

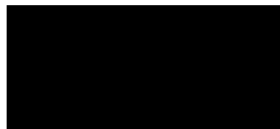
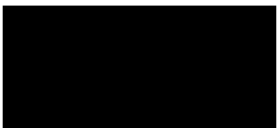
**REPORT ON
GROUND INVESTIGATION
AT
DOGS TRUST MERSEYSIDE
WHISTON LANE
HUYTON**



REPORT STATUS SHEET

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1.0 INTRODUCTION

1.1 Objectives and Scope of Investigation

The existing Dogs Trust Merseyside Rehoming Centre, Huyton (the site) is being considered for redevelopment by Dogs Trust (the Client). The proposals for the site comprise the demolition of existing buildings and construction of several new single-storey buildings, together with associated access, car parking and landscaping.

A Phase I Desk Study/Geo-Environmental Risk Assessment and Coal Mining Risk Assessment was previously carried out by Applied Geology for the site on behalf of Dogs Trust (the Client) in September 2023 (Report Ref: AG3533-23-AQ88). This report should be read in conjunction with the previous Desk Study/Phase I Geo-Environmental Risk Assessment and Coal Mining Risk Assessment. However, a summary of the pertinent desk study finding is presented in Section 3 of this report.

Applied Geology was appointed by the Client to undertake a Phase II ground investigation in order to:

- assess the potential for hazardous substances or conditions to exist at the site that might warrant mitigation or remediation appropriate to the intended end-use proposed by the Client;
- establish geological conditions and geotechnical parameters to assist in the safe and economic engineering design of the proposed development;
- to identify site specific coal mining risks and set out the proposed mitigation strategy to show that the site can be made safe and stable for the proposed development; and
- support a Planning Application.

The terms of reference/brief for the works were mutually developed between Applied Geology and Nolan Associates Ltd (the Client's Engineer) and are outlined in our proposal (AG23-8472let002) and estimate (AG23-8472-02), dated 17th July 2023.

The scope of works undertaken by Applied Geology comprised a ground investigation together with sampling, monitoring, and a programme of laboratory testing, followed by assessment and reporting of the results.

Underground service plans for the site were obtained by Applied Geology between 11th August and 18th August 2023. A topographical survey drawing was prepared by Battlefield Land Surveys Ltd (Drawing ref: LIV13007-A0 PLOT (01 and 02), dated March 2022), was provided by Nolan Associates Ltd.

1.2 Report Layout

This report presents a brief description of the site, a summary of the desk study data and the factual results of the intrusive investigations carried out. An interpretation of the ground conditions and a discussion/assessment of the findings is presented in the later report text sections. The main text of the report has been produced in a concise format, including the use of data tables to summarise key information where possible. The report should be read in conjunction with the general procedures detailed in Appendix E and General Notes given at the end of the main text, which provide details of investigation techniques, assessment methodology and standards,

health & safety and limitations and exceptions of the report. Drawings and factual data including exploratory hole records, laboratory testing results are presented in the other Appendices.

2.0 SITE DESCRIPTION AND PROPOSALS

2.1 Site Description

The site comprises a parcel of land off Whiston Road, Huyton, approximately 1.5km northeast of Huyton town centre. The Ordnance Survey grid reference for the approximate centre of the site is 345780 391251 as shown on the Site Location Plan in Appendix A.

The site is roughly rectangular in plan shape, with dimensions of approximately 300m by 60m and covering an area of approximately 1.8 ha. Topographic levels across the site fall steadily from approximately 40.5m AOD at the north-eastern site boundary to approximately 33m AOD at the south-western site boundary.

The site is bounded to the north/northwest by a railway and associated embankment earthworks, beyond which is a golf course, to the northeast by the M57 motorway, to the south and east by a combination of allotment gardens and Stadt Moers Park, and to the west by Whiston Lane, with residential properties beyond.

A site inspection/walkover was undertaken by Applied Geology on 4th September 2023 as part of the Phase I Desk Study. No significant changes had occurred to the site between the time of the site walkover and the ground investigation fieldwork. The site comprised a car park in the south-west, areas of soft landscaping in the centre and single-storey buildings in the north of the site. In areas of soft landscaping, there were grassy mounds present with semi-mature and mature trees growing above.

2.2 Site Proposals

It is understood that the current proposals for the site comprise the demolition of existing buildings and construction of several new single-storey buildings, together with associated access, car parking and landscaping, as shown on the Site Plan, Dwg No. PDA-EX-00-GA-A-(90)9000, Rev C dated March 2023 by Powell Dobson Architects, a copy of which is presented in Appendix A. The proposed buildings include a new rehoming block (FFL: 36.5m) and training barn (FFL: 35.0m) in the southwest of the site, a new intake building (FFL: 40.5m) to the northeast and other miscellaneous buildings, alongside alterations to the existing car parking to allow for the construction of an access road. A limited cut and fill exercise is anticipated to create the required development plateaus to achieve the desired final floor level of each building.

3.0 SUMMARY OF DESK STUDY INFORMATION

The following sections summarise the key findings of the geoenvironmental Phase 1 desk study and desk-based coal mining risk assessment undertaken by Applied Geology, report ref: AG3533-23-AQ88, dated September 2023.

3.1 Desk Study Data

Site History	• 1850-1900: Site is occupied by agricultural fields, with a small pond in the southwest. Surrounding area is largely occupied by agricultural land and quarries, collieries and coal pits. The existing railway line to the north is shown. • 1900-1950: No significant changes shown on site. Many of the collieries in the surrounding area are now shown to be disused. • 1950-1990: The site is shown to be occupied by three buildings including a greenhouse shown in the southwest, where the pond is no longer shown. Residential properties are shown 70m southwest, the M57 is shown and the existing golf course to the north is shown. The opencast coal workings shown 500m north of the site are disused. • 1990-2002: Kennels are shown in the north of the site. The rest of the site is labelled as a nursery. Allotments are shown to the south and Stadt Moers Park is shown. • 2003-Present: The site is now labelled as a Canine Rescues Centre, with several buildings shown on site concurrent with the current site layout.
Anticipated Geology and Ground Conditions	• The published 1:50,000 scale BGS Map (Sheet 97) and BGS web-viewer indicates that any Made Ground beneath the site is likely to be underlain by Superficial deposits of Glacial Till which is in turn underlain by Solid strata of the Pennine Middle Coal Measures Formation. • A variable thickness of Made Ground is expected beneath the site, especially within the mounds present on site. • No BGS archive boreholes are shown on site or in proximity to the site.
Hydrology	• A culverted watercourse is located less than 10m west of the western site boundary. • There are no recorded surface water abstractions or active licensed discharges to controlled waters within 500m. • The site is shown to lie outside of an area considered to be at risk of flooding from rivers and the sea. There is also a negligible risk of groundwater flooding and a 1 in 30-year return period for surface water flooding between 0.3m - 1.0m depth.
Hydrogeology	• The Superficial strata of Glacial Till is designated a Secondary 'Undifferentiated' Aquifer of medium vulnerability. • The Solid strata of the Pennine Middle Coal Measures Formation is designated a Secondary 'A' Aquifer of low vulnerability. • There are no recorded groundwater abstractions within 500m of site. • The site is not located in a source protection zone.
Other Environmental data	• The site is shown to be situated in a radon affected area, with 3-5% of homes above the Action Level as per the updated BRE 211:2023 guidance. On this basis, basic radon protection measures would usually be considered necessary for new properties. However, it should be noted that the site was previously situated in an area where <1% homes were above the Action Level. The strata present beneath the site consist of Superficial Glacial soils and the Pennine Lower Coal Measures Formation, which would both be typically considered to contain a low content of radon generating constituents.

3.2 Mining History/Coal Mining Risk Assessment Summary

Available BGS archive data across the wider area indicates that the Solid strata are likely to be present at depths of less than 10m below ground level (bgl) across the site. A north-south trending geological fault is shown to truncate the south-western corner of the site, with a downthrow towards the east. The Lower Florida and Higher Florida coal seams are shown to sub-crop beneath the Superficial strata beneath the southern tip of the site, with the strike of the seams approximately in a NW-SE orientation, and the Higher Pigeon House coal seam is shown to sub-crop beneath

the Superficial strata across the north-eastern part of site, again with the strike of the seam orientated approximately NW-SE. All three seams are shown to dip towards the southwest at less than 20 degrees. Considering this, the Higher Pigeon House coal seam is expected to be present directly beneath the Superficial strata across the north-eastern parts (i.e., possibly within 10m bgl), increasing to depths of between 30m and 50m towards the southern corner. Depending on the accuracy of the published mapping, the Lower and Higher Florida coal seams may be present directly beneath the Superficial strata (i.e., possibly within 10m bgl) across the southern corner of the site. Several other coals seams are shown to sub-crop beneath the Superficial strata from approximately 500m to the northeast of the site, including the Park Mine, Higher Ravenhead Delf, Ravenhead Main Delf and Bastion Mine, all of which are again shown to generally dip towards the southwest and as such expected to be present beneath the site, however, at significant depth, greater than 70m bgl.

Due to the presence of the Cheshire Mine, Lower Florida, and Higher Florida coal seams which are anticipated to outcrop at depths of less than 30m, and the potential of unrecorded works which are considered to be likely, the CMRA report identified a potential risk to new developments. As such, a series of boreholes to 30m bgl were recommended to establish the stratigraphy of the Solid geology and assess the risk relating to the presence of shallow unrecorded mine workings.

3.3 Conceptual Site Model

The conceptual site model established as part of the desk study is summarised in the table below.

Source	Pathway	Receptor	Risk*
Potential contaminants within Made Ground or resulting from historical site usage.	Inhalation, ingestion, dermal contact.	End users	Low – Medium
	Migration and Leaching	Secondary 'A' Aquifer	Low
	Direct Contact	Water supply pipes	Low
Ground gas from Made Ground (including backfilled pond) and historical landfill c.55m to the northeast	Migration into buildings, service ducts etc.	End users	Low – Medium
Mine gas	Migration into buildings, service ducts etc.	End users	Low
Elevated sulphates in Made ground	Direct contact, leaching and contact with groundwater	Buried concrete	Low – Medium

*** Definition of Risk Categories**

Negligible - Contaminants that might have unacceptable impact on key receptors, are unlikely to be present, or, no pathway is envisaged.

Low Risk: Contaminants may be present but are unlikely to be at levels to have unacceptable impact on key receptors, or pathways are likely to be minimal.

Medium Risk: Contaminants are probably present and might have an unacceptable impact on key receptors. Pathways may also be present therefore remedial measures may be necessary to reduce the risks.

High Risk – Contaminants probably or certainly present and pathways are probably also present. Therefore, contaminants are likely to have an unacceptable impact on key receptors and remedial measures are likely to be necessary to reduce the risks to acceptable levels.

4.0 GROUND INVESTIGATION WORKS

4.1 Fieldwork

The fieldwork was undertaken between 30th October and 3rd November 2023 and is summarised in the following table:

Type	No.	Reference	Max depth (m bgl)	Rationale
Percussive Sampling with Follow-on by Rotary Core/Open-Hole Drilling	2	RH1 & RH2	30.00	To establish the stratigraphy of the underlying Coal Measures strata and to investigate the presence of workable and/or worked seams within influencing distance of the surface.
Driven Continuous Sample Borehole	9	DCS1 to DCS7, DCS9 to DCS10 (+ DCS2A and DCS10A).	5.45	To permit the collection of shallow geo-environmental and geotechnical data to assist foundation design and to permit the installation of groundwater and gas monitoring standpipes. DCS2/2A was located in the vicinity of the historical backfilled pond in the western part of the site.
Machine excavated Trial Pits	4	TP1 and TP3 to TP5	1.70	To permit assessment of the existing mounds located on site and allow the collection of preliminary earthwork samples.
Soakaway Trial Pit	1	SA1	1.90	To provide a preliminary indication of infiltration potential.
TRL DCP Tests	2	TRL1- TRL2	0.824	TRL1 and TRL2 provided preliminary CBR values for the proposed car parking alteration top the west/southwest in the existing car park.

The borehole and trial pit records, along with the SPT calibration certificates, are included in Appendix B.

The locations of the exploratory holes were selected by Nolan Associates Ltd and set out on site by Applied Geology Limited by trained personnel using a calibrated CAT and Genny in conjunction with the consultation of statutory service drawings. The locations were constrained by the presence of underground supply services, existing buildings, and infrastructure of the canine rescue centre. DCS boreholes DCS2, DCS8, DCS10 were unable to be completed due to an obstruction, access constraints, and groundwater ingress, respectively. DCS2 and DCS10 were relocated in the near vicinity as DCS2A and DCS10A. Full details are recorded on the relevant borehole logs. Surveying and service clearance of each location was undertaken by Safe Dig Surveys Ltd. The positions are presented on Drawing No. AG3533-23-02 in Appendix A. Levels and locations are presented on the borehole and trial pit records.

A Photo-ionisation VOC detector was used on all samples of Made Ground to determine if VOCs were present at detectable concentrations.

The rotary boreholes were drilled using a Comacchio GEO 205 rig using percussive sampling techniques to refusal on bedrock (between 5.5m and 9.0m bgl). Rotary

borehole RH1 was then drilled from refusal (on encountering bedrock) by rotary cored techniques to a depth of 12.0m bgl using water flush at a diameter of 121mm to produce nominal 92.5mm diameter cores, then to 19.5m bgl utilising open-hole techniques. The borehole was due to target 30m bgl, however, it was terminated at 19.5m bgl due to the presence of a hard band of rock which, coupled with the requirement for water flush, prevented further progress. Rotary borehole RH2 was drilled by open-hole techniques using water flush to a depth of 30m bgl.

Permission to disturb/enter Coal Authority mining interests was obtained by Applied Geology Ltd prior to the rotary drilling being undertaken. The rotary drilling was progressed by utilising water flush for the duration of the works to minimise the risk of gas migration. Monitoring for mine gases (methane, hydrogen sulphide, carbon monoxide) and oxygen was undertaken at each borehole position during drilling. No methane, hydrogen sulphide or carbon monoxide was detected, and atmospheric concentrations of oxygen were reported.

A single soakaway infiltration test was undertaken in general accordance with BRE Digest DG365 methodology at the location of SA1. The trial pit was unsupported, filled on a single occasion and monitored over a period of one working day.

In situ testing using a Transport Research Laboratory Dynamic Cone Penetrometer (TRL DCP) was undertaken at location with the hardstanding/car parking area in order to provide information on likely in-situ CBR parameters. The results are plotted as blow count versus depth with equivalent CBR values estimated for individual layers. The results for the soakaways and TRL DCPs are discussed in Section 7 and are included in Appendix C.

4.2 Instrumentation and Monitoring

50mm diameter standpipes were installed in selected boreholes as follows, with further details included in the relevant borehole logs in Appendix B:

- DCS2A, 1.0 to 2.5m bgl, in Made Ground;
- DCS3, 1.0 to 3.0m bgl, in Glacial Till;
- DCS4, 0.5 to 3.5m bgl, in Glacial Till and Glaciofluvial Deposits;
- DCS6, 1.0 to 4.0m bgl, in Glacial Till;
- DCS9, 1.0 to 4.0m bgl, in Glacial Till;
- DCS10A, 1.0 to 4.0m bgl, in Glacial Till.

Washed silica gravel (6-10mm) was used as the filter medium and a 300-micron filter sock was wrapped around the slotted section of the standpipe. Each standpipe was fitted with a push-in bung and single gas tap and was finished with a flush metal cover concreted in place.

Ground gas and groundwater monitoring visits were undertaken on 4 occasions from 10th November 2023 to 15th December 2023 during 2 periods of low and/or falling atmospheric pressure. Each monitoring well was monitored for concentrations of carbon dioxide, methane, oxygen, carbon monoxide, hydrogen sulphide, flow rates and differential pressures and water level. Considering the potential for underlying coal workings, the wells were also monitored for the presence of carbon monoxide and hydrogen sulphide. The monitoring results are included in Appendix C.

4.3 Laboratory Testing

Geotechnical laboratory testing was scheduled by Applied Geology on selected samples recovered. Testing was undertaken in accordance with BS1377 and carried out at UKAS accredited laboratories Professional Soils Laboratory (PSL) and i2 Analytical Ltd, comprising the following:

- 13 No natural moisture content tests;
- 13 No Atterberg limit tests; and
- 10 No BRE SD1 suite tests.

Preliminary earthwork laboratory testing was undertaken on selected bulk samples. Testing was carried out at UKAS accredited Professional Soils Laboratory (PSL) and comprised the following:

- 2 No natural moisture content tests;
- 2 No Atterberg limit tests;
- 3 No particle size distribution tests;
- 3 No moisture content/dry density relationship tests (2.5kg rammer); and
- 3 No particle density tests.

Chemical testing was scheduled by Applied Geology based upon the desk study, walkover and site observations during the fieldwork. Twelve samples of Made Ground were analysed at UKAS accredited laboratory i2 Analytical for the following suite of contaminants:

- Selected metals suite [arsenic, boron, beryllium, cadmium, chromium (total, trivalent and hexavalent), copper, lead, mercury, nickel, selenium, vanadium and zinc];
- Speciated (16 US EPA) Polycyclic Aromatic Hydrocarbons (PAH);
- Total Petroleum Hydrocarbon Criteria Working Group (TPH CWG);
- Benzene, Toluene, Ethylbenzene, and Xylene (BTEX);
- Methyl-tertiary-butyl-ether (MTBE);
- Phenols (total);
- pH;
- Soluble sulphate;
- Soil organic matter; and
- Asbestos testing.

Three samples of the Made Ground were submitted for leachate testing, with the samples being analysed for the following suite of contaminants:

- Selected metals suite [arsenic, beryllium, boron, cadmium, chromium (total, trivalent and hexavalent), copper, mercury, nickel, lead, zinc, selenium, vanadium];
- Speciated (16 US EPA) Polycyclic Aromatic Hydrocarbons (PAH);
- Phenols (total);
- pH;
- Soluble sulphate; and
- Total Organic Carbon.

Laboratory test results are included in Appendix D.

5.0 GROUND CONDITIONS

5.1 Strata Encountered

Hardstanding of asphalt was encountered in the southwest of the site from ground level to depths of up to 0.2m bgl. In areas of soft landscaping, Made Ground/Topsoil and Topsoil was present from ground level to depths of up to 0.65m bgl. Predominantly granular Made Ground has been encountered across the site, beneath the Made Ground/Topsoil, Topsoil, and Hardstanding, generally to depths of between 0.45m and 1.5m bgl. Underlying the Made Ground, Superficial soils of cohesive Glacial Till interbedded with granular Glaciofluvial Deposits were encountered to depths of between 5.3m and 10.25m bgl where they were underlain by Solid strata of the Pennine Middle Coal Measures Formation, proven to depths of up to 30.0m bgl. No broken ground or voids were reported during drilling. Full details of the strata encountered are given on the borehole records presented in Appendix B. SPT N values are plotted against depth in Appendix A. A generalised ground profile is presented below to summarise the information and a conceptual site model is given in Appendix A.

Stratum	Depth to Top of Strata (m bgl)	Thickness (range) (m)	Comments
Hardstanding	GL	0.15 - 0.2	Encountered in DCS2/DCS2A as asphalt in the western car parking portion of the site.
Made Ground/Topsoil & Topsoil	GL	0.15 - 0.65	Encountered across landscaped areas.
Made Ground	GL - 0.5	0.2 – 3.2	Encountered in all locations with the exception of DCS9. Base not encountered in DCS7 in the east of the site and TP1 & TP5, associated with landscape mounds.
Glacial Till	0.45 – 2.5	0.3 – 8.3	Encountered in all locations which penetrated the Made Ground. Base proven in the rotary boreholes only.
Glaciofluvial Deposits	2.8 – 4.0	0.6 - 0.8	Locally interbedded with cohesive Glacial Till in DCS2A and DCS4 across the western area of the site.
Pennine Middle Coal Measures Formation	5.3 – 10.25	24.7+	Encountered in the deeper rotary boreholes only. Base not proven.

5.2 Hardstanding

Hardstanding (up to 0.2m thick) was encountered as asphalt from ground level across the area of existing car parking in the southwestern part of the site.

5.3 Made Ground/Topsoil and Topsoil

Topsoil was encountered in DCS9 from ground level to a depth of 0.6m bgl and comprised brown slightly gravelly clayey sand with frequent rootlets. Gravel was fine to medium angular to subrounded mudstone and quartzite.

Strata designated “Made Ground/Topsoil” was encountered from ground level to depths of between 0.15m and 0.35m bgl in TP3 and TP4 and all of the DCS and rotary boreholes (apart from DCS2/2A and DCS9) located on soft landscaping. The Made Ground/Topsoil generally comprised soft brown slightly gravelly sandy clay/slightly gravelly clayey sand with frequent rootlets. The gravel comprised fine to coarse angular to subangular to brick and mudstone. The stratum has been described as Made Ground/Topsoil due to the presence of underlying Made Ground.

5.4 Made Ground

Made Ground was encountered in all the exploratory holes (apart from DCS9), beneath the hardstanding and Made Ground/Topsoil, generally to depths of between 0.45m and 0.8m bgl. Made Ground was encountered to greater depths in DCS2A (2.5m) in the area of a historically backfilled pond and locally in DCS7 (3.45m), located to the northeastern portion of the site, achieving thicknesses up to 2.35m and 3.2m, respectively. Locally at positions associated with the landscape mounds, Made Ground was encountered between 1.1m and 1.52m bgl, achieving thicknesses of between 0.65m and 1.52m.

A sub-base type of material was encountered directly beneath the asphalt hardstanding in TP1, DCS7 and DCS10/10A (soft landscaping) and DCS2 and DCS2A (car park area in the western part of the site), comprising light grey sandy gravel of fine to coarse angular to subangular limestone up to depths of between 0.2m bgl and 0.6m bgl, achieving thicknesses of up to 0.4m. In TP1, sub-base was encountered at the base of the trial pit at depths of between 1.50m and 1.52m bgl.

The majority of the Made Ground across the site was primarily granular and generally comprised brown to greyish brown slightly clayey to clayey sandy gravel/gravelly clayey sand, locally with a low cobble content and rare fragments of wood. The gravel comprised fine to coarse angular to subangular concrete, brick, coal, sandstone, mudstone and clinker.

In the location of DCS2A, which is the location of the historic pond, cohesive Made Ground was encountered, comprising very soft greenish grey mottled brown slightly sandy slightly gravelly clay with frequent organic material and a strong organic odour. In DCS7, cohesive Made Ground comprised brown and grey slightly gravelly slightly sandy clay. The gravel comprised fine to coarse angular to subrounded mudstone, brick and coal fragments.

The exploratory locations TP3, TP4 and TP5, were targeted to the on-site mounds which comprised predominantly granular Made Ground of slightly clayey gravelly sand and slightly clayey sandy gravel. Gravel is fine to coarse angular to subangular brick, concrete, sandstone flags, mudstone and fragments of metal, ceramic, plastic, glass and fabric. At TP1, cohesive Made Ground was encountered, comprising soft brown slightly sandy very gravelly clay. Gravel is fine to coarse angular to subangular brick, sandstone flags, mudstone and rare plastic fragments. The Made Ground in the mounds generally had a low to high cobble content of angular brick, concrete and sandstone flags.

Three in-situ Standard Penetration Tests (SPTs) undertaken in the granular Made Ground recorded N values of between N=1 and N=2 (very loose). Three in-situ Standard Penetration Test undertaken in cohesive Made Ground recorded N values of between N=0 (i.e., self-weight penetration) and N=7.

Headspace testing undertaken on samples of the Made Ground recorded VOC concentrations at less than the instrument limit of detection (<0.1ppm).

5.5 Glacial Till

Glacial Till was encountered in all of the exploratory holes which penetrated the Made Ground, from depths of 0.45m and 2.5m bgl and proven to depths of between 1.7m and 9.0m bgl, achieving a maximum thickness of 8.3m. The base of the Glacial Till was proven in RH1 and RH2 only.

The Glacial Till generally comprised firm to stiff reddish brown slightly gravelly sandy clay. The gravel comprised fine to coarse angular to subrounded mudstone, quartzite and coal fragments.

Fifteen Atterberg limit tests carried out on samples of Glacial Till recorded plastic limits of between 14% and 20%, liquid limits of between 28% and 40%, plasticity indices of between 14% and 20% (corrected to between 11% and 19%) and moisture contents of between 10% and 25%. The results indicate the soil to be clay of low to intermediate plasticity, with low to medium volume change potential.

Thirty-eight SPTs undertaken in the Glacial Till recorded 'N' values of between N=6 and N=38, generally increasing with depth. Three SPTs recorded 'N' values of ≥ 50 , however, these are likely to be due to the presence of larger particles (i.e., cobbles) or be representative of increasing stiffness/strength in proximity to the underlying Pennine Middle Coal Measures Formation. By applying the empirical relationship between SPT 'N' value, mass shear strength and using a plasticity index of 16% and a corresponding f_1 of 6.0, this correlates to mass shear strengths of between 40kN/m² (low/medium strength) and 225kN/m² (very high strength). This is generally consistent with the field visual assessments of soil strength.

5.6 Glaciofluvial Deposits

Strata interpreted as Glaciofluvial Deposits was encountered locally at the locations of DCS2A and DCS4 only, interbedded within the Glacial Till. The Glaciofluvial Deposits were encountered from depths of between 2.8m and 4.0m bgl and proven to depths of between 3.4m and 4.8m bgl, achieving thicknesses of between 0.6m and 0.8m.

The Glaciofluvial Deposits generally comprised medium dense to dense brown slightly clayey to clayey slightly gravelly sand. The gravel generally comprised fine to coarse angular to subrounded mudstone, quartzite and coal fragments.

Three SPTs carried out in the Glaciofluvial Deposits recorded 'N' values of between N=10 and N=31 (medium dense to dense).

5.7 Pennine Middle Coal Measures Formation

Strata of the Pennine Middle Coal Measures Formation were encountered in both rotary borehole locations (RH1 and RH2) from depths of between 5.3m and 10.25m bgl and proven to depths of at least 30.0m bgl (up to 24.5m penetration) in RH2. The depth to the top of the Solid strata generally increased from the southwest to the northeast, at depths of between 5.3m in the southwest and 9.0m bgl in the north of the site.

Rock Strength Strata

Rock strength strata of the Pennine Middle Coal Measures Formation were conjectured to be between 5.3m and 10.25m bgl and typically comprised extremely weak grey mudstone.

Within the cored section of the rotary borehole, RH1 between 10.50m and 12.00m bgl, the material encountered was an extremely weak grey mudstone. Poor recovery was recorded between 10.50m and 10.84m bgl which is likely to be due to localised weathering at the top of the strata. Fractures were horizontal, very closely to closely spaced planar rough and planar smooth. Within the open-hole sections of RH1 and RH2, (from 12.0m and 5.30m bgl to the base of the boreholes), the strata were described by the driller as grey siltstone with mudstone bands.

No broken ground, voids or loss of flush were reported during drilling.

Within the cored section of RH1, a Total Core Recovery (TCR) of between 27% and 70% has been recorded, with Solid Core Recovery (SCR) of between 0% and 49% and Rock Quality Designations (RQD) of between 0% and 9%.

5.8 Groundwater

Groundwater seepages were encountered in the Glacial Till/Glaciofluvial Deposits during drilling between depths of 2.3m and 3.4m bgl, with no rises recorded. In DCS10, groundwater seepage was recorded in Made Ground. In RH1, groundwater was encountered in the Glacial Till at 2.0m bgl, subsequently rising to 1.65m bgl after 20 minutes. It should be noted that water flush techniques were used which would have likely masked any groundwater strikes during drilling of the rotary boreholes.

Subsequent monitoring of the standpipes installed in the Made Ground, Glacial Till and Glaciofluvial Deposits on four occasions between 10th November 2023 and 13th December 2023 recorded resting groundwater levels of between 0.18m and 1.13m bgl. Groundwater levels showed little variation between monitoring visits.

It should be noted that groundwater levels may vary beyond that observed during the fieldwork period due to seasonal effects throughout the year.

5.9 Ground/Mine Gas

Made Ground has been encountered across the site, generally to depths of between 0.45 and 0.8m bgl. In addition to this, a backfilled historical pond was encountered in DCS2A with frequent organic material and a strong organic odour to depths of up to 2.5m bgl and several mounds comprising Made Ground were present across the site. Apart from this, no other on-site sources of ground gas were observed during the site investigation.

Monitoring of the standpipe in DCS2A, installed solely in the Made Ground, has recorded methane concentrations of between 0.2% and 1.2% by volume. Carbon dioxide concentrations were recorded between 0.8% and 1.9% by volume. Oxygen concentrations were recorded between 19.4% and 21.1% (atmospheric) by volume.

Monitoring of the remaining standpipes installed in the Glacial Till/Glaciofluvial Deposits have recorded methane concentrations at 0.2% by volume. Carbon dioxide concentrations were recorded between 0.2% and 9.5% by volume. Oxygen concentrations were recorded between 5.3% (depleted) and 21.9% (atmospheric) by volume.

Carbon monoxide was consistently recorded between 5ppm and 14ppm in DCS2A, which was installed in the Made Ground. Carbon monoxide was recorded at concentrations of between less than the limit of detection (0.1ppm) and 30ppm in the remaining installations in Glacial Till/Glaciofluvial Deposits. No notable concentrations of hydrogen sulphide were recorded (i.e., less than the limit of detection, <1ppm) throughout the monitoring period.

Flow readings were taken over a three-minute period and generally reported flow rates of between less than the limit of detection (<0.1l/hr) and 3.3/hr in all installations. However, due to flooding at the surface of DCS2A, DCS3 and DCS4 the water had to be drained into the boreholes and may affect the reliability of the flow readings.

Gas screening values (GSVs) have been calculated for each installation using the highest concentrations and highest flow rates in accordance with CIRIA C665. The GSVs are as follows:

Stratum	BH	Response Zone (m bgl)	Ground water level (m bgl)	Max. Methane (%)	Max. Carbon Dioxide (%)	Max. Steady Flow (l/hr)	GSV Methane (l/hr)	GSV Carbon Dioxide (l/hr)
Made Ground	DCS2A	1.0 – 2.50	0.40-0.83	1.2	1.9	3.3	0.0396	0.0627
Glacial Till / Glaciofluvial Deposits	DCS3	1.0 – 3.00	0.98-0.99	0.2	3.7	0.1	0.0002	0.0037
	DCS4	0.5 - 3.50	0.58-0.93	0.2	7.7	0.1	0.0052	0.2002
	DCS6	1.0 – 4.0	1.01-1.13	0.2	9.5	0.1	0.0002	0.0095
	DCS9	1.0 – 4.0	0.18-0.25	0.2	3.9	0.1	0.0002	0.0039
	DCS10A	1.0 – 4.0	0.86-1.08	0.2	8.0	0.5	0.0010	0.0400

^ - Shading: Green = CS1 conditions, Amber = CS2 conditions, Blue = 'saturated' response zone.

5.10 Contamination

The Made Ground across the site generally contained demolition-type material throughout (i.e., brick, concrete, clinker etc.). Other than this, no other visual or olfactory evidence of significant contamination was noted.

6.0 GEOENVIRONMENTAL ASSESSMENT

6.1 Human Health Risk Assessment

The results of the chemical testing on soils have been assessed as described in Appendix E, with specific details as follows:

- Proposed end-use – canine rescue facilities;
- Screening criteria – commercial/industrial, assuming 2.5% SOM;

- Assuming a single dataset based on the proposed redevelopment;

The spreadsheets summarising the laboratory results and relevant screening values for each dataset are presented in Appendix D. For determinands that have been found to exceed screening values, the following table summarises the individual results, the corresponding screening values and the number of exceedances. In respect of benzo(a)pyrene and other genotoxic PAHs, various PAH ratios have been plotted and compared against data from the Culp et al study and found to be within the same range, therefore use of the surrogate marker approach is justified.

None of the chemical testing undertaken on samples of the Made Ground exceeded their corresponding screening values based upon the proposed current end usage.

Measurable concentrations of 'heavier' end hydrocarbon fractions (C₁₀ – C₄₄) were detected in nine of the twelve of the Made Ground samples tested, with TPH concentrations recorded between 14mg/kg and 200mg/kg. All individual fractions were however well below their corresponding screening criteria. The TPH concentrations are probably related to the elevated PAHs in the same samples.

Concentrations of BTEX, MTBE, and phenols were all reported at concentrations below the laboratory limit of detection.

Asbestos screening tests have recorded the presence of chrysotile and amosite asbestos in six of the twelve Made Ground samples tested. Quantification has indicated concentrations of between 0.001% (i.e., the reportable limit of detection) and 0.138%. Although asbestos has generally been identified at concentrations which could be considered background concentrations in an urban environment, one sample taken from a mound on site recorded a concentration of 0.138% (i.e., above the hazardous waste threshold). It should be noted that asbestos containing material (ACM) was not observed during the logging of the soil.

It is recommended that an Asbestos Management Plan is put in place during any planned earthworks. Whilst some of the asbestos in the Made Ground is beneath the footprints of the proposed development or under hardstanding, thus breaking any plausible pathways to end users, it is recommended that the potential risk in soft landscaping areas is mitigated by the placement of an inert cover layer, potentially in conjunction with a geotextile marker layer to prevent mixing. Subject to agreement with the Local Authority, a cover layer thickness of 300mm is considered appropriate.

6.2 Controlled Waters Risk Assessment

The soil testing has not found concentrations of any determinands above those values considered typical for background concentrations in Made Ground. Leachate testing carried out on three samples of the Made Ground did not record any exceedances when compared to the respective screening values and/or less than the laboratory detection limit.

Considering the results of the laboratory testing on soils, general lack of contamination identified by visual and olfactory indicators and considering the presence of low permeability cohesive Glacial Till and the site not being in a groundwater Source Protection Zone, there is considered to be a negligible risk to the underlying Pennine Middle Coal Measures Formation Secondary 'A' Aquifer.

6.3 Disposal of Soil Arisings

The results of chemical testing on the Made Ground indicates that much of the material tested would likely be classified as non-hazardous waste if sent for disposal at landfill (for which WAC testing is not required).

It should however be noted that asbestos above the hazardous waste threshold limit has been identified in the Made Ground at TP5 with a concentration of 0.138% by weight. Further asbestos may also be present beneath areas not investigated. Should significant quantities of bulk asbestos containing material be detected in the soils during site development, a specialist contractor should be consulted to advise treatment/removal and disposal.

The natural soils are likely to be classified as inert waste, if disposed of site and segregated from any Made Ground, however, this should be confirmed by the landfill operator.

General comments regarding the procedures for the assessment of waste soil for off-site disposal purposes is included in Appendix E.

7.0 GEOTECHNICAL ASSESSMENT

7.1 General

The proposals for the site comprise the demolition of existing buildings and construction of several new single-storey buildings, together with landscaping, and car park alterations to allow new access road construction. At the time of writing, no proposed loads were available, however, it is anticipated that the structures will be relatively lightly loaded.

Predominantly granular Made Ground was encountered across the site including the existing grassed mounds scattered across the central areas of the site with deeper Made Ground of up to 3.5m recorded in DCS7 located on the eastern boundary of the site, adjacent to the proposed intake building. The Made Ground is underlain by natural Superficial strata of cohesive Glacial Till which overlies the Pennine Middle Coal Measures Formation. Monitoring of standpipes in the shallow soils recorded groundwater levels between 0.18m and 1.13m bgl, however, these may have been influenced by surface water ingress during the monitoring period.

7.2 Earthworks Aspects

It is understood that some cut and fill is expected to be required across the site to facilitate the development at the desired levels. Finished floor levels are anticipated to range from 35m in the southwest to 40.5m in the northeast.

Based on the currently proposed levels and the findings of the ground investigation, mostly Made Ground soils will be generated from the areas of cut, predominantly from existing mounds across the site. In the areas of deeper cut in the western parts of the site, some shallow strata of Glacial Till may be generated.

Initially four samples of Made Ground were scheduled, however due to the positive asbestos identification in three of the four samples, only one sample of Made Ground and two samples of Glacial Till have been tested for a variety of earthworks

classification tests to provide preliminary information and the results are included in Appendix D.

The classification of soils has been made with respect to the general requirements given in the Manual of Contract Documents for Highway Works, Specification for Highway Works: Volume 1: 2016 [SHW] for use as Earthworks Material and BS6031:2009 'Code of Practice for Earthworks'. It should be noted with clear reference made to the fact that the engineering performance of earthwork materials can be greatly influenced by the moisture content at the time of assessment and excavation/placement of a material can be both improved and reduced, and consideration should be given to the management of the moisture as a key element of any earthworks control. With respect to this, the information included in the following section should be used for guidance on the potential use of the material, with additional testing required prior to use to confirm acceptability.

The grading limits chosen for comparison to the results of the laboratory analysis were taken from SHW Table 6/2, with the description of the material being reference from SHW Table 6/1 and Table 6/2.

The results of the preliminary earthworks testing on the Made Ground soils and likely material classification are summarised in the table below.

Strata	Fines Content (%)	Gravel Content (%)	Plastic Limit (%)	In-situ Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density (Mg/m ³)	Material Class ¹	SHW Description ²
Made Ground	21	48	-	15	12	1.88	2C	Stony cohesive fill
Glacial Till	52 – 58	5 – 11	16 - 18	16 – 17	13 - 14	1.84 – 1.88	2A	Wet cohesive fill

¹ – SHW Table 6/2, ² – SHW Table 6/1

It should be noted that, although not indicated by PSD testing, some of the Made Ground soils are expected to include a proportion of oversized material (>125mm) as identified during the fieldwork.

The preliminary earthworks testing indicates that the natural in-situ moisture contents of the Made Ground and Glacial Till were excavated slightly above optimum moisture content, as derived from the 2.5kg rammer test.

The reuse of the granular Made Ground will need to take into account the positive asbestos results throughout this material when handling as fill material.

7.3 Updated Coal Mining Risk Assessment

As identified in the preliminary Coal Mining Risk Assessment, the shallowest recorded workings beneath the site relate to coal workings in the Plodder seam at 147m depth and were last worked in 1895 with a published extraction thickness of 2.40m. Considering the depth of these workings and the anticipated depth of Solid strata beneath the site (<10m bgl) there is considered to be sufficient rock cover above these recorded workings across the site to prevent the risk of void migration to surface or general aerial subsidence occurring.

The area of Whiston, which the site lies within, has a long history of coal mining dating back to the 16th Century, as such it is possible that shallow unrecorded coal workings have taken place prior to the requirement of abandonment plans in 1872. Speculative

mining during this time often took place seasonally prior to the use of groundwater extraction techniques which become commonplace in the 18th Century. Recent construction work from 40m to the northwest uncovered the presence of five unrecorded shafts and, given that the Cheshire Mine, Lower Florida and Higher Florida coal seams outcrop on site at depths anticipated to be less than 30m bgl, unrecorded workings are considered likely.

No coal or evidence of coal mining was encountered during the fieldwork. In the north of the site, RH1 was drilled to a final depth of 19.5m bgl due to rotary 'refusal' within a hard band of rock. Within the vicinity of RH1, the shallowest anticipated coal seam was the Cheshire Mine coal seam, which was anticipated to be present at depths less than 30m bgl, with an anticipated seam thickness of between 0.30m and 0.73m bgl. It is possible that the Cheshire Mine coal seam may outcrop further south than the position of RH1, which would explain the absence of coal at this location.

Rockhead was encountered at 5.30m bgl at RH2 in the southwest of the site, proving 24.7m of intact rock cover above any potential coal seams present at depths of greater than 30m, beyond which unrecorded workings are considered unlikely. However, due to the presence of faulting in the south/southwest of the site, this coal seam is possibly displaced and still therefore present further east.

7.4 Foundations

The required cut/fill across the site to permit desired levels will have a bearing on the foundation depths. Given the dimensions of the site and the proposed change in levels, this section is set out to discuss separately the proposed construction in the southwest, central, and northeast portions of the site.

Proposed Rehoming building

Based upon the proposed levels and area of cut/fill, it is anticipated that the eastern portion of the proposed rehoming building will be cut to up to c.0.5m below existing levels, with the western parts of the building raised by up to c.1.3m to create a plateau at 36.5m FFL. The fill, if placed from existing ground level, may overlie approximately 2.5m of existing Made Ground, which was recorded adjacent to the proposed rehoming building in DCS2A.

In the areas of cut, it is considered that the firm (or better) Glacial Till is suitable to support shallow foundations. Based upon the borehole data, a minimum founding depth of 0.9m below proposed ground levels will apply to allow for seasonal effects, based on the presence of medium shrinkability cohesive strata. In areas of minimal cut, foundations must be placed below any Made Ground or disturbed ground and beneath any soft or loose natural material.

Strip/trench fill foundations (up to 1.0m wide) competently designed to the above requirements may adopt safe net design bearing pressures up to 100kN/m². This is based on a minimum shear strength of 40kN/m² using traditional methods of bearing capacity calculations e.g. as set out in Tomlinson 7th Edition and a factor of safety of 3 against bearing capacity failure.

Considering the depth of the Made Ground encountered at DCS2A and potential fill, deep trench fill or over excavation and re-engineering of suitable materials back into the void as part of the wider earthworks scheme may be required. However, a ground

improvement solution may be considered as more economically viable solution. Vibro replacement, vibro concrete columns or controlled modulus columns may be considered in this area, with allowable bearing pressures of between 100kN/m² and 150kN/m² usually achievable following treatment. Some delineation of this location could be undertaken during the enabling period to better determine the Made Ground, its extents beneath the proposed rehoming building, and implications for foundation design in this area.

The re-engineering of the placed soils would need to be subject to appropriate earthworks testing and placed in accordance with a detailed Earthworks Specification to ensure that adequate compaction and the required product performance was achieved. If the Made Ground soils were not to be excavated prior to upfilling, ground improvement solutions such as vibro-replacement, vibro concrete columns, and other systems such as controlled modulus columns may be feasible to support shallow foundations following appropriate upfilling. Again, the re-engineering of the Made Ground and natural soils would need to be subject to appropriate supplementary earthworks testing and a detailed specification to ensure that adequate compaction and end product performance was achieved. In addition to this, a specialist ground improvement contractor should be consulted to assess the suitability of the soils to be treated.

Proposed training barn

Across the footprint of the proposed training barn in the southern part of the site, it is anticipated that cut up to 1.0m is to take place. As such, much of the Made Ground is likely to be removed, with the underlying shallow Glacial Till suitable to support conventional strip foundations. Foundations must be placed below any remaining Made Ground or disturbed ground and also beneath any soft or loose natural material. Based on the exploratory hole data across this part of the site, a minimum founding depth of 0.9m bgl is likely to be required.

Strip/trench fill (up to 1m wide) competently designed to the above requirements may adopt safe net design bearing pressures up to 100kN/m². This is based on a minimum shear strength of 40kN/m² using traditional methods of bearing capacity calculations e.g. as set out in Tomlinson 7th Edition and a factor of safety of 3 against bearing capacity failure.

Proposed intake, booked, and TBA buildings

Across the eastern and northeastern part of the site, in the area of the proposed intake, booked, and TBA buildings, the Made Ground was generally between 0.6m and 0.7m thick. Fill in the region of 0.7m is anticipated to facilitate the development of the booked building. Deeper Made Ground was encountered at the location of DCS7, which is in the vicinity of the proposed intake building. As per DCS2A, some delineation and investigation and its implication for foundation design should be investigated during enabling works.

Foundations must be placed within firm or better Glacial Till and below any Made Ground or disturbed ground and also beneath any soft or loose natural material. Based on the exploratory hole data across this part of the site, a minimum founding depth of between 0.9m and 1.2m bgl is likely to be required to ensure foundations are placed below any Made Ground or disturbed ground and also beneath any soft or loose natural material.

Strip/trench fill (up to 1m wide) competently designed to the above requirements may adopt safe net design bearing pressures up to 100kN/m². This is based on a minimum shear strength of 40kN/m² using traditional methods of bearing capacity calculations e.g. as set out in Tomlinson 7th Edition and a factor of safety of 3 against bearing capacity failure.

Foundation inspection should be undertaken by a competent person prior to casting of concrete to confirm that suitable strata has been encountered for the required design requirements.

If, during groundworks, conditions significantly at variance to those described herein are encountered, specialist geotechnical advice should be sought to make appropriate assessment and recommendations.

7.5 Floor Slab and Gas Protection

Based on the proposed levels and areas of cut/fill, it is anticipated that in the vicinity of the proposed training barn, booked and intake buildings will be cut up to c.1.75m below existing levels, exposing Glacial Till at the proposed formation level.

Areas of fill are anticipated on the western part of the site to facilitate the design of the rehoming building. Following the proposed cut and fill, it is anticipated that controlled engineered fill will be underlain in places by Made Ground to depths of up to 2.5m bgl (i.e., in the location of the historic pond). The magnitude of potential differential and total settlements as a result of consolidation of uncontrolled Made Ground may be too significant to permit a ground bearing slab onto the engineering fill without undue settlements occurring. If the Made Ground and/or any other unsuitable strata (i.e., softened Glacial Till) was not to be excavated prior to upfilling, ground improvement solutions such as vibro-replacement may be considered to permit the use of a ground bearing floor slab.

Based on the monitoring results, conceptual model, the ground conditions encountered and the calculated GSVs, the site is characterised as Situation 1 (CIRIA C665).

Current BRE 211:2023 guidance indicates that the site is located in a radon affected area, with 3-5% of homes above the Action Level. It is recommended that further consultation with Building Control is undertaken to confirm the requirements of any necessary protection measures.

7.6 Excavations

Excavations up to c.1.75m deep are envisaged for the earthwork operations and c.1.0m deep for foundation excavations and service trenches. At these depths excavations are expected to be in a combination of granular Made Ground and Glacial Till. These materials may be prone to some short-term instability and spalling and may need to be graded back to a stable angle or trench support should be provided. Trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions. Significant groundwater ingress is not expected, although it is recommended that some provision for obtaining sump pumping equipment is made to control any minor seepage and run off in wet weather conditions.

7.7 Pavement Design

As part of the proposed cut/fill exercise, topsoil must be removed as part of the site clearance prior to pavement construction. Across the areas of proposed cut, formation levels for new pavements are likely to be within Glacial Till. Elsewhere, pavements will be constructed on engineered fill.

In-situ TRL DCP tests undertaken within the shallow Made Ground were extremely variable, as would be expected in this type of soil and equivalent 'short-term' CBR values ranged between 6% and 35%.

A long-term equilibrium CBR value of 2% or less is recommended for the Made Ground. A long-term equilibrium CBR value of 3% is recommended for the cohesive Glacial Till. Proof rolling and soft spot removal of the sub-formation surface should be undertaken prior to pavement construction.

An earthworks specification would be expected to set out a minimum CBR value to be achieved across the areas of proposed fill, which should be extended to include all external areas where pavements, roads, and car parks are proposed.

Care should be taken to ensure that the surface formation is protected as there is a likelihood that it may become softened by the action of precipitation and plant, leading to surface deterioration.

The Glacial Till and Made Ground (where >15% fines content) are considered to be frost susceptible and therefore should not be present within 450mm of the pavement construction surface.

7.8 Soakaways

A soil infiltration rate from the soakaway testing undertaken in SA1 (targeting the Glacial Till) was unable to be calculated due to water levels not dropping significantly enough in the cohesive soils. Based on this and the presence of largely impermeable cohesive Glacial Till beneath the Made Ground across the site, conventional soakaways are considered unlikely to be viable.

7.9 Buried Concrete and Services

The Design Sulphate Class and the Aggressive Chemical Environment for Concrete (ACEC) class have been assessed for each of the strata encountered. The characteristic values calculated for each stratum are outlined in the table below.

Strata	Samples Tested	Soluble Sulphate (g/l) ^{*1}	pH	Total Potential Sulphate (%)	Potentially Pyritic	Design Sulphate Class	ACEC Class
Made Ground	5	0.11	7.4	0.3	Yes	DS2	AC-2
Glacial Till	5	0.03	7.7	0.04	No	DS1	AC-1

Notes:

*1: Characteristic values are rounded to the nearest 10mg/l. In a data set of less than 5 samples, the highest sulphate value and lowest pH is taken as the characteristic value. In a data set of between 5 and 9 the mean of the highest

two sulphate test results has been taken as the characteristic value. In a data set in excess of 9, the mean of the highest 20% has been taken as the characteristic value.

The results of the sulphate tests carried out indicate that one out of five Made Ground Samples tested are potentially pyritic and have identified the Design Sulphate Class to be DS-2 based on the total potential sulphate, with the Aggressive Chemical Environment for Concrete (ACEC) being AC-2 for the Made Ground as defined by the BRE Special Digest 1, Concrete Aggressive Ground, 2005 for a brownfield site and mobile groundwater regime. For the Glacial Till, DS-1, AC-1 conditions are indicated.

Further reference should be made to BRE Special Digest 1 for requirements in respect of types of cement and aggregate to be used and variations in type of concrete construction.

No 'light end' (less than C_8) TPHs, BTEX, MTBEs, or phenols were detected. Whilst detectable levels of 'heavy end' ($>C_{10}$) were recorded, restrictions on buried water pipelines are unlikely to be required. However, the chosen pipeline materials should be discussed and agreed with the local Water Authority once water supply pipe routes are known.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Geo-environmental

The Human Health Risk Assessment has established a low-risk potential to human health. Although there are detectable concentrations asbestos in the Made Ground, the pathway will effectively be broken for the majority of the site by the presence of a building/hardstanding. However, in areas of proposed soft landscaping, it is recommended that the potential risk is mitigated by the placement of an inert cover layer in these areas, breaking the potential risk to end users, potentially in conjunction with a geotextile marker layer. Subject to agreement with the Local Authority, a cover layer thickness of 300mm is considered appropriate. This should be validated in accordance with Local Authority requirements, with sufficient topsoil thickness to meet proposed planting requirements.

A generally low-risk to Controlled Waters, the underlying bedrock Secondary 'A' Aquifer, has been established due to the lack of any potential contaminants within soils and the presence of significant thicknesses of low-permeability cohesive Glacial Till.

It is therefore considered that further assessment is not warranted for Human Health and Controlled Water purposes. An asbestos management plan will need to be implemented when handling Made Ground materials during groundworks and earthwork enablement operations due to the presence of asbestos recorded in this material.

8.2 Geotechnical

At this stage, the risk of overall settlement and crown hole development beneath the site in relation to anticipated coal seams sub-cropping beneath the site and presence of unrecorded shafts remains. As such, additional ground investigation is anticipated to inform the likelihood of historical mining and as such the risk of shallow unrecorded

coal workings beneath the site. It is recommended that additional ground investigation in the form of rotary open-holed boreholes to a provisional depth of 30m bgl are undertaken to inform the likelihood of historical mining beneath the site and the risk this may pose to the proposed development.

Strip/trench foundations competently designed and placed within the firm or better Glacial Till material may adopt safe net design bearing pressures up to 100kN/m².

Based upon the proposed levels of cut-fill, the western part of the proposed rehoming building is expected to be filled up to 1.3m above the existing levels, with the eastern parts to be cut by up to 0.9m below existing levels. Adjacent to the area of fill, up to 2.5m Made Ground was encountered and as such, deep trench fill foundations may be required within the firm (or better) Glacial Till. Alternatively, full depth re-engineering of the Made Ground or a ground improvement solution, such as vibro replacement, vibro concrete columns or controlled modulus columns may be considered in this area, with allowable bearing pressures of between 100kN/m² and 150kN/m² usually achievable following treatment.

Re-engineering of soils during cut-fill operations would need to be subject to appropriate earthworks testing and placed in accordance with a detailed Earthworks Specification to ensure adequate compaction and the required product performance was achieved.

Ground bearing floor slabs are considered appropriate where Made Ground is less than 0.5m thick or in areas of re-engineered/improved soils. Should a ground improvement solution be adopted in areas of deeper Made Ground, treatment could be extended beneath the proposed floor slab areas, to allow a ground bearing slab.

No ground gas protection measures are envisaged, subject to approval by the Local Authority. Considering that current BRE 211:2023 guidance indicates that the site is located in a radon affected area, with 3-5% of homes above the Action Level, it is recommended that further consultation with Building Control is undertaken to confirm the requirements of any necessary protection measures. A Design Sulphate Class of DS-2 and ACEC Class AC-2 is considered appropriate for buried concrete at the site.

Restrictions on buried water supply pipeline materials are considered unlikely, but this should be confirmed with the local Water Authority.

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GENERAL NOTES

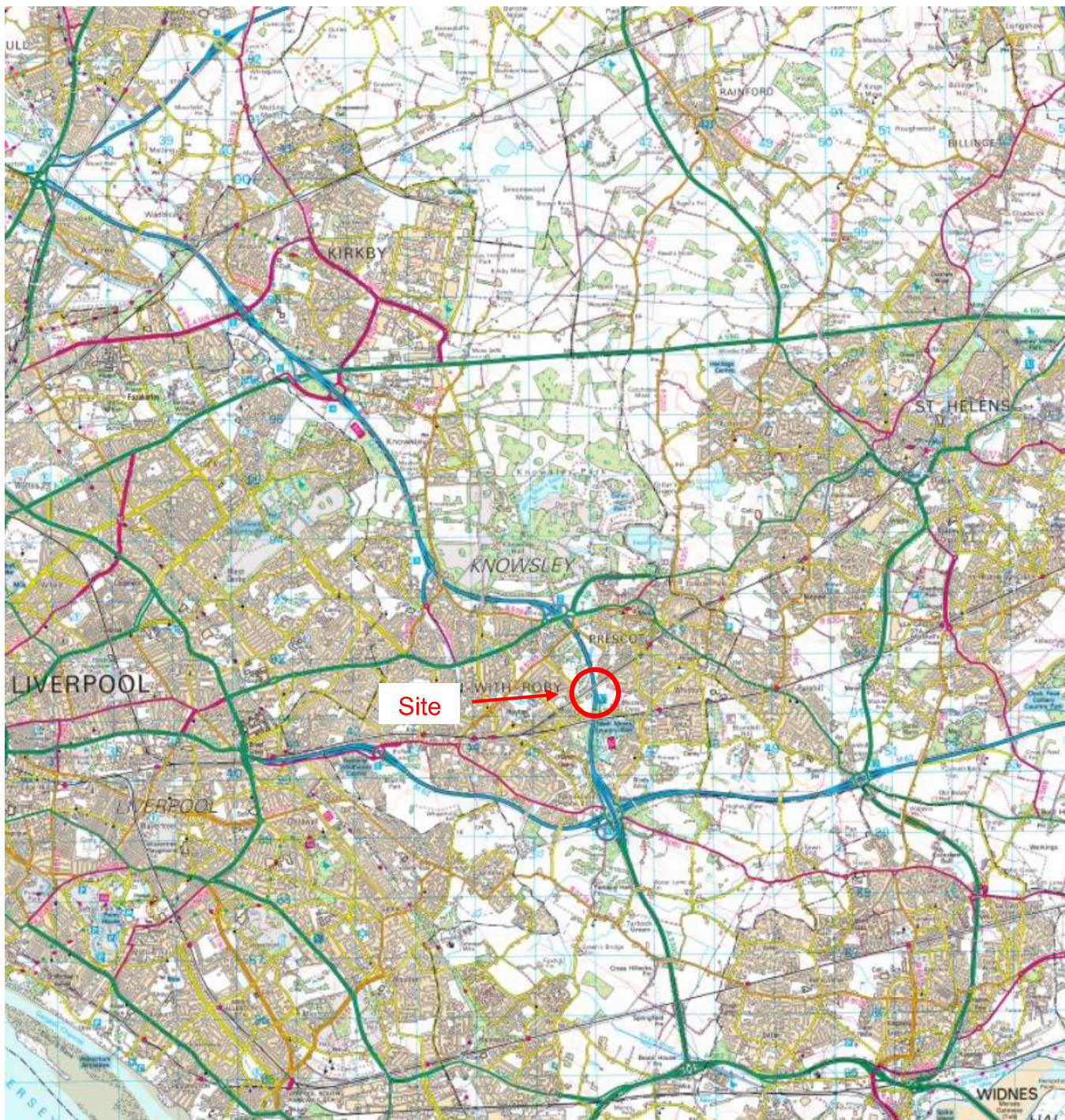
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- B) The services provided are defined within our proposal and are carried out in line with the terms of appointment between Applied Geology and the Client.
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- J) Unless specifically stated, the investigation has not taken into account the possible effects of mineral extraction.
- K) The works performed are not a comprehensive site characterisation and should not be construed as being such.
- L) The findings of the geo-environmental risk assessment are based on information obtained from a variety of sources which Applied Geology believe to be correct. Applied Geology cannot and does not guarantee the authenticity or reliability of the information it has relied upon.
- M) The report represents the findings and opinions of experienced geo-environmental consultants. Applied Geology does not provide legal advice and the advice of lawyers may be required.
- N) Conditions at the site are subject to change from the time of the site inspection.
- O) It is possible that researches carried out by Applied Geology, whilst fully appropriate for a phase 1 desk study, failed to indicate the existence of important information sources. Assuming such indicators actually exist, their information could not have been considered in the formulation of Applied Geology findings and opinions.
- P) The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, depends on very many factors in addition to geotechnical considerations and hence its evaluation is outside the scope of this report.
- Q) Applied Geology operates as a Consultancy and does not operate its own laboratory for soil testing, this work being sub contracted to known and respected, generally UKAS accredited, laboratories. Applied Geology can therefore not be held responsible for the testing carried out.

LIST OF REFERENCES COMMONLY USED BY APPLIED GEOLOGY IN REPORTS

SECTION/TITLE	AUTHOR/PUBLICATION
LABORATORY TESTING	
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SITE WORK	
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BS 5930:2015. Code of Practice for Ground Investigations	BSI
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GEOTECHNICAL DESIGN	
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BS EN 1997-2 Eurocode 7 – Geotechnical Design, Part 2. 2007.	BSI
BS EN 16907:2018 Earthworks, Part 1 & 2.	BSI
BS 6031:2009 Code of Practice for Earthworks.	BSI
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C504 Engineering in Glacial Till. 1999.	CIRIA
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BR414:2001 Protective Measures for Housing on Gas-Contaminated Land.	BRE
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BRE DG 365: Soakaway Design. 2016.	BRE
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CONTAMINATION ASPECTS (Soil & Groundwater)	
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BS 3882:2015 Specification for Topsoil	BSI
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Code of Practice for the Investigation & Mitigation of Possible Petroleum-Based Land Contamination. 1993.	The Institute of Petroleum
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CD 226 Design for New Pavement Construction, Rev 1, 2021.	Highways England, Transport Scotland, Welsh Government & Department for Infrastructure
PLANNING	
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HSG47 Avoiding Danger from Underground Services. 3 rd Ed. 2014.	Health & Safety Executive

APPENDIX A



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APPLIED GEOLOGY

Suite 19, Lowton Business Park
Newton Road
Lowton St. Mary's Warrington WA3 2AN
Tel: 01925 738599
email: admin@appliedgeology.co.uk

Client:

DOGS TRUST

Project:

DOGS TRUST MERSEYSIDE,
WHISTON LANE, HUYTON

Drawn By:

KM

Checked By:

HS

Paper Size:

A4

Scale:

NTS

Date:

22.08.2023

NGR:

345780,391251

Title:

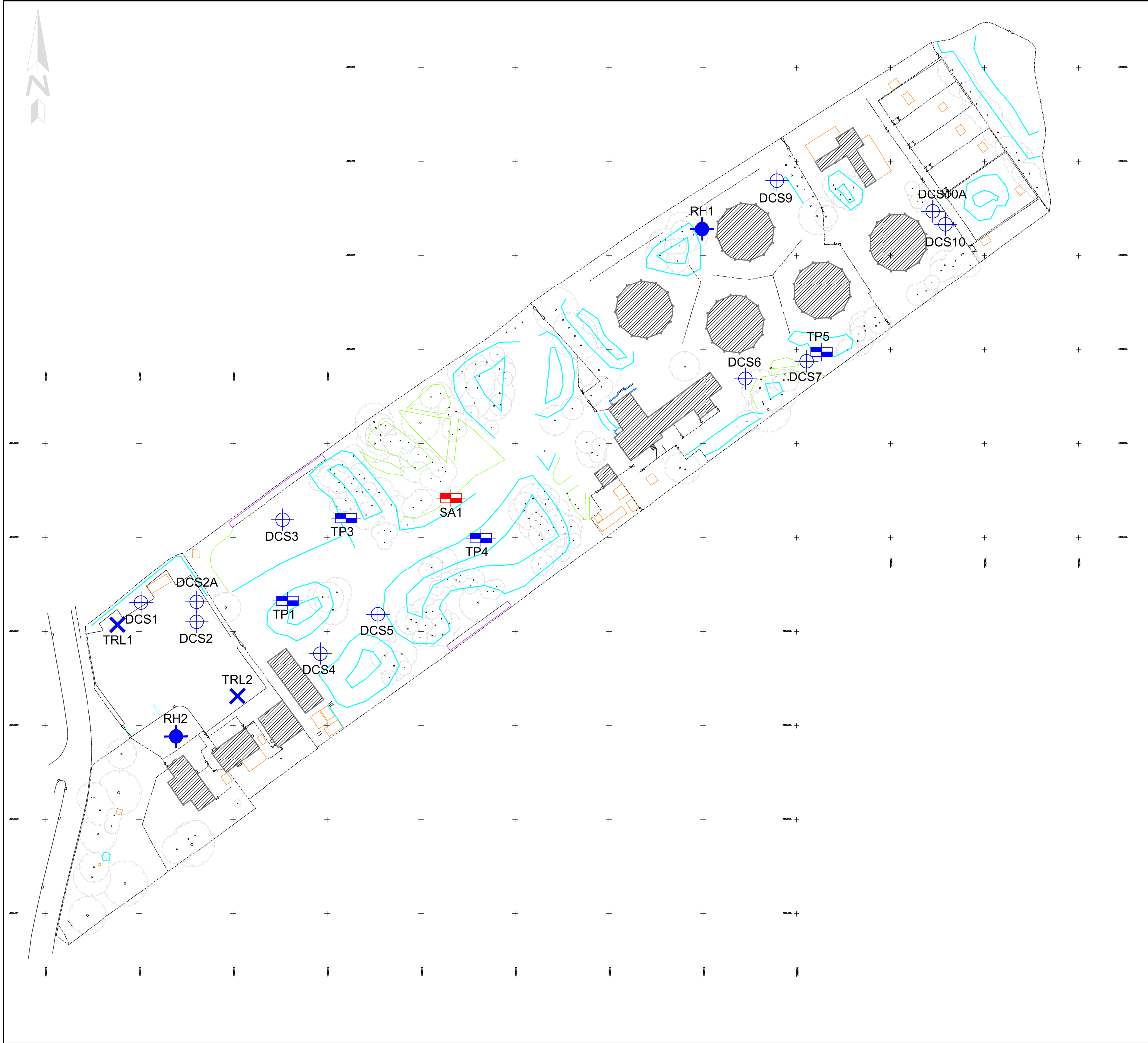
SITE LOCATION PLAN

Drawing No:

AG3533-23-01

Revision:

0



Key:

- Driven Continuous Sampling Borehole
- DCS1
- Rotary Borehole
- RH1
- Machine Excavated Trial Pit
- TP1
- Machine Excavated Trial Pit (with soakaway test)
- SA1
- Transport Research Laboratory Dynamic Cone Penetrometer
- TRL1

Drawing based on LIV13007-A0 PLOT (01) by Battlefield Land Surveys Ltd

APPLIED GEOLOGY
Suite 19
Lowton Business Park
Newton Road
Lowton St. Mary's
Warrington
WA3 2AN

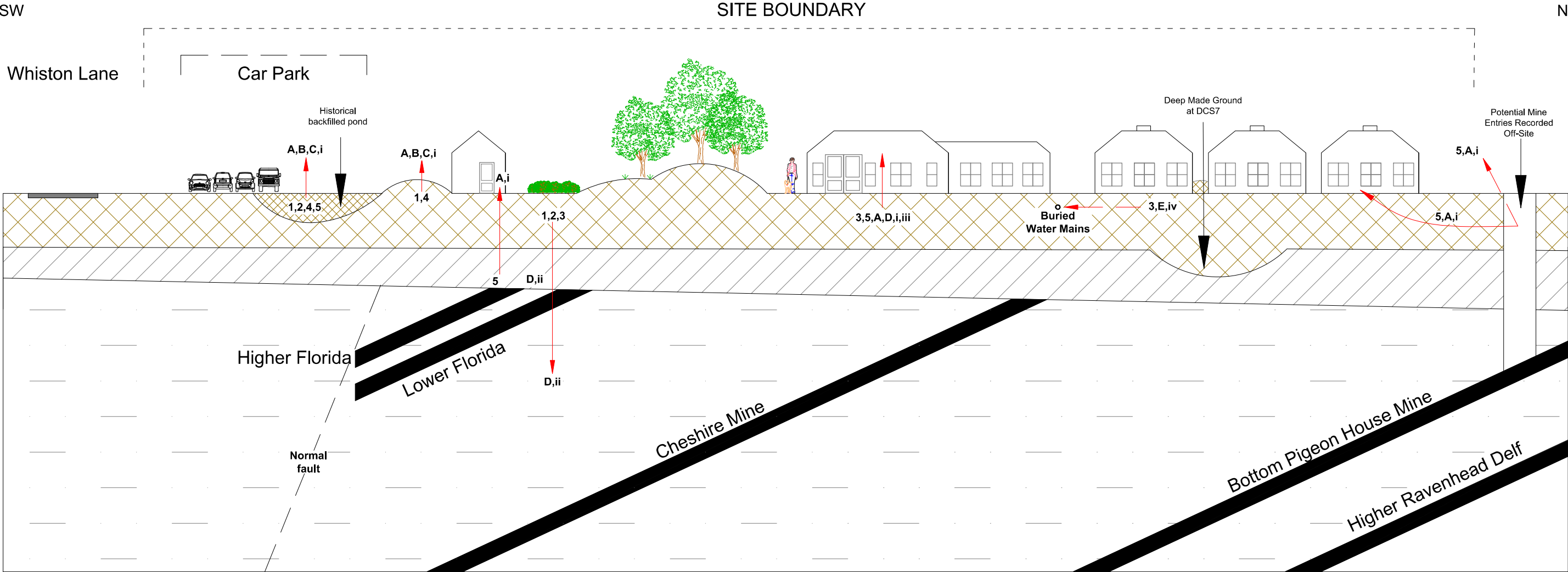
Tel: 01925 738599
email: admin@appliedgeology.co.uk

Client:
DOGS TRUST

Project:
DOGS TRUST MERSEYSIDE
WHISTON LANE, HUYTON

Title:
EXPLORATORY HOLE LOCATION PLAN

Drawn by: AB	Checked by: PG	Paper Size: A3
Scale: 1:1000	Date: 02/10/23	
Drawing No: AG3533-23-02		Revision: 0



SOURCES	PATHWAYS	RECEPTORS
1. Made Ground	A. Inhalation	i. End users
2. Hydrocarbons	B. Ingestion	ii. Secondary 'Undifferentiated' Aquifer
3. Elevated Sulphates	C. Dermal contact	iii. Buried Concrete
4. Asbestos	D. Leaching/migration	iv. Water supply pipes
5. Ground Gas/Mine Gas	E. Direct contact	

Key:	
	Made Ground
	Glacial Till
	Pennine Middle Coal Measures
	Coal Seam

APPLIED GEOLOGY Suite 19 Lowton Business Park Newton St. Mary's Warrington WA3 2AN Tel: 01925 738599 email: admin@appliedgeology.co.uk	Client: DOGS TRUST	Title: CONCEPTUAL SITE MODEL	Drawn by: AB	Checked by: CS	Paper Size: A3
	Project: DOGS TRUST MERSEYSIDE WHISTON LANE, HUYTON		Scale: NTS	Date: 22/02/2024	
			Drawing No: AG3533-23-03	Revision: 0	

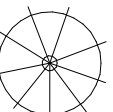
KEY

Refer to Landscape Architect drawings for exact specification.

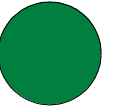
- Brushed Finish Concrete.
NBS - E41120
- Artificial Grass
NBS - C26-350
- Sand
NBS - C26-330
- Grass / natural planting.
Refer to landscape plan for further detail.
- Hogging / gravel walking path.
Refer to landscape plan for further detail.
NBS - C23170
- Loose Gravel
Refer to landscape plan for further detail.
NBS - C23160
- Natural Stone Gabion (Retaining Structure)

Road / Tarmac.
Details to be progressed during detailed design stage.
Refer to CDE for specification

V - Ditch. Refer to Civil Engineer's & Landscape Architect's layout.



Indicative tree location. Refer to Landscape Architect's layout.



Existing Tree location to be retained. Recommended action: No repair required.



Proposed Fire Hydrant Locations.

Pedestrian bollards placed at junction, spaced to allow maintenance vehicles to pass through, but not full sized vehicles.

External seating / planting to be introduced to courtyard.

Vehicle access gate controlled by VNPR / Reception.

Existing car park to be reconfigured to introduce new road along site perimeter.

Proposed rain garden.

Grass free run with mounds and swales. Grass not synthetic, to keep biodiversity area up

Maintenance Shed

Due to existing tree line, paddocks may have to move around corner.

Intake Drop off

Planting / screening for TBA run serenity

Grass free run with mounds and swales. Grass not synthetic, to keep biodiversity area up

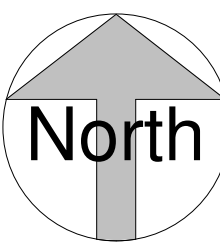
Possible location for attenuation basin, with series of 'V' ditches feeding in excess grey water.

Improvement works to existing grass free run. Could introduce drainage swales, meadow grass sections for enrichment etc and improve biodiversity

Possible location for attenuation basin, with series of 'V' ditches feeding in excess grey water.

Existing reception building converted to Vet Prep / Puppy.

Existing incoming services building to be retained.



5 0 5 10 15 20 25
SCALE: 500
1:1

This drawing must not be scaled.
Figured dimensions and levels to be used.
Any inaccuracies must be notified to the architect.
Detail drawings and large scale drawings take precedence over smaller drawings.

Rev:	A	Combined Booked & TBA building split into two separate buildings - JS	10.03.23	Chk'd:
	B	Site plan amended following development of buildings. Additional grass areas indicated on plan-JS	22.03.23	
	C	Site plan amended to vehicle tracking feedback. Proposed Fire Hydrant locations shown - JS	29.03.23	

A1

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STATUS

S2 - Issued for Information

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ARCHITECTS

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PDA Job No: 22013		REV C	
PDA - EX	- 00 - GA - A - (90) 9000		
ORIGINATOR	VOLUME	LEVEL	SCALE

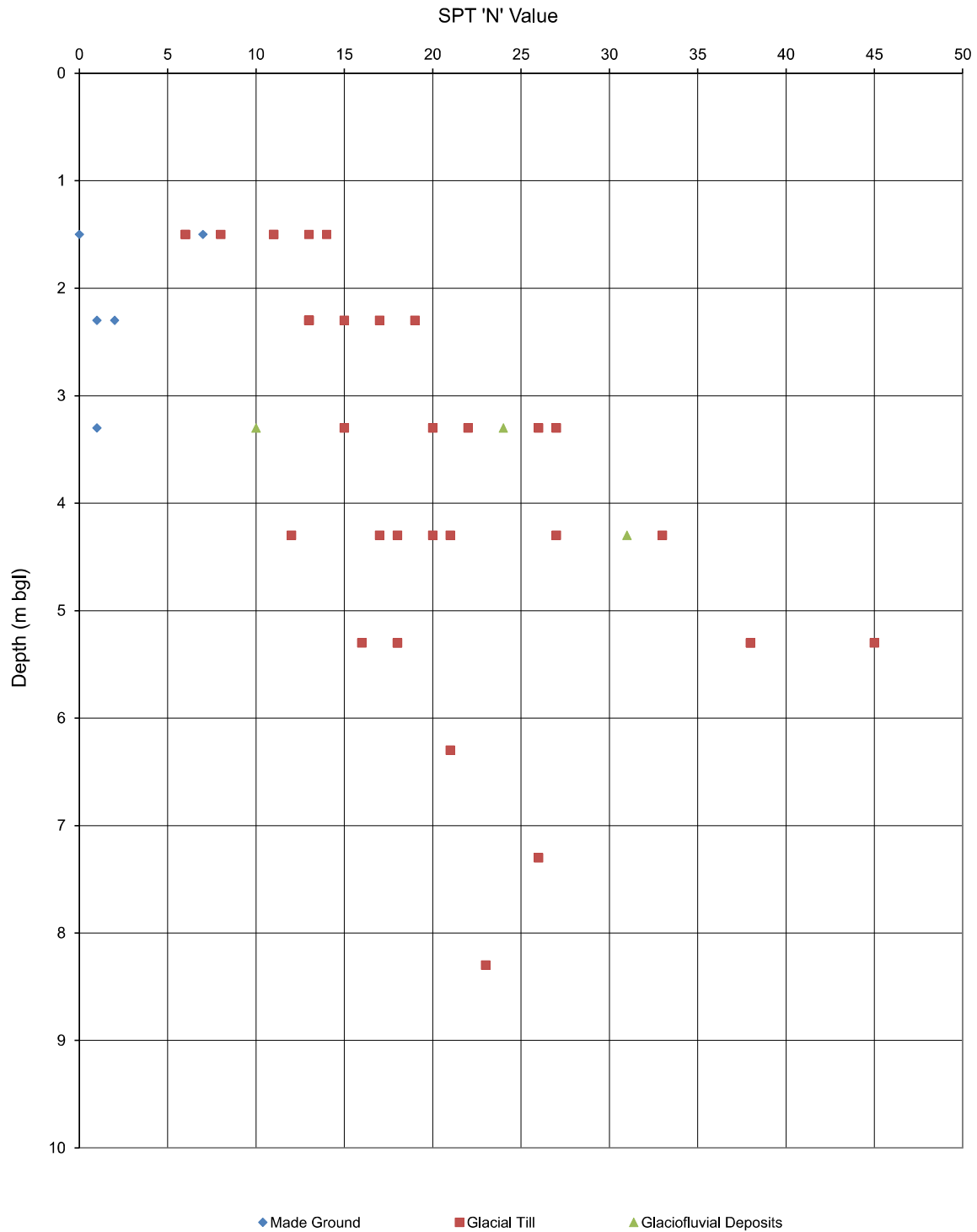
Contract: Dogs Trust
Merseyside Rehoming Centre
Title: Site Plan

Scale: 1 : 500
Date: 07.03.23
Drawn: JS
Checked: OSRH

Prepared: (Name) Powell Dobson, Date: 17.03.23, By: (Name) Powell Dobson, Date: 17.03.23, Checked: (Name) Powell Dobson, Date: 17.03.23, Approved: (Name) Powell Dobson, Date: 17.03.23

F:\Union Square Projects\22013 Dogs Trust, Merseyside Centre\0 - PDA Drawings\4 - Model 2 - Revit\02-Site Plan\22013_PDA_A_EX_External Site (TBA BO Split).rvt

Uncorrected SPT 'N' Value versus depth



Notes: 1. Values >50 omitted for clarity

Client:	Dogs Trust
Project:	Dogs Trust Merseyside, Whiston Lane, Huyton
Project No.	AG3533-23

APPLIED GEOLOGY

APPENDIX B

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS1

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Coordinates

E 345775.48 N 391257.69

Ground Level

34.18m AOD

Project No.

AG3533-23

Sheet

1 of 1

Scale

1:25

Total Depth

4.93m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D ES	0.30			33.93	(0.25)	Soft brown slightly gravelly sandy CLAY with a low cobble content. Gravel is fine to coarse angular to subangular brick, concrete and mudstone. Cobbles are angular brick. (MADE GROUND/TOPSOIL)			
	0.35			33.73	0.25 (0.20) 0.45				
D	0.80					Firm brown sandy gravelly CLAY with a low cobble content. Gravel is fine to coarse angular to subangular brick, concrete, mudstone. Cobbles are angular brick. (MADE GROUND)			
C	1.20	N = 14				Firm light reddish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded mudstone, coal fragments and quartzite. (GLACIAL TILL)			
D	1.30								
D	1.80		87mm /100%						
C	2.00	N = 15				From 1.25m bgl: stiff.			
D	2.30								
D	2.90								
C	3.00	N = 26							
D	3.20								
D	3.80		67mm /95%						
C	4.00	N = 33				From 2.95m bgl: sandy.			
D	4.45								
C	4.75	N >50							
				29.25	4.93	End of Borehole at 4.93m			

Installation:
Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Groundwater Strikes					Drilled: Boreworx Ltd Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	
3.20	3.20				

DCS2

Project No. AG3533-23

Sheet 1 of 1

Scale 1:25

Total Depth 0.60m

Installation:	Groundwater Strikes					Drilled: Boreworx Ltd
Remarks: Hand dug service inspection pit excavated to 0.60m bgl. Borehole terminated at 0.60m bgl due to concrete obstruction. Borehole backfilled with arisings on completion.	Depth Strike	Rose to	Remarks	Cased	Sealed	Logged: AB Checked: CS

APPLiED GEOLOGY

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS2A

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

02/11/2023

End

02/11/2023

Coordinates

E 345790.00 N 391256.00

Ground Level

34.31m AOD

Project No.

AG3533-23

Sheet

1 of 1

Scale

1:25

Total Depth

4.61m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D	0.20	N = 0		34.16	(0.15)	Asphalt.			
					0.15	(MADE GROUND)			
D	0.50			34.01	(0.15)	Grey slightly sandy GRAVEL of fine to coarse angular to subangular limestone.			
					0.30	(MADE GROUND - SUBBASE)			
ES	0.80	N = 1			(1.10)	Soft greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded brick, glass, quartzite and mudstone.			
D	1.00					(MADE GROUND)			
D	1.20								
S	1.20								
D	1.50	N = 10	101mm /40%	32.91	1.40	Very soft greenish grey mottled brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded mudstone, brick and quartzite with frequent organic material and a strong organic odour.			
ES	1.80					(MADE GROUND)			
D	2.00				(1.10)				
S	2.00								
D	2.35	N = 18	101mm /60%	31.81	2.50	Stiff reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments.			
D	2.65			31.51	(0.30)	(GLACIAL TILL)			
S	3.00				2.80	Brown slightly clayey slightly gravelly SAND. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments.			
					(0.60)	(GLACIOFLUVIAL DEPOSITS)			
D	3.30	N >50	92mm /90%	30.91	3.40	Stiff reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone and quartzite.			
						(GLACIAL TILL)			
D	3.80								
C	4.00				(1.21)				
		N >50	79mm /60%						
C	4.60			29.70	4.61				
						End of Borehole at 4.61m			

Installation: 50mm diameter standpipe installed to 2.5m bgl.
Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: DH Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	
2.30	2.30	Seepage at 2.3m bgl.			

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS3

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Coordinates

E 345813.22 N 391279.74

Ground Level

36.73m AOD

Project No.

AG3533-23

Sheet

1 of 1

Scale

1:25

Total Depth

3.29m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install								
ES	0.50	N = 13		36.53	(0.20)	Grass over brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to coarse angular to subangular brick and mudstone. (MADE GROUND/TOPSOIL)											
					0.20												
D	0.75			(0.60)	35.93	0.80	Brown slightly gravelly clayey SAND with low cobble content. Gravel is fine to coarse angular to subangular mudstone, brick, concrete and quartzite. (MADE GROUND)										
D S	1.20 1.20			(2.49)		Firm brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)											
D	1.70									87mm /100%							
D S	2.00 2.00									N = 17	77mm /100%						
D	2.30																
D	2.65																
D S	3.00 3.00									N >50		33.44	3.29	End of Borehole at 3.29m			

Installation: 50mm diameter standpipe installed to 3.00m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole terminated at 3.00m bgl due to refusal.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS4

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Coordinates

E 345823.21 N 391244.16

Ground Level

35.51m AOD

Project No.

AG3533-23

Sheet

1 of 2

Scale

1:25

Total Depth

5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D ES	0.30	N = 6		35.26	(0.25)	Grass over dark brown slightly gravelly slightly clayey SAND with occasional rootlets. Gravel is fine to medium angular to subrounded brick and quartzite. (MADE GROUND/TOPSOIL)			
	0.40			35.06	0.25 (0.20)	Greyish brown clayey sandy GRAVEL of fine to coarse angular to subangular limestone, concrete, brick and mudstone with low cobble content. Cobbles are angular brick. (MADE GROUND)			
D	0.90					Soft brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)			
D S	1.20 1.20					From 1.20m bgl: firm.			
D	1.50								
D	1.80				(2.55)				
D S	2.00 2.00	N = 19	87mm /100%			From 2.00m bgl: stiff and very sandy.			
D	2.50								
D	2.80								
D S	3.00 3.00	N = 24	77mm /80%	32.51	3.00	Medium dense brown slightly clayey SAND. (GLACIOFLUVIAL DEPOSITS)			
D	3.30				(0.60)				
D	3.80	N = 31	67mm /70%	31.91	3.60	Soft brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)			
D S	4.00 4.00			31.51	4.00	Dense brown slightly clayey SAND. (GLACIOFLUVIAL DEPOSITS)			
D	4.50				(0.80)				
D	4.80			30.71	4.80	Stiff brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments.			
D	5.00		57mm /40%						
Continued next sheet									

Installation: 50mm diameter standpipe installed to 3.50m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx
Depth Strike	Rose to	Remarks	Cased	Sealed	
3.40	3.40				
					Logged: AB
					Checked: CS

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS4

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Coordinates

E 345823.21 N 391244.16

Ground Level

35.51m AOD

Project No.

AG3533-23

Sheet

2 of 2

Scale

1:25

Total Depth

5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
S	5.00	N = 45			(0.65)	Stiff brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)			
				30.06	5.45	End of Borehole at 5.45m			

Installation: 50mm diameter standpipe installed to 3.50m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	
3.40	3.40				

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS5

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Coordinates

E 345838.57 N 391254.60

Ground Level

36.73m AOD

Project No.

AG3533-23

Sheet

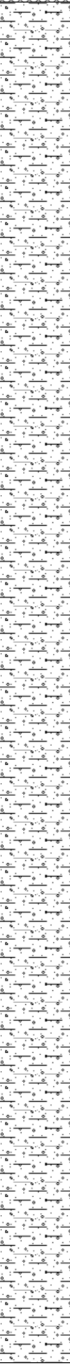
1 of 2

Scale

1:25

Total Depth

5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D ES	0.35 0.40	N = 11		36.53	(0.20) 0.20	Grass over very soft brown slightly gravelly sandy CLAY with frequent rootlets. Gravel is fine to coarse angular to subangular mudstone. (MADE GROUND/TOPSOIL)			
				36.23	(0.30) 0.50	Soft brown slightly gravelly sandy CLAY with occasional rootlets. Gravel is fine to coarse angular to subangular brick, concrete, glass, mudstone and quartzite. (MADE GROUND)			
D	0.90			Firm brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)					
						D S D	1.20 1.20 1.35		
D S	2.00 2.00								
						D	2.50		
D S	3.00 3.00								
						D	3.50		
D	3.80								
		D S	4.00 4.00						
D	4.60								
		D	5.00						
Continued next sheet									

Installation:
Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

DCS5

Project No. AG3533-23

Sheet 2 of 2

Scale 1:25

Total Depth 5.45m

Installation:
Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole backfilled with arisings on completion.

Exploratory hole logs to be read in conjunction with key sheet

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS6

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Coordinates

E 345936.31 N 391317.29

Ground Level

40.20m AOD

Project No.

AG3533-23

Sheet

1 of 2

Scale

1:25

Total Depth

5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install			
D ES	0.40			39.90	(0.30)	Grass over dark brown slightly gravelly slightly clayey SAND with frequent rootlets. Gravel is fine to medium angular to subangular mudstone and brick.						
	0.50				0.30	(MADE GROUND/TOPSOIL)						
D	0.90	N = 8		39.60	(0.30)	Dark brown slightly gravelly clayey SAND with occasional rootlets and low cobble content. Gravel is fine to coarse angular to subangular brick & concrete. Cobbles are angular brick.						
					0.60	(MADE GROUND)						
D	0.90	N = 13	87mm /100%			Firm brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)						
D	1.20											
S	1.20											
D	1.55											
D	2.00	N = 15	77mm /100%			From 2.50m bgl: stiff.						
S	2.00											
D	2.60	N = 12	67mm /100%	(4.85)								
D	3.00											
S	3.00											
D	3.55											
D	3.85	N = 12	57mm /100%									
D	4.00											
S	4.00											
D	4.60											
D	5.00											
						Continued next sheet						

Installation: 50mm diameter standpipe installed to 4.00m bgl.
Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS6

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Client

Dogs Trust

Start

30/10/2023

End

30/10/2023

Project No.

AG3533-23

Sheet

2 of 2

Coordinates

E 345936.31 N 391317.29

Scale

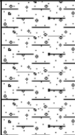
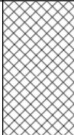
1:25

Ground Level

40.20m AOD

Total Depth

5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
S	5.00	N = 18				Firm brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)			
				34.75	5.45	End of Borehole at 5.45m			

Installation: 50mm diameter standpipe installed to 4.00m bgl.
Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS7

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Project No.

AG3533-23

Client

Dogs Trust

Sheet

1 of 1

Start

31/10/2023

Coordinates

E 345952.65 N 391321.93

Scale

1:25

End

31/10/2023

Ground Level

40.46m AOD

Total Depth

3.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D ES	0.30	N = 7		40.21	(0.25)	Grass over brown slightly gravelly clayey SAND. Gravel is fine to coarse angular to subrounded mudstone, quartzite and brick. (MADE GROUND/TOPSOIL)			
	0.50			40.06	0.25 (0.15) 0.40	White sandy GRAVEL of fine to coarse angular to subrounded limestone. (MADE GROUND - SUBBASE) <i>At 0.40m bgl: membrane.</i>			
					(0.50)	Brown slightly clayey sandy GRAVEL of fine to coarse angular to subangular brick, concrete and mudstone with low cobble content. Cobbles are angular brick. (MADE GROUND)			
D	1.00			39.56	0.90	Firm brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone, brick and coal fragments. (MADE GROUND)			
D S	1.20 1.20					<i>From 1.20m bgl: grey.</i>			
					(1.10)				
D	1.75								
D S	2.00 2.00	N = 2		38.46	2.00	Very loose dark grey slightly sandy clayey GRAVEL of fine to coarse angular to subangular mudstone, brick and coal fragments. (MADE GROUND)			
D	2.30								
D	2.60								
					(1.45)				
D S	3.00 3.00	N = 1							
				37.01	3.45	End of Borehole at 3.45m			

Installation:

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Borehole terminated at 3.00m bgl due to collapse. Borehole backfilled with arisings on completion.

Groundwater Strikes				
Depth Strike	Rose to	Remarks	Cased	Sealed

Drilled: Boreworx

Logged: AB

Checked: CS

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS9

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Project No.

AG3533-23

Client

Dogs Trust

Sheet

1 of 2

Start

31/10/2023

Coordinates

E 345944.65 N 391369.97

Scale

1:25

End

31/10/2023

Ground Level

40.36m AOD

Total Depth

5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
D	0.40			39.71	(0.65)	Grass over brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to medium angular to subrounded mudstone and quartzite. (TOPSOIL)			
ES	0.50								
D	0.90	N = 11	87mm /100%		0.65	Firm yellowish brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)			
D	1.20								
S	1.20								
D	1.75	N = 13	77mm /95%						
D	2.00								
S	2.00								
D	2.55	N = 22	67mm /100%						
D	3.00								
S	3.00								
D	3.40	N = 17	57mm /75%		(4.80)	From 2.75m bgl: stiff.			
D	3.80								
D	4.00								
S	4.00								
D	4.50								
D	5.00					Continued next sheet			

Installation: 50mm diameter standpipe installed to 4.00m bgl.
Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

DCS9

Project No. AG3533-23

Sheet 2 of 2

Scale 1:25

Total Depth 5.45m

Installation: 50mm diameter standpipe installed to 4.00m bgl.
Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Exploratory hole logs to be read in conjunction with key sheet

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS10

Project

Dogs Trust Merseyside, Whiston Lane, Huyton

Project No.

AG3533-23

Client

Dogs Trust

Sheet

1 of 1

Start

31/10/2023

Coordinates

E 345989.52 N 391358.28

Scale

1:25

End

31/10/2023

Ground Level

40.61m AOD

Total Depth

0.60m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
				40.41	(0.20)	Grass over brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to medium angular to subangular mudstone and quartzite.			
					0.20	(MADE GROUND/TOPSOIL)			
					(0.40)	At 0.20m bgl: membrane.			
				40.01	0.60	Grey sandy GRAVEL of fine to coarse angular to subangular limestone. (MADE GROUND - SUBBASE)			
						At 0.35m bgl: membrane.			
						From 0.50m bgl: slightly clayey.			
						End of Borehole at 0.60m			

Installation:
Remarks: Hand dug service inspection pit excavated to 0.60m bgl. Borehole terminated at 0.60m bgl due to rapid influx of water. Borehole backfilled with arisings on completion.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	
0.60	0.60				

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS10A

Project Dogs Trust Merseyside, Whiston Lane, Huyton

Client Dogs Trust

Start 31/10/2023

End 31/10/2023

Coordinates E 345991.00 N 391357.00

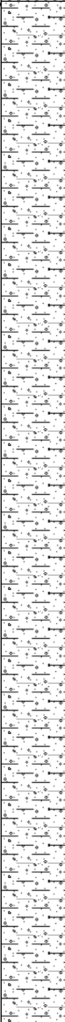
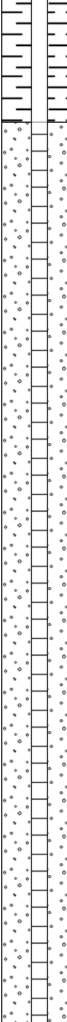
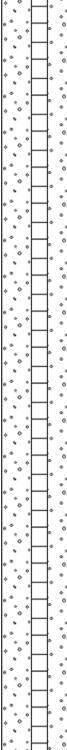
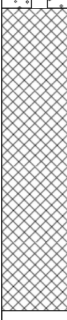
Ground Level 40.61m AOD

Project No. AG3533-23

Sheet 1 of 2

Scale 1:25

Total Depth 5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install	
D	0.15	N = 6		40.41	(0.20)	Grass over brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to medium angular to subrounded mudstone and quartzite. (MADE GROUND/TOPSOIL) <i>At 0.20m bgl: membrane.</i>				
ES	0.40				(0.40)					
D	0.50									
					40.01	0.60	(MADE GROUND - SUBBASE) <i>At 0.35m bgl: membrane.</i>			
D	1.00	N = 13				Soft brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)				
D	1.20									
S	1.20									
D	1.60	N = 20	87mm /100%							
D	2.00									
S	2.00									
D	2.50	N = 21	77mm /95%			From 2.40m bgl: stiff.				
D	3.00									
S	3.00									
D	3.55		67mm /100%		(4.85)					
D	4.00									
S	4.00									
D	4.50		57mm /90%							
D	5.00									
						Continued next sheet				

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

BOREHOLE LOG - DRIVEN CONTINUOUS SAMPLING

DCS10A

Project Dogs Trust Merseyside, Whiston Lane, Huyton

Project No. AG3533-23

Client Dogs Trust

Sheet 2 of 2

Start 31/10/2023

Coordinates E 345991.00 N 391357.00

Scale 1:25

End 31/10/2023

Ground Level 40.61m AOD

Total Depth 5.45m

Sample / Test Type	Depth (m)	Result	Dia./ Rec.	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
S	5.00	N = 38				Soft brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded mudstone, quartzite and coal fragments. (GLACIAL TILL)			
				35.16	5.45	End of Borehole at 5.45m			

Installation: 50mm diameter standpipe installed to 4.00m bgl.

Remarks: Hand dug service inspection pit excavated to 1.20m bgl.

Groundwater Strikes					Drilled: Boreworx Logged: AB Checked: CS
Depth Strike	Rose to	Remarks	Cased	Sealed	

Depth (m)	TCR SCR RQD	If	Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Description of Strata	Legend	GW	Install
10.50	70 49 9	NI 60 150					(0.27)	Reddish brown slightly sandy clayey GRAVEL of mudstone. (GLACIAL TILL)			
						30.16	10.25	Extremely weak grey MUDSTONE recovered as slightly sandy clayey gravel.			
						29.90	(0.25)	(PENNINE MIDDLE COAL MEASURES FORMATION)			
						29.56	10.50	No recovery.			
							(0.34)	Extremely weak grey MUDSTONE. Fractures are horizontal, very closely to closely spaced planar rough and smooth. (PENNINE MIDDLE COAL MEASURES FORMATION)			
							10.84	Between 10.88m and 10.99m bgl: not intact.			
							(1.16)	Between 11.11m and 11.14m bgl: not intact.			
								Between 11.14m and 11.21m bgl: very weak light grey siltstone.			
								Between 11.56m and 11.59m bgl: very weak light grey siltstone.			
								Between 11.78m and 11.84m bgl: not intact with infill of clayey gravel.			
						28.40	12.00	Grey MUDSTONE. (Drillers description) (PENNINE MIDDLE COAL MEASURES FORMATION)			
							(3.30)				
						25.10	15.30	Grey SILTSTONE. (Drillers description) (PENNINE MIDDLE COAL MEASURES FORMATION)			
							(4.20)				
						20.90	19.50	End of Borehole at 19.50m			

Installation:
Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Driven continuous sampled to bedrock from 1.2m to 9.0m bgl. Rotary cored using water flush techniques from 9.0m to 12.0m bgl and 15.8 to 19.5m bgl. Rotary open hole drilling using water flush techniques from 12.0m to 15.8m bgl. Cased to 9.0m bgl. Borehole backfilled with arisings on completion.

Groundwater Strikes					Drilled: Dynamic Sampling Ltd Logged: AB Checked: CS
Depth Strike	Rise	Remarks	Cased	Sealed	
2.00	1.65				

Diameter: 121mm to 9.00m
92.5mm to 12.00m
92.5mm to 19.50m

RH2

Project No. AG3533-23

Sheet 1 of 3

Scale 1:50

Total Depth 30.00m

[illegible]

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Driven continuous sampled to bedrock from 1.2m to 5.5m bgl. Rotary open hole drilling using water flush techniques from 5.5m to 30.0m bgl. Cased to 9.0m bgl. Borehole backfilled with arisings on completion.

Groundwater Strikes					Drilled: Dynamic Sampling Ltd Logged: AB Checked: CS
Depth Strike	Rise	Remarks	Cased	Sealed	

Diameter: 121mm to 5.50m
75mm to 30.00m

RH2

Project No. AG3533-23

Sheet 2 of 3

Scale 1:50

Total Depth 30.00m

[illegible]

Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Driven continuous sampled to bedrock from 1.2m to 5.5m bgl. Rotary open hole drilling using water flush techniques from 5.5m to 30.0m bgl. Cased to 9.0m bgl. Borehole backfilled with arisings on completion.

Groundwater Strikes					Drilled: Dynamic Sampling Ltd Logged: AB Checked: CS
Depth Strike	Rise	Remarks	Cased	Sealed	

Diameter: 121mm to 5.50m
75mm to 30.00m

RH2

Project No. AG3533-23

Sheet 3 of 3

Scale 1:50

Total Depth 30.00m

Installation:
Remarks: Hand dug service inspection pit excavated to 1.20m bgl. Driven continuous sampled to bedrock from 1.2m to 5.5m bgl. Rotary open hole drilling using water flush techniques from 5.5m to 30.0m bgl. Cased to 9.0m bgl. Borehole backfilled with arisinas on completion.

Diameter: 121mm to 5.50m
75mm to 30.00m

TP1

Project No. AG3533-23

Sheet 1 of 1

Scale 1:25

Total Depth 1.50m

Method: 2T Tracked Excavator
Groundwater: Groundwater not encountered.
Stability: Stable.
Remarks: Trial pit completed at mechanical refusal. Trial pit backfilled with arisings on completion.

Length:	1.40m
Width:	0.60m
Logged:	AB
Checked:	CS

TP3

Project No. AG3533-23

Sheet 1 of 1

Scale 1:25

Total Depth 1.70m

Method: 2T Tracked Excavator
Groundwater: Groundwater not encountered.
Stability: Stable.
Remarks: Trial pit completed at target depth. Trial pit backfilled with arisings on completion.

Length:	1.50m
Width:	0.60m
Logged:	AB
Checked:	CS

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
B ES	0.50		38.34	(0.15)	M	Brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to coarse angular to subrounded mudstone and quartzite with rare brick and glass fragments. (MADE GROUND/TOPSOIL)		
				0.15	M	Stiff brown slightly sandy very gravelly CLAY. Gravel is fine to coarse angular to subangular brick, glass, wood fragments, concrete and mudstone. (MADE GROUND)		
B	1.00		37.69	(0.65)	M			
B	1.50		36.79	0.80	H	Stiff reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to subrounded mudstone and quartzite. (GLACIAL TILL)		
				(0.90)				
				1.70		End of Trial Pit at 1.70m		

Method: 2T Tracked Excavator
Groundwater: Groundwater not encountered.
Stability: Stable.
Remarks: Trial pit completed at target depth. Trial pit backfilled with arisings on completion.

Length:	1.30m
Width:	0.60m
Logged:	AB
Checked:	CS

TRIAL PIT LOG

TP5

Project Dogs Trust Merseyside, Whiston Lane, Huyton

Project No. AG3533-23

Client Dogs Trust

Sheet 1 of 1

Date 01/11/2023

Scale 1:25

Ground Level 40.96m AOD

Coordinates E 345956.62 N 391324.41

Total Depth 1.10m

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
ES	0.30					Grass over brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to coarse angular to subrounded glass, brick, mudstone and rare fabric. (MADE GROUND)		
B	0.50			(1.10)				
ES	0.70				M	From 0.70m bgl: high cobble content. Cobbles are angular intact bricks.		
B D	1.00 1.00		39.86	1.10		End of Trial Pit at 1.10m		

Method: 2T Tracked Excavator

Groundwater: Groundwater not encountered.

Stability: Stable.

Remarks: Trial pit completed at mechanical refusal. Trial pit backfilled with arisings on completion.

Length: 1.40m

Width: 0.60m

Logged: AB

Checked: CS

Sample / Test Type	Depth (m)	Result	Level (mAoD)	Strata Depth (thickness) (m)	Ease of Dig	Description of Strata	Legend	GW
				(0.30)	E	Grass over brown slightly gravelly clayey SAND with frequent rootlets. Gravel is fine to coarse angular to subrounded mudstone and quartzite with rare brick and glass fragments. (MADE GROUND/TOPSOIL)		
			37.60	0.30		Greyish brown slightly clayey sandy GRAVEL. Gravel is fine to coarse angular to subangular brick, concrete and mudstone. (MADE GROUND)		
				(0.60)	E			
			37.00	0.90		Stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subangular mudstone, quartzite and coal fragments. (GLACIAL TILL)		
				(1.00)	M			
			36.00	1.90		End of Trial Pit at 1.90m		

Method: 2T Tracked Excavator.

Groundwater: Groundwater not encountered.

Stability: Stable.

Remarks: Soakaway test undertaken within trial pit, see separate results sheet for details. Trial pit backfilled with arisings on completion.

Length: 1.50m

Width: 0.70m

Logged: AB

Checked: CS

SPT SUMMARY SHEET

Project: Dogs Trust Merseyside, Whiston Lane, Huyton
Client: Dogs Trust
Project No: AG3533-23

Borehole No.	Borehole depth (m)	Bottom depth (m)	Casing depth (m)	Water Level (m)	Equipment ref.	Seating Drive		Test Drive					Test Type	N Value
						Blows	Pen (mm)	Blows		Pen (mm)		Total Pen (mm)		
DCS1	1.20	1.65			BX100	3 3	75 75	3 4 3 4	75 75 75 75	300	C	14		
DCS1	2.00	2.45			BX100	3 3	75 75	4 3 3 5	75 75 75 75	300	C	15		
DCS1	3.00	3.45			BX100	3 4	75 75	4 6 7 9	75 75 75 75	300	C	26		
DCS1	4.00	4.45			BX100	6 5	75 75	6 8 10 9	75 75 75 75	300	C	33		
DCS1	4.75	4.93			BX100	25 0	65	27 23	75 40	115	C	>50		
DCS10A	1.20	1.65			BX100	1 1	75 75	2 1 1 2	75 75 75 75	300	S	6		
DCS10A	2.00	2.45			BX100	2 3	75 75	3 3 3 4	75 75 75 75	300	S	13		
DCS10A	3.00	3.45			BX100	2 3	75 75	8 4 4 4	75 75 75 75	300	S	20		
DCS10A	4.00	4.45			BX100	2 3	75 75	4 4 6 7	75 75 75 75	300	S	21		
DCS10A	5.00	5.45			BX100	3 6	75 75	9 9 9 11	75 75 75 75	300	S	38		
DCS2A	1.20	1.65			110-119	1 0	75 75	0 0 0 0	75 75 75 75	300	S	0		
DCS2A	2.00	2.45			110-119	1 0	75 75	0 1 0 0	75 75 75 75	300	S	1		
DCS2A	3.00	3.45			110-119	1 0	75 75	0 3 3 4	75 75 75 75	300	S	10		
DCS2A	4.00	4.45			110-119	4 4	75 75	4 5 4 5	75 75 75 75	300	C	18		
DCS2A	4.60	4.68			110-119	25	30	50	50	50	C	>50		
DCS3	1.20	1.65			BX100	2 2	75 75	4 3 3 3	75 75 75 75	300	S	13		
DCS3	2.00	2.45			BX100	2 2	75 75	3 4 5 5	75 75 75 75	300	S	17		
DCS3	3.00	3.44			BX100	6 10	75 75	10 10 15 15	75 75 75 65	290	S	>50		
DCS4	1.20	1.65			BX100	1 1	75 75	1 1 2 2	75 75 75 75	300	S	6		
DCS4	2.00	2.45			BX100	3 3	75 75	3 4 6 6	75 75 75 75	300	S	19		
DCS4	3.00	3.45			BX100	3 3	75 75	5 6 5 8	75 75 75 75	300	S	24		
DCS4	4.00	4.45			BX100	5 6	75 75	6 8 8 9	75 75 75 75	300	S	31		
DCS4	5.00	5.45			BX100	9 10	75 75	10 11 12 12	75 75 75 75	300	S	45		
DCS5	1.20	1.65			BX100	2 3	75 75	2 3 3 3	75 75 75 75	300	S	11		
DCS5	2.00	2.45			BX100	2 3	75 75	3 3 3 4	75 75 75 75	300	S	13		
DCS5	3.00	3.45			BX100	5 6	75 75	6 6 7 8	75 75 75 75	300	S	27		
DCS5	4.00	4.45			BX100	3 3	75 75	4 4 6 6	75 75 75 75	300	S	20		
DCS5	5.00	5.45			BX100	6 6	75 75	6 7 13 12	75 75 75 75	300	S	38		
DCS6	1.20	1.65			BX100	2 2	75 75	2 2 2 2	75 75 75 75	300	S	8		
DCS6	2.00	2.45			BX100	1 2	75 75	3 3 3 4	75 75 75 75	300	S	13		
DCS6	3.00	3.45			BX100	3 3	75 75	3 4 4 4	75 75 75 75	300	S	15		
DCS6	4.00	4.45			BX100	2 2	75 75	2 3 3 4	75 75 75 75	300	S	12		
DCS6	5.00	5.45			BX100	4 4	75 75	4 4 5 5	75 75 75 75	300	S	18		
DCS7	1.20	1.65			BX100	1 1	75 75	0 2 3 2	75 75 75 75	300	S	7		

Notes:

1. Test carried out in general accordance with BS EN ISO 22476-3:2005
2. N values have not been subjected to any correction.
3. Test carried out using split spoon S, or solid cone C.

SPT SUMMARY SHEET

Project: Dogs Trust Merseyside, Whiston Lane, Huyton
Client: Dogs Trust
Project No: AG3533-23

Borehole No.	Borehole depth (m)	Bottom depth (m)	Casing depth (m)	Water Level (m)	Equipment ref.	Seating Drive				Test Drive						Test Type	N Value			
						Blows		Pen (mm)		Blows				Pen (mm)				Total Pen (mm)		
DCS7	2.00	2.45			BX100	1	1	75	75	1	0	1	0	75	75	75	75	300	S	2
DCS7	3.00	3.45			BX100	1	0	75	75	0	1	0	0	75	75	75	75	300	S	1
DCS9	1.20	1.65			BX100	1	1	75	75	2	2	3	4	75	75	75	75	300	S	11
DCS9	2.00	2.45			BX100	2	2	75	75	2	3	4	4	75	75	75	75	300	S	13
DCS9	3.00	3.45			BX100	4	5	75	75	4	5	7	6	75	75	75	75	300	S	22
DCS9	4.00	4.45			BX100	3	3	75	75	4	4	5	4	75	75	75	75	300	S	17
DCS9	5.00	5.45			BX100	2	2	75	75	2	4	5	5	75	75	75	75	300	S	16
RH1	5.00	5.45			SH01	2	3	75	75	3	5	5	5	75	75	75	75	300	S	18
RH1	6.00	6.45			SH01	3	3	75	75	4	4	6	7	75	75	75	75	300	S	21
RH1	7.00	7.45			SH01	4	4	75	75	5	7	7	7	75	75	75	75	300	S	26
RH1	8.00	8.45			SH01	1	3	75	75	4	5	7	7	75	75	75	75	300	S	23
RH1	9.00	9.40			SH01	6	8	75	75	13	15	16	6	75	75	75	20	245	S	>50
RH2	4.00	4.45			SH01	2	3	75	75	5	7	8	7	75	75	75	75	300	S	27
RH2	5.50	5.63			SH01	13	12	75	20	50				30				30	S	>50

Notes:

1. Test carried out in general accordance with BS EN ISO 22476-3:2005
2. N values have not been subjected to any correction.
3. Test carried out using split spoon S, or solid cone C.

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: BX100
Test Date: 15/09/2023
Report Date: 15/09/2023
File Name: BX100.spt
Test Operator: MT

Instrumented Rod Data

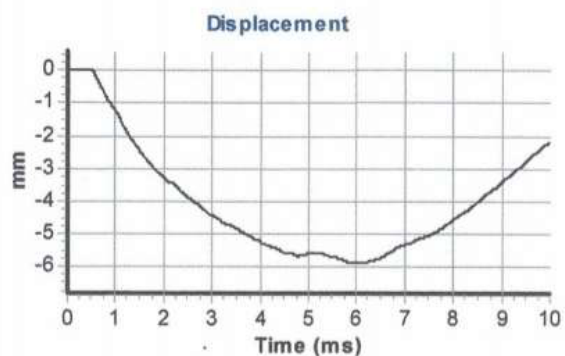
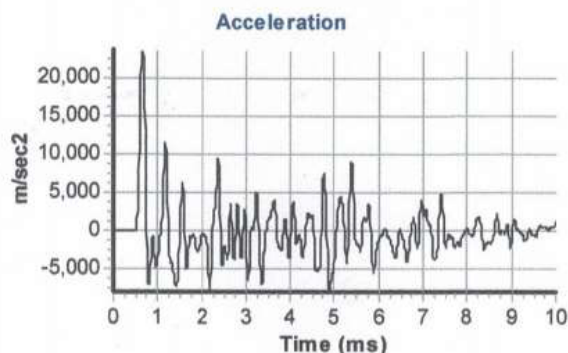
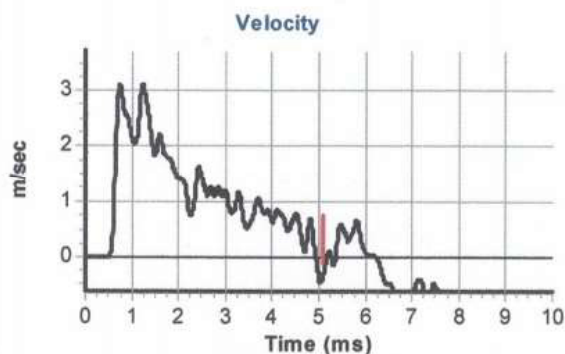
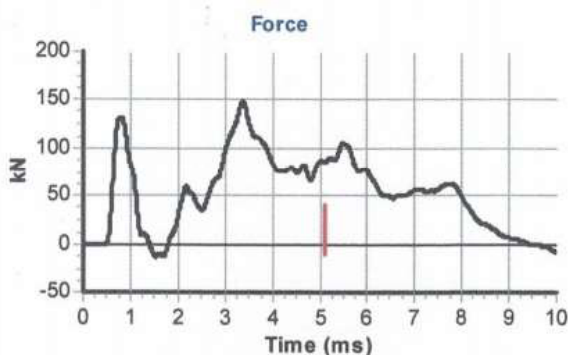
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.5
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 72572
Accelerometer No.2: 72757

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location

BOREWORX LTD - (86247)



Calculations

Area of Rod A (mm²): 970
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 311

Energy Ratio E_r (%): **66**

Signed: M.TONER
Title: FITTER

The recommended calibration interval is 12 months

Dynamic Sampling Uk Ltd
Unit 8 Victory Park
Victory Road
Derby
DE248ZF

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

SPT Hammer Ref: SH01
Test Date: 17/05/2023
Report Date: 17/05/2023
File Name: SH01.spt
Test Operator: B.HUNTER

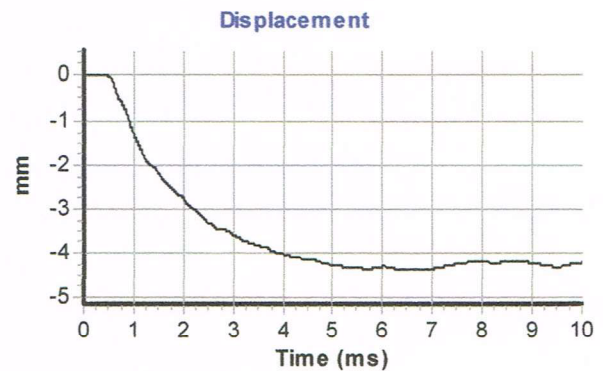
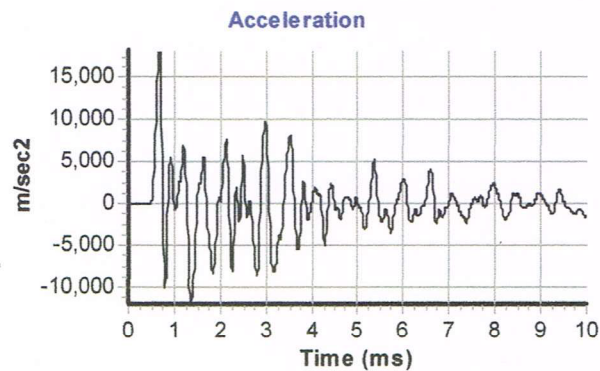
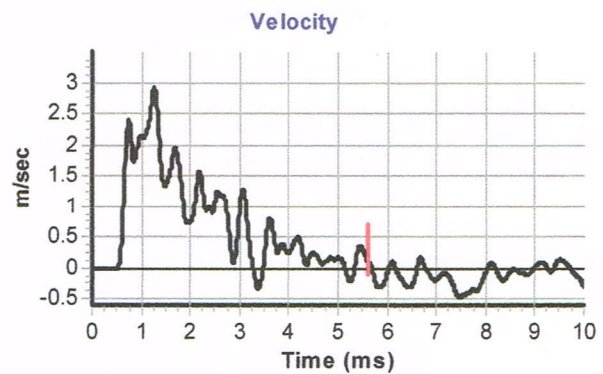
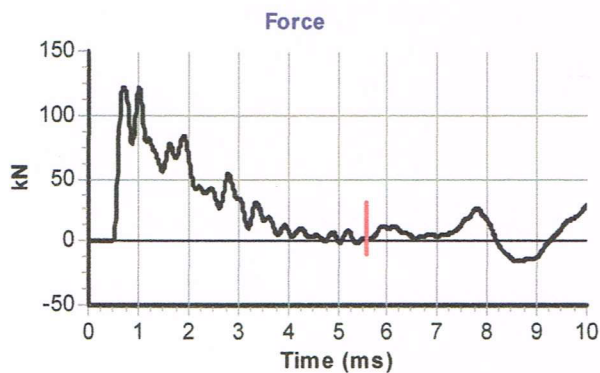
Instrumented Rod Data

Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.6
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 62901
Accelerometer No.2: 62902

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location



Calculations

Area of Rod A (mm^2): 983
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 285

Energy Ratio E_r (%): **60**

Signed: Bruce Hunter
Title: Operations Manager



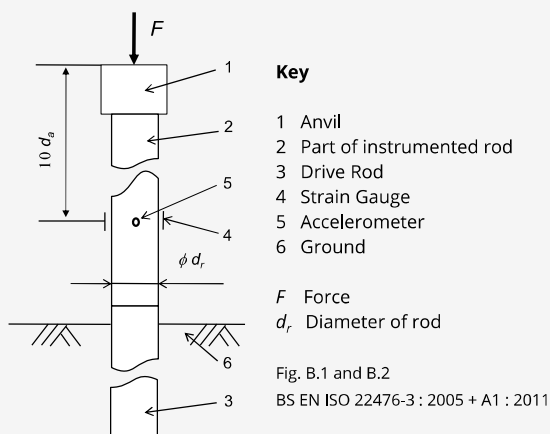
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer Premier
 Test No EQU2023_34
 Client Applied Geology

Test Depth (m) 9.20
 Mass of hammer $m = 63.5\text{kg}$
 Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod



Diameter $d_r = 0.052\text{ m}$
 Length of instrumented rod 0.558 m
 Area $A = 11.61\text{ cm}^2$
 Modulus $E_a = 206843\text{ MPa}$

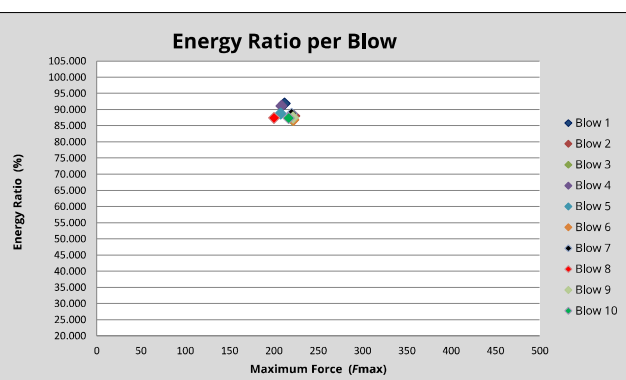
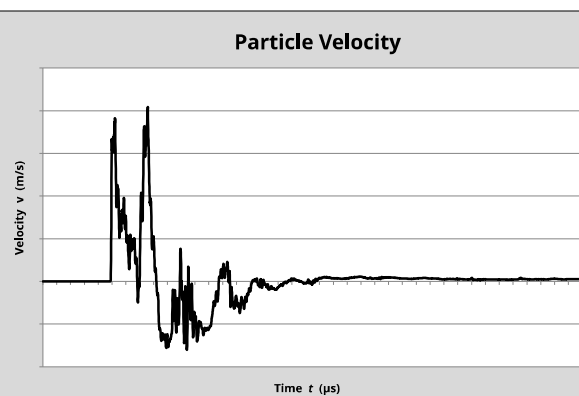
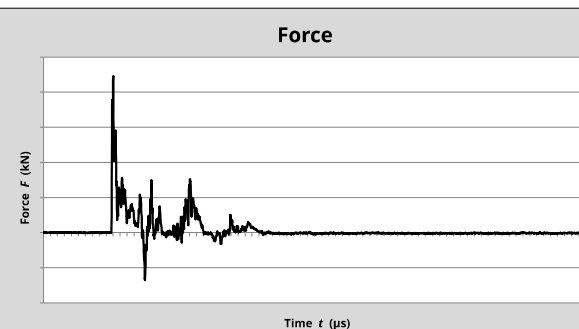
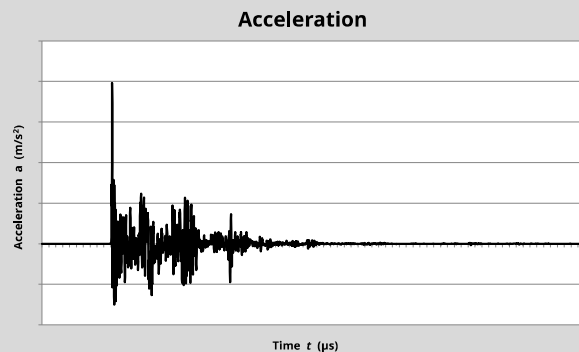
DATE OF TEST VALID UNTIL HAMMER ID

03/02/2023	03/02/2024	110 119
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$E_{\text{meas}} = 0.419\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

Comments



$$\text{Energy Ratio (Er)} = \frac{E_{\text{meas}}}{E_{\text{theor}}}$$

88.48%
 © COPYRIGHT 2023

Equipe SPT Analyzer Operator

ks

Certificate prepared by

[Signature]

Certificate checked by

[Signature]

Certificate date

06/03/2023

Exploratory Hole Log Key Sheet

Sample Notation		Backfill Symbols		Legend Symbols	
D	Small Disturbed sample		Sand		Topsoil
B	Bulk Disturbed sample		Gravel		Made Ground
ES	Environmental sample		Concrete		Concrete
U	Undisturbed U100 sample		Bentonite		Clay
UT	Undisturbed UT100 sample		Arising		Silt
C	Core sample		Grout		Sand
W	Water sample				Gravel
In Situ Test Notation		Installation Symbols			Peat
S	Standard Penetration Test		Plain Standpipe		Cobbles
S (C)	Standard Penetration Test (cone)		Slotted Standpipe		Boulders
HV	Hand Shear Vane Test		Piezometer		Mudstone
PID	Photoionization Detector Test		Vibrating Wire Piezometer		Siltstone
MEXE	Mexecone Cone Penetrometer Test		Inclinometer		Sandstone
PP	Pocket Penetrometer Test		Extensometer (with magnet locations)		Limestone
K	Permeability Test				Chalk
Results Notation		Groundwater (GW)			Coal
Cu	Shear Strength		Rise		Breccia
N	SPT N Value		Groundwater Strike - with Recorded Rise		Conglomerate
PID	VOC Concentration		Strike		Shale
()	U/UT Blow Count		Groundwater Strike - No Recorded Rise		Igneous Rock
Rotary Core Notation					Metamorphic Rock
TCR	Total Core Recovery				No Recovery
SCR	Solid Core Recovery				
RQD	Rock Quality Designation				
FI	Fracture Index				
If	Fracture Spacing				
NI	Non Intact				
NR	No Recovery				
NA	Not Applicable				
Ease of Dig					
VE	Very Easy				
E	Easy				
M	Moderate				
H	Hard				
VH	Very Hard				
General Notes					
1. Details of the standpipe/piezometer are given on the log. The 'Install' column shows a graphical representation of the installed including depth of instruments including slotted section or piezometer depth, and backfill details. 2. Standard Penetration Test is defined in BS EN ISO 17892. Total N value is shown on the logs, full details of the test increments, equipment references, water and casing levels shown on the SPT Summary Sheet.					
Note: Most soils comprise a mixture of particle sizes. The soil type is graphically represented on the log and may be a combination of these symbols.					

APPENDIX C

Ground Gas Monitoring and Flow Results

Project Number: AG3533-23
Project Name: Dogs Trust Merseyside, Whiston Lane, Huyton

Date and Time of Monitoring: Friday 10th November - 10:30am
Phase of Monitoring: 1 of 4

BH No.	Flow Range (litres/hr over 3 mins)			Differential Pressure (mb)	Methane % v/v		Carbon dioxide % v/v		Oxygen % v/v		Diameter of installation (mm)	Water level (m bgl)
	Max	Min	Avg		Peak	Steady	Peak	Steady	Min	Steady		
DCS2A	3.9	2.7	-	4.28	1.2	1.2	1.6	1.5	20.3	20.3	50	0.40
DCS3	-	-	-	-	-	-	-	-	-	-	50	-
DCS4	7.6	2.6	-	5.50	0.2	0.2	4.9	4.0	16.8	17.3	50	-
DCS6	0.1	0.1	0.1	0.00	0.2	0.1	7.6	7.1	6.1	6.1	50	0.93
DCS9	0.0	0.0	0.0	0.46	0.2	0.2	0.8	0.8	18.7	18.7	50	0.18
DCS10A	16.7	0.5	0.5	1.06	0.2	0.2	0.2	0.2	21.9	21.9	50	1.06

Additional gases (if required)

BH No.	VOCs (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Diameter of installation (mm)
DCS2A	0.0	8	0	50
DCS3	-	-	-	50
DCS4	0.0	30	0	50
DCS6	0.0	0	0	50
DCS9	0.0	0	0	50
DCS10A	0.0	1	0	50

Borehole specific comments/observations
Standpipe flooded at surface
Cover unable to access due to cement. Standpipe flooded at surface
Cover unable to access due to cement. Standpipe flooded at surface

Meteorological Data

Atmospheric Pressure (mb)	Start: 990
Atmospheric Pressure (mb)	Finish: 995
Pressure Rising or Falling	Falling
Weather Conditions	Overcast
Atmospheric Oxygen (% vol)	21.3
Wind Speed & Direction	6kmh NE
Ambient Air Temperature (°C)	5.0

Site Data

Monitoring Personnel	Alex Boylan
GPS Instrument	
Gasmeter Serial Number	G503948
PID Serial Number	108308
Ground Conditions (vegetation stress, visual contamination):	

General Notes:

- 1. Instrument specification data and calibration information provided on a separate sheet



Ground Gas Monitoring and Flow Results

Project Number: AG3533-23

Date and Time of Monitoring: Monday 20th November - 10:30am

Project Name: Dogs Trust Merseyside, Whiston Lane, Huyton

Phase of Monitoring: 2 of 4

BH No.	Flow Range (litres/hr over 3 mins)			Differential Pressure (mb)	Methane % v/v		Carbon dioxide % v/v		Oxygen % v/v		Diameter of installation (mm)	Water level (m bgl)
	Max	Min	Avg		Peak	Steady	Peak	Steady	Min	Steady		
DCS2A	-10.3	-4.4	-	-7.71	0.2	0.2	0.8	0.8	20.1	20.1	50	0.63
DCS3	0.0	0.0	-	0.0	0.2	0.2	2.8	2.8	9.5	9.5	50	0.98
DCS4	-8.3	-3.2	-5.8	-4.06	0.2	0.2	7.3	7.3	16.0	16.0	50	0.58
DCS6	0.0	0.0	0.0	-0.21	0.2	0.2	9.5	9.5	5.3	5.3	50	1.04
DCS9	-2.8	-0.4	-1.6	-2.81	0.2	0.2	0.8	0.7	18.2	18.2	50	0.19
DCS10A	-10.3	-0.6	-0.6	1.10	0.2	0.2	0.2	0.2	21.6	21.6	50	1.08

Additional gases (if required)

BH No.	VOCs (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Diameter of installation (mm)
DCS2A	0.0	6	0	50
DCS3	0.0	5	0	50
DCS4	0.0	1	0	50
DCS6	0.0	0	0	50
DCS9	0.0	0	0	50
DCS10A	0.0	1	0	50

Borehole specific comments/observations
Standpipe flooded at surface
Standpipe flooded at surface

Meteorological Data

Atmospheric Pressure (mb)	Start: 1005
Atmospheric Pressure (mb)	Finish: 1005
Pressure Rising or Falling	Rising
Weather Conditions	Raining
Atmospheric Oxygen (% vol)	21.3
Wind Speed & Direction	15kmh W
Ambient Air Temperature (°C)	10.0

Site Data

Monitoring Personnel	Alex Boylan
GPS Instrument	
Gasmeter Serial Number	G503948
PID Serial Number	108308
Ground Conditions (vegetation stress, visual contamination):	

General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

Ground Gas Monitoring and Flow Results

Project Number: AG3533-23

Date and Time of Monitoring: Monday 29th November - 10:15am

Project Name: Dogs Trust Merseyside, Whiston Lane, Huyton

Phase of Monitoring: 3 of 4

BH No.	Flow Range (litres/hr over 3 mins)			Differential Pressure (mb)	Methane % v/v		Carbon dioxide % v/v		Oxygen % v/v		Diameter of installation (mm)	Water level (m bgl)
	Max	Min	Avg		Peak	Steady	Peak	Steady	Min	Steady		
DCS2A	-6.8	-2.6	-	-1.13	0.2	0.2	1.3	1.3	21.1	21.1	50	0.83
DCS3	-1.8	-0.1	-	-0.3	0.2	0.2	2.5	2.5	12.2	12.2	50	0.99
DCS4	3.2	0.5	-	-0.15	0.2	0.2	7.7	7.7	9.0	9.0	50	0.93
DCS6	0.1	0.0	0.1	-0.50	0.2	0.2	9.3	9.3	9.0	9.0	50	1.13
DCS9	-5.8	-0.7	-3.3	-5.17	0.2	0.2	3.7	3.7	14.8	14.8	50	0.25
DCS10A	13.7	0.4	0.4	-0.40	0.2	0.2	8.0	3.7	9.9	18.6	50	0.94

Additional gases (if required)

BH No.	VOCs (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Diameter of installation (mm)
DCS2A	0.0	5	0	50
DCS3	0.0	1	0	50
DCS4	0.0	0	0	50
DCS6	0.0	0	0	50
DCS9	0.0	0	0	50
DCS10A	0.0	4	0	50

Borehole specific comments/observations
Standpipe flooded at surface
Standpipe flooded at surface
Standpipe flooded at surface
Water being drawn into gas monitor tubing due to water level

Meteorological Data

Atmospheric Pressure (mb)	Start: 1002
Atmospheric Pressure (mb)	Finish: 1001
Pressure Rising or Falling	Falling
Weather Conditions	Sunny, frozen ground
Atmospheric Oxygen (% vol)	22.0
Wind Speed & Direction	2kmh NE
Ambient Air Temperature (°C)	1.0

Site Data

Monitoring Personnel	Alex Boylan
GPS Instrument	
Gasmeter Serial Number	G503948
PID Serial Number	108308
Ground Conditions (vegetation stress, visual contamination):	

General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

Ground Gas Monitoring and Flow Results

Project Number: AG3533-23
Project Name: Dogs Trust Merseyside, Whiston Lane, Huyton

Date and Time of Monitoring: Friday 15th December - 10:30am
Phase of Monitoring: 4 of 4

BH No.	Flow Range (litres/hr over 3 mins)			Differential Pressure (mb)	Methane % v/v		Carbon dioxide % v/v		Oxygen % v/v		Diameter of installation (mm)	Water level (m bgl)
	Max	Min	Avg		Peak	Steady	Peak	Steady	Min	Steady		
DCS2A	-6.0	-2.0	-	-0.38	0.2	0.2	1.9	1.9	19.4	19.4	50	0.79
DCS3	-3.1	-1.2	-	-0.19	0.2	0.2	3.7	3.7	15.1	15.1	50	0.98
DCS4	0.1	0.1	0.1	-0.17	0.2	0.2	7.2	7.2	8.3	8.3	50	0.91
DCS6	0.0	0.0	0.0	-0.17	0.1	0.1	8.1	8.1	9.4	9.4	50	1.01
DCS9	-5.2	-0.7	-3.0	-0.46	0.1	0.1	3.9	3.9	14.7	14.7	50	0.21
DCS10A	7.2	0.2	0.2	-0.03	0.1	0.1	3.5	3.5	18.5	18.5	50	0.86

Additional gases (if required)

BH No.	VOCs (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Diameter of installation (mm)
DCS2A	0.0	14	0	50
DCS3	0.0	3	0	50
DCS4	0.0	4	0	50
DCS6	0.0	6	0	50
DCS9	0.0	3	0	50
DCS10A	0.0	3	0	50

Borehole specific comments/observations
Standpipe flooded at surface
Standpipe flooded at surface

Meteorological Data

Atmospheric Pressure (mb)	Start: 1029
Atmospheric Pressure (mb)	Finish: 1030
Pressure Rising or Falling	Rising
Weather Conditions	Cloudy, light rain
Atmospheric Oxygen (% vol)	21.4
Wind Speed & Direction	15kmh WSW
Ambient Air Temperature (°C)	8.0

Site Data

Monitoring Personnel	Alex Boylan
GPS Instrument	
Gasmeter Serial Number	G503948
PID Serial Number	108308
Ground Conditions (vegetation stress, visual contamination):	

General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

Gas Monitoring Equipment Specification and Accuracy Details

Instrument Specifications

Instrument	Atmospheric Pressure Range	Temperature Range	Flow Range	Flow Resolution	Borehole Pressure Range
GA5000	500-1500 mb +/- 5 mb	-10°C to + 50°C	0-20 lt/hr +/- 0.3 l/hr	0.1l/hr	.+500/-500 mbar +/- 4 mbar
Phocheck Tiger	-	-20 to + 60°C (Certified to -15 to + 45°C)	-	-	-

Instrument Accuracy

Instrument		Methane	Lower Explosive Limit	Carbon Dioxide	Oxygen	Volatile Organic Compounds	Hydrogen Sulphide	Carbon Monoxide
GA5000	Detection Range	0-100%	-	0 -100%	0-25%	NA	0 -50ppm response <30 secs	0 - 1000ppm response <30 Secs
	Detection Accuracy	./+/- 0.5% @ 0 to 70%, +/-1.5% @ 70 to 100% Response < 10 secs	N/A	./+/- 0.5% @ 0 to 60%, +/-1.5% @ 60 to 100% Response < 10 secs	./+/- 1.0% @ 0 to 25%, Response < 20 secs	NA	./+/- 1.5% FS	./+/- 2% of FS
Phocheck Tiger	Detection Range	N/A	N/A	N/A	N/A	1 ppb - 10,000 ppm	N/A	N/A
	Detection Accuracy	N/A	N/A	N/A	N/A	+/- 1ppb +/- 5% of actual displayed accuracy +/- One digit Response < 2sec	N/A	N/A

Calibration Frequency

Equipment Serial Numbers

Instruments are calibrated annually. Details of the instrument calibration certificates and service records are available if required.		
	GA5000 (G503948, G505383, G505737)	
	Phocheck Tiger - (T-108308, T-109597, T-109598, T-110423)	

Filling	1
Trial Pit Length (m)	1.50
Trial Pit Width (m)	0.70
Trial Pit Depth (m)	1.90
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 10 is a line graph showing Depth (m bgl) on the Y-axis versus Time (minutes) on the X-axis. The Y-axis ranges from 0.00 to 2.00 m bgl, and the X-axis ranges from 0.00 to 350.00 minutes. Four data series are plotted, all showing a constant depth over time:

- Max effective depth:** Represented by a purple line with 'x' markers, maintaining a constant depth of approximately 0.85 m bgl.
- 75%:** Represented by a red line with square markers, maintaining a constant depth of approximately 1.10 m bgl.
- 25%:** Represented by a green line with triangle markers, maintaining a constant depth of approximately 1.65 m bgl.
- Empty:** Represented by a cyan line with 'x' markers, maintaining a constant depth of approximately 1.90 m bgl.

Soil Infiltration Rate (m/s)

*

* Water level did not drop sufficiently for the calculation to be made

Client:	Dogs Trust
Project:	Dogs Trust Merseyside, Whiston Lane, Huyton
Project No.	AG3533-23

APPLiED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL1

Date

02/11/2023

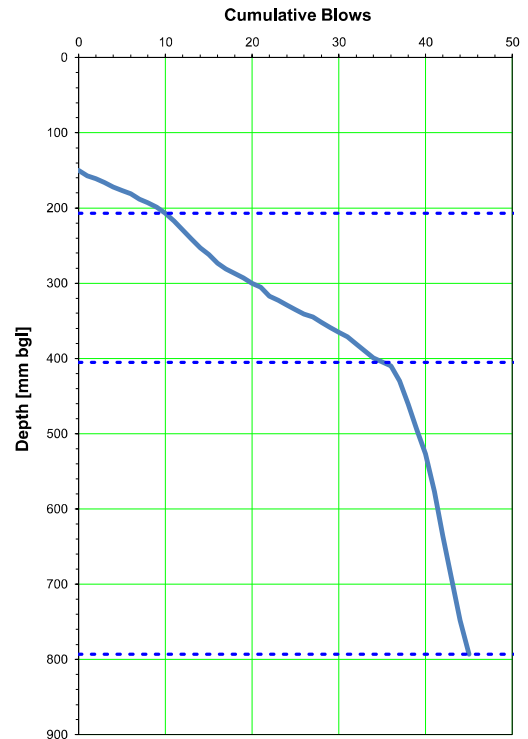
Operator

AB

Start Depth (mm bgl)

150

Checked by: SD

[illegible]

Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Made Ground over Glacial Till

Remarks:

Test commenced from base of asphalt adjacent to DCS1

Client:	Dogs Trust
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Project:	Dogs Trust Merseyside, Whiston Lane, Huyton
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Project No.	AG3533-23
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APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL2

Date

02/11/2023

Operator

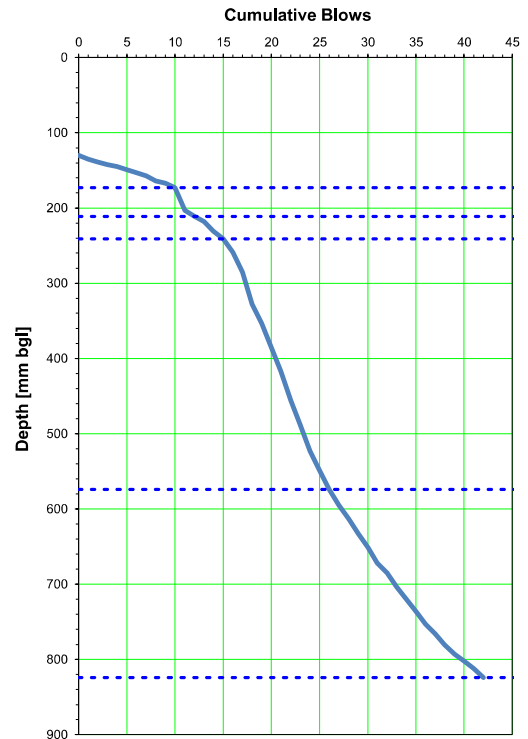
AB

Start Depth (mm bgl)

130

Checked by: SD

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	10	10	65	43	173
Layer 2	2	12	13	38	211
Layer 3	3	15	26	30	241
Layer 4	11	26	8	333	574
Layer 5	16	42	17	250	824



Notes: TRL Equation : $\log_{10}(\text{CBR}) = 2.480 - 1.057 \times \log_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Onto Made Ground

Remarks:

Test commenced from base of asphalt.

Client: Dogs Trust

Project: Dogs Trust Merseyside, Whiston Lane, Huyton

Project No. AG3533-23

APPLIED GEOLOGY

APPENDIX D

SOIL CHEMICAL RESULTS COMPARED AGAINST SCREENING VALUES FOR HUMAN HEALTH

Site: Dogs Trust Merseyside, Whiston Lane, Huyton
Job No: AG3533-23

Land Use: Commercial / Industrial

Dataset: All results

Soil Organic Matter (%) 2.5 %

Exploratory Hole Reference		DCS1	DCS2A	DCS3	DCS4	DCS5	DCS6	DCS9	DCS10A	TP1	TP3	TP4	TP5	No. of samples (n)	Commercial / Industrial	Source/Justification
Depth (m)		0.35	1.80	0.50	0.40	0.40	0.50	0.50	0.40	0.40	0.60	0.5	0.7			
Strata	Units	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG			
Organic Matter (%)	%	2.6	21	2.7	1.5	3.8	4.8	4.0	0.6	2.0	2.7	2.2	3.3	12		
pH	pH Units	7.8	7.3	7.9	7.9	7.5	7.7	7.7	8.6	8.1	7.5	8.4	8.3	12		
Arsenic	mg/kg	12	20	16	8.2	15	17	16	1.4	11	19	14	28	12	640	LOM/CI EH S4UL (2015)
Beryllium	mg/kg	0.94	1.4	0.91	0.41	0.79	0.88	0.86	0.07	0.74	1.1	0.82	3.1	12	12	LOM/CI EH S4UL (2015)
Boron - Total	mg/kg	6.5	20	6.6	4.1	5.1	7	5.2	1.3	5.9	6.2	6.1	13	12	240000	LOM/CI EH S4UL (2015)
Cadmium	mg/kg	0.7	0.2	0.9	0.8	1	1.3	1.2	0.3	0.5	0.7	0.7	3.2	12	190	LOM/CI EH S4UL (2015)
Chromium (total)	mg/kg	28	24	24	11	19	24	21	3.4	20	23	22	18	12	8600	LOM/CI EH S4UL (2015)
Chromium - III	mg/kg	27	23	23	10	18	23	20	1.6	19	22	22	16	12	8600	LOM/CI EH S4UL (2015)
Chromium (VII) Screen	mg/kg	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	12	33	LOM/CI EH S4UL (2015)
Copper	mg/kg	54	90	56	27	84	76	140	6.9	42	60	50	180	12	68000	LOM/CI EH S4UL (2015)
Lead	mg/kg	69	95	75	73	67	85	80	15	43	60	53	150	12	2300	LOM/CI EH S4UL (2015)
Mercury (Total)	mg/kg	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	12	1100	LOM/CI EH S4UL (2015)
Nickel	mg/kg	27	34	27	9.5	21	23	21	1.7	19	26	24	50	12	980	LOM/CI EH S4UL (2015)
Selenium	mg/kg	1.0	1.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	12	12000	LOM/CI EH S4UL (2015)
Vanadium	mg/kg	33	32	31	13	25	30	28	2.5	23	37	27	49	12	9000	LOM/CI EH S4UL (2015)
Zinc	mg/kg	99	110	100	84	96	130	99	8.4	74	99	77	160	12	730000	LOM/CI EH S4UL (2015)
Naphthalene	mg/kg	0.05	0.34	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.37	0.52	0.2	12	460	LOM/CI EH S4UL (2015)
Acenaphthylene	mg/kg	0.25	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.09	0.05	0.05	12	97000	LOM/CI EH S4UL (2015)
Acenaphthene	mg/kg	0.43	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.34	2.2	0.43	12	97000	LOM/CI EH S4UL (2015)
Fluorene	mg/kg	0.29	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.23	1.8	0.34	12	68000	LOM/CI EH S4UL (2015)
Phenanthrene	mg/kg	3.8	0.16	0.32	0.13	0.21	0.27	0.19	0.05	0.25	2.5	9.8	2.3	12	22000	LOM/CI EH S4UL (2015)
Anthracene	mg/kg	1.4	0.05	0.1	0.05	0.06	0.06	0.05	0.05	0.07	0.64	1.3	0.31	12	540000	LOM/CI EH S4UL (2015)
Fluoranthene	mg/kg	8.1	0.2	0.62	0.21	0.67	0.44	0.39	0.05	0.63	4.3	8.3	2.1	12	23000	LOM/CI EH S4UL (2015)
Pyrene	mg/kg	7.4	0.33	0.57	0.22	0.81	0.45	0.38	0.05	0.65	4.2	6.2	1.8	12	54000	LOM/CI EH S4UL (2015)
Benzo[a]anthracene	mg/kg	4	0.17	0.33	0.12	0.48	0.18	0.18	0.05	0.32	2.2	2.8	0.92	12	*	Genotoxic PAH see Benzo[a]pyrene
Chrysene	mg/kg	3.6	0.46	0.34	0.13	0.5	0.24	0.24	0.05	0.35	1.9	2.7	0.9	12	*	Genotoxic PAH see Benzo[a]pyrene
Benzo[b]fluoranthene	mg/kg	4.8	0.19	0.51	0.16	0.6	0.38	0.3	0.05	0.42	2.3	2.5	0.87	12	*	Genotoxic PAH see Benzo[a]pyrene
Benzo[k]fluoranthene	mg/kg	1.9	0.1	0.18	0.08	0.24	0.15	0.16	0.05	0.19	1.3	1.0	0.41	12	*	Genotoxic PAH see Benzo[a]pyrene
Benzo[a]pyrene	mg/kg	4.2	0.22	0.38	0.16	0.48	0.28	0.26	0.05	0.38	2.3	2.1	0.8	12	76	C4SL (2014)
Dibenzofluoranthene	mg/kg	0.61	0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.05	0.29	0.25	0.13	12	*	Genotoxic PAH see Benzo[a]pyrene
Indeno[1,2,3-cd]pyrene	mg/kg	2.2	0.09	0.2	0.1	0.22	0.15	0.14	0.05	0.19	1.1	0.84	0.41	12	*	Genotoxic PAH see Benzo[a]pyrene
Benzo[ghi]perylene	mg/kg	2.7	0.12	0.3	0.1	0.26	0.2	0.18	0.05	0.25	1.3	0.91	0.52	12	*	Genotoxic PAH see Benzo[a]pyrene
Total of 16 PAHs	mg/kg	45.8	2.31	3.85	1.41	4.6	2.9	2.42	0.8	3.96	25.2	43.1	12.4			
Phenols (Total)	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	12	690	LOM/CI EH S4UL (2015)
Benzene	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12	47	LOM/CI EH S4UL (2015)
Toluene	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12	110000	LOM/CI EH S4UL (2015)
Ethylbenzene	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12	13000	LOM/CI EH S4UL (2015)
m,p Xylene	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12	14000	LOM/CI EH S4UL (2015)
o-Xylene	mg/kg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	12	15000	LOM/CI EH S4UL (2015)
Aliphatic TPH >C5-C6	mg/kg	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	12	5900	LOM/CI EH S4UL (2015)
Aliphatic TPH >C6-C8	mg/kg	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	12	17000	LOM/CI EH S4UL (2015)
Aliphatic TPH >C8-C10	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	12	4800	LOM/CI EH S4UL (2015)
Aliphatic TPH >C10-C12	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.0	1.0	1.0	1.0	12	23000	LOM/CI EH S4UL (2015)
Aliphatic TPH >C12-C16	mg/kg	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.3	2.0	2.0	2.0	2.0	12	82000	LOM/CI EH S4UL (2015)
Aliphatic TPH >C16-C21	mg/kg	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	12	-	
Aliphatic TPH >C21-C35	mg/kg	31	34	37	8.0	8.0	8.0	8.0	8.0	8.0	28	23	8.0	12	No Risk	LOM/CI EH S4UL (2015)
Aliphatic TPH >C35-C44	mg/kg	8.4	8.4	36	8.4	8.4	8.4	8.4	8.4	8.4	12	9.3	8.4	12	No Risk	LOM/CI EH S4UL (2015)
Total Aliphatic Hydrocarbons	mg/kg	38	37	74	10	10	10	10	18	10	41	32	10	12		
Aromatic TPH >C5-C7	mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	12	46000	LOM/CI EH S4UL (2015)
Aromatic TPH >C7-C8	mg/kg	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	12	100000	LOM/CI EH S4UL (2015)
Aromatic TPH >C8-C10	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	12	9100	LOM/CI EH S4UL (2015)
Aromatic TPH >C10-C12	mg/kg	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	12	28000	LOM/CI EH S4UL (2015)
Aromatic TPH >C12-C16	mg/kg	3.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	12	37000	LOM/CI EH S4UL (2015)
Aromatic TPH >C16-C21	mg/kg	39	10	10	10	10	10	10	10	10	10	10	10	12	28000	LOM/CI EH S4UL (2015)
Aromatic TPH >C21-C35	mg/kg	80	20	50	10	14	10	10	10	14	40	32	37	12	28000	LOM/CI EH S4UL (2015)
Aromatic TPH >C35-C44	mg/kg	36	8.4	46	8.4	8.4	8.4	8.4	8.4	8.4	11	16	17	12	28000	LOM/CI EH S4UL (2015)
Total Aromatic Hydrocarbons	mg/kg	160	26	98	20	20	20	20	20	20	62	51	59	12		
Total Petroleum Hydrocarbons	mg/kg	200	60	170	10	19	10	10	15	14	100	84	59	12		
Asbestos ID	Detection	Detected	Not-detected	Detected	Detected	Not-detected	Not-detected	Not-detected	Not-detected	Detected	Not-detected	Detected	Detected	12		Detection Limit
Asbestos ID	Description	Chrysotile	-	Chrysotile	Amosite	-	-	-	-	Amosite	-	Chrysotile	Chrysotile	6		Detection Limit
Asbestos Quantity	%	0.001	-	0.001	0.007	-	-	-	-	0.001	-	0.001	0.138			Detection Limit

Key -
Value within sample set exceeds screening value

LOM/CI EH S4UL Reference No. S4UL3159 (2015)
Values in bold are reported at the laboratory limit of detection
Benzo(a)pyrene has been used as a 'surrogate marker for genotoxic PAH' as discussed in Appendix E of CLARE SP1010 'Development of C4SL for Assessment of Land Affected by Contamination', December 2013.
This allows assessment of the combined carcinogenic risk associated with genotoxic PAH using only b(a)p. Genotoxic PAHs include Benzo(a)pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Benzo(ghi)perylene and have been marked with a * on the table.

SUMMARY OF LEACHATE TEST RESULTS

Site Dogs Trust Merseyside, Whiston Lane, Huyton
Job Number AG3533-23
Type of Water Leachate

Determinand	Limit of Detection	Hazardous or Non-Hazardous ^a	Sample Identity Depth Sampled	DCS2A 1.8 02/11/2023	DCS5 0.4 30/10/2023	DCS10A 0.4 31/10/2023	No. of samples (n)	Waters Screening Value	Source & Justification
pH	0.1	-	-	7.7	7.4	7.9	3	-	-
TOC	0.1	-	mg l ⁻¹	20	15.7	15.7	3	-	-
Arsenic	1	Haz	µg l ⁻¹	7.5	2.5	1	3	10	UK Drinking Water Standards (2010)
Cadmium	0.08	Non Haz	µg l ⁻¹	0.08	0.08	0.08	3	5	UK Drinking Water Standards (2010)
Chromium (Total)	0.4	Non Haz	µg l ⁻¹	2.1	3.7	1.9	3	50	UK Drinking Water Standards (2010)
Chromium (III)	5	Non Haz	µg l ⁻¹	5	5	5	3	5	Detection Limit
Chromium (VI)	5	Haz	µg l ⁻¹	5	5	5	3	5	Detection Limit
Copper	0.7	Non Haz	µg l ⁻¹	64	32	28	3	2000	UK Drinking Water Standards (2010)
Lead	1	Haz	µg l ⁻¹	6	7.4	8.4	3	10	UK Drinking Water Standards (2010)
Mercury	0.5	Haz	µg l ⁻¹	0.5	0.5	0.5	3	0.5	Detection limit
Nickel	0.3	Non Haz	µg l ⁻¹	3.6	3.3	2.7	3	20	UK Drinking Water Standards (2010)
Selenium	4	Non Haz	µg l ⁻¹	4	4	4	3	10	UK Drinking Water Standards (2010)
Zinc	0.4	Non Haz	µg l ⁻¹	16	26	24	3	5000	UK Drinking Water Standards (2010)
Boron	10	Non Haz	µg l ⁻¹	180	10	10	3	1000	UK Drinking Water Standards (2010)
Beryllium	0.2	Non Haz	µg l ⁻¹	0.2	0.2	0.2	3	12	UK Drinking Water Standards (2010)
Vanadium	1.7	Non Haz	µg l ⁻¹	6	2.4	5	3	20	EQS
Sulphate	0.1	Non Haz	mg l ⁻¹	9.6	0.9	0.9	3	250	UK Drinking Water Standards (2010)
Phenol	1	Non Haz	µg l ⁻¹	2.1	1.9	1.9	3	7.7	WFD Environmental Standard, 2010
Naphthalene	0.01	Non Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Acenaphthylene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Acenaphthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Fluorene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Phenanthrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Anthracene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Fluoranthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Pyrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Benzo[a]anthracene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Chrysene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Benzo[b]fluoranthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Benzo[k]fluoranthene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Benzo[a]pyrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Dibenz[a,h]Anthracene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Indeno[1,2,3-c,d]Pyrene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit
Benzo[g,h,i]perylene	0.01	Haz	µg l ⁻¹	0.01	0.01	0.01	3	0.01	Detection limit

Key-

Result exceeds Screening Value (for Non Haz determinands)

^a Note:

Hazardous and non-hazardous substances determined by JAGDAG (Jan 2017) and published at <http://www.wfd.uk.org/sites/default/files/Media/170116%20Substance%20Determinationsfinal.pdf>. These are marked in bold.

For substances not assessed by JAGDAG, Applied Geology has assumed a determination based on our understanding of the behaviour of the chemical. These determinations are highlighted in yellow.

Values in bold at the limit of detection

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Analytical Report Number : 23-67319

Project / Site name:	Dogs Trust	Samples received on:	07/11/2023
Your job number:	AG3533-23	Samples instructed on/ Analysis started on:	07/11/2023
Your order number:		Analysis completed by:	15/11/2023
Report Issue Number:	1	Report issued on:	15/11/2023
Samples Analysed:	3 leachate samples - 12 soil samples		

Signed:



Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 23-67319
Project / Site name: Dogs Trust

Lab Sample Number	2870501	2870502	2870503	2870504	2870505
Sample Reference	DCS1	DCS2A	DCS3	DCS4	DCS5
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.35	1.80	0.50	0.40	0.40
Date Sampled	30/10/2023	02/11/2023	30/10/2023	30/10/2023	30/10/2023
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	60
Total mass of sample received	kg	0.001	NONE	2	1.1
				0.7	0.7
				0.7	0.8

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	Chrysotile	Amosite	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	< 0.001	0.007	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	< 0.001	0.007	-
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO	DSO	DSO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	7.3	7.9	7.9	7.5
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	49	2100	340	15	18
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0245	1.04	0.171	0.0077	0.0092
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	24.5	1040	171	7.7	9.2
Organic Matter	%	0.1	MCERTS	-	21	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	2.6	-	2.7	1.5	3.8

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.34	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.25	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.43	0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.29	0.08	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	3.8	0.16	0.32	0.13	0.21
Anthracene	mg/kg	0.05	MCERTS	1.4	< 0.05	0.1	< 0.05	0.06
Fluoranthene	mg/kg	0.05	MCERTS	8.1	0.2	0.62	0.21	0.67
Pyrene	mg/kg	0.05	MCERTS	7.4	0.33	0.57	0.22	0.81
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4	0.17	0.33	0.12	0.48
Chrysene	mg/kg	0.05	MCERTS	3.6	0.26	0.34	0.13	0.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	4.8	0.19	0.51	0.16	0.6
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.9	0.1	0.18	0.08	0.24
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.2	0.22	0.38	0.16	0.48
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.2	0.09	0.2	0.1	0.22
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.61	< 0.05	< 0.05	< 0.05	0.07
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.7	0.12	0.3	0.1	0.26

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	45.8	2.31	3.85	1.41	4.6
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Analytical Report Number: 23-67319
Project / Site name: Dogs Trust

Lab Sample Number	2870501	2870502	2870503	2870504	2870505
Sample Reference	DCS1	DCS2A	DCS3	DCS4	DCS5
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.35	1.80	0.50	0.40	0.40
Date Sampled	30/10/2023	02/11/2023	30/10/2023	30/10/2023	30/10/2023
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	20	16	8.2	15
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.94	1.4	0.91	0.41	0.79
Boron (total)	mg/kg	1	MCERTS	6.5	20	6.6	4.1	5.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	< 0.2	0.9	0.8	1
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	27	23	23	10	18
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	24	24	11	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	54	90	56	27	64
Lead (aqua regia extractable)	mg/kg	1	MCERTS	69	95	75	73	67
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	34	27	9.5	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.2	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	33	32	31	13	25
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	99	110	100	84	96

Magnesium (water soluble)	mg/kg	5	NONE	22	160	13	8.1	11
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Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	31	34	37	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44 _{EH_CU+HS_ID_AL}	mg/kg	8.4	NONE	< 8.4	< 8.4	36	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	37	36	38	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	38	37	74	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	3.6	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	39	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	80	20	50	< 10	14
TPH-CWG - Aromatic > EC35 - EC44 _{EH_CU_ID_AR}	mg/kg	8.4	NONE	36	< 8.4	46	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	120	23	52	< 10	19
TPH-CWG - Aromatic (EC5 - EC44) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	160	26	98	< 10	20

TPHCWG - Total C5 - C44 Aliphatic & Aromatic _{EH_CU+HS_ID_TC}	mg/kg	10	NONE	200	60	170	< 10	19
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-67319
Project / Site name: Dogs Trust

Lab Sample Number				2870506	2870507	2870508	2870509	2870510
Sample Reference				DCS6	DCS9	DCS10A	TP1	TP3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.40	0.40	0.60
Date Sampled				30/10/2023	31/10/2023	31/10/2023	01/11/2023	01/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	99	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	19	2	13	13
Total mass of sample received	kg	0.001	NONE	0,8	0,7	0,8	0,8	0,7

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Amosite	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	< 0.001	-
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO	DSO	DSO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.7	8.6	8.1	7.5
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	30	12	8.1	110	68
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0152	0.006	0.004	0.0531	0.0342
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.2	6	4	53.1	34.2
Organic Matter	%	0.1	MCERTS	-	-	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	4.8	4	0.6	2	2.7

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.37
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.09
Acenaphthene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	0.06	0.34
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.05	0.23
Phenanthrene	mg/kg	0.05	MCERTS	0.27	0.19	< 0.05	0.25	2.5
Anthracene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	0.07	0.64
Fluoranthene	mg/kg	0.05	MCERTS	0.44	0.39	< 0.05	0.63	4.3
Pyrene	mg/kg	0.05	MCERTS	0.45	0.38	< 0.05	0.65	4.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.18	0.18	< 0.05	0.32	2.2
Chrysene	mg/kg	0.05	MCERTS	0.3	0.24	< 0.05	0.35	1.9
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.36	0.3	< 0.05	0.42	2.3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.15	0.16	< 0.05	0.19	1.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.28	0.26	< 0.05	0.38	2.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.15	0.14	< 0.05	0.19	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.05	0.29
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.2	0.18	< 0.05	0.25	1.3

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.9	2.42	< 0.80	3.86	25.2
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Analytical Report Number: 23-67319
Project / Site name: Dogs Trust

Lab Sample Number				2870506	2870507	2870508	2870509	2870510
Sample Reference				DCS6	DCS9	DCS10A	TP1	TP3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.50	0.40	0.40	0.60
Date Sampled				30/10/2023	31/10/2023	31/10/2023	01/11/2023	01/11/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	16	1.4	11	19
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.88	0.86	0.07	0.74	1.1
Boron (total)	mg/kg	1	MCERTS	7	5.2	1.3	5.9	6.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.3	1.2	0.3	0.5	0.7
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	1.9	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	23	20	1.6	19	22
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24	21	3.4	20	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	76	140	6.9	42	60
Lead (aqua regia extractable)	mg/kg	1	MCERTS	85	80	15	43	60
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	21	1.7	19	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30	26	2.5	23	37
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	99	8.4	74	99
Magnesium (water soluble)	mg/kg	5	NONE	12	8.2	5.7	12	7.9
Monoaromatics & Oxygenates								
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.02	NONE	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	1.2	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	3.3	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	28
TPH-CWG - Aliphatic > EC35 - EC44 _{EH_CU_ID_AL}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	12
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	< 10	< 10	15	< 10	28
TPH-CWG - Aliphatic (EC5 - EC44) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	< 10	< 10	18	< 10	41
TPH-CWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.05	NONE	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	14	40
TPH-CWG - Aromatic > EC35 - EC44 _{EH_CU_ID_AR}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	11
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	< 10	< 10	< 10	14	51
TPH-CWG - Aromatic (EC5 - EC44) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	< 10	< 10	< 10	20	62
TPHCWG - Total C5 - C44 Aliphatic & Aromatic _{EH_CU+HS_ID_TC}	mg/kg	10	NONE	< 10	< 10	15	14	100

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-67319

Project / Site name: Dogs Trust

Lab Sample Number				2870511	2870512
Sample Reference				TP4	TP5
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.70
Date Sampled				01/11/2023	01/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	17
Total mass of sample received	kg	0.001	NONE	0,8	0,8

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	0.138
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	0.138
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8,4	8,3
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	30	270
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0148	0.134
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	14,8	134
Organic Matter	%	0.1	MCERTS	-	-
Organic Matter (automated)	%	0.1	MCERTS	2,2	3,3

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.52	0.2
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	2.2	0.43
Fluorene	mg/kg	0.05	MCERTS	1.8	0.34
Phenanthrene	mg/kg	0.05	MCERTS	9.8	2.3
Anthracene	mg/kg	0.05	MCERTS	1.3	0.31
Fluoranthene	mg/kg	0.05	MCERTS	8.3	2.1
Pyrene	mg/kg	0.05	MCERTS	6.2	1.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.8	0.92
Chrysene	mg/kg	0.05	MCERTS	2.7	0.9
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.5	0.87
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1	0.41
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.1	0.8
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.84	0.41
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.25	0.13
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.91	0.52

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	43.1	12.4
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Analytical Report Number: 23-67319

Project / Site name: Dogs Trust

Lab Sample Number				2870511	2870512
Sample Reference				TP4	TP5
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	0.70
Date Sampled				01/11/2023	01/11/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	28
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.82	3.1
Boron (total)	mg/kg	1	MCERTS	6.1	13
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	3.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	22	16
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	50	180
Lead (aqua regia extractable)	mg/kg	1	MCERTS	53	150
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	50
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	27	49
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	77	160
Magnesium (water soluble)	mg/kg	5	NONE	6.2	9.8
Monoaromatics & Oxygenates					
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.02	NONE	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.02	NONE	< 0.020	< 0.020
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.05	NONE	< 0.050	< 0.050
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44 _{EH_CU_ID_AL}	mg/kg	8.4	NONE	9.3	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	23	< 10
TPH-CWG - Aliphatic (EC5 - EC44) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	32	< 10
TPH-CWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.01	NONE	< 0.010	< 0.010
TPH-CWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.01	NONE	< 0.010	< 0.010
TPH-CWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.05	NONE	< 0.050	< 0.050
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	32	37
TPH-CWG - Aromatic > EC35 - EC44 _{EH_CU_ID_AR}	mg/kg	8.4	NONE	16	17
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	35	42
TPH-CWG - Aromatic (EC5 - EC44) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	51	59
TPHCWG - Total C5 - C44 Aliphatic & Aromatic _{EH_CU+HS_ID_TG}	mg/kg	10	NONE	84	59

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-67319
Project / Site name: Dogs Trust
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2870501	DCS1	0.35	152	Loose Fibres	Chrysotile	< 0.001	< 0.001
2870503	DCS3	0.50	141	Loose Fibres	Chrysotile	< 0.001	< 0.001
2870504	DCS4	0.40	141	Loose Fibres & Loose Fibrous Debris	Amosite	0.007	0.007
2870509	TP1	0.40	151	Loose Fibres	Amosite	< 0.001	< 0.001
2870511	TP4	0.50	145	Loose Fibres	Chrysotile	< 0.001	< 0.001
2870512	TP5	0.70	144	Asbestos Cement	Chrysotile	0.138	0.138

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



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Analytical Report Number: 23-67319

Project / Site name: Dogs Trust

Lab Sample Number				2870513	2870514	2870515
Sample Reference				DCS2A	DCS5	DCS10A
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.80	0.40	0.40
Date Sampled				02/11/2023	30/10/2023	31/10/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status			

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	7.7	7.4	7.9
Sulphate as SO ₄	mg/l	0.1	ISO 17025	9.6	0.9	0.9
Total Organic Carbon (TOC)	mg/l	0.1	NONE	20	15.7	15.7

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	2.1	1.9	1.9
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	7.5	2.5	< 1.0
Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2
Boron (dissolved)	µg/l	10	ISO 17025	180	< 10	< 10
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	2.1	3.7	1.9
Copper (dissolved)	µg/l	0.7	ISO 17025	64	32	28
Lead (dissolved)	µg/l	1	ISO 17025	6	7.4	8.4
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	3.6	3.3	2.7
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	6	2.4	5
Zinc (dissolved)	µg/l	0.4	ISO 17025	16	26	24

Magnesium (dissolved)	mg/l	0.005	ISO 17025	1.5	1.3	1.8
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-67319
Project / Site name: Dogs Trust

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2870501	DCS1	None Supplied	0,35	Brown loam and sand with gravel and vegetation.
2870502	DCS2A	None Supplied	1,8	Brown clay with gravel and vegetation.
2870503	DCS3	None Supplied	0,5	Brown loam and clay with gravel and vegetation.
2870504	DCS4	None Supplied	0,4	Brown loam and sand with gravel.
2870505	DCS5	None Supplied	0,4	Brown loam and sand with gravel and vegetation.
2870506	DCS6	None Supplied	0,5	Brown loam and sand with gravel and vegetation.
2870507	DCS9	None Supplied	0,5	Brown loam and sand with gravel and vegetation.
2870508	DCS10A	None Supplied	0,4	Non Soil**
2870509	TP1	None Supplied	0,4	Brown clay with gravel.
2870510	TP3	None Supplied	0,6	Brown loam and clay with gravel.
2870511	TP4	None Supplied	0,5	Brown loam and sand with gravel and vegetation.
2870512	TP5	None Supplied	0,7	Brown loam and sand with gravel and vegetation.

Analytical Report Number : 23-67319

Project / Site name: Dogs Trust

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
NRA Leachate Prep	10:1 extract with de-ionised water shaken for 24 hours then filtered.	In-house method based on National Rivers Authority	L020-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025

Analytical Report Number : 23-67319

Project / Site name: Dogs Trust

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Stones content of soil	Standard preparation for all samples unless otherwise detailed, Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon in leachate	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Cr (III) in leachate	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. Refer to CoA for band specific accreditation.	In-house method with silica gel split/clean up.	L088/76-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
TPHCWG Ali Aro Sum	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. Refer to CoA for band specific accreditation.	In-house method with silica gel split/clean up.	L088/76-PL	W	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

Analytical Report Number : 23-67319

Project / Site name: Dogs Trust

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

**** - Unaccredited sample matrix**

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Analytical Report Number : 23-69412

Project / Site name:	Dogs Trust Merseyside	Samples received on:	16/11/2023
Your job number:	AG3533 23	Samples instructed on/ Analysis started on:	16/11/2023
Your order number:		Analysis completed by:	23/11/2023
Report Issue Number:	1	Report issued on:	23/11/2023
Samples Analysed:	10 soil samples		



Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 23-69412
Project / Site name: Dogs Trust Merseyside

Lab Sample Number				2881503	2881504	2881505	2881506	2881507
Sample Reference				DCS2A	DCS3	DCS3	DCS4	DCS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.75	1.70	1.20	0.35
Date Sampled				02/11/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	56	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	11	11	15	15
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.5	0.6

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.4	8.1	7.5	7.7
Total Sulphate as SO ₄	%	0.005	MCERTS	0.029	0.032	0.018	0.031	0.04
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0659	0.0117	0.0079	0.0197	0.0283
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	65.9	11.7	7.9	19.7	28.3
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	3.1	0.6	-	-	2.3
Total Sulphur	%	0.005	MCERTS	0.055	0.03	0.009	0.012	0.031
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	-	-	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	14	5.5	-	-	9.1
Magnesium (leachate equivalent)	mg/l	2.5	NONE	6.9	2.8	-	-	4.5

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-69412
Project / Site name: Dogs Trust Merseyside

Lab Sample Number				2881508	2881509	2881510	2881511	2881512
Sample Reference				DCS6	DCS7	DCS7	DCS9	DCS10A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90	1.75	2.60	1.20	1.20
Date Sampled				30/10/2023	31/10/2023	31/10/2023	31/10/2023	31/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	21	73	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	14	6.1	12	13
Total mass of sample received	kg	0.001	NONE	0.6	0.5	0.6	0.5	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	7.5	7.9	8.4	8.1
Total Sulphate as SO ₄	%	0.005	MCERTS	0.026	0.09	0.039	0.021	0.013
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.029	0.0379	0.148	0.022	0.0218
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	29	37.9	148	22	21.8
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	1.6	4.3	-	-
Total Sulphur	%	0.005	MCERTS	0.014	0.049	0.146	0.01	0.008
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	< 2.0	< 2.0	-	-

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	-	< 5.0	17	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	< 2.5	8.3	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-69412

Project / Site name: Dogs Trust Merseyside

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2881503	DCS2A	None Supplied	0.5	Brown clay and loam with gravel.
2881504	DCS3	None Supplied	0.75	Brown clay and loam with vegetation and stones.
2881505	DCS3	None Supplied	1.7	Brown clay and sand with gravel.
2881506	DCS4	None Supplied	1.2	Brown clay and sand with gravel.
2881507	DCS5	None Supplied	0.35	Brown loam and clay with gravel and vegetation.
2881508	DCS6	None Supplied	0.9	Brown clay and sand with gravel.
2881509	DCS7	None Supplied	1.75	Brown clay and sand with gravel and stones.
2881510	DCS7	None Supplied	2.6	Brown clay and sand with gravel and stones.
2881511	DCS9	None Supplied	1.2	Brown clay with gravel.
2881512	DCS10A	None Supplied	1.2	Brown clay and sand with gravel.

Analytical Report Number : 23-69412
Project / Site name: Dogs Trust Merseyside

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.



LABORATORY REPORT



Contract Number: PSL23/9723

Report Date: 11 December 2023

Client's Reference: AG3533-23

Client Name: Applied Geology Limited
The Old Barn
Church Farm
Fulbrook Lane
Sherbourne
Warwick

For the attention of: Hannah Spencer/Alex Boylan

Contract Title: Dogs Trust, Merseyside

Date Received: 16/11/2023

Date Commenced: 16/11/2023

Date Completed: 11/12/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)


S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
DCS1		D	0.80		Brown slightly gravelly sandy CLAY.
DCS3		D	1.20		Brown slightly gravelly sandy CLAY.
DCS3		D	2.30		Brown slightly gravelly sandy CLAY.
DCS4		D	0.90		Brown slightly gravelly sandy CLAY.
DCS5		D	1.70		Brown slightly gravelly sandy CLAY.
DCS5		D	3.00		Brown slightly gravelly sandy CLAY.
DCS6		D	1.20		Brown slightly gravelly sandy CLAY.
DCS9		D	2.55		Brown slightly gravelly sandy CLAY.
DCS9		D	0.90		Brown slightly gravelly sandy CLAY.
DCS10A		D	1.00		Brown slightly gravelly sandy CLAY.
RH1		D	1.70		Brown slightly gravelly sandy CLAY.
DCS10A		D	2.50		Brown slightly gravelly sandy CLAY.
DCS4		D	2.00		Brown slightly gravelly sandy CLAY.
TP3		B	0.50		MADE GROUND brown very sandy clayey silty gravel with some cobbles.
TP3		B	1.50		Brown slightly gravelly sandy CLAY.
TP4		B	1.00		Brown slightly gravelly sandy CLAY.



Dogs Trust, Merseyside

Contract No:

PSL23/9723

Client Ref:

AG3533-23

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
DCS1		D	0.80		13			30	16	14	81	Low Plasticity CL
DCS3		D	1.20		18			37	19	18	90	Intermediate Plasticity CI
DCS3		D	2.30		14			32	16	16	83	Low Plasticity CL
DCS4		D	0.90		19			35	18	17	91	Intermediate Plasticity CI
DCS5		D	1.70		17			34	17	17	85	Low Plasticity CL
DCS5		D	3.00		10			28	14	14	75	Low Plasticity CL
DCS6		D	1.20		18			35	18	17	90	Intermediate Plasticity CI
DCS9		D	2.55		13			28	14	14	84	Low Plasticity CL
DCS9		D	0.90		25			40	20	20	94	Intermediate Plasticity CI
DCS10A		D	1.00		18			33	17	16	89	Low Plasticity CL
RH1		D	1.70		18			35	17	18	88	Intermediate Plasticity CI
DCS10A		D	2.50		13			29	15	14	81	Low Plasticity CL
DCS4		D	2.00		16			30	15	15	92	Low Plasticity CL
TP3		B	0.50				2.58					
TP3		B	1.50		16		2.65	32	16	16	87	Low Plasticity CL
TP4		B	1.00		17		2.64	38	18	20	80	Intermediate Plasticity CI

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.



Dogs Trust, Merseyside

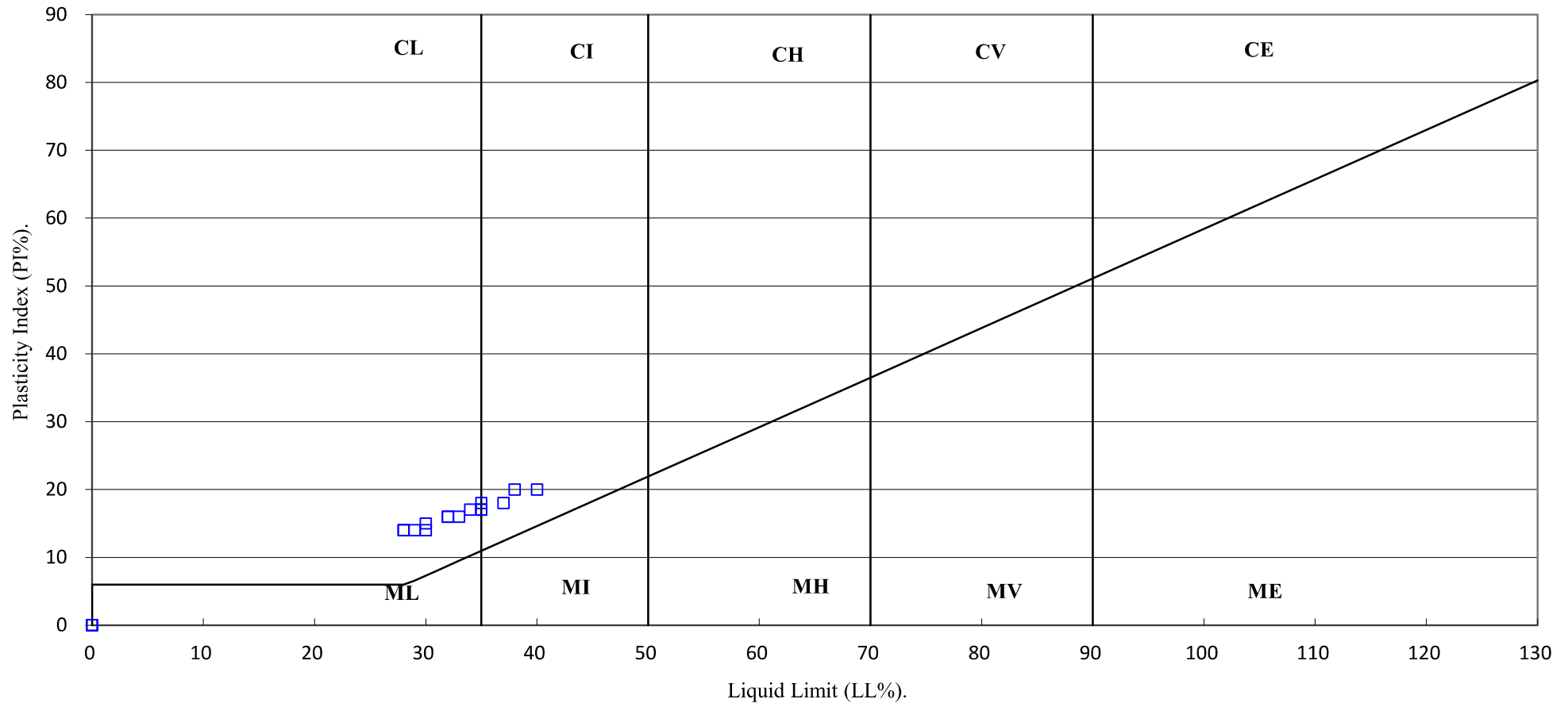
Contract No:

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PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

TP3

Top Depth (m):

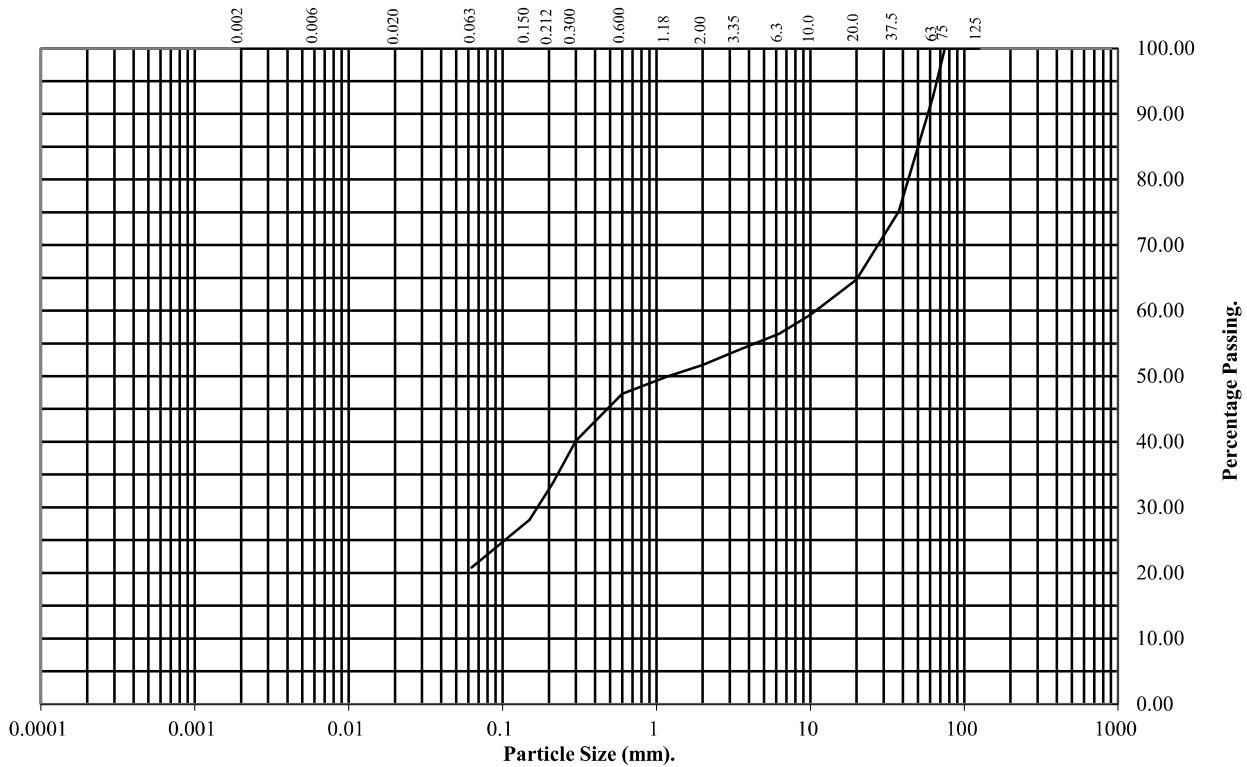
0.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	93
37.5	75
20	65
10	59
6.3	56
3.35	54
2	52
1.18	50
0.6	47
0.3	40
0.212	34
0.15	28
0.063	21

Soil Fraction	Total Percentage
Cobbles	7
Gravel	41
Sand	31
Silt/Clay	21

Remarks:

See Summary of Soil Descriptions



Dogs Trust, Merseyside

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

TP3

Top Depth (m):

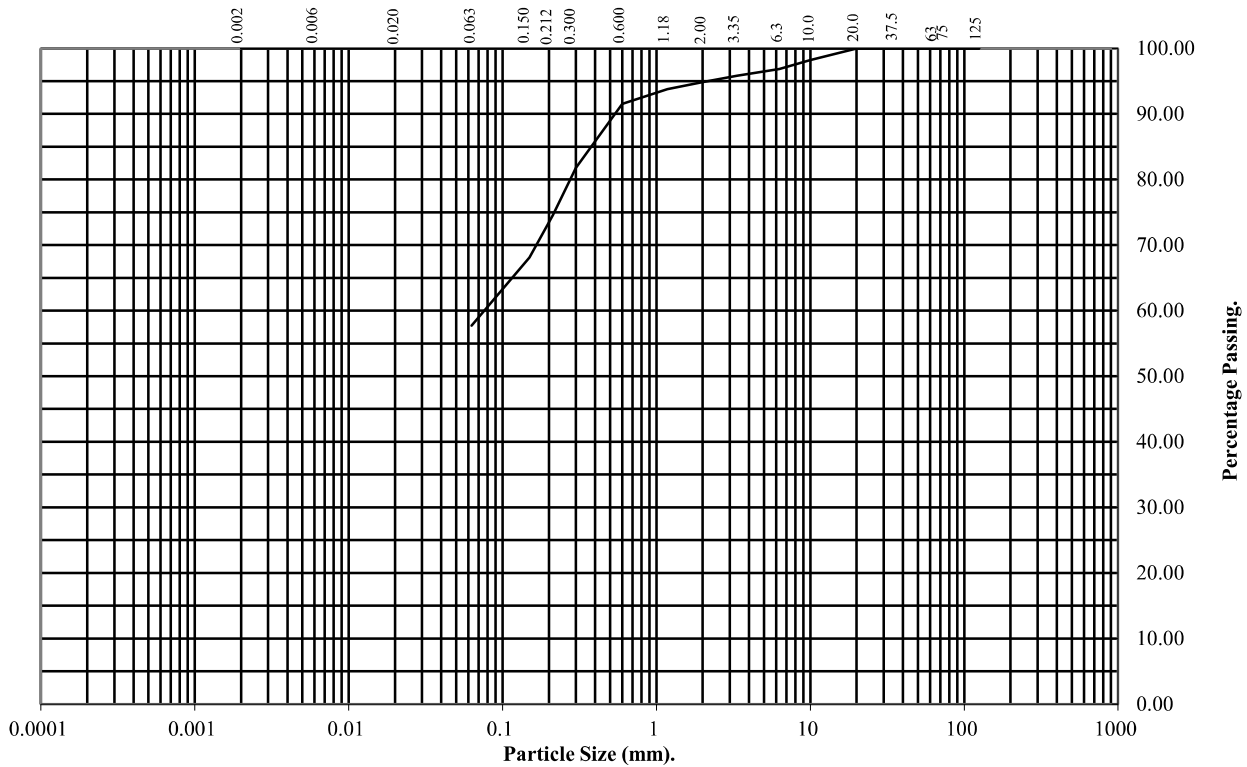
1.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	97
3.35	96
2	95
1.18	94
0.6	92
0.3	82
0.212	75
0.15	68
0.063	58

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	37
Silt/Clay	58

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

TP4

Top Depth (m):

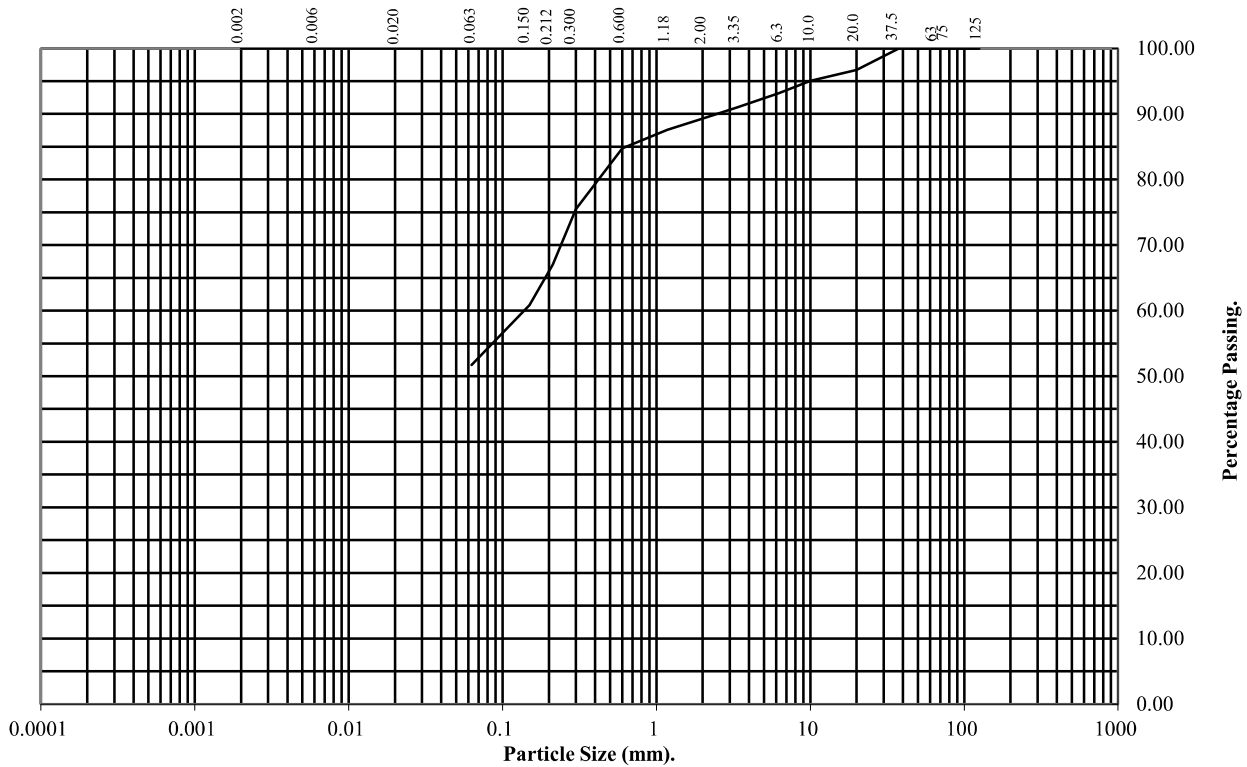
1.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	97
10	95
6.3	93
3.35	91
2	89
1.18	88
0.6	85
0.3	75
0.212	67
0.15	61
0.063	52

Soil Fraction	Total Percentage
Cobbles	0
Gravel	11
Sand	37
Silt/Clay	52

Remarks:

See Summary of Soil Descriptions



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

Non compliance with BS 1377 : Part 4 : Clause 3.4 : 1990

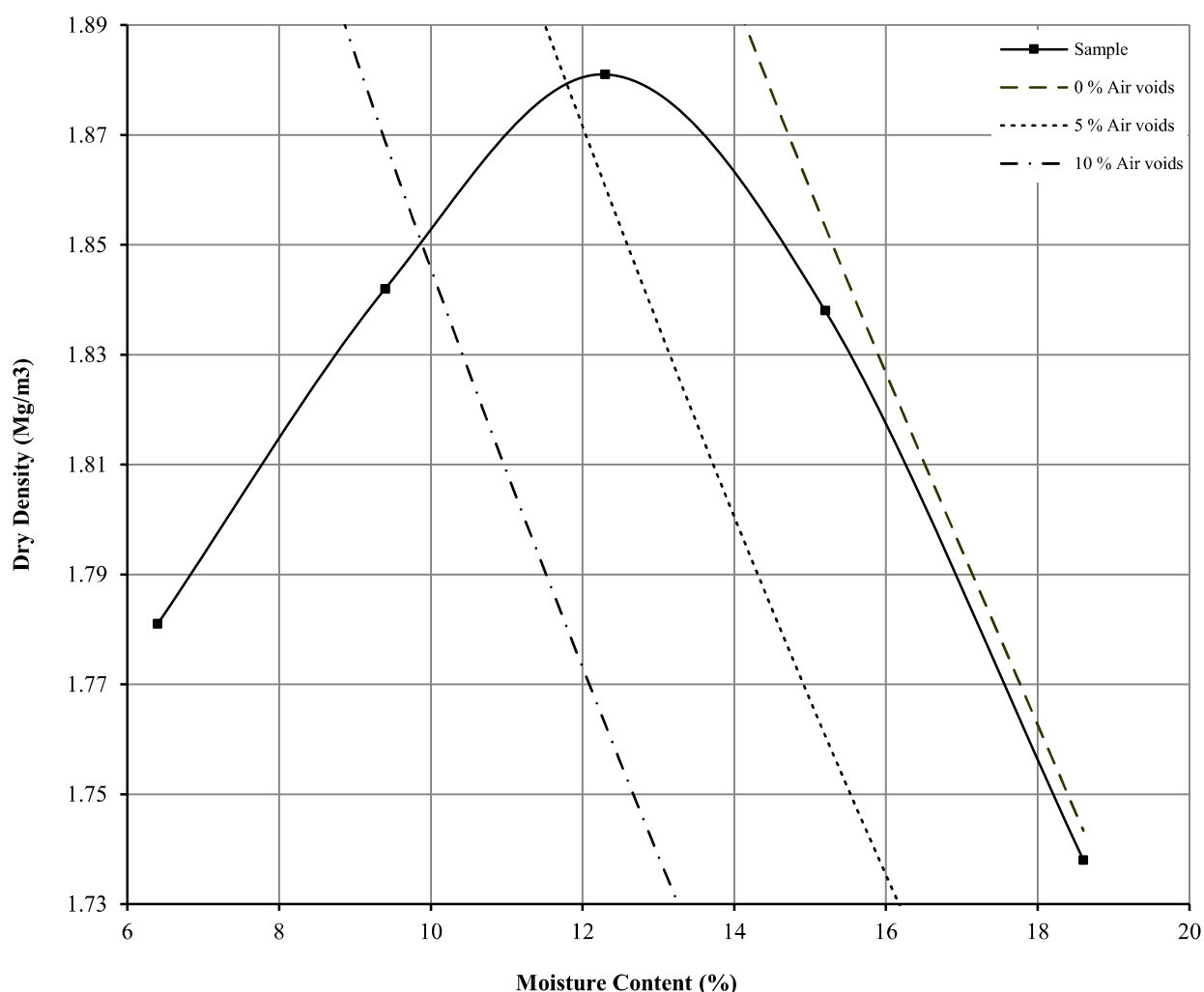
Hole Number: TP3

Top Depth (m) : 0.50

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	15	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.58	Measured	Material Retained on 37.5 mm Test Sieve (%):	25
Maximum Dry Density (Mg/m3):	1.88		Material Retained on 20.0 mm Test Sieve (%):	10
Optimum Moisture Content (%):	12			
Remarks See summary of soil descriptions				

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

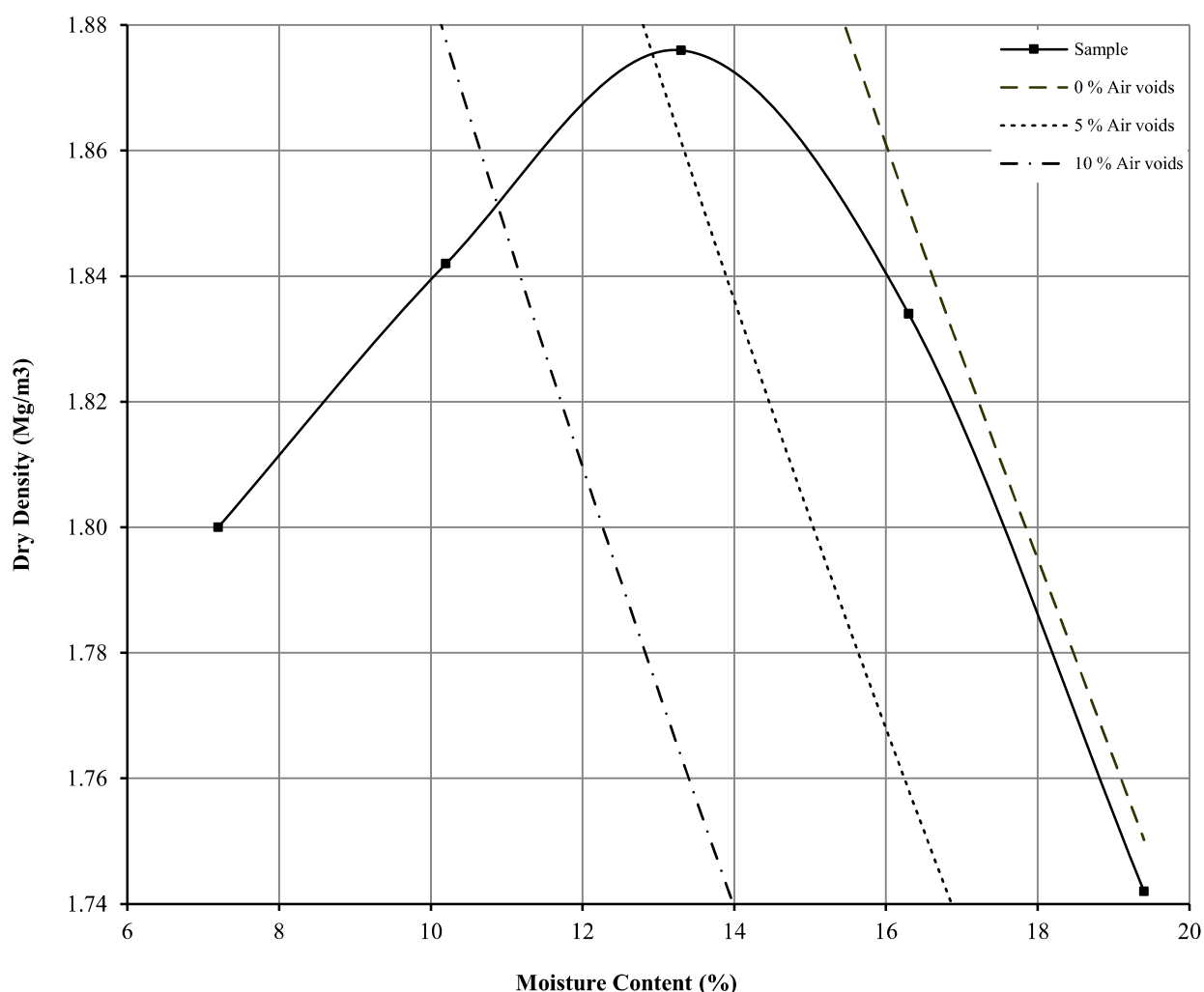
Hole Number: TP3

Top Depth (m) : 1.50

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.88		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	13			
Remarks See summary of soil descriptions				



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

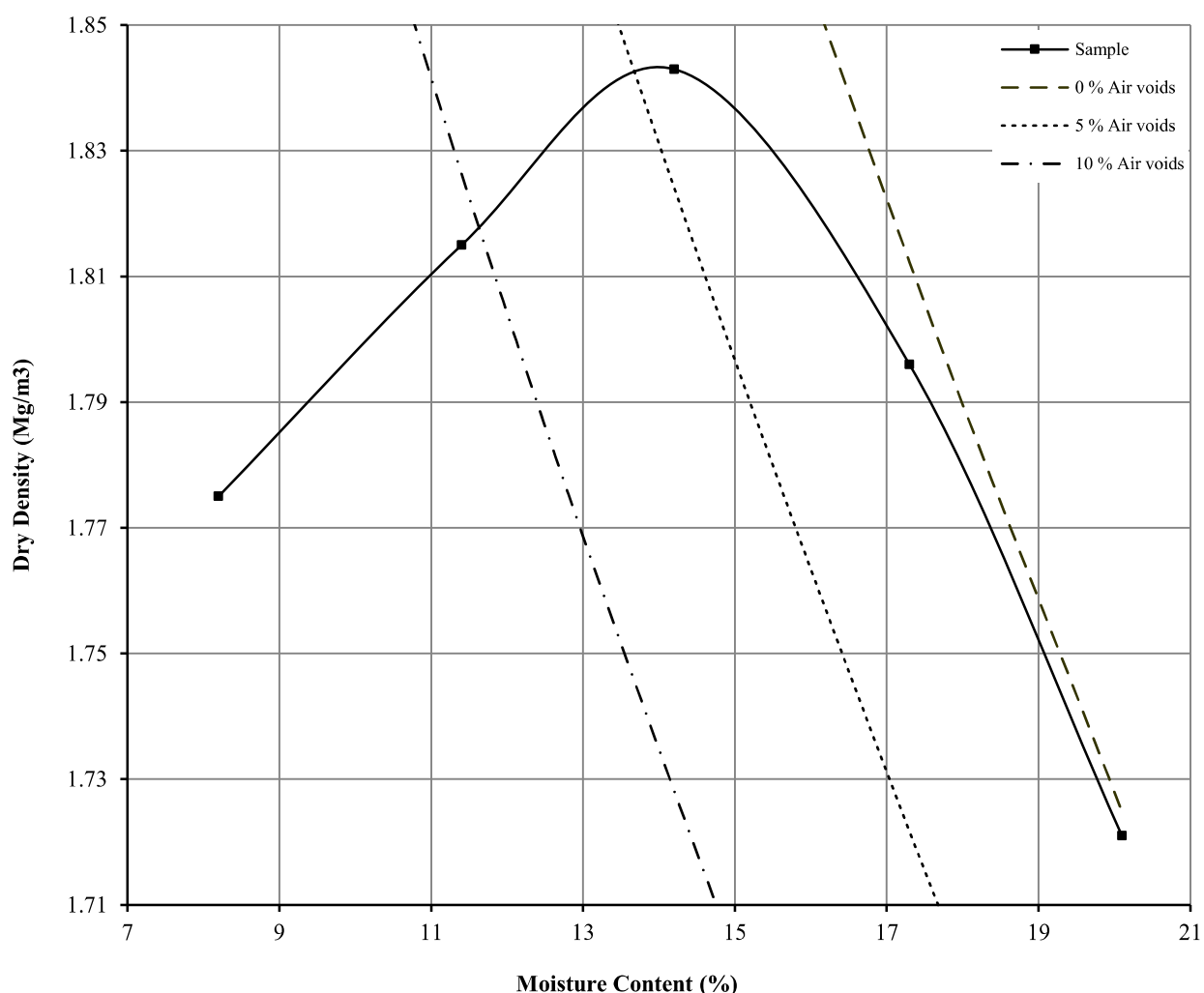
Hole Number: TP4

Top Depth (m) : 1.00

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	17	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.64	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.84		Material Retained on 20.0 mm Test Sieve (%):	3
Optimum Moisture Content (%):	14			
Remarks See summary of soil descriptions				



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APPENDIX E

APPENDIX E

STANDARD FIELDWORK AND ASSESSMENT PROCEDURES

Scope of Work

The scope of work undertaken is defined in Section 1 of the Report. It should be noted that Applied Geology Limited does not provide arboricultural surveys, specialist surveys for the detection of invasive plant species (such as Japanese Knotweed) or protected species of wildlife. Information from environmental and ecological datasets is included from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website, however, if a full assessment of Environmental or Ecological aspects is required, it is recommended that other specialists are consulted. Similarly, information on flood risk is included; obtained from the Environment Agency Web site and the GroundSure report; but this is not intended to be a full hydrological study and, if a flood risk assessment is needed, additional analysis by others is recommended to confirm this aspect of the development. Also, whilst our field staff have undergone asbestos awareness training, Applied Geology does not undertake asbestos surveys or provide specific advice relating to asbestos-containing materials. Any suspected asbestos-containing materials observed by our field staff will be mentioned in the report but further assessment by others may be required.

Fieldwork

Fieldwork is generally carried out in accordance with BS5930 (2015) "Code of Practice for Site Investigations" and BS10175 (2011) Investigation of Potentially Contaminated Sites, unless otherwise stated.

Prior to commencement on site, statutory services plans are generally obtained and verbal enquiries are also made regarding the positions of private or statutory services on site. Prior to excavation or drilling, locations are scanned with a cable avoidance tool (CAT) and service pits are generally excavated at borehole positions, where possible.

Descriptions and depths of the various strata recovered are presented on the exploratory hole records, reproduced in the report appendices, together with sample depths, the results of in-situ testing, comments on groundwater inflows, and any other pertinent information. The strata descriptions are in general accordance with BS5930:2015. Disturbed plastic pot and glass amber jar samples are recovered from the various strata and stored and transported in cool boxes, where relevant, for possible future laboratory testing.

Light cable percussion boreholes are generally drilled using a Pilcon Wayfarer or Dando rig and are advanced using equipment to bore 200/150mm diameter boreholes. Disturbed plastic pot samples are recovered from all deposits encountered to allow examination and laboratory testing. Certain strata are cased off due to their tendency to collapse, particularly in the presence of groundwater inflows and/or to reduce the risk of cross contamination. In situ Standard Penetration Tests, using Split Spoon (SPT) and Cone (CPT) are undertaken in the boreholes to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Within the fine grained (cohesive) deposits, "undisturbed" 100mm driven open tube samples were recovered from the various deposits to provide samples for examination and laboratory testing. On encountering groundwater, boring is usually suspended for 20 minutes while any rise in water level is recorded. Full details of the groundwater observations and monitoring results during boring operations are included on the borehole records. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion, unless otherwise stated on the individual logs.

Unless otherwise stated on the relevant logs, trial pits are excavated using a wheeled backhoe excavator, usually with a 0.6m wide bucket. The excavations are logged from the ground surface by an Engineering Geologist / Geo-environmental Engineer and relevant field testing, appropriate to the soils encountered, is carried out on samples brought to the surface. Representative disturbed soil samples are collected from selected horizons for subsequent laboratory testing. The trial pits are

usually unshored and where reasonable, left open for a period of time to allow observations of pit stability and depth and inflow rate of any groundwater ingress. The excavations are backfilled with arisings prior to moving on to the next position. Any trial pits carried out as part of this or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable.

Driven Continuous Sampling (DCS) boreholes are drilled using a track mounted Global mini-rig or similar using sampling tubes of varying diameter (decreasing with depth). Samples of the deposits encountered are recovered in 1m long clear plastic liners, which are logged and sub-sampled on site by an Engineering Geologist. Generally for geotechnical investigations, during the drilling process in-situ Standard Penetration Tests (SPTs) are undertaken at selected depths to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Groundwater seepages are noted during drilling if encountered. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion.

Unless specifically stated in the report, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of the exploratory holes where it is considered they may impact on proposed development.

It should be noted that groundwater levels at any particular site may fluctuate due to rainfall, seasonal variations etc and, therefore, levels may be different to those measured during the course of the fieldwork and monitoring period.

Laboratory Testing

The geotechnical testing was carried out in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes and was undertaken by a UKAS accredited specialist laboratory. Chemical testing was undertaken by a UKAS accredited specialist chemical testing laboratory and MCERTS accredited methods, in accordance with Environment Agency recommendations, were specified where available.

Contamination Assessment – Human Health

Applied Geology Limited has followed the guidance given in the Land Contamination Risk Management (LCRM) publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and relevant screening values. Risk to human health has been initially assessed by comparing soil results against various published screening criteria. These have been sourced from the following, in order of preference:

- DEFRA. Category 4 Screening Levels (C4SL), March 2014;
- LQM/CIEH S4UL for Human Health Risk Assessment (S4UL), 2015*;
- Environment Agency/DEFRA, Soil Guideline Values (SGV) published in 2009;
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (GAC), 2010.

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Except for lead and benzo(a)pyrene, the assessments will be carried out by comparing results against the LQM/CIEH S4UL in the first instance, where these values are exceeded, then reference will be made to the C4SLs where such exist. Lead will only be compared to the C4SL because no S4UL exists for lead. For Benzo(a)pyrene, Applied Geology has chosen to adopt the approach presented by the C4SL committee rather than the approach proposed by LQM/CIEH. Further discussion on this is presented below.

It is our view, and the view of others in the industry, that the C4SL were derived for use in both the Part IIA system and through the planning system, as they allow identification of those sites that fall within Category 4 (not contaminated) and are therefore able to be developed with no further remedial action. The C4SLs are considered to represent a contamination level that is 'low' from a toxicological view point, which we therefore consider to be 'acceptable' under planning.

Historically, the level of contamination has been assessed with reference to SGV values which were derived to represent a 'minimal' level of contamination. The SGVs are still valid and can be used alongside C4SL, however both screening values are only intended to provide guidance as to the level of contamination and, where concentrations fall below these screening values, the site is not contaminated (and is within Category 4). Exceedance of a SGV/S4UL/C4SL does not automatically indicate that an 'unacceptable' risk exists at a site; simply that further consideration of that particular contaminant is required.

At this time, there are two toxicological methodologies that can be used in the derivation of screening criteria for PAHs; Relative Potency Factor (RPFs) or the Surrogate Marker approach. Applied Geology has chosen (based on the latest guidance from the Health Protection Agency (HPA) to use the surrogate marker approach proposed in the C4SL methodology, whereby benzo(a)pyrene can be used as a surrogate marker for all 'genotoxic' (gene damaging) PAHs. The surrogate marker approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using data from toxicity studies in which a PAH mixture of known composition was tested. Exposure to the surrogate marker benzo(a)pyrene is assumed to represent exposure to all the PAHs in the environmental matrix. Thus, the level of toxicity ascribed to the surrogate represents the toxicity of the PAH mixture. This allows an assessment of the combined carcinogenic risk associated with genotoxic PAHs using only benzo(a)pyrene. In order to confirm that the mixture of genotoxic PAH in the soil is similar to the coal tar mixture used in the toxicological study, various PAH ratios are plotted and checked to see that they fall within the limits set in HPA, 2010.

Contamination Assessment – Water Quality

Risks to water quality has been assessed by following the Environment Agency guidance on groundwater protection (previously known as GP3), updated on their website in March 2017, see <https://www.gov.uk/government/policies/water-quality> and 'The Environment Agency's approach to groundwater protection' (March 2017 Version 1.0).

For hazardous substances, which should be prevented from entering groundwater, the screening criteria are initially set as the limit of detection, however, if groundwater has already been impacted, an appropriate environmental standard will then be used. For hazardous substances, background quality may also be taken into account.

For non-hazardous compounds, their release should not result in any pollution or significant risk of pollution in the future, as such comparison with UK DWS or EQS standards will allow determination of whether pollution could occur. Typically screening criteria will be sourced from the following:

- Environmental Standards (ES), which are defined in European legislation such as the Water Framework Directive (WFD) (2000/60/EC) and the Priority Substances Directive (PSD) (2008/105/EC) a daughter directive of the WFD.
- The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Direction, 2010.
- UK Water Supply (Water Quality) Regulations, 2010.
- UK quality standards for water to be used for direct abstraction to potable supply e.g. Surface Water (Abstraction for Drinking Water) (Classification) Regulations, 1996.
- World Health Organisation (WHO) Guidelines for Drinking Water Quality.

Re-use of Soils and Waste Soil Disposal

It is noted that if any excavated material is to be reused on site, a Waste Management Plan (WMP) and / or a Materials Management Plan (MMP) will probably be required. Any such materials must be suitable for re-use without further treatment, and only the quantity necessary for the specified works should be used. Any materials not within these definitions may need to be considered as waste whereby a Waste Management Licence Exemption may also be required.

A specific categorisation and assessment of potential waste soils arising from the proposed development has not been undertaken as part of the investigation, unless otherwise detailed in the report text. However, generic comments and advice are made below for the reader.

All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous, prior to removal from site, as required by the "Duty of Care" (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC ("Landfill Directive"). Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included). This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

Soils excavated on many sites would generally fall under the EWC description "Soil and Stones", EWC code 17 05 04. Waste Acceptance Criteria (WAC) testing is required for many Inert wastes and generally for all Hazardous Waste but not for non-hazardous waste. There are certain restrictions for inert wastes regarding topsoil and peat. Any asbestos must be disposed of by suitably licensed contractors to a suitably licensed facility.

Health & Safety Aspects

As outlined within the HSE publication 'Successful Health and Safety Management - HSG65', this report should inform your development of safe systems of work and information as an input into the safety management system.

When developing risk control systems we suggest making reference to the CIRIA report 132 "A guide for safe working on contaminated sites" and the HSE document "Protection of workers and the general public during the development of contaminated land – HSG66". All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations.

Where excavations are undertaken on site, trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions. Care should be taken when digging excavations to prevent undermining or causing loss of support to the foundations of the nearby adjoining structures. Surcharging such as from spoil or vehicle movements close to excavation sides should be avoided. Practical guidance on trench excavation is given in CIRIA Report 97 Trenching Practice. Guidance on groundwater control is given in CIRIA Report 113 Control of groundwater for temporary works. Temporary works should be designed by a suitably qualified engineer or a competent person particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design and Management) (CDM) Regulations.