposed in the south of the Site. The covered lagoons will hold 10,000m^3 of processed water. Material will need to be removed for the construction of the lagoons. The lagoons will be cut up to 3.3m, increasing in depths towards the north.

The ground where the tanks are located will be cut up to 5.0m deep towards the northwest, causing the increase in bund height around the tanks from 2.0m to 5.0m high. The three clamps will be cut up to 3.3m increasing in depth to the north. The central section of the Site, where the bulk of the infrastructure is located, will be subjected up to 2.2m of cut, and 1.1m of fill.

The material cut will be placed around the perimeter of the Site. The material will also be used to construct the clamps, forming bunds approximately 3.5m in height, and the bunds around the lagoons at approximately 2.5m in height.

The ground investigation encountered one geological stratum, the Lowestoft Formation comprising slightly sandy gravelly clay. This is likely to be classified as Class 2, cohesive fil, in accordance with Series 600 of MCHW[10].

Laboratory testing on this material included water content and plasticity, with results of thirteen samples indicating the material can be classified as a Class 2A material (water content was greater than -4% of Plastic

9 Interim Advice Note (IAN) 73/06 Revision 1 (2009) Design Guidance for Road Pavement Foundations

10 Specification for Highways Works, Series 600, Earthworks, February 2016.

Limit). three samples of the material recorded water content values lower than -4% of Plastic Limit and are therefore classified at Class 2B material.

Three samples were submitted for Particle Size Distribution (PSD) testing. In accordance with Table 6/2 of Series 600, all samples can be classified as Class 2A or Class 2B. One sample, in TP1 at 2.5m bgl, could be classified as Class 2C, stony cohesive material.

Compaction testing was carried out on three samples using a 2.5kg rammer. The results show that two of the samples were wet of OMC and one was dry. Therefore, prior to placement the material should be subjected to moisture conditioning.

Testing will need to be conducted during the earthworks to ensure the material is classified in accordance with Series 600. Compliance testing should be conducted at an approved UKAS accredited laboratory in addition to in-situ testing onsite. Adoption of the Method Compaction specification detailed in Series 600 will ensure a minimum of 90% compaction (10% air voids). Results presented in **Error! Reference source not found.** show that all three samples comply with this.

9.4 Stability Analysis

9.4.1 Justification for Modelling Approach and Software

The analytical methods used in this stability assessment include limit equilibrium stability analyses for the derivation of factors of safety for the sheet pile.

The limit equilibrium analyses have been undertaken using the package Slope/W 2021.04 (Geo-Slope International). The Morgenstern-Price non-circular methods of analysis have been used.

9.4.2 Data Summary

The following data are required as input for the analyses undertaken for this Stability Risk Assessment

- material unit weight; and,
- drained and undrained shear strength of soils.

Appropriate parameters have been derived based on field observations, in-situ testing and laboratory results obtained from the investigation. Where no direct measurement of a particular property is available, reference has been made to literature references and relevant experience from within SLR in the same or similar materials.

A summary of the geotechnical parameters used in the design and analysis of the development are presented in tabular form in Table 9-1.

The ground investigation intersected topsoil overlying the Lowestoft Formation comprising sandy gravelly clay. Under undrained conditions, parameters for the cohesive Lowestoft Formation have been defined using an increasing strength with depth function. A minimum undrained shear strength of 100kPa has been applied, with strength increasing by 30kPa per metre (based on the results of the ground investigation). This takes into account the increasing overburden pressure with depth within the Clay. In the long term, the clay has been modelled in drained conditions using effective cohesion (c') and angle of internal friction (ϕ').

9.4.3 Selection of Appropriate Factors of Safety

The factor of safety is the numerical expression of the degree of confidence that exists, for a given set of conditions, against a particular failure mechanism occurring. It is commonly expressed as the ratio of the load or action which would cause failure against the actual load or actions likely to be applied during service. This is readily determined by limit equilibrium slope stability analyses, which are the only type of analyses required for the current study.

Prior to determining appropriate factors of safety for the various components of the model, it is necessary to identify key 'receptors' and evaluate the consequences in the event of a failure (relating to both stability and integrity). Consideration of the following receptors is required:

- groundwater;
- property - relating to site infrastructure, third party property; and,
- human beings (i.e. direct risk).

The factor of safety adopted for each component of the model would be related to the consequences of a failure. A factor of safety of 1.3 is considered appropriate when using conservative peak shear strength parameters.

9.4.4 Stability Analysis

The stability analysis considers a worst-case scenario, with the highest section of the cut slope at 5m behind the tanks. The material which will be cut into is the Lowestoft Formation comprising sandy gravelly clay which was the only lithology encountered and was consistent across the Site, increasing in strength with depth.

A 10m sheet pile has been applied to the model, which is proposed for temporary works and as a permanent structure. Analysis, presented in Appendix 09, shows a factor of safety in excess of >1.3 at 12.76 in the short term in undrained conditions; and 2.454 in drained conditions to reflect the long-term condition.

9.5 Groundwater

No groundwater strikes were recorded during the site investigation; however, groundwater levels between 3.61m bgl and 4.31m bgl were recorded in the shallow boreholes (SBH1-4 and DBH1 records a water level of 10.48m bgl.

Based on these observations any groundwater flows are considered to be slow and volumes are unlikely to be sufficient to impact on the overall development, including the stability of the proposed retaining structure. Notwithstanding this, measures may be required to manage groundwater flows during construction. Shallow sumps may need to be excavated in limited areas of the site during construction to allow pumping of groundwater from the construction; although this may be avoided with careful excavation planning to provide falls for any water to discharge from the area. Provided Contamination testing is carried out to document that water generated from the site is clean and discharge occurs for not more than 6 months, water pumped from the construction works can be discharged to local surface water features without the need for a discharge consent.

9.6 Foundation Options

The ground investigation encountered topsoil overlying the Lowestoft Formation across the majority of the Site comprising firm to stiff sandy gravelly clay in all locations to a maximum depth of 15.0m bgl.

During foundation assessment a worst-case scenario is considered. This uses the lowest bearing ground conditions with the highest load. This allows for the variation across the site as well as considering a maximum load. Design parameters selected are based on field observations, laboratory results and published guidance where relevant.

9.6.1 Shrink Swell Potential

The volume change potential of the shrinkable soils is critical to the foundation design. Although not necessarily required, reference should be made to NHBC Guidelines, Section 4.2[11]. In the context of building near trees, this is considered to provide a best practice approach.

A total of eighteen samples were submitted for plasticity testing. Three samples from TP2 and TP6 are considered low plasticity with no volume change potential. Eleven samples are considered to have a low volume change potential and four samples are considered to have a medium volume change potential.

The boundary of the Site is vegetated with trees however, the type, moisture demand and size are unknown and will need to be taken into considering during detailed foundation design. Notwithstanding this, structures are situated outside the zone of influence. The minimum foundation depth for foundations outside the zone of influence for low and medium potential soils is 0.75m and 0.9m bgl respectively for traditional strip foundations. Raft foundations are able to accommodate larger magnitude differential settlements and therefore shallower foundation depths can be applied.

9.6.2 Bearing Capacity and Settlement Performance

Based on the ground conditions encountered on site, and the provided loadings; shallow foundations are considered appropriate.

Structures such as the grid entry unit, propane tanks, compressor, and gas flare have anticipated loads of 50kPa and will be founded on raft foundations. The majority of the structures will be formed into in-situ clay. Smaller structures such as the compressor are proposed to be constructed on site derived Class 2A placed material, of up to 1.1m thick. The underlying ground conditions have been modelled in undrained conditions for in-situ material, and in drained conditions for placed material; applying strengths obtained from field observations, in-situ testing and inferred from laboratory analysis. Dimensions for the proposed structures have not been provided at this time, therefore calculations have assumed a raft foundation with an area of approximately 20m^2 and 0.4m thick, will achieve a bearing capacity in excess of 200kPa in both undrained and drained conditions. Calculated settlement of <10mm is anticipated, which is within acceptable limits for the design of the structure.

Five tanks are proposed to be constructed on circular foundations in the northwest of the Site. The tanks will be constructed on individual foundations into the in-situ Lowestoft Formation with loadings of 150kN/m^2. Dimensions of the structures have been provided; with the tanks at 34m in diameter, a circular spread footing foundation will achieve a bearing capacity in excess of 500kPa. Direct parameters for settlement were obtained during the ground investigation. One undisturbed sample from DBH01 was submitted for oedometer consolidation testing. Calculations based on the results from this test resulted in anticipated settlement of 24mm.

9.6.3 General

There is potential for areas of softer material, with a reduced allowable bearing capacity, to be present within the development area. Prior to construction foundation excavations should be proof rolled with a Wacker plate to highlight any soft areas. These should then be removed and backfilled with suitable granular material to ensure the structure remains stable.

9.6.4 Floor Slabs

Based on the currently development proposals no floor slabs will be required.

[11] NHBC Standards 2020, Part 4: Foundations

9.7 General

In addition to the above recommendations, it is recommended that all design and construction works, including temporary works, be carried out on site in accordance with recognised engineering codes of practice including BS8004 (2015: Code of Practice for Foundations) and BS6031 (2009: Code of Practice for Earthworks).

10.0 Land Quality Conclusions & Recommendations

The findings from the ground investigation and subsequent land quality assessments are as follows.

10.1 Conclusions

10.1.1 Ground Conditions

Ground conditions across the Site comprised of topsoil, which was found across the whole Site. The Lowestoft Formation (glacial till diamicton) which comprised of silts, clays, sands and gravels was found across the whole Site and found to extend beneath the final depths of the exploratory locations. A small clast of chalk was found in SBH4 however this is not considered to represent the bedrock geology of the Lewes Nodular Chalk Formation.

10.1.2 Visual / Olfactory Indications of Contamination

No visual of olfactory evidence of contamination was noted in any of the exploratory hole locations. Headspace readings were undertaken using a photo-ionisation detector (PID) and all results were <1ppm.

10.1.3 Groundwater and Ground Gas

Groundwater monitoring wells were installed in each of the 5no. boreholes on the Site. Groundwater depths were found to vary from dry to 3.46m and 10.48m bgl (with SBH3 being recorded as dry) during the return visit on 6th October 2022.

Ground gas concentrations were found to below across the Site and no significant flows were recorded in any of the monitoring wells. Total organic carbon concentrations recorded across the Site were found to be low. SLR consider it unlikely that there is a significant risk posed to human health or property from ground gas.

10.1.4 Revised Conceptual Site Model

No exceedances of the screening criteria protective of human health were recorded in the soils sampled at the site in relation to a commercial land use. The concentrations of contaminants in soil on-site are not considered to present an unacceptable risk to human health for the proposed land use.

Given the lack of an identified source of contamination the site is considered to represent a negligible risk to human health and controlled waters.

10.2 Recommendations

No further investigation or remediation is considered necessary for the proposed development. A watching brief should be maintained for potentially unexpected contamination during development.

Soils are to be stripped and stockpiled separately in accordance with the Code of Practice[12] and a Soil Management Plan prepared. Given the site investigation has not identified any sources of potential contamination, it is likely that on-site soils can be excavated and reused as part of the proposed development. It is the responsibility of a holder of material to form their own view on whether that material is waste or not. Given the proposed reuse of natural occurring material within the site boundary and lack of any identified contamination sources it is likely that excavated soils reused as part of the proposed development would not be considered waste. However, we would recommend that any soil reuse is covered by a Materials Management Plan (MMP) in accordance with the CLAIRE Definition of Waste Code of Practice (DoWCoP).

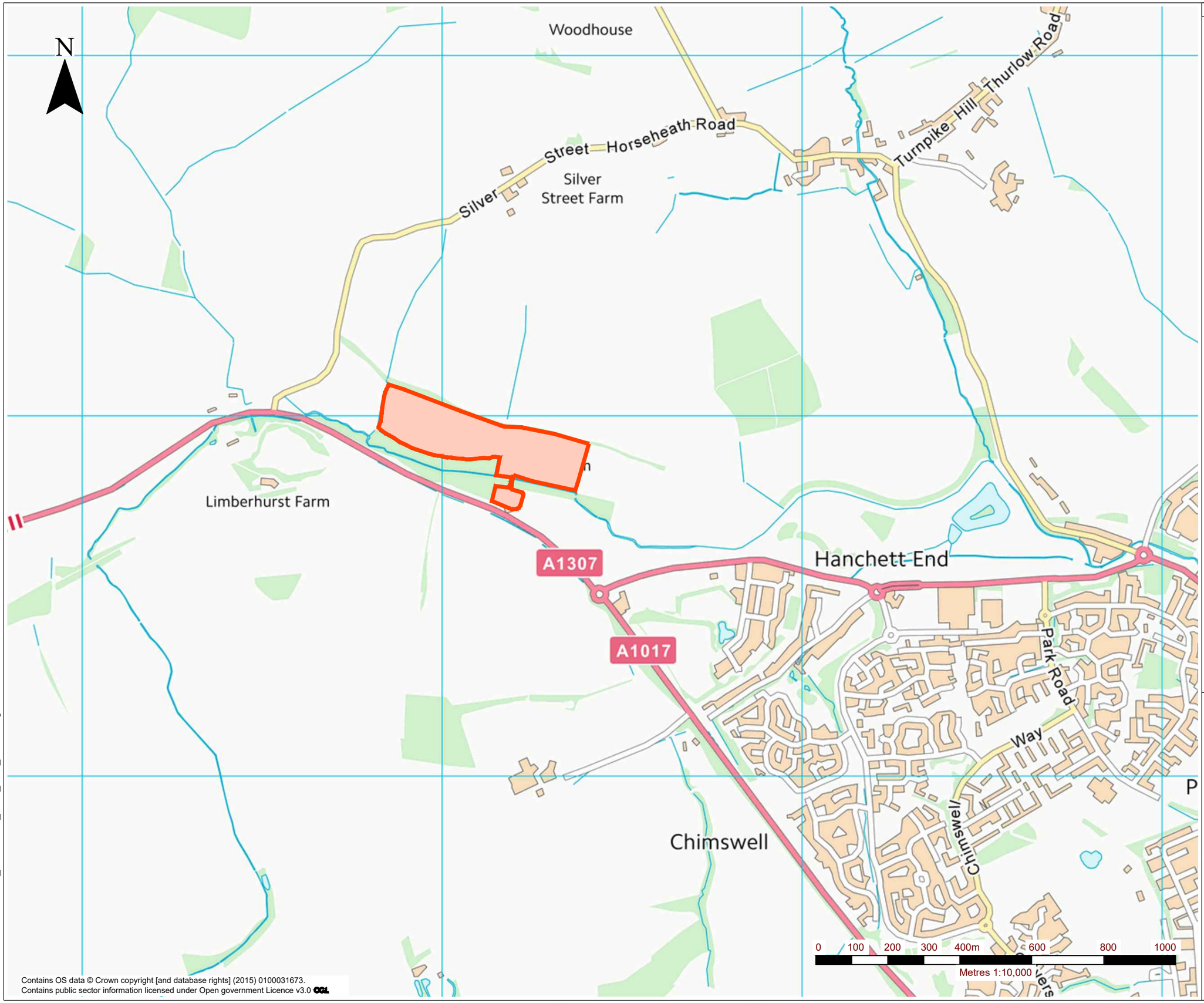
[12] Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. DEFRA (2009)

Any material brought on to Site will need to be suitable from a chemical perspective and will require chemical test certificates to be provided. Any material removed off-site will need to follow a MMP or Duty of Care procedures. All such records are to be retained by the contractor.

The contractor will be required to avoid any work that may result in silting of the off-site stream (Stour Brook) located to the south of the site boundary.

The contractor is to follow good practice measures during the operation of plant and machinery to ensure that there are no releases of hydrocarbons, lubricants or oils to ground during site preparation.

DRAWINGS



LEGEND

SITE LOCATION

SUITE 5, BRINDLEY COURT
GRESLEY ROAD
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T: +44 (0)1905 751310
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www.slrconsulting.com

THURLOW
SPRING GROVE POWER

GROUND INVESTIGATION REPORT

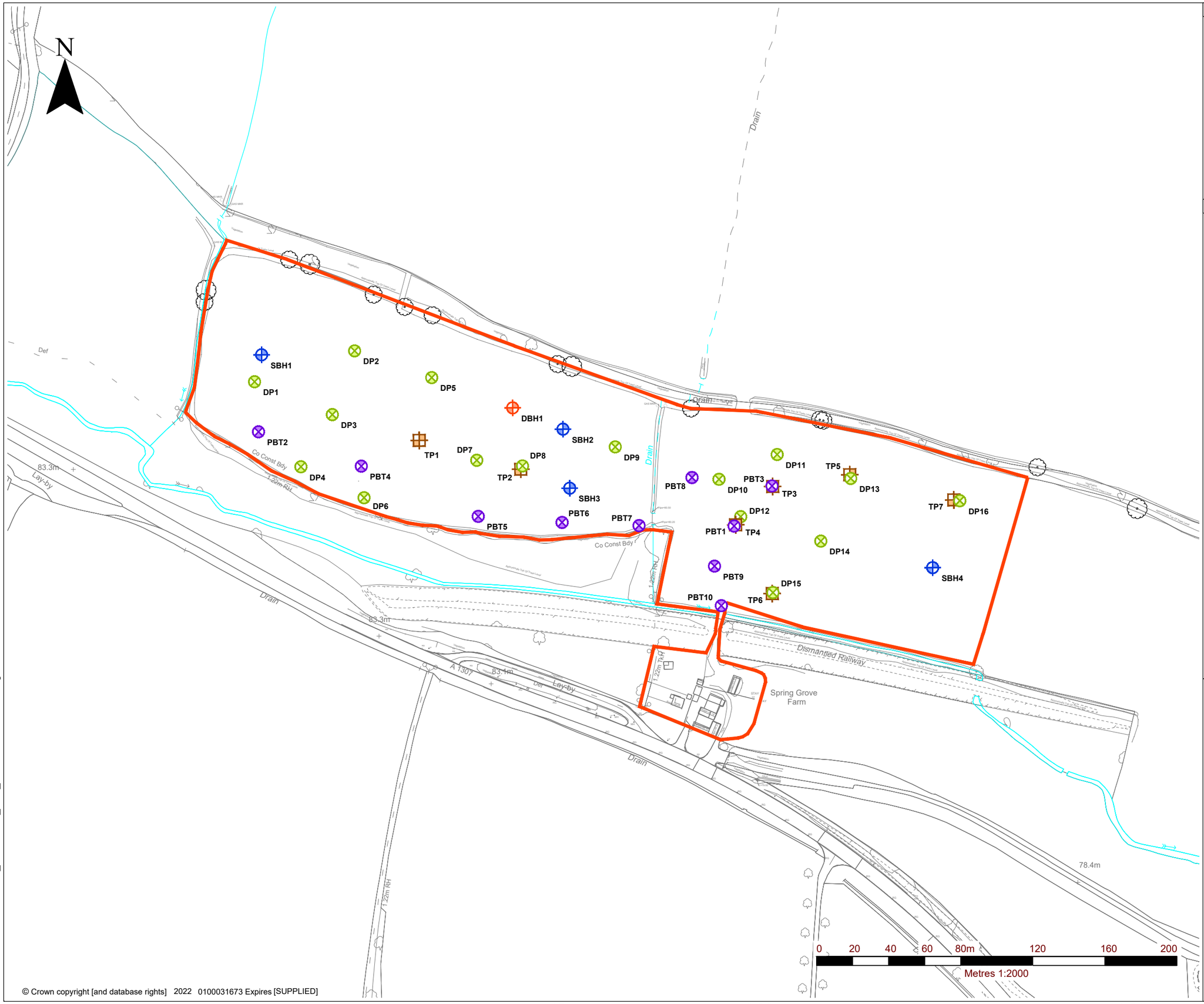
SITE LOCATION PLAN

DRAWING 01

Scale 1:10,000 @ A3

Date AUGUST 2022

404.11923.00002.19.001.0_THURLOW_SITE_LOC_PLAN.dwg



NOTES

1. DRAWING IS BASED ON CLIENT SUPPLIED DRAWING, REF: EXTERNAL LEVELS, 29951 / 104 REV C, DATED: MARCH 2022.

LEGEND

- SITE BOUNDARY
- BOREHOLE 15m (DEEP)
- BOREHOLE 6m (SHALLOW)
- TRIAL PIT
- DYNAMIC PROBE
- PLATE BEARING TEST

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THURLOW
SPRING GROVE POWER

GROUND INVESTIGATION REPORT

EXPLORATORY HOLE PLAN - CURRENT LAYOUT

DRAWING 02a

Scale 1:2000 @ A3

Date NOVEMBER 2022

404.11923.00002.19.002a.1_THURLOW_EXP_HOLES-CURRENT.dwg

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404.11923.00002.19.002b.1_THURLOW_EXP_HOLES-PROP.dwg

NOTES

1. DRAWING IS BASED ON CLIENT SUPPLIED DRAWING, REF: EXTERNAL LEVELS, 29951 / 104 REV C, DATED: MARCH 2022.

LEGEND

- SITE BOUNDARY
- BOREHOLE 15m (DEEP)
- BOREHOLE 6m (SHALLOW)
- TRIAL PIT
- DYNAMIC PROBE
- PLATE BEARING TEST

acorn BIOENERGY

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THURLOW
SPRING GROVE POWER

GROUND INVESTIGATION REPORT

EXPLORATORY HOLE PLAN - PROPOSED LAYOUT

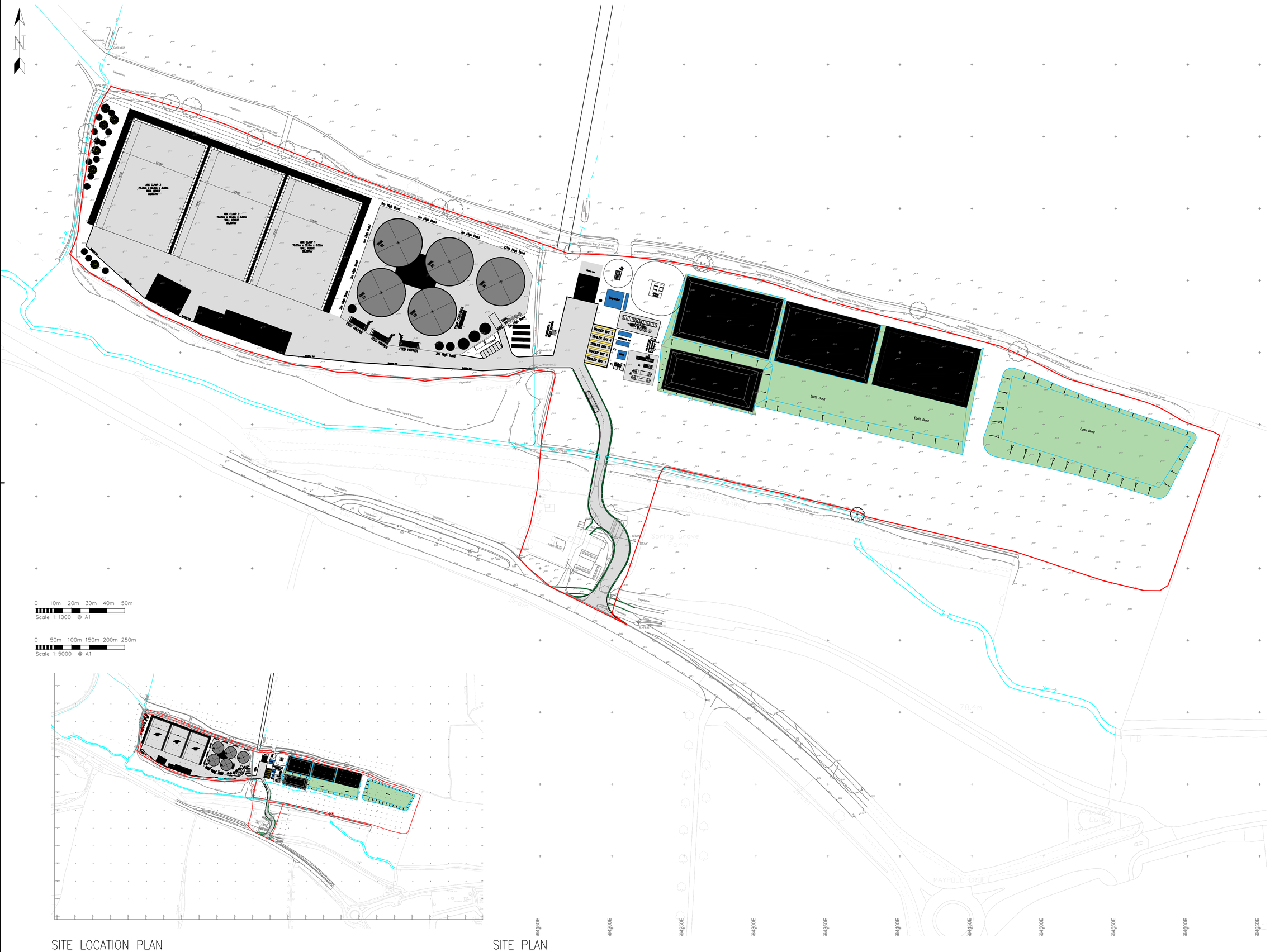
DRAWING 02b

Scale	Date
1:2000 @ A3	NOVEMBER 2022

APPENDIX 01

Proposed Development Plan

AS NOTED ON A1 FRAME



SITE LOCATION PLAN
Scale: 1:5000 @ A1

SITE PLAN
Scale: 1:1000 @ A1

NOT FOR CONSTRUCTION

NOTES:-

1. All dimensions must be checked on site and not scaled from this drawing.
2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
3. All levels shown on this drawing are relative to Agreed Topographic survey
4. This drawing is to be read in conjunction with 29351/100 Series Drawings.
5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

Existing Watercourse

Gas Line with Easement Offset

Site Red Line Boundary (11.2Ha)

Rev	Date	Description	DR	CH
H	23/08/22	Bund updated	JR	JHC
G	15/08/22	SLR Flood Extent Added	JHC	JHC
F	10/08/22	Draft-Lagoon Update	JHC	JHC
E	02/08/22	Draft Layout	DJC	JHC
D	13/06/22	LAYOUT AMENDED	DJC	JHC
C	05/04/22	CONCEPT LAYOUT	DJC	JHC
B	04/03/22	CONCEPT LAYOUT	JHC	JHC
A	24/02/22	CONCEPT LAYOUT	JHC	JHC

UVDB verified by Achilles
Registered
Link-up empowered by Achilles
Qualified via Audit
GGP CONSULT
CONSULTING ENGINEERS
PROJECT MANAGEMENT
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Priory Park East
HULL HU4 7DY
United Kingdom
Telephone (+44) 01482 627963
Fax (+44) 01482 641736
Email info@ggpconsult.co.uk

Client: acorn

Job Title: Thurlow Estate AD Plant

Drawing Title: Site Layout

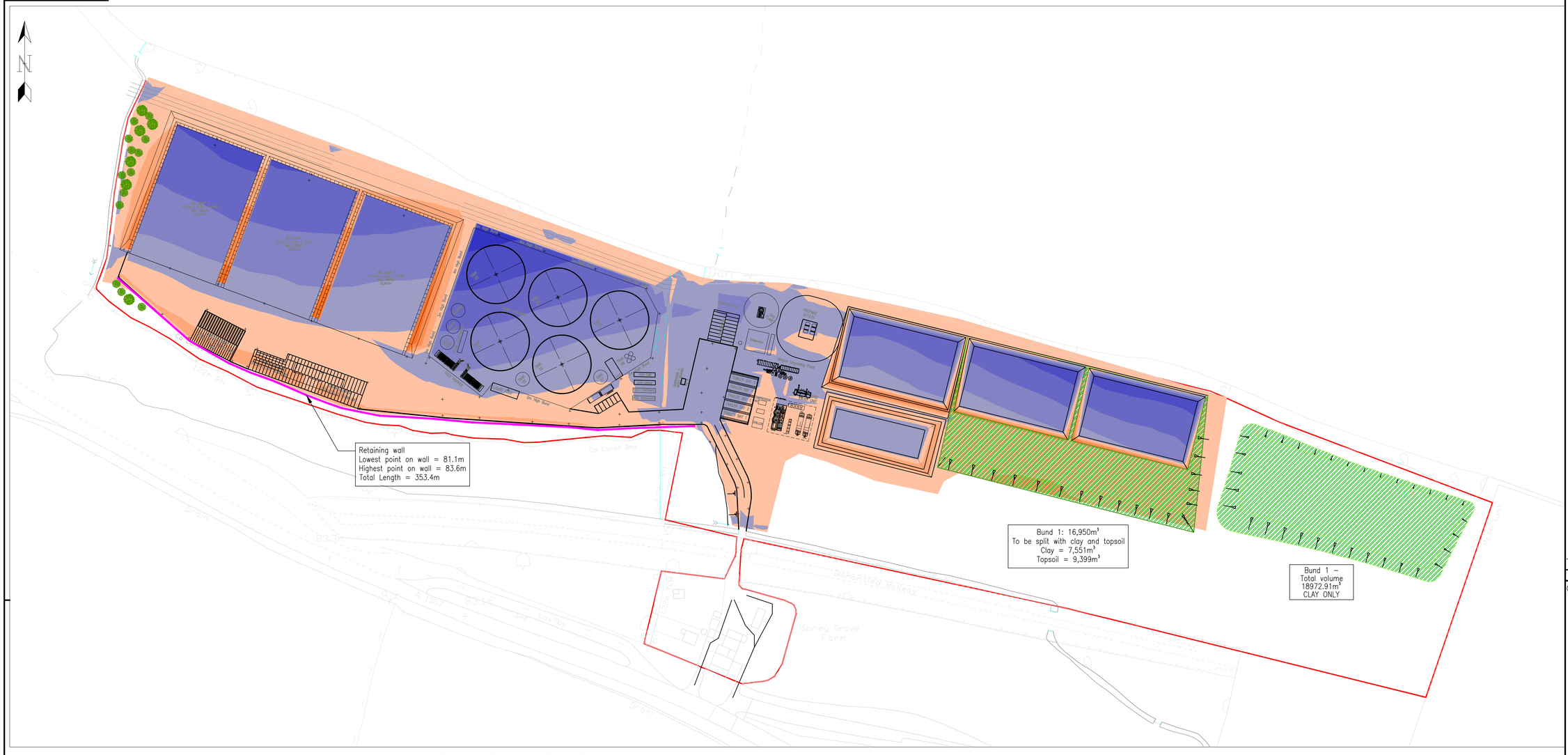
Status: APPROVAL

Scale	Date
NTS	Jan' '22

Drawn By	Checked	Approved
J. Collins	JHC	JHC

Drg. No.	Rev
29351/101	H

DRAWN AT 1:1 ON A1 FRAME



CUT AND FILL HEAT MAP
Scale: 1:1250 @ A1

Bund 2 –
Total volume 16950m³ (Overlaid)
(Split Volume) ; CLAY= 7551m³ TOPSOIL= 9399m³

(Cut – Fill)	58236.89m³	–	22604.51m³	=	35,632.38m³
(Bund Total)				=	46,462m³
(Disposal)				=	0

Height Bands	Cut Volume	Fill Volume
Fill 4.4m - 5.5m	--	0.24m³
Fill 3.3m - 4.4m	--	94.02m³
Fill 2.2m - 3.3m	--	959.69m³
Fill 1.1m - 2.2m	--	3249.46m³
Fill 0m - 1.1m	--	18301.12m³
Cut 0m - 1.1m	32291.23m³	--
Cut 1.1m - 2.2m	18243.28m³	--
Cut 2.2m - 3.3m	6740.32m³	--
Cut 3.3m - 4.4m	906.91m³	--
Cut 4.4m - 5.5m	55.15m³	--
Cut 5.5m - 6.6m	--	--

Total Cut: 58236.89m³
Total Fill: 22604.51m³

NOT FOR CONSTRUCTION

NOTES:-

1. All dimensions must be checked on site and not scaled from this drawing.
2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
3. All levels shown on this drawing are relative to Agreed Topographic survey
4. This drawing is to be read in conjunction with topographical survey and Site investigation reports

Rev	Date	Description	DR	CH
A	18/08/22	Issued for approval	WS	JK

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Fax (+44) 01482 641736
Email info@ggpconsult.co.uk

Client: acorn

Job Title: Thulow Estate AD Plant

Drawing Title: CUT AND FILL TO TOPSOIL FORMATION

Status: APPROVAL

Scale: 1250 @ A1
Date: JUNE '22

Drawn By: J Randle
Checked: JHC
Approved: JHC

Drg. No.: 29351/6001
Rev: A

APPENDIX 02

Exploratory Location Borehole and Trial Pit Logs

BOREHOLE LOG

BOREHOLE No **DBH1**

Client: **Acorn Bioenergy**

Project No:	Date:	Ground Level:	Co-ordinates:
404.11923.00004.00 21	13/09/2022	84.39m	E564049 N246970

Project: **Thurlow**

Sheet 1 of 2

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	SPT N Value 10 20 30 40		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument / Backfill
0.30 - 0.60	B	HS	0ppm			84.19		0.20	Soft dark brown slightly sandy CLAY. Sand is fine to coarse (TOPSOIL).	
		HS	0ppm					(1.50)	Stiff light brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular, fine to coarse of flint and chalk. Occasional cobbles of Chalk.	
1.20 - 1.65	SPTLS	SPT	N=31	31						
		HS	0ppm			82.69		1.70		
1.70	D								Stiff grey gravelly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular, fine to coarse of flint and chalk. Occasional cobbles of Chalk.	
2.00 - 2.45	U	HS	0ppm					(1.00)		
2.50	D	HS	0ppm			81.69		2.70		
		SPT	N=16	16					Firm to stiff light brown gravelly very sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of chalk. Occasional cobbles of chalk.	
3.10 - 3.40	B	HS	0ppm							
3.50	ES	HS	0ppm							
4.10 - 4.55	SPTLS	HS	0ppm							
		SPT	N=22	22				(3.10)		
4.60	D	HS	0ppm							
5.10 - 5.55	SPTLS	HS	0ppm							
		SPT	N=27	27						
		HS	0ppm			78.59		5.80		
5.90 - 6.30	B	HS	0ppm						Stiff to very stiff grey gravelly CLAY. Gravel is sub-angular fine to coarse of chalk. Frequent cobbles of chalk.	
		SPT	N=32	32						
		HS	0ppm							
7.00	ES	HS	0ppm							
7.10	D									
		HS	0ppm							
8.10 - 8.55	U	HS	0ppm							
8.60	D	HS	0ppm							
		HS	0ppm							
9.50 - 9.95	SPTLS	SPT	N=34	34						
		HS	0ppm							
		HS	0ppm						Borehole Continued on Next Page	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Dpt	Casing Dia	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Service traced and CAT scanned. Hand pit to 1.2m. Installed with 50mm monitoring well with top hat cover. No water strike observed during drilling. No visual or olfactory evidence of contamination. Water depth was 10.48m bgl on 06/10/2022.

All dimensions in metres	Contractor: Oakley Soils	Method: Cable percussion (shell and auger)	Logged By:	Approved By:
Scale 1:66	Plant: Dando	Hole Size: 150mm	IG	ML

SLR Consulting, Mill Barn 28 Hollingworth Court Turkey Mill, Maidstone ME14 5PP

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

BOREHOLE LOG

BOREHOLE No **DBH1**

Client: **Acorn Bioenergy**

Project No:	Date:	Ground Level:	Co-ordinates:
404.11923.00004.00 21	13/09/2022	84.39m	E564049 N246970

Project: **Thurlow**

Sheet 2 of 2

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	SPT N Value 10 20 30 40	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
10.20	D								Stiff to very stiff grey gravelly CLAY. Gravel is sub-angular fine to coarse of chalk. Frequent cobbles of chalk.	
		HS	0ppm							
11		HS	0ppm							
11.20 - 11.50	B	SPT	N=40	40						
		HS	0ppm							
12		HS	0ppm							
		HS	0ppm					(8.90)		
12.60 - 13.05	SPTLS	SPT	N=40	40						
13		HS	0ppm							
13.20	D									
		HS	0ppm							
14.00	ES	HS	0ppm							
14.10 - 14.55	U									
14.60	D	HS	0ppm			69.69		14.70		
14.90	D					69.39		15.00	Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub angular to sub-rounded fine to coarse chalk.	
15.00 - 15.45	SPTLS	SPT	N=27	27					Borehole Complete at 15.00m	
		HS	0ppm							
16										
17										
18										
19										

Boring Progress and Water Observations					
Date	Time	Depth	Casing Dpt	Casing Dia	Water Dpt

Chiselling		
From	To	Hours

Water Added	
From	To

General Remarks

Service traced and CAT scanned. Hand pit to 1.2m. Installed with 50mm monitoring well with top hat cover. No water strike observed during drilling. No visual or olfactory evidence of contamination. Water depth was 10.48m bgl on 06/10/2022.

All dimensions in metres	Contractor: Oakley Soils	Method: Cable percussion (shell and auger)	Logged By:	Approved By:
Scale 1:66	Plant: Dando	Hole Size: 150mm	IG	ML

SLR Consulting, Mill Barn 28 Hollingworth Court Turkey Mill, Maidstone ME14 5PP

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

BOREHOLE LOG

BOREHOLE No **SBH1**

Client: **Acorn Bioenergy**

Project No:	Date:	Ground Level:	Co-ordinates:
404.11923.00004.00 21	14/09/2022	85.33m	E563874 N247007

Project: **Thurlow**

Sheet 1 of 1

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	SPT N Value 10 20 30 40	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
0.10	ES					85.08		0.25	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
		HS	0ppm			84.78		0.55	Firm dark brown slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse of flint.	
0.70	ES					84.53		0.80	Yellowish brown slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is sub-rounded, fine to medium of flint and occasional chalk.	
1		HS	0ppm							
1.20 - 1.65	SPTLS	SPT	N=12	12					Firmt to stiff greyish brown slightly gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse of chalk and flint.	
		HS	0ppm					(1.40)		
1.90	ES									
2.00 - 2.45 2	SPTLS	SPT	N=15	15						
		HS	0ppm			83.13		2.20		
		HS	0ppm						Firmt to stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded, fine to coarse of chalk and flint.	
								(1.20)		
3.00 - 3.45 3	SPTLS	SPT	N=23	23						
		HS	0ppm							
3.20	ES					81.93		3.40		
		HS	0ppm						Firm light grey gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse of chalk.	
4.00 - 4.45 4	SPTLS	SPT	N=23	23						
		HS	0ppm							
		HS	0ppm					(2.60)		
5.00 - 5.45 5	SPTLS	SPT	N=33	33						
		HS	0ppm							
		HS	0ppm							
5.80	ES									
6.00 - 6.45 6	SPTLS	SPT	N=34	34		79.33		6.00		
		HS	0ppm						Borehole Complete at 6.00m	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Dpt	Casing Dia	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Service traced and CAT scanned. Hand pit to 1.2m. Installed with 50mm monitoring well with top hat cover. No water strike observed during drilling. No visual or olfactory evidence of contamination. Water depth was 3.46m bgl on 06/10/2022.

All dimensions in metres	Contractor: Smiths Drilling Services Ltd	Method: Window Sampler	Logged By:	Approved By:
Scale 1:41	Plant: Terrier	Hole Size: 125mm	DG-J	ML

SLR Consulting, Mill Barn 28 Hollingworth Court Turkey Mill, Maidstone ME14 5PP

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

BOREHOLE LOG

BOREHOLE No **SBH2**

Client: **Acorn Bioenergy**

Project No:	Date:	Ground Level:	Co-ordinates:
404.11923.00004.00 21	13/09/2022	83.19m	E564084 N246956

Project: **Thurlow**

Sheet 1 of 1

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	SPT N Value 10 20 30 40	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
		HS	0ppm			82.94		0.25	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
						82.59		0.60	Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded, fine to coarse of flint and chalk.	
0.90	ES							(0.50)	Firm grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular, fine to coarse of flint and chalk.	
1		HS	0ppm			82.09		1.10		
1.20 - 1.65	SPTLS	SPT	N=38	38					Stiff greyish brown gravelly sandy CLAY. Sand is fine to coarse. Gravel is sub-rounded, fine to coarse of chalk. Occasional cobbles of chalk.	
		HS	0ppm			81.64		1.55		
									Firm light grey gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse of chalk and occasional flint.	
2.00 - 2.45	2 SPTLS	SPT	N=20	20						
		HS	0ppm							
		HS	0ppm							
3		SPT	N=17	17						
		HS	0ppm							
		HS	0ppm					(3.89)	*3.40 - 3.45 Band of flint*	
4.00 - 4.45	4 SPTLS	SPT	N=17	17						
		HS	0ppm							
4.50	ES	HS	0ppm							
5.00 - 5.45	5 SPTLS	SPT	N=28	28						
		HS	0ppm							
		HS	0ppm			77.75		5.44		
								(0.56)	Stiff grey gravelly CLAY. Gravel is sub-rounded, fine to coarse of chalk.	
6.00 - 6.45	6 SPTLS	SPT	N=30	30		77.19		6.00		
		HS	0ppm						Borehole Complete at 6.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Service traced and CAT scanned. Hand pit to 1.2m. Installed with 50mm monitoring well with top hat cover. No water strike observed during drilling. No visual or olfactory evidence of contamination. Water depth was 3.50m bgl on 06/10/2022.

All dimensions in metres	Contractor: Smiths Drilling Services Ltd	Method: Window Sampler	Logged By:	Approved By:
Scale 1:41	Plant: Terrier	Hole Size: 125mm	DG-J	ML

SLR Consulting, Mill Barn 28 Hollingworth Court Turkey Mill, Maidstone ME14 5PP

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

BOREHOLE LOG

BOREHOLE No **SBH3**

Client: **Acorn Bioenergy**

Project No:	Date:	Ground Level:	Co-ordinates:
404.11923.00004.00 21	14/09/2022	81.31m	E564088 N246915

Project: **Thurlow**

Sheet 1 of 1

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	SPT N Value 10 20 30 40	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
						81.11		0.20	Light brown slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is angular, fine to coarse of flint (TOPSOIL).	
0.40	ES	HS	0ppm					(0.90)	Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded, fine to coarse of flint.	
1		HS	0ppm			80.21		1.10		
1.20 - 1.65	SPTLS	SPT	N=21	21		80.01		1.30	Firm yellowish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded, fine to coarse of chalk and occasional flint.	
1.30 - 1.70	D	HS	0ppm			79.61		1.70	Yellowish brown clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint.	
2.00 - 2.45 2	SPTLS	SPT	N=11	11					Stiff mottled light grey and brown gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse of chalk and occasional flint.	
2.10	ES	HS	0ppm					(1.45)		
		HS	0ppm							
3.00 - 3.45 3	SPTLS	SPT	N=22	22		78.16		3.15		
		HS	0ppm						Stiff grey gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse of chalk. Occasional cobbles of chalk and rare flint.	
		HS	0ppm							
4.00 - 4.45 4	SPTLS	SPT	N=33	33						
		HS	0ppm					(2.55)		
		HS	0ppm							
5.00 - 5.45 5	SPTLS	SPT	N=34	34						
		HS	0ppm							
5.50	ES	HS	0ppm			75.61		5.70		
6.00 - 6.45 6	SPTLS	SPT	0ppm	50		75.31		6.00	Firm greyish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of chalk. Occasional cobbles of chalk and rare flint.	
		HS							Borehole Complete at 6.00m	

Boring Progress and Water Observations						Chiselling			Water Added	
Date	Time	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To

General Remarks

Service traced and CAT scanned. Hand pit to 1.2m. Installed with 50mm monitoring well with top hat cover. No water strike observed during drilling. No visual or olfactory evidence of contamination. No water in well on 06/10/2022.

All dimensions in metres	Contractor: Smiths Drilling Services Ltd	Method: Window Sampler	Logged By:	Approved By:
Scale 1:41	Plant: Terrier	Hole Size: 125mm	DG-J	ML

BOREHOLE LOG

BOREHOLE No **SBH4**

Client: **Acorn Bioenergy**

Project No:	Date:	Ground Level:	Co-ordinates:
404.11923.00004.00 21	12/09/2022	80.42m	E564340 N246860

Project: **Thurlow**

Sheet 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	SPT N Value 10 20 30 40		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
0.15	ES					80.17		0.25	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
0.50	D	HS	0ppm			79.82		0.60	Yellowish brown slightly clayey sandy GRAVEL. Sand is medium to coarse. Gravel is angular, fine to coarse of flint. Frequent cobbles of flint.	
1		HS	0ppm			79.57		0.85	Light grey slightly sandy GRAVEL. Sand is fine to medium. Gravel is angular fine to coarse of flint. Occasional cobbles of flint.	
1.20	ES	SPT	N=34	34					Stiff grey gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse of chalk. Occasional cobbles of chalk and rare flint.	
1.20 - 1.65	SPTLS									
		HS	0ppm					(1.50)		
2.00 - 2.45	2 SPTLS	SPT	N=20	20						
		HS	0ppm							
		HS	0ppm							
2.85	ES					78.07		2.35	Soft white CHALK. Frequent sub-rounded, fine to coarse gravels of chalk.	
								(0.55)		
3.00 - 3.45	3 SPTLS	SPT	N=15	15		77.52		2.90	Stiff grey gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse of chalk. Occasional cobbles of chalk and rare flint.	
		HS	0ppm							
		HS	0ppm					(1.50)		
4.00 - 4.45	4 SPTLS	SPT	N=26	26						
		HS	0ppm							
		HS	0ppm			76.02		4.40	Stiff dark grey gravelly CLAY. Gravel is sub-rounded, fine to coarse of chalk.	
								(0.60)		
5.00 - 5.45	5 SPTLS	SPT	N=40	40		75.42		5.00	Borehole Complete at 5.00m	
		HS	0ppm							
	6									

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Service traced and CAT scanned. Hand pit to 1.2m. Installed with 50mm monitoring well with top hat cover. No water strike observed during drilling. Between 2.35m and 2.90m bgl was described as damp. No visual or olfactory evidence of contamination. Water depth was 4.31m bgl on 06/10/2022.

All dimensions in metres	Contractor: Smiths Drilling Services Ltd	Method: Window Sampler	Logged By:	Approved By:
Scale 1:41	Plant: Terrier	Hole Size: 125mm	DG-J	ML

TRIAL PIT LOG

TRIAL PIT No **TP1**

Client: **Acorn Bioenergy**

Project: **Thurlow**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	14/09/2022	83.63m	E563984 N246948	1 of 1

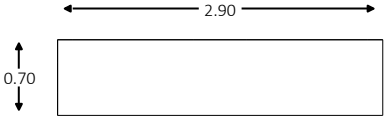
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					83.23		(0.40) 0.40	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
		HS	0ppm						
0.60	ES				82.68		(0.55) 0.95	Firm to stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded, fine to coarse of flint and occasional chalk.	
1.00 - 1.50 1	B	HS	0ppm						
1.40	ES				81.83		(0.85) 1.80	Stiff grey gravelly CLAY. Gravel is angular to sub-rounded, fine to coarse of flint and chalk. Frequent cobbles, boulders and large boulders of flint.	
		HS	0ppm						
2		HS	0ppm						
2.50 - 3.00	B	HS	0ppm				(1.20)		
3.00 3	ES	HS	0ppm		80.63		3.00	Stiff mottled light grey and brown gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse of chalk and occasional flint.	
								Trial Pit Complete at 3.00m	

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. No visual or olfactory evidence of contamination. No water encountered.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres Scale 1:25	Contractor: Ian Kiddy Plant Hire Plant: Hitachi Excavator	Method: Trial pit/trench	Logged By: DG-J	Approved By: ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No **TP2**

Client: **Acorn Bioenergy**

Project: **Thurlow**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	14/09/2022	82.39m	E564054 N246928	1 of 1

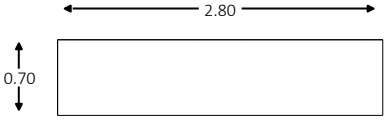
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
0.20	ES				82.01		(0.38) 0.38	Light brown slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is angular, fine to coarse of flint (TOPSOIL).	
		HS	0ppm					Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded, fine to coarse of flint.	
1		HS	0ppm		81.29		(0.72) 1.10		
1.50	ES	HS	0ppm		80.59		(0.70) 1.80	Yellowish brown clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint.	
2		HS	0ppm					Stiff mottled light grey and brown gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse of chalk and occasional flint.	
2.50	D	HS	0ppm				(1.20)		
3		HS	0ppm		79.39		3.00		
								Trial Pit Complete at 3.00m	

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. No visual or olfactory evidence of contamination. No water encountered.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor: Ian Kiddy Plant Hire	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:25	Plant: Hitachi Excavator		DG-J	ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No **TP3**

Client: **Acorn Bioenergy**

Project: **Thurlow**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	13/09/2022	81.56m	E564229 N246916	1 of 1

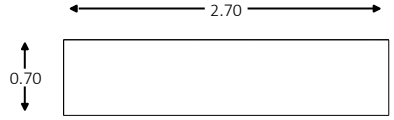
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					81.29		(0.27) 0.27	Soft to firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
0.50	ES	HS	0ppm		80.78		(0.51) 0.78	Orangish brown slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is angular, fine to coarse of flint. Occasional cobbles of flint.	
1		HS	0ppm					Stiff mottled light grey and brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of chalk and flint. Occasional cobbles of chalk and flint.	
		HS	0ppm				(1.72)		
2.00 2	D	HS	0ppm						
		HS	0ppm		79.06		2.50		
								Trial Pit Complete at 2.50m	
3									

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. PBT3 carried out in top 0.5m. No visual or olfactory evidence of contamination. No water encountered.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor: Ian Kiddy Plant Hire	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:25	Plant: Hitachi Excavator		DG-J	ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No
TP4

Client:
Acorn Bioenergy

Project:
Thurlow

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	13/09/2022	80.67m	E564203 N246889	1 of 1

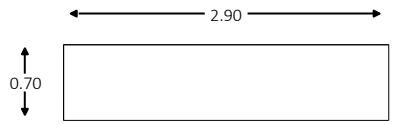
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
0.20	ES				80.37		(0.30) 0.30	Soft to firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
		HS	0ppm		79.75		(0.62) 0.92	Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular, fine to coarse of flint. Occasional cobbles of flint	
1.00 1	D	HS	0ppm		79.42		(0.33) 1.25	Grey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to sub-rounded, fine to coarse of flint. Frequent cobbles of flint.	
		HS	0ppm					Stiff mottled light grey and brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of chalk and flint. Frequent cobbles and boulders of chalk and flint.	
2.00 2	ES	HS	0ppm				(1.55)		
		HS	0ppm		77.87		2.80		
3								Trial Pit Complete at 2.80m	

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. PBT1 carried out in top 0.5m. No visual or olfactory evidence of contamination. No water encountered.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres Scale 1:25	Contractor: Ian Kiddy Plant Hire Plant: Hitachi Excavator	Method: Trial pit/trench	Logged By: DG-J	Approved By: ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No **TP5**

Client: **Acorn Bioenergy**

Project: **Thurlow**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	14/09/2022	82.45m	E564283 N246924	1 of 1

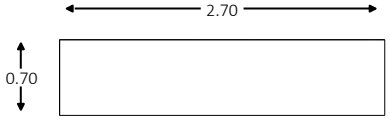
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					82.15		(0.30) 0.30	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
0.60	D ES	HS	0ppm		81.60		(0.55) 0.85	Stiff brown slightly gravelly CLAY. Gravel is sub-angular, fine to coarse of flint and chalk.	
1		HS	0ppm					Stiff light grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded, fine to coarse of chalk and occasional flint. Rare cobbles of chalk.	
		HS	0ppm				(1.75)		
2		HS	0ppm						
		HS	0ppm		79.85		2.60		
								Trial Pit Complete at 2.60m	
3									

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. No visual or olfactory evidence of contamination. No water encountered.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor: Ian Kiddy Plant Hire	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:25	Plant: Hitachi Excavator		DG-J	ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No **TP6**

Client: **Acorn Bioenergy**

Project: **Thurlow**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	13/09/2022	79.17m	E564229 N246842	1 of 1

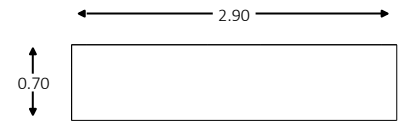
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					78.72		(0.45) 0.45	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
		HS	0ppm						
0.60	D ES				78.02		(0.70) 1.15	Stiff brown sandy CLAY. Sand is fine to medium. Occasional sub-angular, fine to coarse flint gravels.	
1		HS	0ppm						
1.30 - 2.00	B				77.12		(0.90) 2.05	Yellowish brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to sub-rounded, fine to coarse of flint. Frequent cobbles and boulders of flint. *1.15 - 2.05 Wet*	
		HS	0ppm						
1.80	B D								
2		HS	0ppm		76.27		(0.85) 2.90	Stiff mottled light grey and brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of chalk and flint. Frequent cobbles and boulders of chalk and flint.	
		HS	0ppm						
3								Trial Pit Complete at 2.90m	

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. No visual or olfactory evidence of contamination. Water encountered in gravel strata between 1.15m and 2.05m bgl.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres Scale 1:25	Contractor: Ian Kiddy Plant Hire Plant: Hitachi Excavator	Method: Trial pit/trench	Logged By: DG-J	Approved By: ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

TRIAL PIT LOG

TRIAL PIT No **TP7**

Client: **Acorn Bioenergy**

Project: **Thurlow**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
404.11923.00004.00 21	14/09/2022	83.39m	E564355 N246907	1 of 1

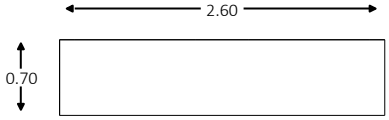
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					83.04		(0.35) 0.35	Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded, fine to coarse of flint (TOPSOIL).	
0.50	B	HS	0ppm					Stiff brown slightly gravelly CLAY. Gravel is sub-angular, fine to coarse of flint and chalk.	
							(0.80)		
1		HS	0ppm		82.24		1.15		
1.50 - 2.50	B	HS	0ppm					Stiff light grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded, fine to coarse of chalk and occasional flint. Rare cobbles of chalk.	
							(1.45)		
2		HS	0ppm						
2.20	B								
		HS	0ppm		80.79		2.60		
								Trial Pit Complete at 2.60m	
3									

GENERAL REMARKS:

Service traced and CAT scanned. Backfilled with arisings. No visual or olfactory evidence of contamination. No water encountered.

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
J = Jar Sample
D = Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor: Ian Kiddy Plant Hire	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:25	Plant: Hitachi Excavator		DG-J	ML

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

APPENDIX 03

Gas and Groundwater Monitoring Data

Soil Gas Monitoring Record Sheet 2.10.1: Soil Gas Sheet

Site Name : Thurlow

Address: Bowsey Field, Spring Grove Farm, Withersfield, Haverhill, South Cambridgeshire, CB9 7SW

Operator: Steph Gage

Job Number: 404.11923.00004.0021

Date: 06/10/2022

Weather Conditions: cold, raining

Air Temperature (Deg C)

Wind Speed (mph)

Ground Surface Conditions

Equipment: GA 5000, dip tape

Next Calibration Due:

Sample Point Ref	Sample Point Type (e.g. spike, well etc)	Barometric Pressure (mbar)	Depth of Water (m)	Depth of well (m)	Methane (CH4)		Carbon Dioxide (CO2)		Oxygen (O2)		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Flow (l/hr)	Gas Pressure (mbar)	Sample Collected?	Sample Type
					Peak (%v/v)	Steady State (%v/v)	Peak (%v/v)	Steady State (%v/v)	Min (%v/v)	Steady State (%v/v)						
SBH1	Well	1020	3.46	5.74	0	0	1.6	1.8	20.2	20	1	0	0	-0.09	No	
SBH2	Well	1017	3.5	5.57	0	0	2.8	2.8	20.1	18.3	2	0	-0.2	0	No	
SBH3	Well	1017	-	5.5	0	0	0.9	1.8	20.1	19.2	1	0		0.02	No	
SBH4	Well	1017	4.31	4.67	0	0	0.1	2.5	21.1	18.2	0	0	0	0.02	No	
DBH1	Well	1020	10.48	14.71	0	0	1.5	1.5	18.2	17.5	25	0	0	-0.16	No	

Comments:

APPENDIX 04

Plate Bearing Test Results

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 14/09/2022

0998

Contract	**Haverhill**
Serial No.	**41458_1**

Client:

Oakley Soils & Concrete Engineering Ltd
Rede Hall Farm
Rede
Bury St Edmunds
Suffolk
IP29 4UG

Soil Property Testing Ltd

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

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

Samples Submitted By:

Oakley Soils & Concrete Engineering Ltd

Samples Labelled:

Haverhill

Approved Signatories:

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

☐ **W. Johnstone**
Materials Lab Manager

[redacted]

Date Received: 12/09/2022

Samples Tested Between: 12/09/2022 **and** 14/09/2022

Remarks:

For the attention of James Impey
Your Reference No: EEE/92N
Your Order No: 6759

Notes:

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

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 14/09/2022

0998

Contract	**Haverhill**		
Serial No.	**41458_1**	**Target Date**	14/09/2022
Scheduled By	Oakley Soils & Concrete Engineering Ltd		
Schedule Remarks			

Bore Hole No.	Type	Sample Ref.	Top Depth	Plate Bearing Test																		Sample Remarks
PBT1	PBT	PBT001		1																		
PBT10	PBT	PBT010		1																		
PBT2	PBT	PBT002		1																		
PBT3	PBT	PBT003		1																		
PBT4	PBT	PBT004		1																		
PBT5	PBT	PBT005		1																		
PBT6	PBT	PBT006		1																		
PBT7	PBT	PBT007		1																		
PBT8	PBT	PBT008		1																		
PBT9	PBT	PBT009		1																		
Totals				**10**																		**End of Schedule**

Contract	**Haverhill**
Serial No.	**41458_1**

Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test
BS1377: Part 9: 1990:4 .1.6.4.2 - Incremental Loading Test

This test is suitable when the drained loading characteristics of the soil is required

In order to decide the loading for the increments, an initial estimate of the likely maximum load to be applied is obtained during the contract review stage with the client. At least five approximately equal spaced increments are then applied cumulatively to the plate. Each increment shall not be more than 1/5th of the proposed designed bearing pressure.

Incremental cycles of unloading and reloading may be made during this test to obtain an indication of the relative amounts of reversible, i.e. elastic, and irreversible deformation that have occurred. The slope of the load/deformation curve may be used to determine the undrained deformation modulus.

The load shall be maintained at each increment until the penetration of the plate has ceased, or in the case of cohesive soils, when it is judged that primary consolidation has been completed.

Graphs showing plate settlement against both bearing pressure and time are presented, in accordance with BS1377:1990: Part 9, together with other information as per clause 4.1.8, if required.

Contract	**Haverhill**
Serial No.	**41458_1**

Useful Information

The load cell and jack have a 25 tonne capacity, however the extension rods only have a 12.5 tonne capacity.

The depth of influence of a plate is generally accepted as being twice the diameter of the plate.

300mm diameter plate for clay and fine-grained soils:

Max pressure using extension rods - 1794 kN/m2 (179 tonnes per m2)

450mm diameter plate for coarse grained soils and spread loads:

Max pressure using extension rods - 771 kN/m2 (77 tonnes per m2)

600mm diameter plate for very coarse materials and modelling spread loads (requires a two man lift):

Max pressure using extension rods - 434 kN/m2 (43 tonnes per m2)

Contract	**Haverhill**
Serial No.	**41458_1**

Reporting of Information Outside the Scope of BS1377: 1990: Part 9

Reporting of Mass and Calculated Force of Equipment and Plates:

This is presently not included in the bearing pressure results shown on the test sheets but is included in the Test Remarks.

Bedding Load and Resulting Settlement:

A bedding load of 10% of the maximum force to be applied is imposed for a 30 second duration in accordance with current industry practice, and the resulting bedding settlement is recorded in the Test Remarks.

Modulus of Sub-Grade Reaction (k)

This is also reported together with the k_{762} value on the test sheet and is calculated or interpolated, at a plate settlement of 1.25mm.

Approximate CBR Value

Ref: Interim Advice Note 73/06 (2009) Design Guidance for Road Pavement Foundations (Draft 25) Paragraph 7.14

This states an approximate empirical relationship with CBR can be made as follows using the value of k_{762}:

$$CBR = 6.1 \times 10^{-8} \times (k_{762})^{1.733} \%$$

where k_{762} is the modulus of subgrade reaction, defined as the applied pressure under the loading platen divided by the displacement (normally 1.25mm or by interpolation) with a plate of 762mm diameter.

Factors for other plate sizes can be obtained from the graph in fig.7.4 of the IAN document or from the following calculation:

$$Factor = 0.079 + (0.001209 \times Plate\ Diameter\ (mm))$$

Plate size / factors

600mm diameter = 0.8044
455mm diameter = 0.6291
300mm diameter = 0.4417

This estimated CBR value is shown on the test sheet.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 14/09/2022

0998

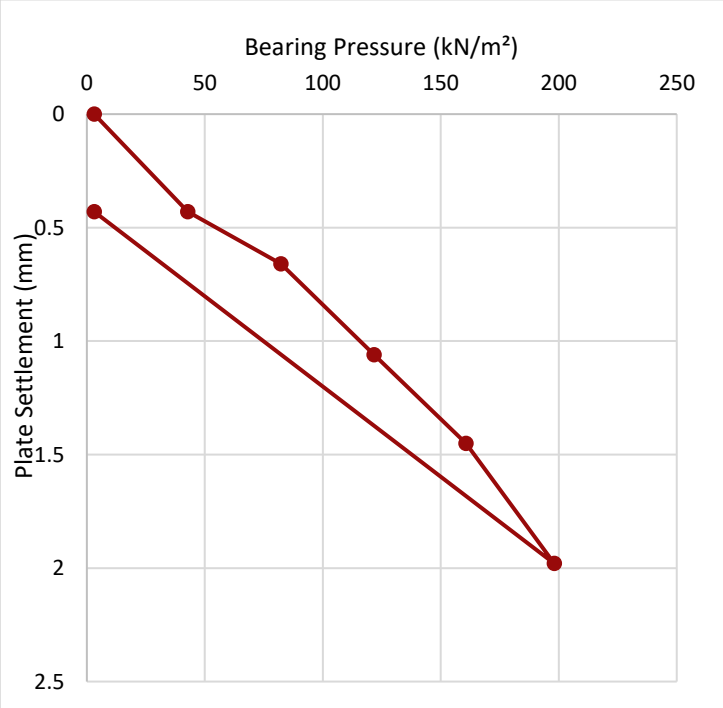
Contract	**Haverhill**
Serial No.	**41458_1**

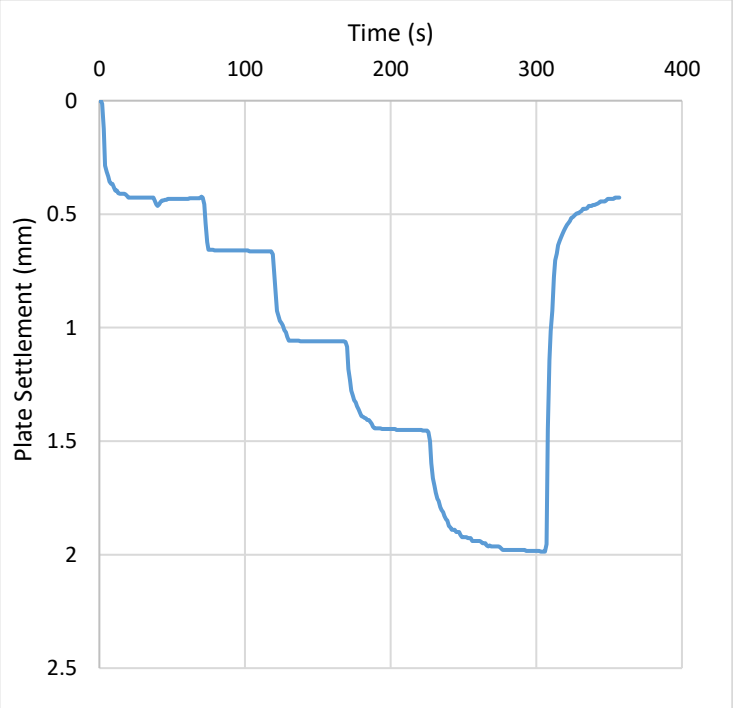
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT001	Depth (m)	0.50
Location	PBT1	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 44.7", N 52° 5' 45.6"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.68mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	198
Maximum Deformation	(mm)	1.98
Modulus of Subgrade Reaction K	(MN/m³)	112.6
K762	(MN/m³)	70.8
Estimated CBR	(%)	16

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
42.7	0.43
82.3	0.66
121.7	1.06
160.7	1.45
198.1	1.98
3.1	0.43





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

Equipment calibrated by Impact Test Equipment Ltd - load cell UKAS accredited

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 14/09/2022

0998

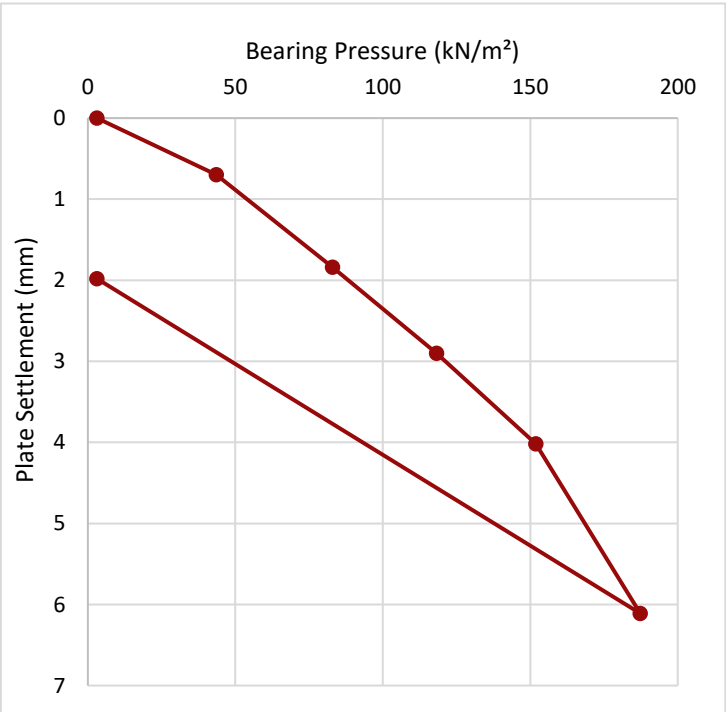
Contract	**Haverhill**
Serial No.	**41458_1**

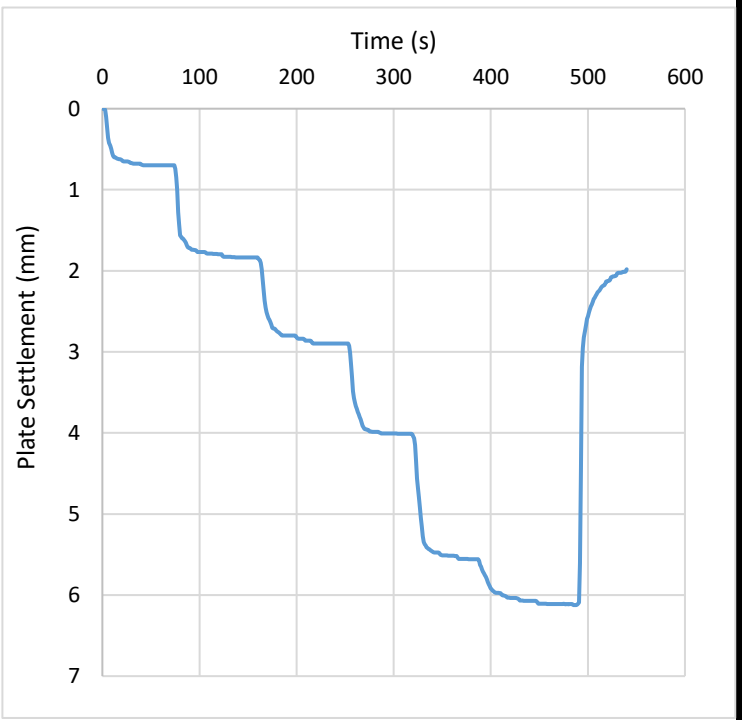
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT010	Depth (m)	0.50
Location	PBT10	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 43.8", N 52° 5' 43.7"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.94mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	187
Maximum Deformation	(mm)	6.11
Modulus of Subgrade Reaction K	(MN/m³)	50.0
K762	(MN/m³)	31.5
Estimated CBR	(%)	3.8

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
43.5	0.70
82.9	1.84
118.2	2.90
151.9	4.02
187.3	6.11
3.1	1.98





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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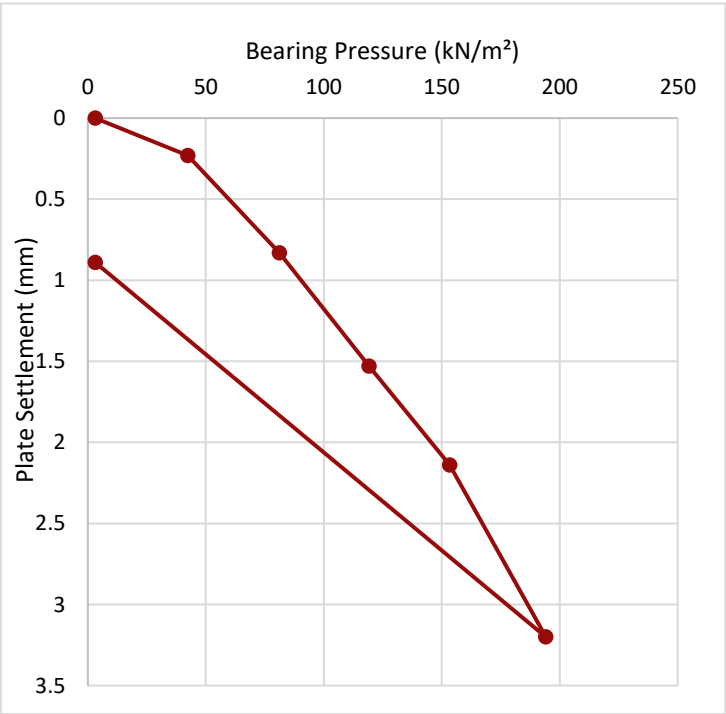
Contract	**Haverhill**
Serial No.	**41458_1**

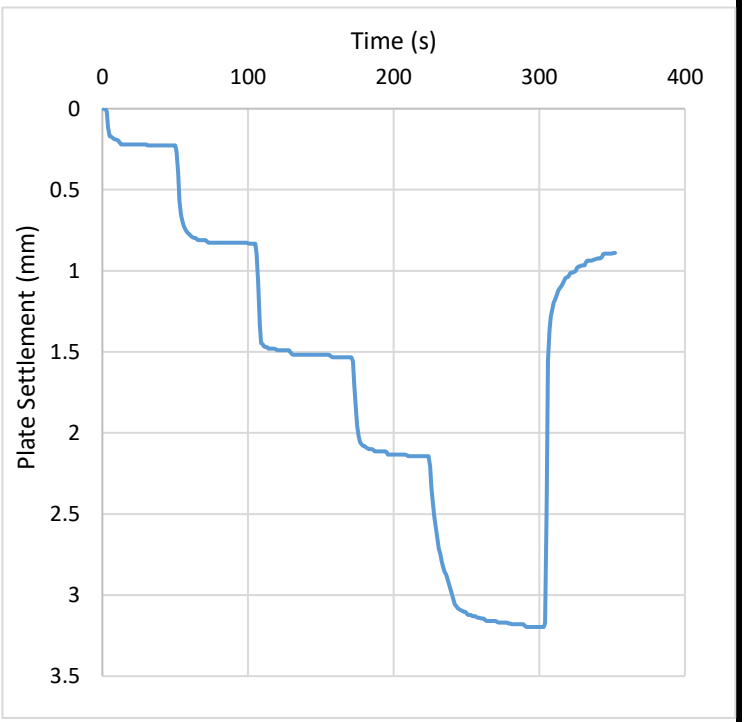
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	HAV002	Depth (m)	0.50
Location	PBT2	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 27.3", N 52° 5' 48.0"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.76mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	194
Maximum Deformation	(mm)	3.20
Modulus of Subgrade Reaction K	(MN/m³)	83.1
K762	(MN/m³)	52.3
Estimated CBR	(%)	9.2

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
42.4	0.23
81.1	0.83
119.1	1.53
153.3	2.14
194.1	3.20
3.1	0.89





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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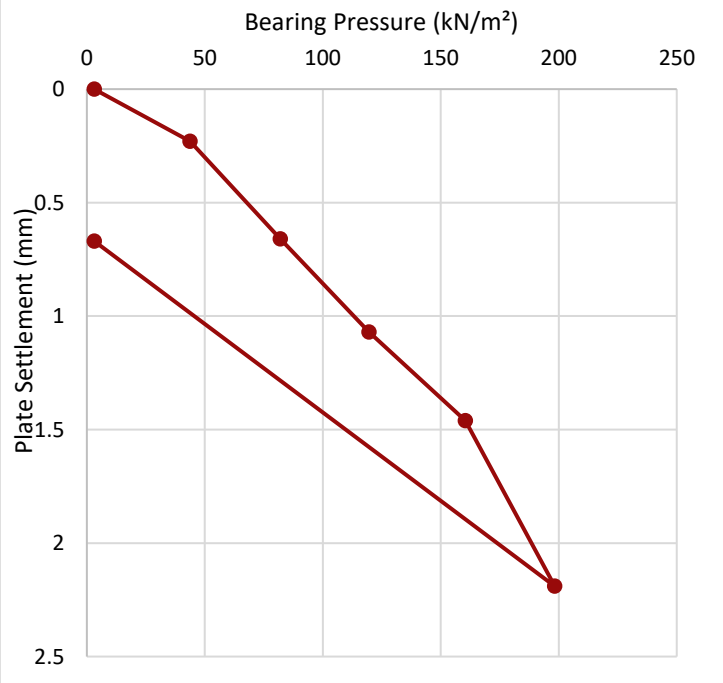
Serial No.	**41458_1**

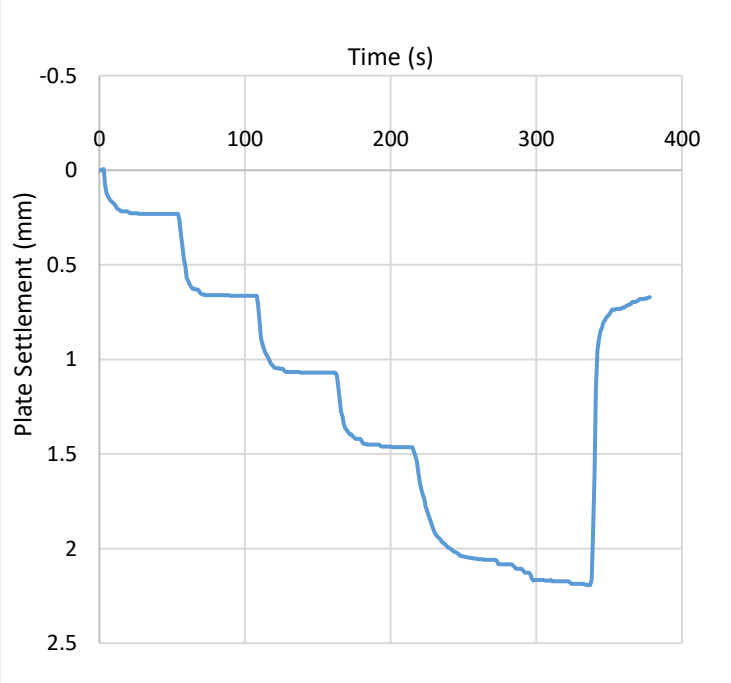
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT003	Depth (m)	0.50
Location	PBT3	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 46.1", N 52° 5' 46.5"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.96mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	198
Maximum Deformation	(mm)	2.19
Modulus of Subgrade Reaction K	(MN/m³)	110.7
K762	(MN/m³)	69.6
Estimated CBR	(%)	15

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
43.7	0.23
82	0.66
119.6	1.07
160.4	1.46
198.3	2.19
3.1	0.67





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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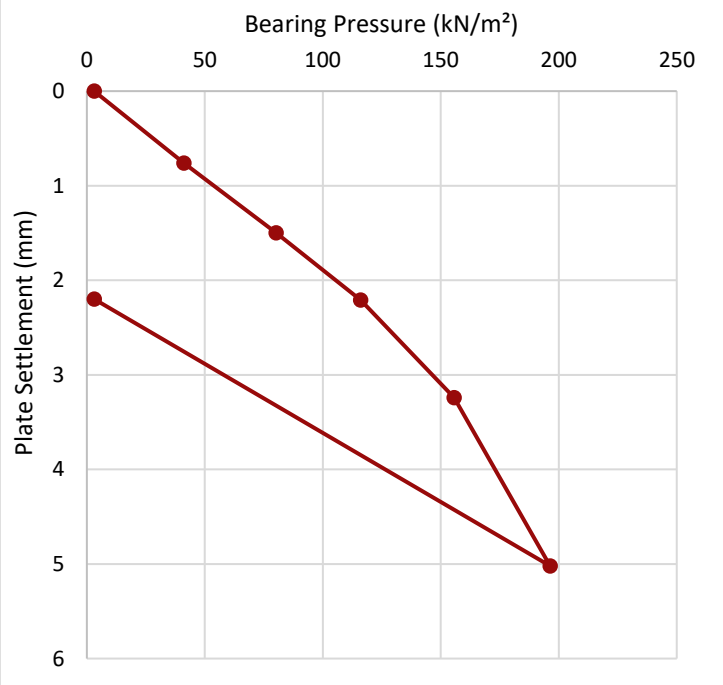
Serial No.	**41458_1**

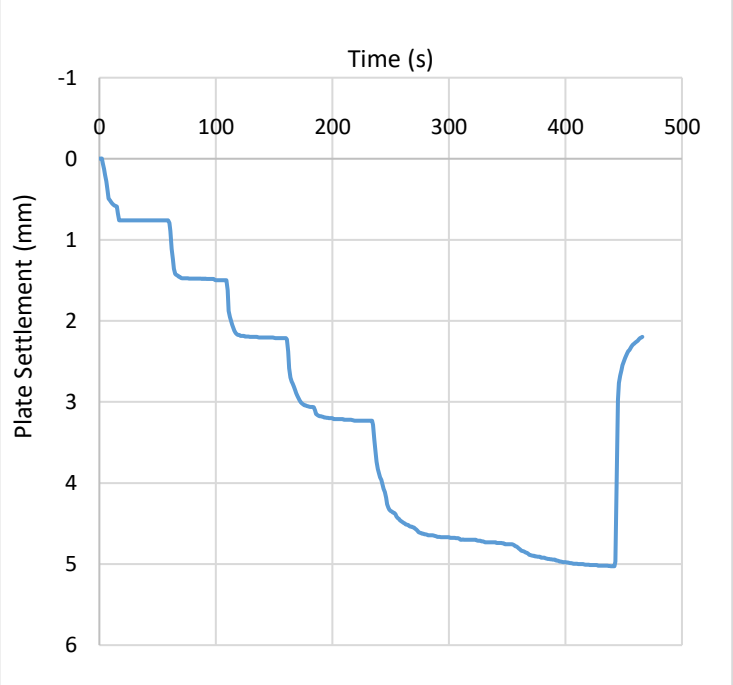
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT004	Depth (m)	0.50
Location	PBT4	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 31.0", N 52° 5' 47.3"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.86mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	196
Maximum Deformation	(mm)	5.02
Modulus of Subgrade Reaction K	(MN/m³)	53.6
K762	(MN/m³)	33.7
Estimated CBR	(%)	4.3

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
41.1	0.76
80.2	1.50
116	2.21
155.6	3.24
196.3	5.02
3.1	2.20





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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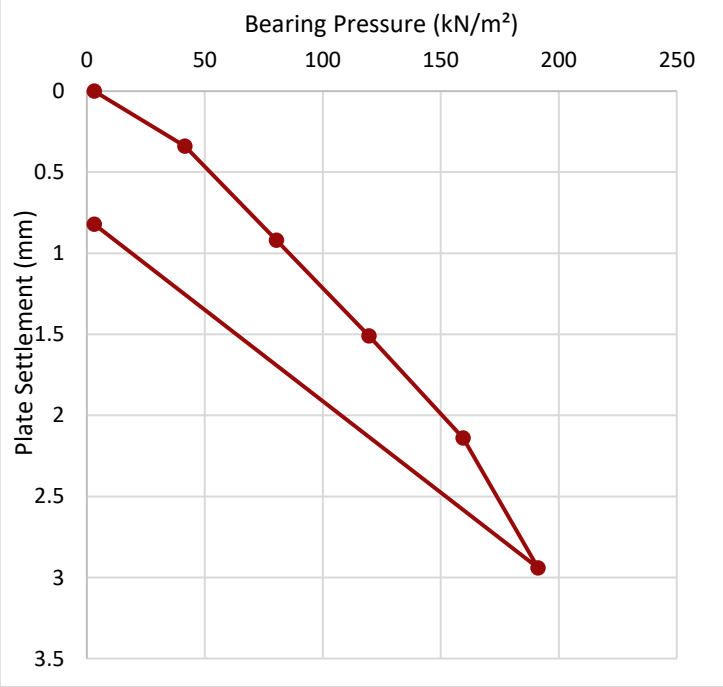
Serial No.	**41458_1**

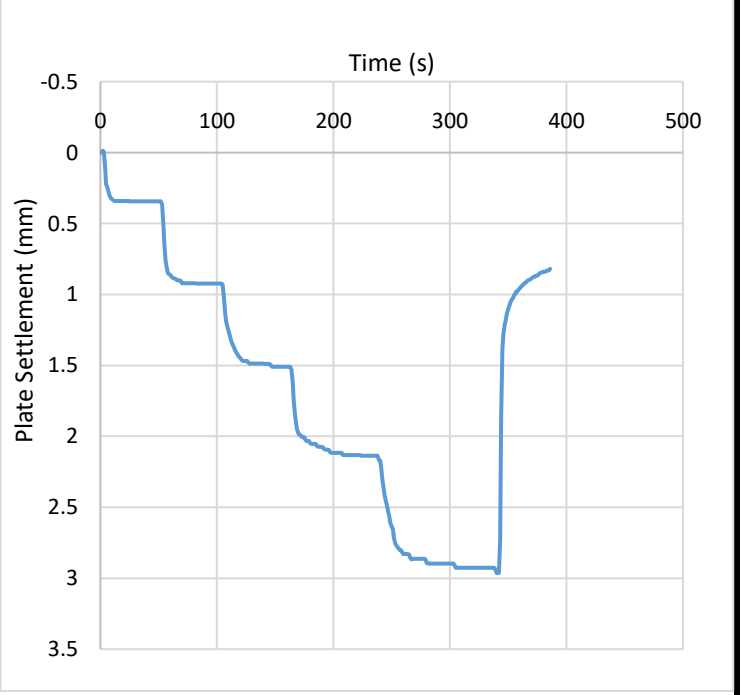
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT005	Depth (m)	0.50
Location	PBT5	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 35.1", N 52° 5' 46.0"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.73mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	191
Maximum Deformation	(mm)	2.94
Modulus of Subgrade Reaction K	(MN/m³)	81.8
K762	(MN/m³)	51.5
Estimated CBR	(%)	8.9

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
41.5	0.34
80.4	0.92
119.5	1.51
159.4	2.14
191.2	2.94
3.1	0.82





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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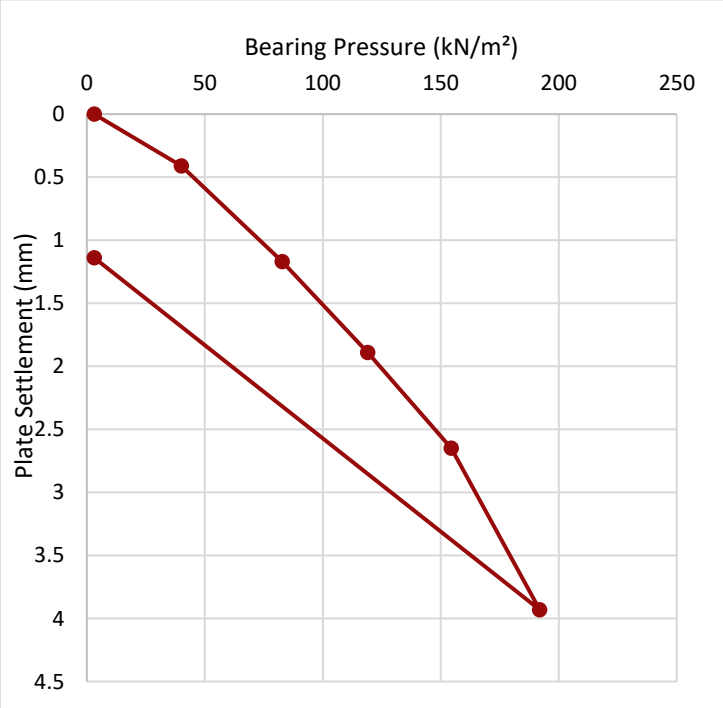
Serial No.	**41458_1**

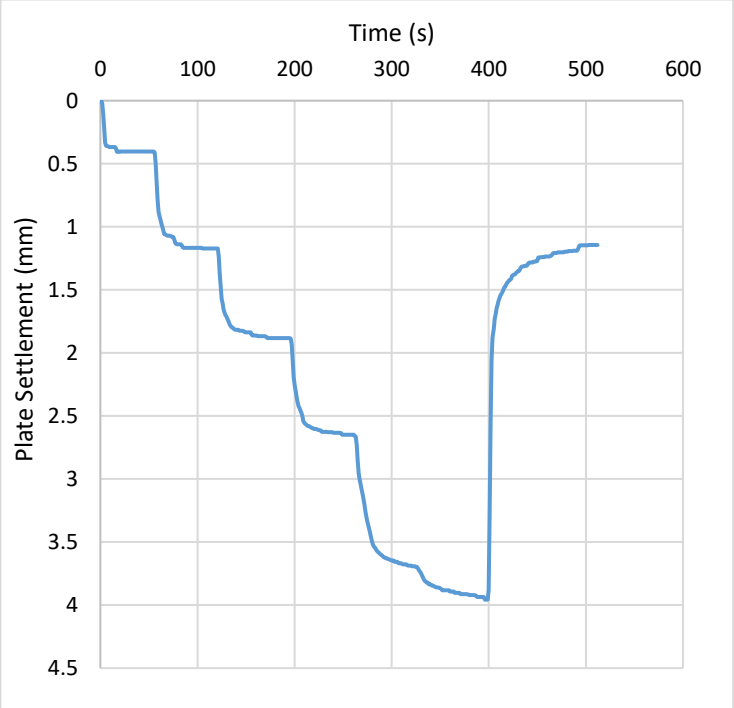
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT006	Depth (m)	0.50
Location	PBT6	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 38.3", N 52° 5' 45.7"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.82mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	192
Maximum Deformation	(mm)	3.93
Modulus of Subgrade Reaction K	(MN/m³)	69.5
K762	(MN/m³)	43.7
Estimated CBR	(%)	6.7

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
40.1	0.41
82.8	1.17
119	1.89
154.5	2.65
191.9	3.93
3.1	1.14





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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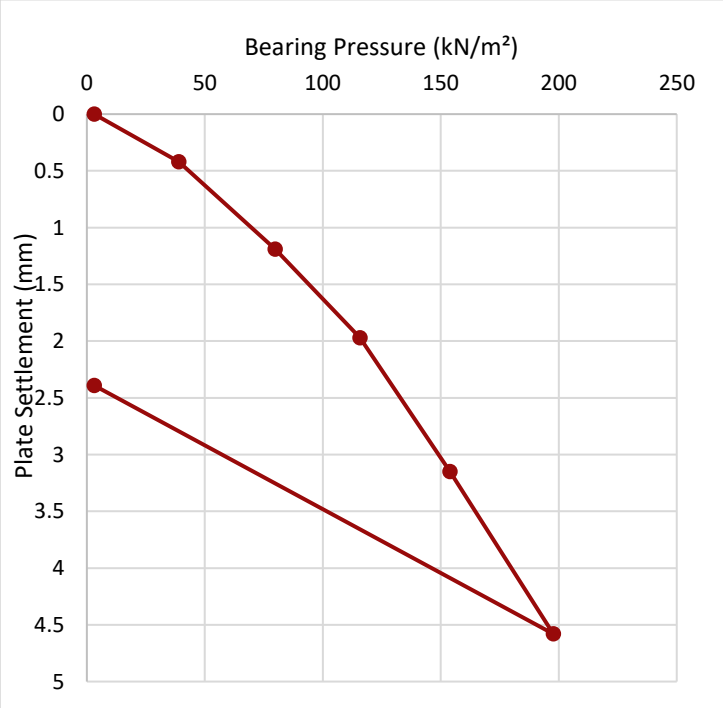
Contract	**Haverhill**
Serial No.	**41458_1**

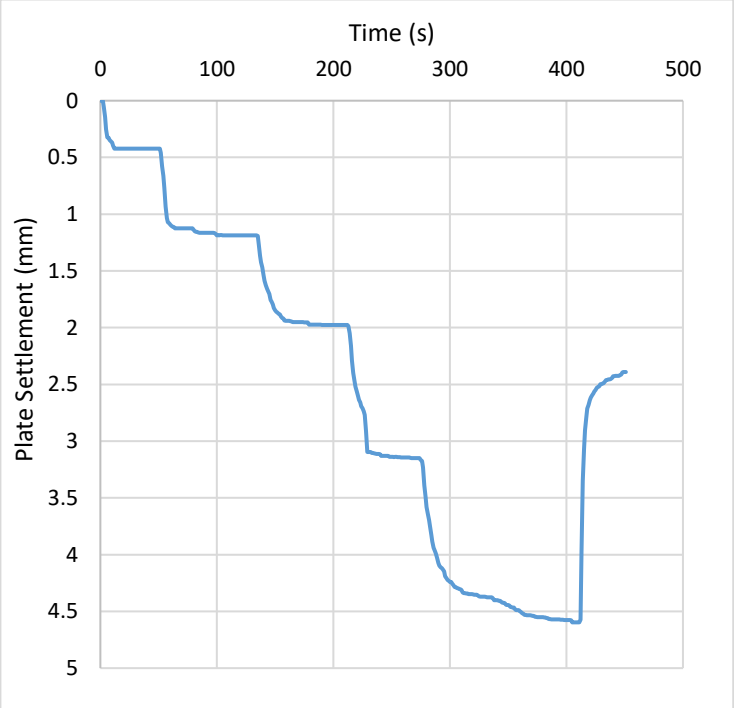
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT007	Depth (m)	0.50
Location	PBT7	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 40.9", N 52° 5' 45.6"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.77mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	198
Maximum Deformation	(mm)	4.58
Modulus of Subgrade Reaction K	(MN/m³)	66.1
K762	(MN/m³)	41.6
Estimated CBR	(%)	6.2

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
38.9	0.42
79.8	1.19
115.8	1.97
153.9	3.15
197.7	4.58
3.1	2.39





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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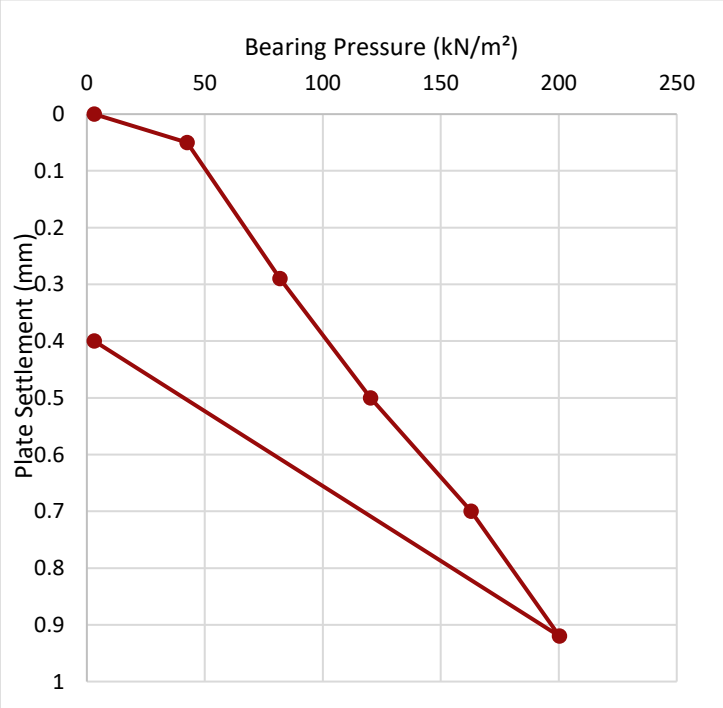
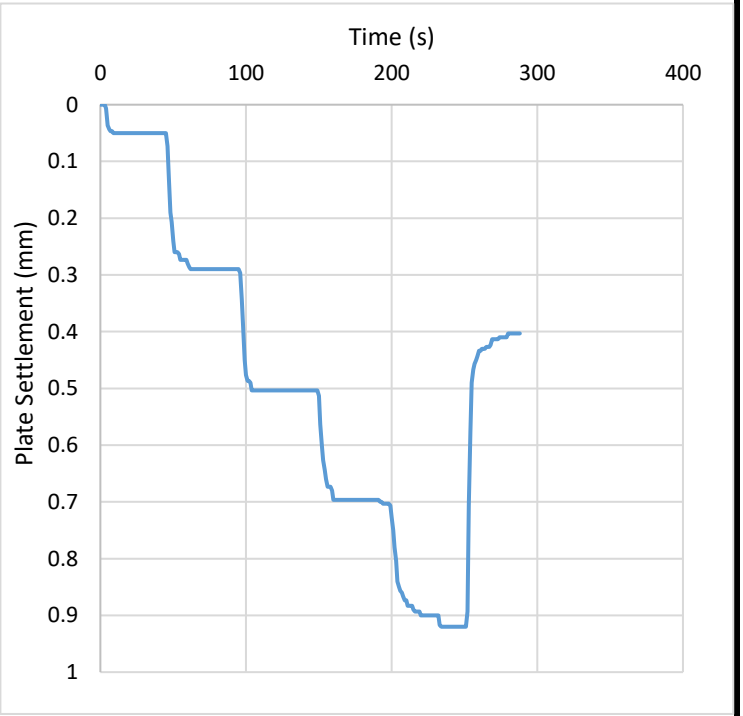
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT008	Depth (m)	0.50
Location	PBT8	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 43.3", N 52° 5' 46.8"	Number of Cycles	1
Material Type	Yellowish brown gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.34mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1	
Maximum Applied Pressure	(kPa)	200	
Maximum Deformation	(mm)	0.92	
Modulus of Subgrade Reaction K	(MN/m³)	205.1	
K762	(MN/m³)	129.0	
Estimated CBR	(%)	44	*

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
42.5	0.05
81.9	0.29
120.3	0.50
162.9	0.70
200.3	0.92
3.1	0.40





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

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*CBR value calculated from an interpolation to 1.25mm

TEST REPORT

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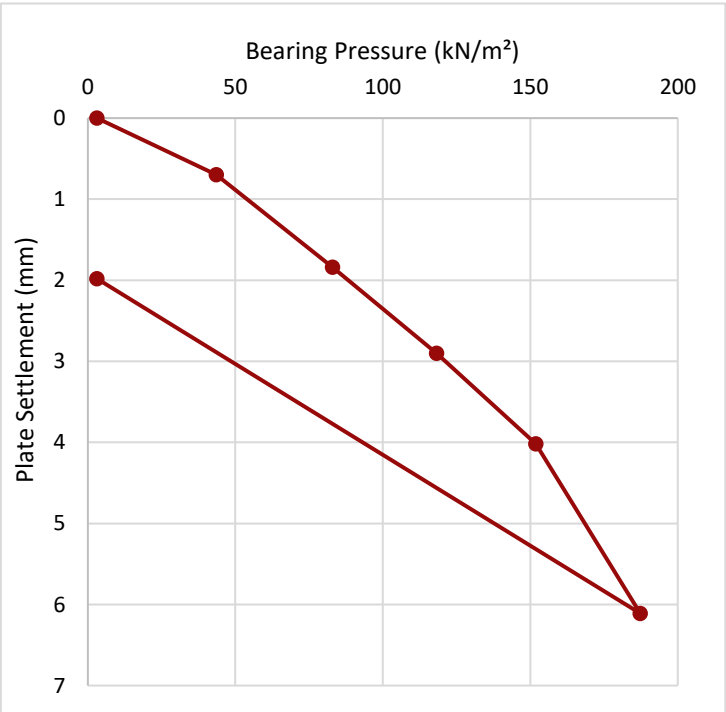
Serial No.	**41458_1**

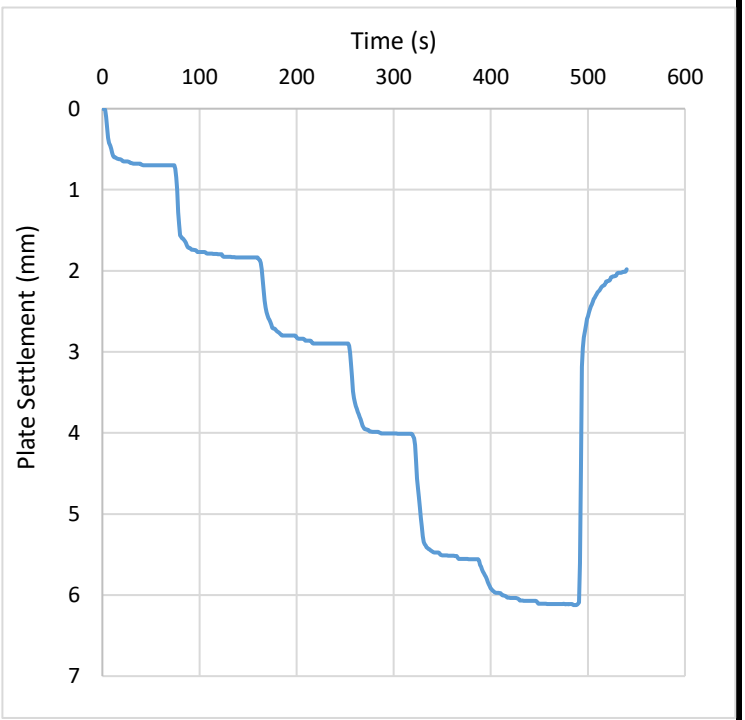
Determination of the Vertical Deformation and Strength Characteristics of Soil by the Plate Loading Test

Test Reference	PBT009	Depth (m)	0.50
Location	PBT9	Distance to excavation wall (m)	0.5
Date of Test	12/09/2022	Reaction Type	8 TONNE 360
Weather Conditions	Dry	Plate Diameter (mm)	455
GPS Coordinates	E 0° 23' 43.8", N 52° 5' 43.7"	Number of Cycles	1
Material Type	Yellowish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to medium angular to subrounded black, brown and white chert.		
Test Remarks	A bedding load of 20kN is imposed and released before test (10% of planned maximum load). A bedding settlement of 0.88mm is not included in the plate settlement chart. The total mass of apparatus acting on the plate, including the plate, before adding the applied load is 52.075kg (Force = 3.1kN/m²). This is included in the bearing pressure chart.		

		Cycle 1
Maximum Applied Pressure	(kPa)	187
Maximum Deformation	(mm)	6.11
Modulus of Subgrade Reaction K	(MN/m³)	50.0
K762	(MN/m³)	31.5
Estimated CBR	(%)	3.8

Bearing Pressure (kN/m²)	Plate Settlement (mm)
3.1	0
43.5	0.70
82.9	1.84
118.2	2.90
151.9	4.02
187.3	6.11
3.1	1.98





Test Method: BS 1377: Part 9 Cl. 4.1: 1990 - Incremental Loading Test

Comments: Estimated CBR - Ref: Design Guide for Road Pavements IAN 73/06 (2009)

Equipment calibrated by Impact Test Equipment Ltd - load cell UKAS accredited

Contract	**Haverhill**
Serial No.	**41458_1**

Plate Bearing Capacity - Approximate Test Locations

Not to Scale

APPENDIX 05

Dynamic Probe Results

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 2

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	–		3.5-3.6	4	65 FT	**7.0**-7.1		
0.1-0.2	1		3.6-3.7	4		7.1-7.2		
0.2-0.3	1		3.7-3.8	5		7.2-7.3		
0.3-0.4	3		3.8-3.9	7		7.3-7.4		
0.4-0.5	3	10 FT	3.9-**4.0**	17		7.4-7.5		
0.5-0.6	4		**4.0**-4.1	44	60 FT	7.5-7.6		
0.6-0.7	5		4.1-4.2	10		7.6-7.7		
0.7-0.8	7		4.2-4.3	7		7.7-7.8		
0.8-0.9	6		4.3-4.4	20		7.8-7.9		
0.9-**1.0**	6		4.4-4.5	7		7.9-**8.0**		
1.0-1.1	7		4.5-4.6	7		**8.0**-8.1		
1.1-1.2	6		4.6-4.7	8		8.1-8.2		
1.2-1.3	6	20 FT	4.7-4.8	8		8.2-8.3		
1.3-1.4	4		4.8-4.9	6		8.3-8.4		
1.4-1.5	4		4.9-**5.0**	8		8.4-8.5		
1.5-1.6	5		**5.0**-5.1	8	70 FT	8.5-8.6		
1.6-1.7	4		5.1-5.2	7		8.6-8.7		
1.7-1.8	4		5.2-5.3	10		8.7-8.8		
1.8-1.9	3		5.3-5.4	10		8.8-8.9		
1.9-**2.0**	3		5.4-5.5	10		8.9-**9.0**		
2.0-2.1	4		5.5-5.6	10		**9.0**-9.1		
2.1-2.2	3		5.6-5.7	10		9.1-9.2		
2.2-2.3	3		5.7-5.8	9		9.2-9.3		
2.3-2.4	3	15 FT	5.8-5.9	10		9.3-9.4		
2.4-2.5	3		5.9-**6.0**	10		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	4		6.1-6.2			9.6-9.7		
2.7-2.8	5		6.2-6.3			9.7-9.8		
2.8-2.9	5		6.3-6.4			9.8-9.9		
2.9-**3.0**	4		6.4-6.5			9.9-**10.0**		
3.0-3.1	4		6.5-6.6					
3.1-3.2	4		6.6-6.7					
3.2-3.3	3		6.7-6.8					
3.3-3.4	4		6.8-6.9					
3.4-3.5	4		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 3

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	3		3.6-3.7	6	60 FT	7.1-7.2		
0.2-0.3	3		3.7-3.8	6		7.2-7.3		
0.3-0.4	3		3.8-3.9	6		7.3-7.4		
0.4-0.5	3	20 FT	3.9-**4.0**	5		7.4-7.5		
0.5-0.6	4		**4.0**-4.1	5		7.5-7.6		
0.6-0.7	4		4.1-4.2	7		7.6-7.7		
0.7-0.8	5		4.2-4.3	6	110 FT	7.7-7.8		
0.8-0.9	5		4.3-4.4	7		7.8-7.9		
0.9-**1.0**	5		4.4-4.5	7		7.9-**8.0**		
1.0-1.1	4		4.5-4.6	8		**8.0**-8.1		
1.1-1.2	4		4.6-4.7	7		8.1-8.2		
1.2-1.3	5		4.7-4.8	6		8.2-8.3		
1.3-1.4	5	30 FT	4.8-4.9	8		8.3-8.4		
1.4-1.5	4		4.9-**5.0**	9		8.4-8.5		
1.5-1.6	4		**5.0**-5.1	10		8.5-8.6		
1.6-1.7	4		5.1-5.2	14		8.6-8.7		
1.7-1.8	3		5.2-5.3	13		8.7-8.8		
1.8-1.9	3		5.3-5.4	14	130 FT	8.8-8.9		
1.9-**2.0**	3		5.4-5.5	13		8.9-**9.0**		
2.0-2.1	2		5.5-5.6	14		**9.0**-9.1		
2.1-2.2	3		5.6-5.7	14		9.1-9.2		
2.2-2.3	3	35 FT	5.7-5.8	12		9.2-9.3		
2.3-2.4	2		5.8-5.9	11		9.3-9.4		
2.4-2.5	3		5.9-**6.0**	12		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	6		6.1-6.2			9.6-9.7		
2.7-2.8	5		6.2-6.3			9.7-9.8		
2.8-2.9	5		6.3-6.4			9.8-9.9		
2.9-**3.0**	5		6.4-6.5			9.9-**10.0**		
3.0-3.1	4		6.5-6.6					
3.1-3.2	5		6.6-6.7					
3.2-3.3	5		6.7-6.8					
3.3-3.4	6		6.8-6.9					
3.4-3.5	6		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*	
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*	
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate	
COMMENTS:		Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 4

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	5	45 FT	7.1-7.2		
0.2-0.3	2		3.7-3.8	5		7.2-7.3		
0.3-0.4	2	20 FT	3.8-3.9	4		7.3-7.4		
0.4-0.5	2		3.9-**4.0**	5		7.4-7.5		
0.5-0.6	3		**4.0**-4.1	5		7.5-7.6		
0.6-0.7	2		4.1-4.2	10		7.6-7.7		
0.7-0.8	4		4.2-4.3	10	90 FT	7.7-7.8		
0.8-0.9	3		4.3-4.4	11		7.8-7.9		
0.9-**1.0**	4		4.4-4.5	10		7.9-**8.0**		
1.0-1.1	4		4.5-4.6	14		**8.0**-8.1		
1.1-1.2	4		4.6-4.7	9		8.1-8.2		
1.2-1.3	6	30 FT	4.7-4.8	9		8.2-8.3		
1.3-1.4	6		4.8-4.9	10		8.3-8.4		
1.4-1.5	9		4.9-**5.0**	9		8.4-8.5		
1.5-1.6	6		**5.0**-5.1	10		8.5-8.6		
1.6-1.7	6		5.1-5.2	10		8.6-8.7		
1.7-1.8	6		5.2-5.3	10	95 FT	8.7-8.8		
1.8-1.9	6		5.3-5.4	11		8.8-8.9		
1.9-**2.0**	6		5.4-5.5	10		8.9-**9.0**		
2.0-2.1	4		5.5-5.6	11		**9.0**-9.1		
2.1-2.2	4		5.6-5.7	12		9.1-9.2		
2.2-2.3	4		5.7-5.8	10		9.2-9.3		
2.3-2.4	3		5.8-5.9	10		9.3-9.4		
2.4-2.5	4	35 FT	5.9-**6.0**	11		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	5		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	4		6.3-6.4			9.8-9.9		
2.9-**3.0**	4		6.4-6.5			9.9-**10.0**		
3.0-3.1	4		6.5-6.6					
3.1-3.2	4		6.6-6.7					
3.2-3.3	5		6.7-6.8					
3.3-3.4	5		6.8-6.9					
3.4-3.5	5		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 5

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1	15 FT	3.5-3.6	5	50 FT	**7.0**-7.1		
0.1-0.2	2		3.6-3.7	9		7.1-7.2		
0.2-0.3	1		3.7-3.8	10		7.2-7.3		
0.3-0.4	2		3.8-3.9	13		7.3-7.4		
0.4-0.5	2		3.9-**4.0**	17		7.4-7.5		
0.5-0.6	2		**4.0**-4.1	4	55 FT	7.5-7.6		
0.6-0.7	2		4.1-4.2	5		7.6-7.7		
0.7-0.8	3		4.2-4.3	7		7.7-7.8		
0.8-0.9	3		4.3-4.4	6		7.8-7.9		
0.9-**1.0**	3		4.4-4.5	7		7.9-**8.0**		
1.0-1.1	3	10 FT	4.5-4.6	6		**8.0**-8.1		
1.1-1.2	4		4.6-4.7	7		8.1-8.2		
1.2-1.3	3		4.7-4.8	7		8.2-8.3		
1.3-1.4	3		4.8-4.9	7		8.3-8.4		
1.4-1.5	3		4.9-**5.0**	7		8.4-8.5		
1.5-1.6	3		**5.0**-5.1	6	100 FT	8.5-8.6		
1.6-1.7	3		5.1-5.2	6		8.6-8.7		
1.7-1.8	4		5.2-5.3	6		8.7-8.8		
1.8-1.9	4		5.3-5.4	7		8.8-8.9		
1.9-**2.0**	4		5.4-5.5	7		8.9-**9.0**		
2.0-2.1	3	20 FT	5.5-5.6	7		**9.0**-9.1		
2.1-2.2	3		5.6-5.7	8		9.1-9.2		
2.2-2.3	4		5.7-5.8	7		9.2-9.3		
2.3-2.4	3		5.8-5.9	6		9.3-9.4		
2.4-2.5	4		5.9-**6.0**	8		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	4		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	4		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	4		6.5-6.6					
3.1-3.2	4		6.6-6.7					
3.2-3.3	5		6.7-6.8					
3.3-3.4	5		6.8-6.9					
3.4-3.5	5		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 6

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	2		3.5-3.6	6		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	6	10 FT	7.1-7.2		
0.2-0.3	2		3.7-3.8	7		7.2-7.3		
0.3-0.4	2	25 FT	3.8-3.9	7		7.3-7.4		
0.4-0.5	2		3.9-**4.0**	7		7.4-7.5		
0.5-0.6	3		**4.0**-4.1	6		7.5-7.6		
0.6-0.7	4		4.1-4.2	8		7.6-7.7		
0.7-0.8	5		4.2-4.3	7		7.7-7.8		
0.8-0.9	4		4.3-4.4	6	50 FT	7.8-7.9		
0.9-**1.0**	5		4.4-4.5	8		7.9-**8.0**		
1.0-1.1	4		4.5-4.6	8		**8.0**-8.1		
1.1-1.2	5		4.6-4.7	7		8.1-8.2		
1.2-1.3	5		4.7-4.8	9		8.2-8.3		
1.3-1.4	5		4.8-4.9	9		8.3-8.4		
1.4-1.5	4	20 FT	4.9-**5.0**	11		8.4-8.5		
1.5-1.6	4		**5.0**-5.1	12		8.5-8.6		
1.6-1.7	4		5.1-5.2	12		8.6-8.7		
1.7-1.8	3		5.2-5.3	12		8.7-8.8		
1.8-1.9	4		5.3-5.4	12	70 FT	8.8-8.9		
1.9-**2.0**	3		5.4-5.5	12		8.9-**9.0**		
2.0-2.1	3		5.5-5.6	13		**9.0**-9.1		
2.1-2.2	3		5.6-5.7	13		9.1-9.2		
2.2-2.3	3		5.7-5.8	14		9.2-9.3		
2.3-2.4	4		5.8-5.9	13		9.3-9.4		
2.4-2.5	3	15 FT	5.9-**6.0**	13		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	3		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	3		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	5		6.5-6.6					
3.1-3.2	6		6.6-6.7					
3.2-3.3	5		6.7-6.8					
3.3-3.4	6		6.8-6.9					
3.4-3.5	6		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 7

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	2		3.5-3.6	1		**7.0**-7.1		
0.1-0.2	3		3.6-3.7	2	60	7.1-7.2		
0.2-0.3	4	20	3.7-3.8	3		7.2-7.3		
0.3-0.4	3		3.8-3.9	3		7.3-7.4		
0.4-0.5	3		3.9-**4.0**	5		7.4-7.5		
0.5-0.6	5		**4.0**-4.1	3		7.5-7.6		
0.6-0.7	5		4.1-4.2	5		7.6-7.7		
0.7-0.8	4		4.2-4.3	5		7.7-7.8		
0.8-0.9	4		4.3-4.4	5	100	7.8-7.9		
0.9-**1.0**	3		4.4-4.5	5		7.9-**8.0**		
1.0-1.1	4		4.5-4.6	6		**8.0**-8.1		
1.1-1.2	5		4.6-4.7	6		8.1-8.2		
1.2-1.3	3		4.7-4.8	6		8.2-8.3		
1.3-1.4	3	55	4.8-4.9	6		8.3-8.4		
1.4-1.5	6		4.9-**5.0**	6		8.4-8.5		
1.5-1.6	6		**5.0**-5.1	7		8.5-8.6		
1.6-1.7	6		5.1-5.2	7		8.6-8.7		
1.7-1.8	6		5.2-5.3	6		8.7-8.8		
1.8-1.9	5		5.3-5.4	8	100	8.8-8.9		
1.9-**2.0**	5		5.4-5.5	13		8.9-**9.0**		
2.0-2.1	3		5.5-5.6	13		**9.0**-9.1		
2.1-2.2	4		5.6-5.7	10		9.1-9.2		
2.2-2.3	3	30	5.7-5.8	10		9.2-9.3		
2.3-2.4	4		5.8-5.9	12		9.3-9.4		
2.4-2.5	5		5.9-**6.0**	13		9.4-9.5		
2.5-2.6	5		**6.0**-6.1			9.5-9.6		
2.6-2.7	3		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	4		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	3		6.5-6.6					
3.1-3.2	3		6.6-6.7					
3.2-3.3	1		6.7-6.8					
3.3-3.4	1		6.8-6.9					
3.4-3.5	2		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 8

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	2		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	3		3.6-3.7	5	65 FT	7.1-7.2		
0.2-0.3	2		3.7-3.8	5		7.2-7.3		
0.3-0.4	2	0 FT	3.8-3.9	4		7.3-7.4		
0.4-0.5	3		3.9-**4.0**	5		7.4-7.5		
0.5-0.6	3		**4.0**-4.1	5		7.5-7.6		
0.6-0.7	3		4.1-4.2	5		7.6-7.7		
0.7-0.8	3		4.2-4.3	7		7.7-7.8		
0.8-0.9	5		4.3-4.4	7	120 FT	7.8-7.9		
0.9-**1.0**	9		4.4-4.5	7		7.9-**8.0**		
1.0-1.1	18		4.5-4.6	7		**8.0**-8.1		
1.1-1.2	22		4.6-4.7	7		8.1-8.2		
1.2-1.3	22		4.7-4.8	6		8.2-8.3		
1.3-1.4	18		4.8-4.9	7		8.3-8.4		
1.4-1.5	20		4.9-**5.0**	8		8.4-8.5		
1.5-1.6	12	70 FT	**5.0**-5.1	6		8.5-8.6		
1.6-1.7	10		5.1-5.2	6		8.6-8.7		
1.7-1.8	8		5.2-5.3	6		8.7-8.8		
1.8-1.9	9		5.3-5.4	6		8.8-8.9		
1.9-**2.0**	10		5.4-5.5	7		8.9-**9.0**		
2.0-2.1	9		5.5-5.6	9	120 FT	**9.0**-9.1		
2.1-2.2	10		5.6-5.7	9		9.1-9.2		
2.2-2.3	6		5.7-5.8	8		9.2-9.3		
2.3-2.4	6		5.8-5.9	9		9.3-9.4		
2.4-2.5	5	60 FT	5.9-**6.0**	10		9.4-9.5		
2.5-2.6	5		**6.0**-6.1			9.5-9.6		
2.6-2.7	6		6.1-6.2			9.6-9.7		
2.7-2.8	6		6.2-6.3			9.7-9.8		
2.8-2.9	5		6.3-6.4			9.8-9.9		
2.9-**3.0**	6		6.4-6.5			9.9-**10.0**		
3.0-3.1	6		6.5-6.6					
3.1-3.2	5		6.6-6.7					
3.2-3.3	4		6.7-6.8					
3.3-3.4	5		6.8-6.9					
3.4-3.5	4		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 9

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	3	70 FT	**7.0**-7.1		
0.1-0.2	2		3.6-3.7	5		7.1-7.2		
0.2-0.3	2		3.7-3.8	4		7.2-7.3		
0.3-0.4	3		3.8-3.9	5		7.3-7.4		
0.4-0.5	4	0 FT	3.9-**4.0**	5		7.4-7.5		
0.5-0.6	8		**4.0**-4.1	6		7.5-7.6		
0.6-0.7	13		4.1-4.2	6		7.6-7.7		
0.7-0.8	17		4.2-4.3	5	70 FT	7.7-7.8		
0.8-0.9	13		4.3-4.4	5		7.8-7.9		
0.9-**1.0**	15		4.4-4.5	5		7.9-**8.0**		
1.0-1.1	9		4.5-4.6	5		**8.0**-8.1		
1.1-1.2	13		4.6-4.7	6		8.1-8.2		
1.2-1.3	11		4.7-4.8	5		8.2-8.3		
1.3-1.4	12	20 FT	4.8-4.9	9		8.3-8.4		
1.4-1.5	13		4.9-**5.0**	11		8.4-8.5		
1.5-1.6	10		**5.0**-5.1	7		8.5-8.6		
1.6-1.7	7		5.1-5.2	9		8.6-8.7		
1.7-1.8	9		5.2-5.3	8	70 FT	8.7-8.8		
1.8-1.9	6		5.3-5.4	10		8.8-8.9		
1.9-**2.0**	7		5.4-5.5	8		8.9-**9.0**		
2.0-2.1	5		5.5-5.6	7		**9.0**-9.1		
2.1-2.2	6		5.6-5.7	7		9.1-9.2		
2.2-2.3	3		5.7-5.8	7		9.2-9.3		
2.3-2.4	4	30 FT	5.8-5.9	8		9.3-9.4		
2.4-2.5	3		5.9-**6.0**	7		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	3		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	3		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	3		6.5-6.6					
3.1-3.2	3		6.6-6.7					
3.2-3.3	4		6.7-6.8					
3.3-3.4	3		6.8-6.9					
3.4-3.5	3		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 10

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	5		7.1-7.2		
0.2-0.3	2		3.7-3.8	5	50	7.2-7.3		
0.3-0.4	3		3.8-3.9	5		7.3-7.4		
0.4-0.5	4	10	3.9-**4.0**	6		7.4-7.5		
0.5-0.6	5		**4.0**-4.1	6		7.5-7.6		
0.6-0.7	10		4.1-4.2	8		7.6-7.7		
0.7-0.8	15		4.2-4.3	7		7.7-7.8		
0.8-0.9	16		4.3-4.4	7		7.8-7.9		
0.9-**1.0**	16		4.4-4.5	7	70	7.9-**8.0**		
1.0-1.1	14		4.5-4.6	7		**8.0**-8.1		
1.1-1.2	11		4.6-4.7	7		8.1-8.2		
1.2-1.3	8		4.7-4.8	7		8.2-8.3		
1.3-1.4	8	20	4.8-4.9	7		8.3-8.4		
1.4-1.5	6		4.9-**5.0**	7		8.4-8.5		
1.5-1.6	6		**5.0**-5.1	7		8.5-8.6		
1.6-1.7	6		5.1-5.2	13		8.6-8.7		
1.7-1.8	5		5.2-5.3	16		8.7-8.8		
1.8-1.9	7		5.3-5.4	13	110	8.8-8.9		
1.9-**2.0**	7		5.4-5.5	12		8.9-**9.0**		
2.0-2.1	6		5.5-5.6	11		**9.0**-9.1		
2.1-2.2	5		5.6-5.7	12		9.1-9.2		
2.2-2.3	5		5.7-5.8	14		9.2-9.3		
2.3-2.4	3	30	5.8-5.9	15		9.3-9.4		
2.4-2.5	3		5.9-**6.0**	14		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	3		6.1-6.2			9.6-9.7		
2.7-2.8	4		6.2-6.3			9.7-9.8		
2.8-2.9	4		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	3		6.5-6.6					
3.1-3.2	4		6.6-6.7					
3.2-3.3	4		6.7-6.8					
3.3-3.4	4		6.8-6.9					
3.4-3.5	5		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: \ \

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	4		7.1-7.2		
0.2-0.3	1		3.7-3.8	5	30 FT	7.2-7.3		
0.3-0.4	1		3.8-3.9	5		7.3-7.4		
0.4-0.5	2	0	3.9-**4.0**	4		7.4-7.5		
0.5-0.6	2		**4.0**-4.1	5		7.5-7.6		
0.6-0.7	5		4.1-4.2	6		7.6-7.7		
0.7-0.8	6		4.2-4.3	6		7.7-7.8		
0.8-0.9	9		4.3-4.4	10		7.8-7.9		
0.9-**1.0**	10		4.4-4.5	10	70 FT	7.9-**8.0**		
1.0-1.1	21		4.5-4.6	12		**8.0**-8.1		
1.1-1.2	28		4.6-4.7	9		8.1-8.2		
1.2-1.3	22		4.7-4.8	6		8.2-8.3		
1.3-1.4	22		4.8-4.9	7		8.3-8.4		
1.4-1.5	10	10 FT	4.9-**5.0**	10		8.4-8.5		
1.5-1.6	14		**5.0**-5.1	9		8.5-8.6		
1.6-1.7	14		5.1-5.2	10		8.6-8.7		
1.7-1.8	13		5.2-5.3	8		8.7-8.8		
1.8-1.9	11		5.3-5.4	9		8.8-8.9		
1.9-**2.0**	12		5.4-5.5	8	90 FT	8.9-**9.0**		
2.0-2.1	13		5.5-5.6	7		**9.0**-9.1		
2.1-2.2	13		5.6-5.7	8		9.1-9.2		
2.2-2.3	9		5.7-5.8	7		9.2-9.3		
2.3-2.4	7		5.8-5.9	7		9.3-9.4		
2.4-2.5	9	10 FT	5.9-**6.0**	9		9.4-9.5		
2.5-2.6	7		**6.0**-6.1			9.5-9.6		
2.6-2.7	6		6.1-6.2			9.6-9.7		
2.7-2.8	6		6.2-6.3			9.7-9.8		
2.8-2.9	7		6.3-6.4			9.8-9.9		
2.9-**3.0**	6		6.4-6.5			9.9-**10.0**		
3.0-3.1	6		6.5-6.6					
3.1-3.2	6		6.6-6.7					
3.2-3.3	5		6.7-6.8					
3.3-3.4	5		6.8-6.9					
3.4-3.5	5		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 12

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	4		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	4		7.1-7.2		
0.2-0.3	2		3.7-3.8	4	70	7.2-7.3		
0.3-0.4	3	15	3.8-3.9	4		7.3-7.4		
0.4-0.5	4		3.9-**4.0**	6		7.4-7.5		
0.5-0.6	4		**4.0**-4.1	6		7.5-7.6		
0.6-0.7	4		4.1-4.2	3		7.6-7.7		
0.7-0.8	4		4.2-4.3	7		7.7-7.8		
0.8-0.9	8		4.3-4.4	6	60	7.8-7.9		
0.9-**1.0**	8		4.4-4.5	6		7.9-**8.0**		
1.0-1.1	6		4.5-4.6	6		**8.0**-8.1		
1.1-1.2	5		4.6-4.7	6		8.1-8.2		
1.2-1.3	5		4.7-4.8	7		8.2-8.3		
1.3-1.4	4		4.8-4.9	5		8.3-8.4		
1.4-1.5	4	20	4.9-**5.0**	6		8.4-8.5		
1.5-1.6	3		**5.0**-5.1	6		8.5-8.6		
1.6-1.7	3		5.1-5.2	7		8.6-8.7		
1.7-1.8	3		5.2-5.3	8		8.7-8.8		
1.8-1.9	3		5.3-5.4	7	90	8.8-8.9		
1.9-**2.0**	3		5.4-5.5	7		8.9-**9.0**		
2.0-2.1	3		5.5-5.6	7		**9.0**-9.1		
2.1-2.2	2		5.6-5.7	7		9.1-9.2		
2.2-2.3	3		5.7-5.8	6		9.2-9.3		
2.3-2.4	3		5.8-5.9	7		9.3-9.4		
2.4-2.5	2	20	5.9-**6.0**	7		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	2		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	3		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	3		6.5-6.6					
3.1-3.2	3		6.6-6.7					
3.2-3.3	4		6.7-6.8					
3.3-3.4	4		6.8-6.9					
3.4-3.5	4		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 13

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	3		7.1-7.2		
0.2-0.3	2		3.7-3.8	4		7.2-7.3		
0.3-0.4	3		3.8-3.9	4		7.3-7.4		
0.4-0.5	4		3.9-**4.0**	4		7.4-7.5		
0.5-0.6	5	25	**4.0**-4.1	5		7.5-7.6		
0.6-0.7	5		4.1-4.2	6		7.6-7.7		
0.7-0.8	8		4.2-4.3	6		7.7-7.8		
0.8-0.9	17	FT	4.3-4.4	6	110	7.8-7.9		
0.9-**1.0**	24		4.4-4.5	7		7.9-**8.0**		
1.0-1.1	23		4.5-4.6	6		**8.0**-8.1		
1.1-1.2	27		4.6-4.7	7		8.1-8.2		
1.2-1.3	29	43	4.7-4.8	8	FT	8.2-8.3		
1.3-1.4	21		4.8-4.9	8		8.3-8.4		
1.4-1.5	18	TT	4.9-**5.0**	8		8.4-8.5		
1.5-1.6	14		**5.0**-5.1	9		8.5-8.6		
1.6-1.7	12		5.1-5.2	9		8.6-8.7		
1.7-1.8	12		5.2-5.3	10		8.7-8.8		
1.8-1.9	10		5.3-5.4	10		8.8-8.9		
1.9-**2.0**	8		5.4-5.5	10	120	8.9-**9.0**		
2.0-2.1	7		5.5-5.6	9		**9.0**-9.1		
2.1-2.2	7	60	5.6-5.7	10		9.1-9.2		
2.2-2.3	7		5.7-5.8	12	FT	9.2-9.3		
2.3-2.4	5	FT	5.8-5.9	14		9.3-9.4		
2.4-2.5	5		5.9-**6.0**	14		9.4-9.5		
2.5-2.6	6		**6.0**-6.1			9.5-9.6		
2.6-2.7	5		6.1-6.2			9.6-9.7		
2.7-2.8	5		6.2-6.3			9.7-9.8		
2.8-2.9	5		6.3-6.4			9.8-9.9		
2.9-**3.0**	6		6.4-6.5			9.9-**10.0**		
3.0-3.1	5		6.5-6.6					
3.1-3.2	5		6.6-6.7					
3.2-3.3	4	60	6.7-6.8					
3.3-3.4	5		6.8-6.9					
3.4-3.5	4	FT	6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 14

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	4		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	4		7.1-7.2		
0.2-0.3	1		3.7-3.8	5	40 FT	7.2-7.3		
0.3-0.4	2		3.8-3.9	5		7.3-7.4		
0.4-0.5	4		3.9-**4.0**	4		7.4-7.5		
0.5-0.6	4	0	**4.0**-4.1	5		7.5-7.6		
0.6-0.7	6		4.1-4.2	4		7.6-7.7		
0.7-0.8	9		4.2-4.3	6		7.7-7.8		
0.8-0.9	10		4.3-4.4	7		7.8-7.9		
0.9-**1.0**	10		4.4-4.5	6	95 FT	7.9-**8.0**		
1.0-1.1	9		4.5-4.6	6		**8.0**-8.1		
1.1-1.2	7		4.6-4.7	5		8.1-8.2		
1.2-1.3	7		4.7-4.8	6		8.2-8.3		
1.3-1.4	7		4.8-4.9	5		8.3-8.4		
1.4-1.5	9	40 FT	4.9-**5.0**	6		8.4-8.5		
1.5-1.6	8		**5.0**-5.1	5		8.5-8.6		
1.6-1.7	10		5.1-5.2	7		8.6-8.7		
1.7-1.8	6		5.2-5.3	7		8.7-8.8		
1.8-1.9	5		5.3-5.4	7		8.8-8.9		
1.9-**2.0**	5		5.4-5.5	6		8.9-**9.0**		
2.0-2.1	6		5.5-5.6	7		**9.0**-9.1		
2.1-2.2	4		5.6-5.7	6		9.1-9.2		
2.2-2.3	4		5.7-5.8	8		9.2-9.3		
2.3-2.4	3		5.8-5.9	8		9.3-9.4		
2.4-2.5	4	40 FT	5.9-**6.0**	7		9.4-9.5		
2.5-2.6	4		**6.0**-6.1			9.5-9.6		
2.6-2.7	3		6.1-6.2			9.6-9.7		
2.7-2.8	3		6.2-6.3			9.7-9.8		
2.8-2.9	3		6.3-6.4			9.8-9.9		
2.9-**3.0**	3		6.4-6.5			9.9-**10.0**		
3.0-3.1	3		6.5-6.6					
3.1-3.2	4		6.6-6.7					
3.2-3.3	4		6.7-6.8					
3.3-3.4	4		6.8-6.9					
3.4-3.5	4		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: 15

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	5		**7.0**-7.1		
0.1-0.2	1		3.6-3.7	5		7.1-7.2		
0.2-0.3	1		3.7-3.8	4	30	7.2-7.3		
0.3-0.4	2	0	3.8-3.9	4		7.3-7.4		
0.4-0.5	3		3.9-**4.0**	6		7.4-7.5		
0.5-0.6	2		**4.0**-4.1	5		7.5-7.6		
0.6-0.7	3		4.1-4.2	5		7.6-7.7		
0.7-0.8	2		4.2-4.3	4		7.7-7.8		
0.8-0.9	3		4.3-4.4	6	70	7.8-7.9		
0.9-**1.0**	3		4.4-4.5	5		7.9-**8.0**		
1.0-1.1	3		4.5-4.6	4		**8.0**-8.1		
1.1-1.2	3		4.6-4.7	5		8.1-8.2		
1.2-1.3	4		4.7-4.8	5		8.2-8.3		
1.3-1.4	5		4.8-4.9	5		8.3-8.4		
1.4-1.5	5	5	4.9-**5.0**	6		8.4-8.5		
1.5-1.6	6		**5.0**-5.1	4		8.5-8.6		
1.6-1.7	4		5.1-5.2	6		8.6-8.7		
1.7-1.8	4		5.2-5.3	5		8.7-8.8		
1.8-1.9	3		5.3-5.4	5	95	8.8-8.9		
1.9-**2.0**	3		5.4-5.5	4		8.9-**9.0**		
2.0-2.1	3		5.5-5.6	6		**9.0**-9.1		
2.1-2.2	2		5.6-5.7	6		9.1-9.2		
2.2-2.3	3		5.7-5.8	5		9.2-9.3		
2.3-2.4	2		5.8-5.9	5		9.3-9.4		
2.4-2.5	3	10	5.9-**6.0**	7		9.4-9.5		
2.5-2.6	3		**6.0**-6.1			9.5-9.6		
2.6-2.7	3		6.1-6.2			9.6-9.7		
2.7-2.8	4		6.2-6.3			9.7-9.8		
2.8-2.9	4		6.3-6.4			9.8-9.9		
2.9-**3.0**	4		6.4-6.5			9.9-**10.0**		
3.0-3.1	4		6.5-6.6					
3.1-3.2	4		6.6-6.7					
3.2-3.3	4		6.7-6.8					
3.3-3.4	4		6.8-6.9					
3.4-3.5	4		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*	
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*	
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate	
COMMENTS:		Checked	Approved

OAKLEY SOILS AND CONCRETE ENGINEERING LTD

DYNAMIC PROBE RECORD

Date: Crew: SS/RS Probe Hole No: / 6

Location: Land at Spring Grove Farm, Haverhill, CB9 7SW Job No: EEE/92N

DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING	DEPTH (m)	BLOW COUNT	TORQUE READING
0.0-0.1	1		3.5-3.6	7		**7.0**-7.1		
0.1-0.2	3		3.6-3.7	6	30 FT	7.1-7.2		
0.2-0.3	3		3.7-3.8	7		7.2-7.3		
0.3-0.4	3		3.8-3.9	6		7.3-7.4		
0.4-0.5	3	10 FT	3.9-**4.0**	7		7.4-7.5		
0.5-0.6	3		**4.0**-4.1	8		7.5-7.6		
0.6-0.7	3		4.1-4.2	8		7.6-7.7		
0.7-0.8	3		4.2-4.3	8		7.7-7.8		
0.8-0.9	3		4.3-4.4	7	70 FT	7.8-7.9		
0.9-**1.0**	3		4.4-4.5	7		7.9-**8.0**		
1.0-1.1	5		4.5-4.6	6		**8.0**-8.1		
1.1-1.2	6		4.6-4.7	8		8.1-8.2		
1.2-1.3	6		4.7-4.8	9		8.2-8.3		
1.3-1.4	7		4.8-4.9	9		8.3-8.4		
1.4-1.5	7	10 FT	4.9-**5.0**	8		8.4-8.5		
1.5-1.6	8		**5.0**-5.1	10		8.5-8.6		
1.6-1.7	8		5.1-5.2	11		8.6-8.7		
1.7-1.8	8		5.2-5.3	11		8.7-8.8		
1.8-1.9	9		5.3-5.4	12		8.8-8.9		
1.9-**2.0**	9		5.4-5.5	12	130 FT	8.9-**9.0**		
2.0-2.1	8		5.5-5.6	13		**9.0**-9.1		
2.1-2.2	8		5.6-5.7	14		9.1-9.2		
2.2-2.3	8		5.7-5.8	14		9.2-9.3		
2.3-2.4	7		5.8-5.9	14		9.3-9.4		
2.4-2.5	7	10 FT	5.9-**6.0**	14		9.4-9.5		
2.5-2.6	6		**6.0**-6.1			9.5-9.6		
2.6-2.7	6		6.1-6.2			9.6-9.7		
2.7-2.8	7		6.2-6.3			9.7-9.8		
2.8-2.9	7		6.3-6.4			9.8-9.9		
2.9-**3.0**	6		6.4-6.5			9.9-**10.0**		
3.0-3.1	6		6.5-6.6					
3.1-3.2	6		6.6-6.7					
3.2-3.3	5		6.7-6.8					
3.3-3.4	7		6.8-6.9					
3.4-3.5	7		6.9-**7.0**					

Hammer: type/mass.....63.5kg	Cone: type/diameter.....50mm	Cone left behind: Yes/No*
Standard drop.....750mm	Rod: type/diameter.....35mm	Hole backfilled: Yes/No*
Damper: Yes/No* Type.....N/A.....		*Delete as appropriate
COMMENTS:	Checked	Approved

APPENDIX 06

Chemical Laboratory Certificates

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
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W: www.element.com

SLR Consulting Ltd
28 Mill Barn
Turkey Mill
Maidstone
ME14 5PP

Attention :	Dominic Goodchild-James
Date :	
Your reference :	404.11925.00004.021
Our reference :	Test Report 22/15211 Batch 1
Location :	Thurlow
Date samples received :	17th September, 2022
Status :	Final Report
Issue :	1

Twenty nine samples were received for analysis on 17th September, 2022 of which eight were schedul ease find attached our Test Report which should be read with notes at the end of the report and should include all sections if re ons and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless are not surrogate corrected.

Authorised By:

[redacted]

Simon Gomery BSc
Project Manager

SLR Consulting Ltd
404.11925.00004.021

Report : Solid

Location: Thurlow
Contact: Dominic Goodchild-James
EMT Job No: 22/15211

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EM													
Sample ID	SBH1	SBH1											
Depth	0.10	1.90	0.90	0.15	0.20								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	14/09/2022	14/09/2022	13/09/2022	12/09/2022	14/09/2022	13/09/2022	14/09/2022	13/09/2022					
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022			LOD/LOR	Units	Method No.
Arsenic #M	15	12	16	19	16	14	15	43			<0.5	mg/kg	TM30/PM15
Barium #M	65	49	77	80	63	75	62	76			<1	mg/kg	TM30/PM15
Beryllium	1.1	1.3	1.7	1.4	1.2	1.3	1.4	1.4			<0.5	mg/kg	TM30/PM15
Cadmium #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM30/PM15
Chromium #M	43	35	41	69	42	50	45	67			<0.5	mg/kg	TM30/PM15
Copper #M	14	22	24	21	15	17	18	14			<1	mg/kg	TM30/PM15
Lead #M	23	11	11	24	28	23	18	11			<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.2	<0.1			<0.1	mg/kg	TM30/PM15
Nickel #M	28	36	40	32	27	29	33	46			<0.7	mg/kg	TM30/PM15
Selenium #M	1	<1	<1	1	<1	1	1	2			<1	mg/kg	TM30/PM15
Vanadium	46	45	61	59	48	54	54	74			<1	mg/kg	TM30/PM15
Zinc #M	65	68	78	97	70	85	77	91			<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #M	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Acenaphthene #M	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Fluorene #M	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Phenanthrene #M	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Fluoranthene #M	0.07	<0.03	<0.03	0.06	0.07	0.05	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Pyrene #	0.06	<0.03	<0.03	0.05	0.06	0.05	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06			<0.06	mg/kg	TM4/PM8
Chrysene #M	0.03	<0.02	<0.02	0.04	0.05	0.03	<0.02	<0.02			<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	<0.07	<0.07	<0.07	0.08	<0.07	<0.07	<0.07			<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6			<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02			<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94	85	84	91	90	93	92	94			<0	%	TM4/PM8
MTBE #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Benzene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Toluene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Ethylbenzene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
m/p-Xylene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
o-Xylene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM36/PM12
Xylenes (sum of isomers) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	mg/kg	TM36/PM12

SLR Consulting Ltd
404.11925.00004.021

Report : Solid

Location: Thurlow
Contact: Dominic Goodchild-James
EMT Job No: 22/15211

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EM											LOD/LOR	Units	Method No.
Sample ID	SBH1	SBH1											
Depth	0.10	1.90	0.90	0.15	0.20								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	14/09/2022	14/09/2022	13/09/2022	12/09/2022	14/09/2022	13/09/2022	14/09/2022	13/09/2022					
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022	17/09/2022					
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #M	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #M	<4	<4	<4	<4	<4	<4	<4	<4			<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #M	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #M	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35 (EH+HS_CU_1D_AL)	<19	<19	<19	<19	<19	<19	<19	<19			<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #M	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4	<4	<4	<4	<4	<4			<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 (EH+HS_CU_1D_AR) #	<19	<19	<19	<19	<19	<19	<19	<19			<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-35) (EH+HS_CU_1D_Total)	<38	<38	<38	<38	<38	<38	<38	<38			<38	mg/kg	TM5/TM36/PM8/PM12/PM16
Natural Moisture Content	13.0	18.6	15.3	19.7	13.2	11.8	13.3	15.7			<0.1	%	PM4/PM0
Free Cyanide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	mg/kg	TM89/PM45
Total Cyanide #M	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	mg/kg	TM89/PM45
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				None	PM13/PM0
Sample Colour	Medium Brown	Dark Brown	Dark Brown	Dark Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown				None	PM13/PM0
Other Items	stones, roots	stones, chalk	stones, chalk	stones	stones	stones, loam, roots	roots, stones	stones, sand				None	PM13/PM0
Total Organic Carbon #	1.4	0.47	0.27	1.8	1.4	1.4	0.82	0.16			<0.02	%	TM21/PM24
pH #M	5.9	8.3	8.3	8.1	6.1	7.0	8.3	8.6			<0.01	pH units	TM73/PM11

Client Name: SLR Consulting Ltd
Reference: 404.11925.00004.021
Location: Thurlow
Contact: Dominic Goodchild-James

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/15211	1	SBH1	0.10	3	Catherine Coles	23/09/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	23/09/2022	**Asbestos Fibres**	NAD
					Catherine Coles	23/09/2022	**Asbestos ACM**	NAD
					Catherine Coles	23/09/2022	**Asbestos Type**	NAD
22/15211	1	SBH4	0.15	33	Catherine Coles	23/09/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	23/09/2022	**Asbestos Fibres**	NAD
					Catherine Coles	23/09/2022	**Asbestos ACM**	NAD
					Catherine Coles	23/09/2022	**Asbestos Type**	NAD
22/15211	1	TP2	0.20	57	Catherine Coles	23/09/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	23/09/2022	**Asbestos Fibres**	NAD
					Catherine Coles	23/09/2022	**Asbestos ACM**	NAD
					Catherine Coles	23/09/2022	**Asbestos Type**	NAD
22/15211	1	TP4	0.20	66	Catherine Coles	23/09/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	23/09/2022	**Asbestos Fibres**	NAD
					Catherine Coles	23/09/2022	**Asbestos ACM**	NAD
					Catherine Coles	23/09/2022	**Asbestos Type**	NAD

Client Name: SLR Consulting Ltd
Reference: 404.11925.00004.021
Location: Thurlow
Contact: Dominic Goodchild-James

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviati						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

22/15211

H

e are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

CERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations ill be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS d.

sumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be ed unless we are requested to remove them.

amples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 nths.

you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/15211

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 22/15211

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes	Yes	AR	Yes

APPENDIX 07

Assessment Criteria Screening

Exceeds GAC
Exceeds LOD

Client Name	Acorn AD
Site Name	Thurlow
Job Number	404.11923.00004.0021
Date	04/11/2022
Description of Data Assessment / Zoning	Zone X
Selected Screening Value and Land Use	GAC - Commercial

Sample ID	SBH1	SBH1	SBH2	SBH4	TP2	TP4	TP5	TP6	-	-	-	-	-
Depth	0.1	1.9	0.90	0.15	0.2	0.2	0.6	1.8	-	-	-	-	-
Sample Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	-	-	-	-	-
Sampled Date	22/09/14	22/09/14	22/09/13	22/09/12	22/09/14	22/09/13	22/09/14	22/09/13	00/01/00	00/01/00	-	-	-
Sample Received Date	22/09/17	22/09/17	22/09/17	22/09/17	22/09/17	22/09/17	22/09/17	22/09/17	00/01/00	00/01/00	00/01/1900	00/01/1900	00/01/1900
EMT Sample No	1-3	7-9	16-18	31-33	55-57	64-66	70-72	76-78	-	-	-	-	-
Batch Number	1	1	1	1	1	1	1	1	-	-	-	-	-
Strata / Zone	Zone X	Zone X	Zone X	Zone X	Zone X	Zone X	Zone X	Zone X	-	-	-	-	-

Test	**Units**	**LOD**	**Selected GAC**	**No. Above GAC**													
					-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	<0.5	640	0	15	12	16	19	16	14	15	43	-	-	-	-	-
Barium	mg/kg	<1	22000	0	65	49	77	80	63	75	62	76	-	-	-	-	-
beryllium	mg/kg	<0.5	420	0	1.1	1.3	1.7	1.4	1.2	1.3	1.4	1.4	-	-	-	-	-
Cadmium	mg/kg	<0.1	348	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Chromium	mg/kg	<0.5	30400	0	43	35	41	69	42	50	45	67	-	-	-	-	-
Copper	mg/kg	<1	71700	0	14	22	24	21	15	17	18	14	-	-	-	-	-
Lead	mg/kg	<5	2330	0	23	11	11	24	28	23	18	11	-	-	-	-	-
Mercury	mg/kg	<0.1	3600	0	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.2	<0.1	-	-	-	-	-
Nickel	mg/kg	<0.7	1800	0	28	36	40	32	27	29	33	46	-	-	-	-	-
Selenium	mg/kg	<1	13000	0	1	<1	<1	1	<1	1	1	2	-	-	-	-	-
vanadium	mg/kg	<1	3160	0	46	45	61	59	48	54	54	74	-	-	-	-	-
Zinc	mg/kg	<5	665000	0	65	68	78	97	70	85	77	91	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
PAH MS					-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	<0.04	200	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
Acenaphthylene	mg/kg	<0.03	84000	0	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	-	-	-
Acenaphthene	mg/kg	<0.05	85000	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-
Fluorene	mg/kg	<0.04	64000	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
Phenanthrene	mg/kg	<0.03	22000	0	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	-	-	-
Anthracene	mg/kg	<0.04	530000	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
Fluoranthene	mg/kg	<0.03	23000	0	0.07	<0.03	<0.03	0.06	0.07	0.05	<0.03	<0.03	-	-	-	-	-
Pyrene	mg/kg	<0.03	54000	0	0.06	<0.03	<0.03	0.05	0.06	0.05	<0.03	<0.03	-	-	-	-	-
Benzo(a)anthracene	mg/kg	<0.06	90	0	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	-	-	-
Chrysene	mg/kg	<0.02	140	0	0.03	<0.02	<0.02	0.04	0.05	0.03	<0.02	<0.02	-	-	-	-	-
Benzo(bk)fluoranthene	mg/kg	<0.07			<0.07	<0.07	<0.07	<0.07	0.08	<0.07	<0.07	<0.07	-	-	-	-	-
Benzo(a)pyrene	mg/kg	<0.04	14	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
Indeno(123cd)pyrene	mg/kg	<0.04	60	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	<0.04	13	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	<0.04	650	0	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	-	-	-
PAH 16 Total	mg/kg	<0.6			<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	<0.05	100	0	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.02	140	0	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	-	-	-	-	-
PAH Surrogate % Recovery	%	<0			94	85	84	91	90	93	92	94	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	mg/kg	<0.005	7900	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-
Benzene	mg/kg	<0.005	28	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-
Toluene	mg/kg	<0.005	869	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-
Ethylbenzene	mg/kg	<0.005	518	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-
m & p Xylene	mg/kg	<0.005	576	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-
o-Xylene	mg/kg	<0.005	576	0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-
Total Xylenes	mg/kg	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
TPH CWG					-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics					-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatics >C5-C6	mg/kg	<0.1	3400	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aliphatics >C6-C8	mg/kg	<0.1	8300	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aliphatics >C8-C10	mg/kg	<0.1	2100	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aliphatics >C10-C12	mg/kg	<0.2	10000	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aliphatics >C12-C16	mg/kg	<4	61000	0	<4	<4	<4	<4	<4	<4	<4	<4	-	-	-	-	-
Aliphatics >C16-C21	mg/kg	<7	1600000	0	<7	<7	<7	<7	<7	<7	<7	<7	-	-	-	-	-
Aliphatics >C21-C35	mg/kg	<7	1600000	0	<7	<7	<7	<7	<7	<7	<7	<7	-	-	-	-	-
Total Aliphatics >C5 - C35	mg/kg	<19			<19	<19	<19	<19	<19	<19	<19	<19	-	-	-	-	-
Aromatics					-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatics >EC5-EC7	mg/kg	<0.1	28000	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aromatics >EC7-EC8	mg/kg	<0.1	59000	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aromatics >EC8-EC10	mg/kg	<0.1	3700	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Aromatics >EC10-EC12	mg/kg	<0.2	17000	0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-
Aromatics >EC12-EC16	mg/kg	<4	36000	0	<4	<4	<4	<4	<4	<4	<4	<4	-	-	-	-	-
Aromatics >EC16-EC21	mg/kg	<7	28000	0	<7	<7	<7	<7	<7	<7	<7	<7	-	-	-	-	-
Aromatics >EC21-EC35	mg/kg	<7	28000	0	<7	<7	<7	<7	<7	<7	<7	<7	-	-	-	-	-
Total aromatics C5-35	mg/kg	<19			<19	<19	<19	<19	<19	<19	<19	<19	-	-	-	-	-
Total aliphatics and aromatics(C5-35)	mg/kg	<38			<38	<38	<38	<38	<38	<38	<38	<38	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Moisture Content	%	<0.1			13	18.6	15.3	19.7	13.2	11.8	13.3	15.7	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
Free Cyanide	mg/kg	<0.5		0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
Total Cyanide	mg/kg	<0.5		0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Type	None				Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	-	-	-	-	-
Sample Colour	None				Medium Brown	Dark Brown	Dark Brown	Dark Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown	-	-	-	-	-
Other Items	None				stones, roots	stones, chalk	stones, chalk	stones	stones	stones, loam, roots	roots, stones	stones, sand	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon	%	<0.02			1.4	0.47	0.27	1.8	1.4	1.4	0.82	0.16	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	<0.01			5.9	8.3	8.3	8.1	6.1	7	8.3	8.6	-	-	-	-	-
					-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX 08

Geotechnical Laboratory Certificates

GEOLABS Limited
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SLR Consulting Limited
3rd Floor
The Brew House
Jacob Street
Bristol
BS2 0EQ

21 October 2022
Report No : GEO/36361/01

For the attention of Ms A Kenshole

Date samples received	20/09/2022
Date written instructions received	20/09/2022
Date testing commenced	21/09/2022
Date of sample disposal	**18/11/2022**

Our ref **GEO / 36361**
Your Ref **404.11923.00004.0021**

Project **THURLOW**

Further to your instructions we have pleasure in enclosing the results of the tests you requested in the attached figures.

LABORATORY TEST REPORT

Item No	Test Quantity	Description
1	~	Geotechnical Test Summary
~	19	Water Content
~	19	Liquid & Plastic Limits
~	14	pH Value & Water Soluble Sulphate Content as SO4
2	3	Particle Size Distribution
3	3	Moisture Content / Dry Density Relationship
4	1	One Dimensional Consolidation
5	3	Unconsolidated Undrained Triaxial Compression

Any opinions or interpretations expressed herein are outside the scope of UKAS accreditation. All results contained in this report are provisional unless signed by an approved signatory. The results contained in this report relate only to samples received in the laboratory and are tested 'as received' unless otherwise stated. This report should not be reproduced, except in full, without the written approval of the laboratory. The results reported are applicable only to the test items received by the laboratory.

All the necessary data required by the documented test procedures has been recorded and will be stored for a period of not less than 6 years. This data will be issued to yourselves at your request. All samples will be disposed of after the date shown above. Written confirmation will be required to retain the samples beyond this period and a storage charge may be applied.

We trust that the above meets your requirements and should you require any further information or assistance, please do not hesitate to contact us.

Yours faithfully
on behalf of **GEOLABS Limited**

[redacted]

S Burke
Senior Technician

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC %	LL %	PL %	PI %	<425 µm %	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 g/L	W/S Mg mg/L	
DBH1	2.00		U	Very stiff brown mottled grey gravelly CLAY.	20.3					2.15	1.79	Undisturbed	40	320	160				
DBH1	2.50		D	Dark grey gravelly CLAY. Gravel is fine to medium chalk.	22.4	48	20	28	89										
DBH1	3.10-3.40		B	Light brown gravelly sandy CLAY															Compaction
DBH1	4.10		D													8.5	< 0.010		
DBH1	5.10		D	Light grey sandy gravelly silty CLAY. Sand is fine. Gravel is fine to medium chalk.	17.7	28	17	11	91										
DBH1	5.90-6.30		B	Grey slightly gravelly slightly sandy silty CLAY.															Particle Size Distribution Compaction
DBH1	8.10		U	Very stiff grey mottled cream sandy gravelly silty CLAY. Gravel includes chalk. Sand is fine.	17.4					2.16	1.84	Undisturbed	162	745	373				One Dimensional Consolidation
DBH1	8.60		D	Dark grey gravelly CLAY. Gravel is chalk.	19.2	30	17	13	90										
DBH1	9.50		D													8.0	0.086		
DBH1	12.60		D	Dark grey gravelly CLAY. Gravel is fine to medium chalk.	17.4	38	16	22	80										

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW
404.11923.00004.0021

GEOLABS

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC %	LL %	PL %	PI %	<425 µm %	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 g/L	W/S Mg mg/L	
DBH1	13.20		D													7.9	0.33		
DBH1	14.10		U	Very stiff grey gravelly CLAY. Gravel is fine to medium chalk.	17.6					2.13	1.81	Undisturbed	282	640	320				
DBH1	14.90		D	Dark brown sandy gravelly CLAY. Sand and gravel are fine to medium.	12.3	33	10	23	89										
SBH1	1.20-1.65		D	Dark brown gravelly CLAY. Gravel is fine to medium chalk.	16.6	43	17	26	94							8.2	0.022		
SBH1	4.00-4.45		D	Light grey gravelly silty CLAY. Gravel is fine to medium chalk.	18.5	29	17	12	92							7.4	0.010		
SBH2	2.00-2.45		D													8.6	0.018		
SBH2	4.00-4.45		D	Light grey gravelly silty CLAY. Gravel is fine to medium chalk.	20.4	32	16	16	85										
SBH2	6.00-6.45		D	Grey gravelly CLAY. Gravel is fine to medium chalk.	18.6	33	17	16	81										
SBH3	1.20-1.65		D													8.6	< 0.010		
SBH3	2.00-2.45		D	Slightly yellowish brown gravelly CLAY. Gravel is fine to medium chalk.	18.3	36	17	19	89										

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW
404.11923.00004.0021

GEOLABS

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC %	LL %	PL %	PI %	<425 µm %	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 g/L	W/S Mg mg/L	
SBH3	5.00-5.45		D	Dark grey gravelly CLAY. Gravel is fine to medium chalk.	17.7	38	17	21	89										
SBH4	3.00-3.45		D	Light grey gravelly silty CLAY. Gravel is fine to medium chalk.	23.4	32	18	14	73							8.6	< 0.010		
TP1	1.00-1.50		B	Dark brown mottled grey gravelly CLAY. Gravel is flint, include fine to medium chalk.	18.6	50	19	31	91										
TP1	2.50		B	Brown slightly gravelly slightly sandy silty CLAY with one cobble.															Particle Size Distribution
TP2	2.50		D	Slightly yellowish brown and light grey clayey GRAVEL. Gravel is fine to medium flint and chalk.	15.5	27	18	9.0	73							8.8	< 0.010		
TP3	2.00		D	Slightly yellowish brown and light grey clayey GRAVEL. Gravel is fine to medium flint and chalk.	17.8	32	17	15	85							8.2	< 0.010		
TP4	1.00		D	Dark brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine. Gravel is fine to medium.	15.0	42	20	22	89							8.3	< 0.010		
TP5	0.60		D	Dark brown sandy gravelly silty CLAY with occasional rootlets. Sand is fine. Gravel is fine to medium.	14.8	40	16	24	88							8.3	< 0.010		
TP6	1.30-2.00		B	Brown gravelly sandy CLAY.	8.9	29	13	16	47										
TP6	1.80		D	Brown sandy silty clayey GRAVEL with chalk. Sand is fine to medium.	14.2	44	20	24	22							8.5	< 0.010		

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW
404.11923.00004.0021

GEOLABS

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC %	LL %	PL %	PI %	<425 µm %	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 g/L	W/S Mg mg/L	
TP7	1.50-2.50		B	Brown slightly gravelly slightly sandy silty CLAY.												8.5	< 0.010		Particle Size Distribution Compaction

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed)

Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW
404.11923.00004.0021

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BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

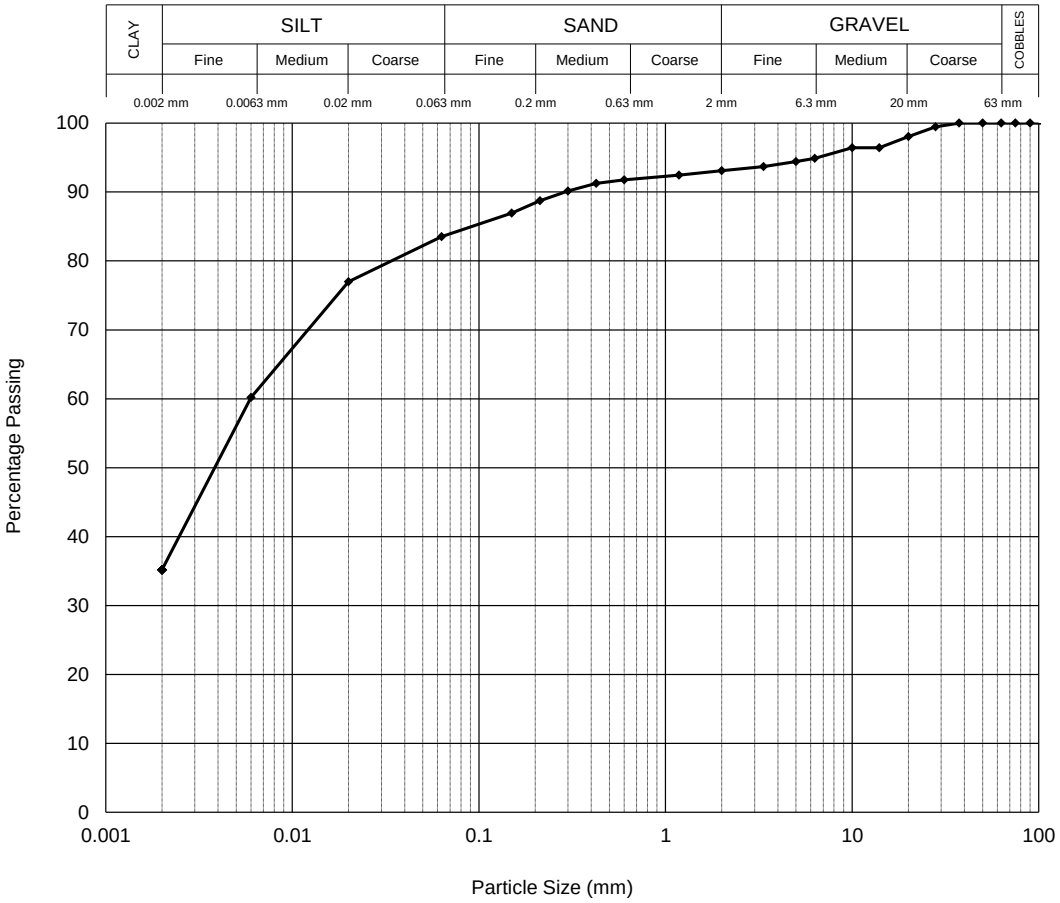
Location	DBH1
Depth (m)	5.90-6.30
Sample Type	B

Description

Grey slightly gravelly slightly sandy silty CLAY.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	99
20.0 mm	98
14.0 mm	96
10.0 mm	96
6.30 mm	95
5.00 mm	94
3.35 mm	94
2.00 mm	93
1.18 mm	92
600 µm	92
425 µm	91
300 µm	90
212 µm	89
150 µm	87
63 µm	84



Sedimentation	
No Pre-treatment used	
Temp (°C)	25.0
Size	% Pass
20 µm	77
6 µm	60
2 µm	35

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	6.9
Sand	9.5
Silt	48.4
Clay	35.2

Tested by AW
Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

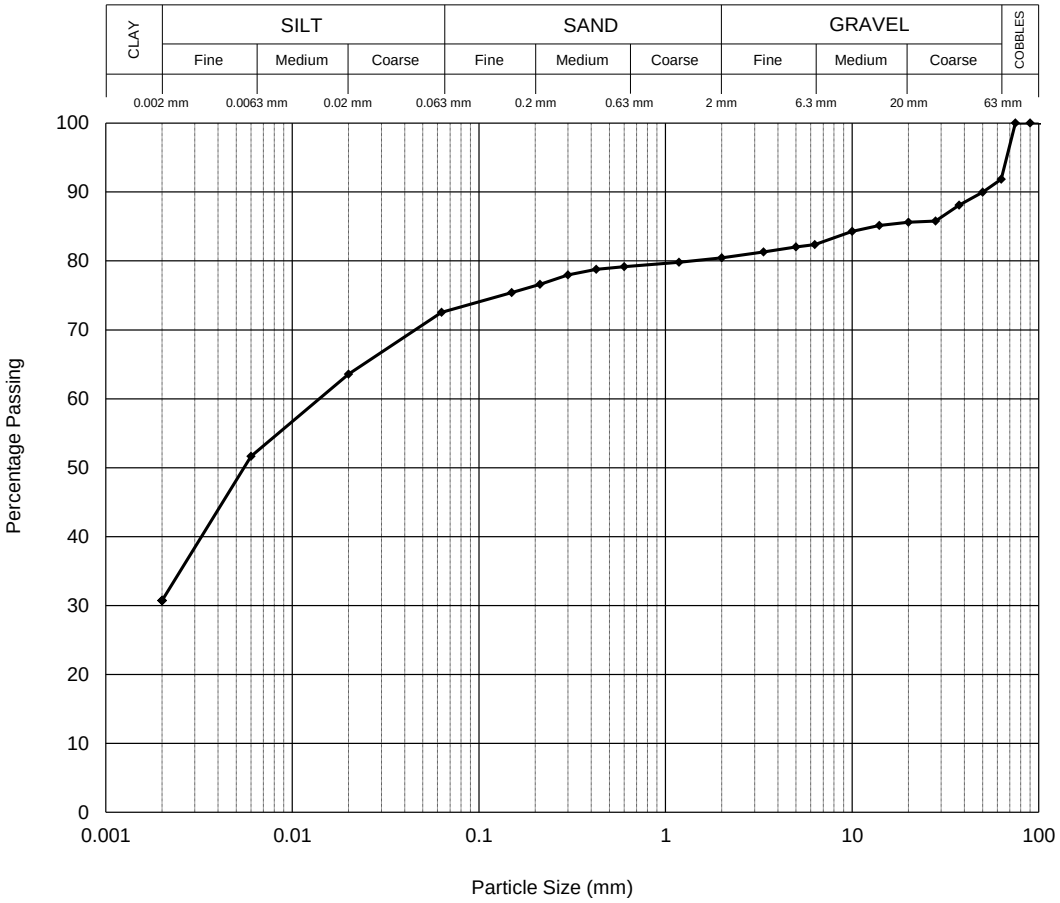
Location	TP1
Depth (m)	2.50
Sample Type	B

Description

Brown slightly gravelly slightly sandy silty CLAY with one cobble.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	92
50.0 mm	90
37.5 mm	88
28.0 mm	86
20.0 mm	86
14.0 mm	85
10.0 mm	84
6.30 mm	82
5.00 mm	82
3.35 mm	81
2.00 mm	80
1.18 mm	80
600 µm	79
425 µm	79
300 µm	78
212 µm	77
150 µm	75
63 µm	73



Sedimentation	
No Pre-treatment used	
Temp (°C)	25.0
Size	% Pass
20 µm	64
6 µm	52
2 µm	31

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	8.1
Gravel	11.4
Sand	7.9
Silt	41.9
Clay	30.7

Tested by AW
Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

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404.11923.00004.0021

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UKAS TESTING 1982

BS EN ISO 17892-4 : 2016

PARTICLE SIZE DISTRIBUTION

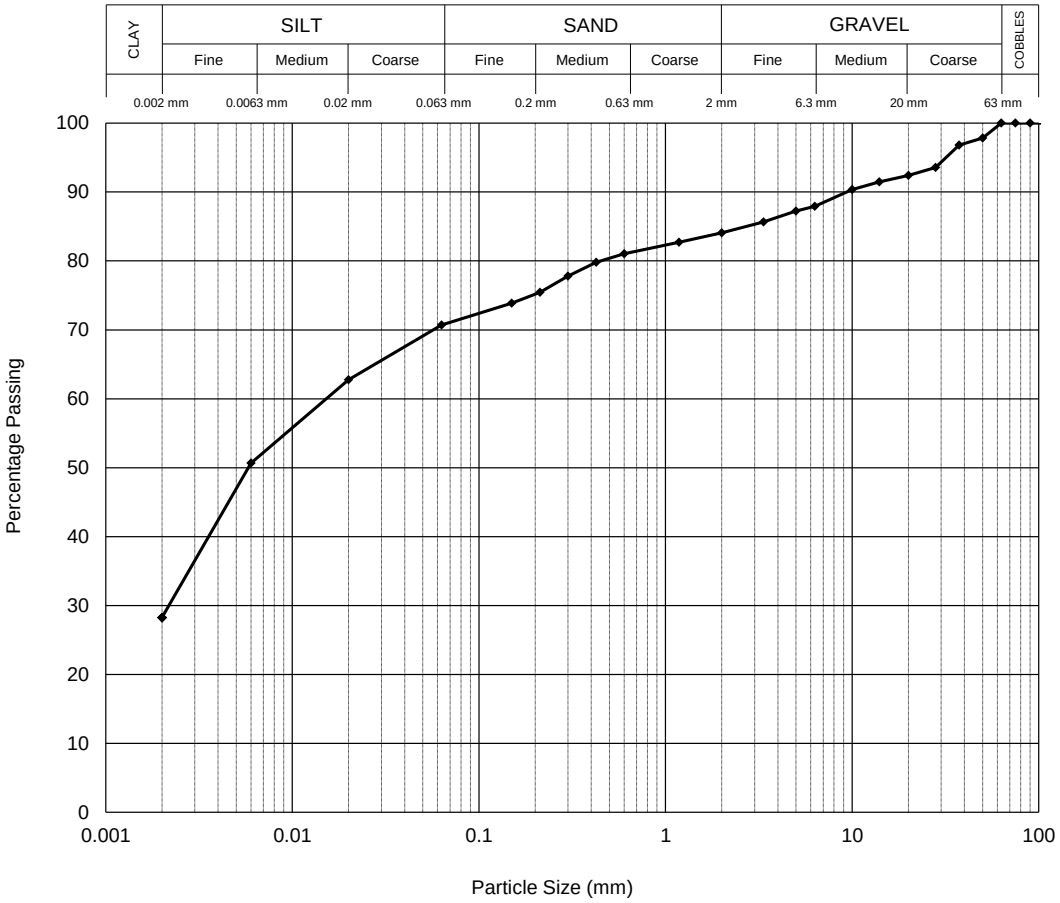
Location	TP7
Depth (m)	1.50-2.50
Sample Type	B

Description

Brown slightly gravelly slightly sandy silty CLAY.

BS EN ISO 17892-4 : 2016 : Clause 5.2 - Wet Sieve
BS EN ISO 17892-4 : 2016 : Clause 5.4 - Sedimentation by Pipette

Sieve	
Size	% Pass
200.0 mm	100
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	98
37.5 mm	97
28.0 mm	94
20.0 mm	92
14.0 mm	91
10.0 mm	90
6.30 mm	88
5.00 mm	87
3.35 mm	86
2.00 mm	84
1.18 mm	83
600 µm	81
425 µm	80
300 µm	78
212 µm	75
150 µm	74
63 µm	71



Sedimentation	
No Pre-treatment used	
Temp (°C)	25.0
Size	% Pass
20 µm	63
6 µm	51
2 µm	28

Particle Density 2.70(A) Mg/m³

Particle Proportions	
Cobbles	0.0
Gravel	15.9
Sand	13.4
Silt	42.4
Clay	28.3

Tested by AW
Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

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THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

BS1377:Part 4:1990 Clause 3.3

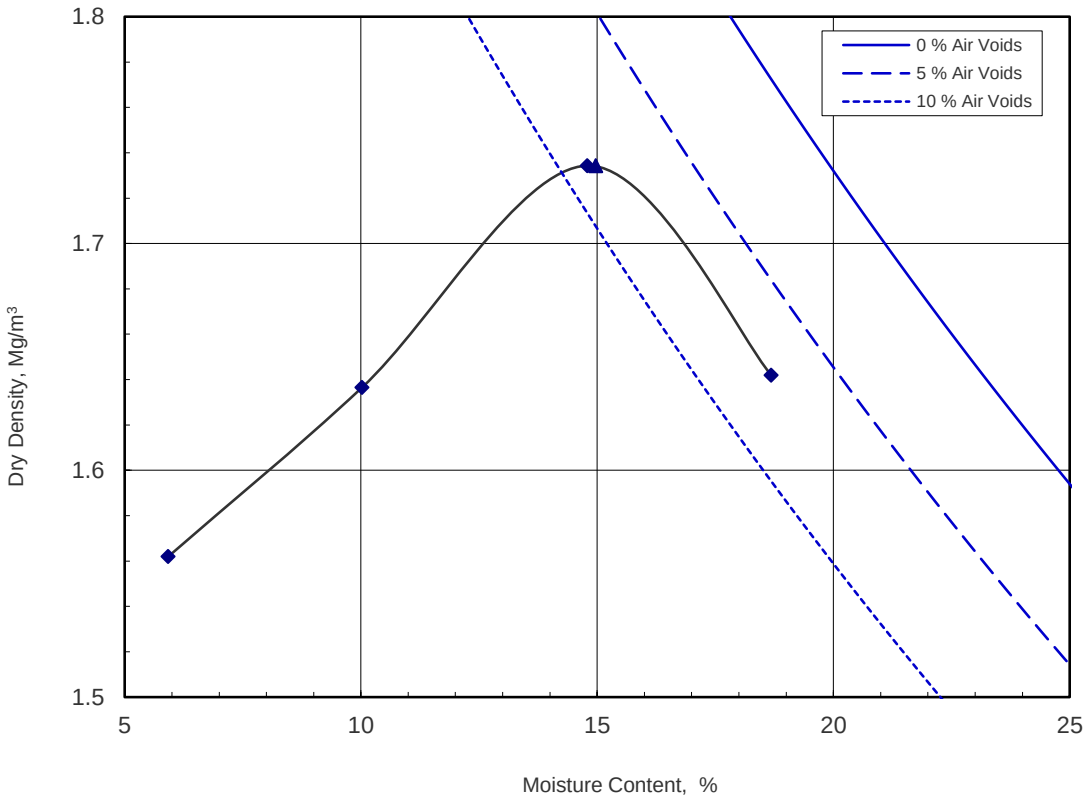
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	DBH1
Depth (m)	3.10-3.40
Sample Type	B

Description:

Light brown gravelly sandy CLAY

Preparation		Oven dried
Test Method		2.5kg Rammer for soils with particles up to medium-gravel size
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	0
Mass Retained on 20.0 mm Sieve	%	1
Particle Density - Assumed	Mg/m³	2.65
Maximum Dry Density	Mg/m³	1.73
Optimum Moisture Content	%	15.0



Determination		1	2	3	4	5
Moisture Content	%	5.9	10.0	14.8	18.7	
Dry Density	Mg/m³	1.56	1.64	1.73	1.64	

Tested by AD
Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

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UKAS TESTING 1982

BS1377:Part 4:1990 Clause 3.3

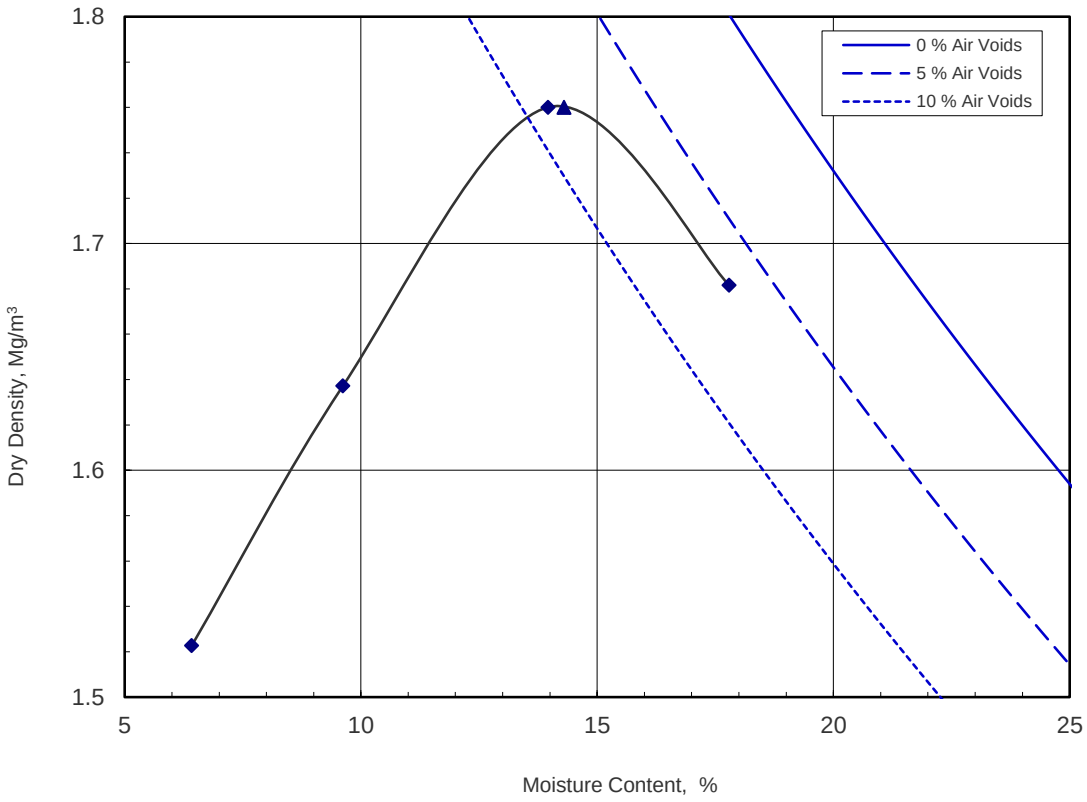
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	DBH1
Depth (m)	5.90-6.30
Sample Type	B

Description:

Grey slightly gravelly slightly sandy silty CLAY.

Preparation		Oven dried
Test Method		2.5kg Rammer for soils with particles up to medium-gravel size
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	0
Mass Retained on 20.0 mm Sieve	%	2
Particle Density - Assumed	Mg/m³	2.65
Maximum Dry Density	Mg/m³	1.76
Optimum Moisture Content	%	14.3



Determination		1	2	3	4	5
Moisture Content	%	6.4	9.6	14.0	17.8	
Dry Density	Mg/m³	1.52	1.64	1.76	1.68	

Tested by AD
Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

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UKAS TESTING 1982

BS1377:Part 4:1990 Clause 3.4

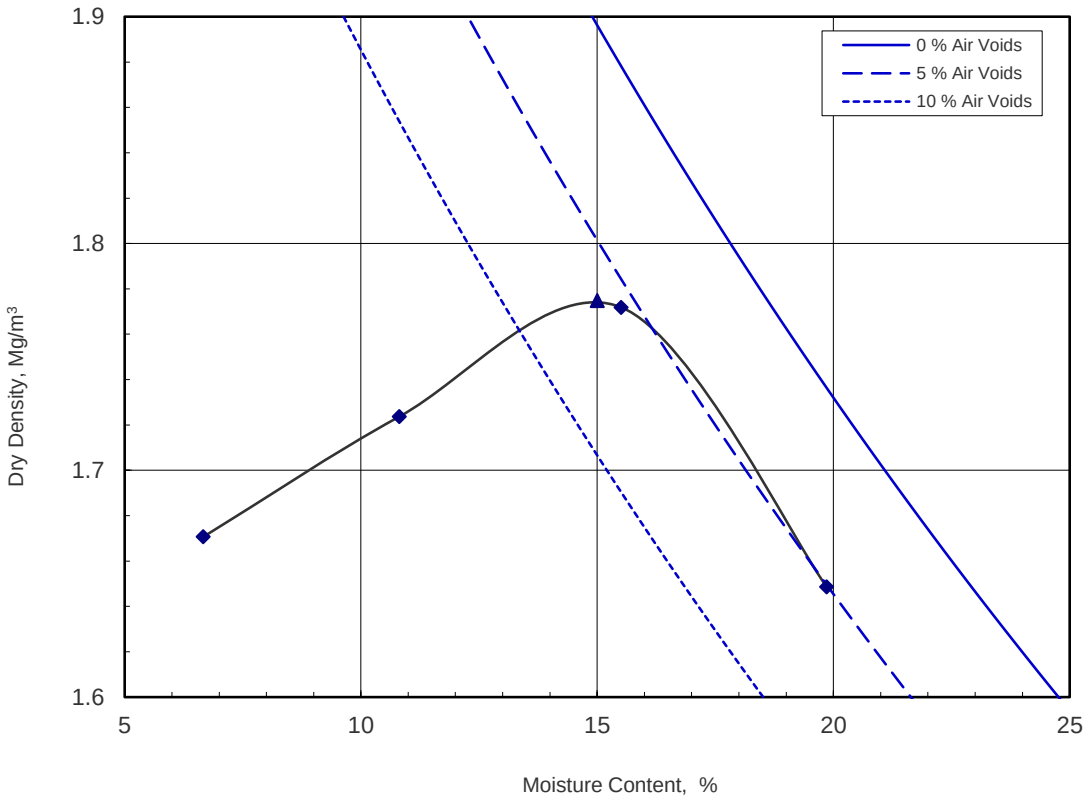
MOISTURE CONTENT / DRY DENSITY RELATIONSHIP

Location	TP7
Depth (m)	1.50-2.50
Sample Type	B

Description:

Brown slightly gravelly slightly sandy silty CLAY.

Preparation		Oven dried
Test Method		2.5kg Rammer for soils with some coarse gravel-size particles
Samples Used		Single
Mass Retained on 37.5 mm Sieve	%	3
Mass Retained on 20.0 mm Sieve	%	4
Particle Density - Assumed	Mg/m³	2.65
Maximum Dry Density	Mg/m³	1.77
Optimum Moisture Content	%	15.0



Determination		1	2	3	4	5
Moisture Content	%	6.7	10.8	15.5	19.9	
Dry Density	Mg/m³	1.67	1.72	1.77	1.65	

Tested by AD
Checked and Approved by

[redacted]

S Burke - Senior Technician
21/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

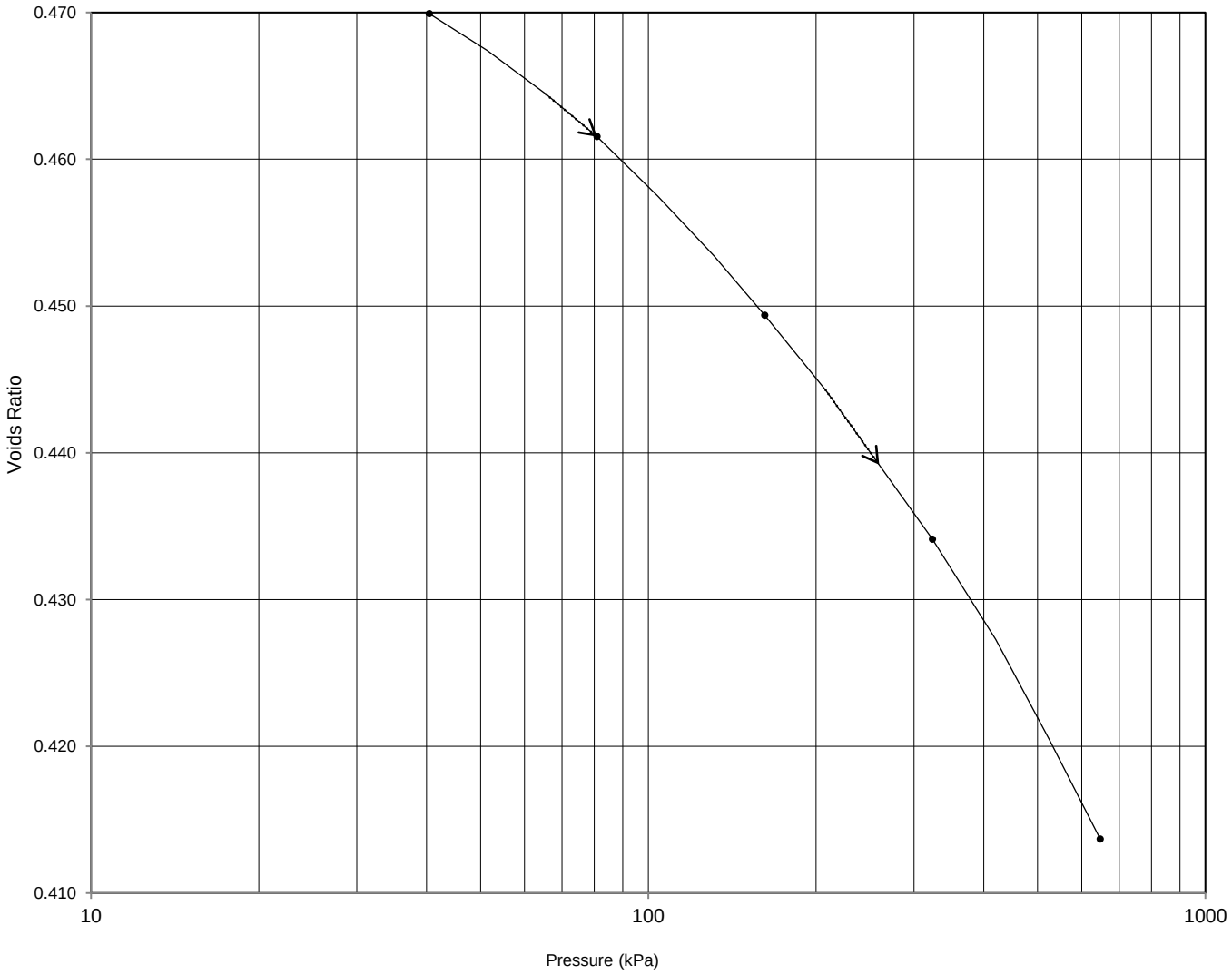
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

Location	DBH1
Depth (m)	8.10
Sample Type	U
Depth within original (mm)	8.18-8.23
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Very stiff grey mottled cream sandy gravelly silty CLAY. Gravel includes chalk. Sand is fine.



Initial Conditions:

Height	(mm)	18.99	Water Content	(%)	17.8	(from trimmings)
Diameter	(mm)	74.78	Voids Ratio		0.485	
Area	(mm^2)	4392	Bulk Density	(Mg/m^3)	2.10	
Volume	(cm^3)	83.40	Dry Density	(Mg/m^3)	1.78	
Laboratory Temperature	(ºC)	19.0	Particle density	(Mg/m^3)	2.65 (Assumed)	
			Degree of Saturation	(%)	97.4	

Results have been corrected for equipment deformation

Checked and Approved by

[redacted]

S Burke - Senior Technician
18/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

Location	DBH1
Depth (m)	8.10
Sample Type	U
Depth within original (mm)	8.18-8.23
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Very stiff grey mottled cream sandy gravelly silty CLAY. Gravel includes chalk. Sand is fine.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 40.5	0.26	5.3	t50	1.74	0.470
40.5 - 81	0.14	6.5	t50	1.40	0.462
81 - 162	0.10	6.0	t50	1.49	0.449
162 - 324	0.065	7.3	t50	1.20	0.434
324 - 648	0.041	9.6	t50	0.894	0.415

Checked and Approved by

[redacted]

S Burke - Senior Technician
18/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-8 : 2018

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location	DBH1
Depth (m)	2.00
Sample Type	U

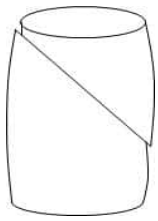
Description:

Very stiff brown mottled grey gravelly CLAY.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.7
Diameter	(mm)	101.2
Moisture content	(%)	20.3
Bulk density	(Mg/m³)	2.15
Dry density	(Mg/m³)	1.79
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	201.7
Membrane correction	(kPa)	0.9
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	40
Strain at failure	(%)	14.9
Maximum deviator stress	(kPa)	320
Shear Stress Cu	(kPa)	160

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	170

Tested by WS
Checked and Approved by

[redacted]

S Burke - Senior Technician
18/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-8 : 2018

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location	DBH1
Depth (m)	8.10
Sample Type	U

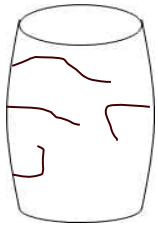
Description:

Very stiff grey mottled cream sandy gravelly silty CLAY. Gravel includes chalk. Sand is fine.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.7
Diameter	(mm)	102.3
Moisture content	(%)	17.4
Bulk density	(Mg/m³)	2.16
Dry density	(Mg/m³)	1.84
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	201.7
Membrane correction	(kPa)	1.1
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	162
Strain at failure	(%)	19.8
Maximum deviator stress	(kPa)	745
Shear Stress Cu	(kPa)	373

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	30

Tested by WS
Checked and Approved by

[redacted]

S Burke - Senior Technician
18/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-8 : 2018

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location	DBH1
Depth (m)	14.10
Sample Type	U

Description:

Very stiff grey gravelly CLAY. Gravel is fine to medium chalk.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.3
Diameter	(mm)	102.1
Moisture content	(%)	17.6
Bulk density	(Mg/m³)	2.13
Dry density	(Mg/m³)	1.81
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	201.2
Membrane correction	(kPa)	1.1
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	282
Strain at failure	(%)	19.9
Maximum deviator stress	(kPa)	640
Shear Stress Cu	(kPa)	320

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	160

Tested by WS
Checked and Approved by

[redacted]

S Burke - Senior Technician
18/10/2022

Project Number:

GEO / 36361

Project Name:

THURLOW

404.11923.00004.0021

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UKAS TESTING 1982

GEOLABS®

Client	SLR Consulting Limited
Project No.	36361
Project Name	**THURLOW**

TEST RESTRICTION

The following tests have been scheduled on the above project and **CANNOT** be performed for the reason stated. If alternative samples are available for the restricted tests, please supply details.

Laboratory ID	BH / TP No.	Sample Ref.	Depth (m)		Type	Test(s) Scheduled			Reason for Restriction	Description
457248	TP6		1.30	2.00	B	Compaction			Zone X based on mass retained on 37.5mm sieve exceeding 10%. Mass retained on 37.5mm sieve is 22.4%.	Brown gravelly sandy CLAY.
457249	TP1		2.50		B	Compaction			zone X based on mass retained on 37.5mm sieve exceeding 10%. Mass retained on 37.5mm sieve is 11.9%.	Brown gravelly sandy CLAY.

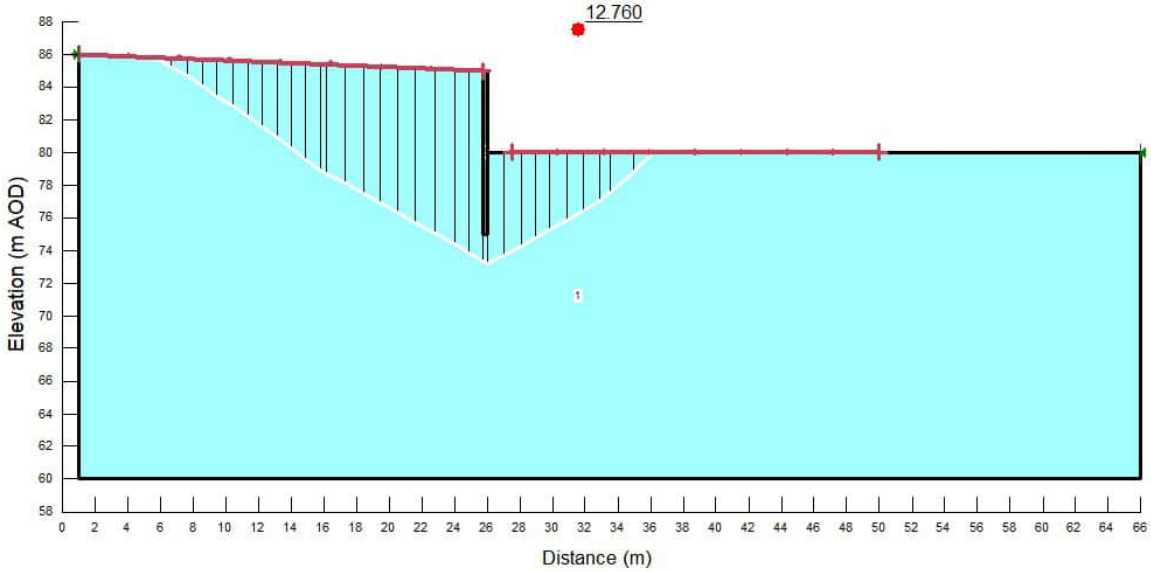
Comments / remarks	
Test restriction raised by	[redacted]

APPENDIX 09

Slope Stability Analysis

Title: Thurlow Sheet Pile Stability
Analysis Type: Morgenstern-Price
Factor of Safety: 12.760

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	C-Top of Layer (kPa)	C-Rate of Change ((kN/m²)/m)	C-Maximum (kPa)
	Lowestoft Formation	S=f(depth)	18	100	30	400
	Sheet Pile	High Strength	25			



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Tel: 0117 906 4280

Web: www.slrconsulting.com

Project Title: Thurlow Anaerobic Digestion Facility
Sheet Pile Stability Analysis Results

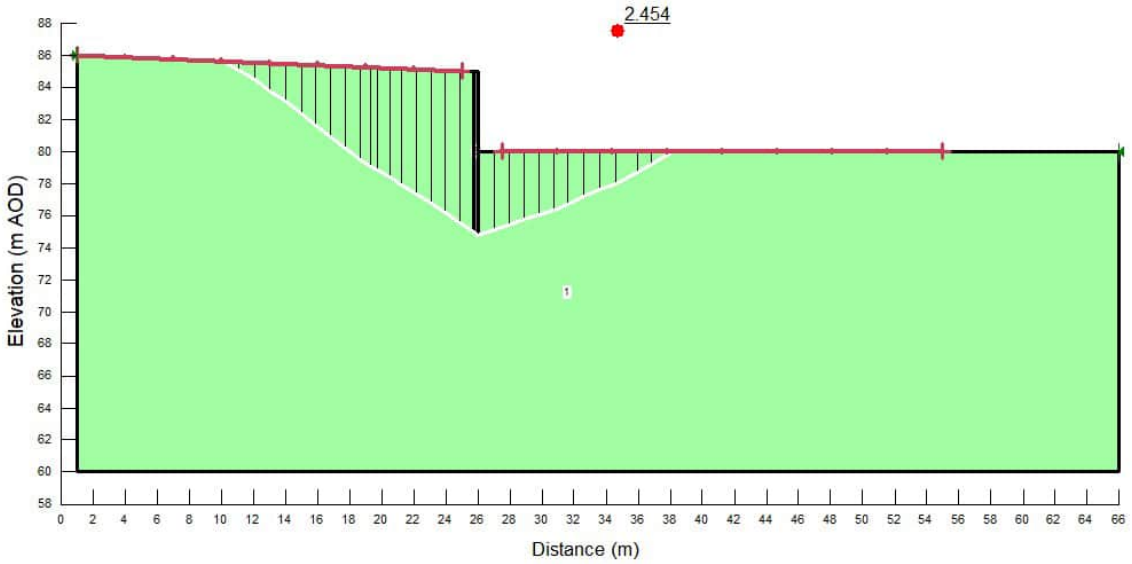
Client: Acorn Bioenergy Ltd.

Project Number: 404.11923.00004.0021

Date: December 2022

Title: Thurlow Sheet Pile Stability
Analysis Type: Morgenstern-Price
Factor of Safety: 2.454

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Phi-B (°)
	Lowestoft Formation	Mohr-Coulomb	18	1	30	0
	Sheet Pile	High Strength	25			



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Tel: 0117 906 4280

Web: www.slrconsulting.com

Project Title: Thurlow Anaerobic Digestion Facility
Sheet Pile Stability Analysis Results

Client: Acorn Bioenergy Ltd.

Project Number: 404.11923.00004.0021

Date: December 2022

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