Camborne Mews, Wandsworth

Ground Investigation Report

December 2021

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On behalf of Harlequin Projects Ltd, Technics Group commissioned Earth Environmental and Geotechnical Limited to undertake a ground investigation at Camborne Mews, Wandsworth.

A summary of the commissioned report is presented below. The appended Earth Environmental and Geotechnical Limited report should be referred to for full details.

Report Summary

Site Location

Camborne Mews, Wandsworth, SW18 5ED

Site Description and Proposed Development

The site comprises a vacant garage/workshop previously used for car servicing and repair, with a large warehouse building in the eastern half of the site and the remainder comprising hardstanding.

It is proposed to demolish the existing buildings on site and construct a terrace of residential properties with associated garden areas.

Ground Investigation

The ground investigation comprised four window sampler boreholes to a maximum depth of 4m below ground level (mbgl) and was undertaken on 24th November 2021. Samples were taken for geotechnical and chemical laboratory analysis.

Ground and Groundwater Conditions

The investigation encountered up to 0.15m of hardstanding over Made Ground, generally comprising sandy gravelly clay, which was proven to a maximum thickness of 0.8mbgl beneath the existing building and a maximum of 0.45mbgl outside of the building footprint. The Made Ground was underlain by the loose silty sand or sandy gravel of the Kempton Park Gravel Member followed at 2.2mbgl by the soft to firm clay of the London Clay Formation which was proven to a maximum depth of 4mbgl. Testing on the London Clay confirmed it to be a clay of high plasticity and high volume change potential.

A strong hydrocarbon odour was noted within the Made Ground at WS04, within the southern part of the existing building. No further visual or olfactory evidence of contamination was noted.

Groundwater was encountered at 2.2mbgl within WS02. No groundwater was encountered in the other boreholes during drilling or during the subsequent monitoring visit.

One round of ground gas monitoring was undertaken following the site works. This found no flow of gas and no elevated or unusual concentrations of carbon dioxide, methane, hydrogen sulphide or carbon monoxide. Concentrations of oxygen were within the normal range for air.

Falling Head Infiltration Testing

Falling head infiltration testing was undertaken within WS02 during the monitoring visit. The test was undertaken twice and recorded infiltration rates for the underlying Kempton Park Gravel of 5.57×10^{-7}m/s and 6.46×10^{-7}m/s, respectively.

Ground Contamination

Four soil samples were tested for a range of contaminants and the results of the analysis were compared against appropriate screening criteria for a residential end use.

Exceedances of lead and mercury were recorded in samples of Made Ground from across the site. Concentrations of the other contaminants tested were below the assessment criteria and no asbestos was detected.

Conclusions and Recommendations - Geotechnical
Shallow strip or pad foundations are anticipated to be appropriate for the proposed development, founded either within the Kempton Park Gravels or the London Clay Formation. Foundations should be taken to a minimum depth of 1mbgl to ensure that they are founded within the natural soils and should not be placed within Made Ground. Allowable bearing pressures of between 99kN/m^2 and 409kN/m^2 are anticipated for strip or pad foundations at between 1mbgl and 3mbgl. Settlements are anticipated to be in the order of 20mm to 40mm within the London Clay or 40mm to 110mm within the Kempton Park Gravel. Further details on anticipated allowable bearing capacities and settlements are presented in Section 5 of the appended report. All foundation excavations should be inspected by a suitable qualified engineer to prove that the founding strata is suitable and uniform along the length of the foundation, and capable of taking the anticipated structural loadings. Buried concrete should be designed to DS-1 and AS-1d. Excavations within the Made Ground and Kempton Park Gravel have the potential to be unstable and should be battered back or appropriate shored and supported to maintain stability. Groundwater is anticipated to be present at 2.2mbgl and significant dewatering is not anticipated to be required. However, limited inflows of perched water from the Made Ground may occur. Based on the infiltration testing, soakaway drainage is not anticipated to be appropriate for the site. This should be confirmed by a suitably qualified drainage engineer.
Conclusions and Recommendations - Contamination
A preliminary ground gas risk assessment indicates that the site is Characteristic Situation 1 and has a very low risk with respect to ground gas. No mitigation measures are anticipated to be required. Due to the elevated concentrations of lead and mercury recorded within the Made Ground, remedial measures will be required for the mitigation of risks to human health. These will comprise capping of the underlying soils to break the source-pathway-receptor linkage. Hardstanding or buildings will provide an appropriate cap, with capping within soft landscaped garden areas comprising the removal of the top 600mm of Made Ground and replacement with clean imported soils over a no-dig barrier. This may be reduced to a depth of 350mm in soft landscaped areas outside of private gardens. Risks to construction workers may be mitigated through the use of appropriate PPE and a high standard of personal hygiene, including hand washing. These measures will require agreement with the Local Authority and validation of the installed remedial measures will also be required, within a final Verification Report at the conclusion of the works.

Appendix A

Earth Environmental and Geotechnical Report

EARTH ENVIRONMENTAL
& GEOTECHNICAL

CAMBORNE MEWS

WANDSWORTH

LONDON

SW18 5ED

PHASE II COMBINED GEO-ENVIRONMENTAL & GEOTECHNICAL SITE INVESTIGATION REPORT

Report Ref: R0671/21

December 2021

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PHASE II COMBINED GEO-ENVIRONMENTAL & GEOTECHNICAL SITE INVESTIGATION

CAMBORNE MEWS

WANDSWORTH

SW18 5ED

REPORT REF: R0671/21

DECEMBER 2021

Prepared on Behalf of:

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1 electronic copy Technics Group Ltd

PHASE II COMBINED GEO-ENVIRONMENTAL & GEOTECHNICAL SITE INVESTIGATION

CAMBORNE MEWS, WANDSWORTH SW18 5ED

Report Reference: R0671/21

Version A.0

Date: 22nd December 2021

Prepared for: Technics Group Ltd

Prepared by: Earth Environmental & Geotechnical (Southern) Ltd
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Definition of Version Code:
D. Applied during initial drafting of the report before it has been reviewed.
C. Applied after the report has been reviewed but before it has been approved by the Project Manager.
B. Applied after the Project Manager has approved the report ready for issue to the client.
A. Applied to reports after external/internal review.

The version number starts at "0" and is raised by "1" at each re-type.

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1.0 INTRODUCTION

1.1 Background

A Combined Geo-Environmental and Geotechnical Site Investigation has been commissioned by Technics Group Ltd (the Client) to examine ground conditions and retrieve soil samples for geotechnical and environmental testing. The works have been completed to help inform a proposed new residential development at the site in Camborne Mews, Wandsworth.

1.2 Terms of Reference

Earth Environmental and Geotechnical (Southern) Ltd (EEGSL) was commissioned by the Client to undertake a Combined Geo-Environmental and Geotechnical Site Investigation of the assessment site in accordance with email correspondence and proposal R0671 dated 22nd November 2021.

The objectives of this site investigation are as follows:

- Provide environmental and geotechnical information on the shallow soils present beneath site
- Undertake ground investigation works to assess the presence and likely extent of any potential environmental hazards (soil, ground gas and groundwater contamination) associated with the areas of the site investigated.
- Undertake falling head infiltration tests within installed monitoring boreholes at the assessment site to help inform drainage design.
- Undertake one rounds of ground gas and groundwater level monitoring.
- Provide a Factual and Interpretive Ground Investigation Report.

1.3 Limitations of the Study

The report is written in the context of an agreed scope of work and budget and should not be used in a different context. New information, improved practices or changes in legislation may require a reinterpretation of the report in whole or in part. EEGSL reserve the right to amend either conclusions or recommendations in light of any further information that may become available. The report is provided for the sole use by the Client and is confidential to them.

Recommendations within this report are also based on exploratory records and examination of samples and, where applicable, laboratory tests. No liability can be accepted for conditions not revealed by the boreholes and trial pits, particularly at intervening locations. Whilst every effort is made to ensure accuracy of data supplied, all opinions expressed as to the spatial distribution of strata between sampling locations is for guidance only and no responsibility is accepted as to its accuracy.

2.0 SITE LOCATION & DESCRIPTION

2.1 Site Location & Description

The assessment site covers an area of approximately 0.02 ha, is roughly square in shape and is currently occupied by a disused garage/workshop consisting of a large double garage building, used for car serving and repair, with attached office and an area of hardstanding to the front with small outbuilding. The site is accessed via Camborne Mews off from the main Camborne Road.

The assessment site is bounded to the north, east and west by residential dwellings and to the south by several large commercial units. Further east and south from the assessment site large recreational fields are present.

The assessment site itself is located along Camborne Mews in Wandsworth, London. The site is centred on National Grid Reference TQ252738 (E: 525234, N:173815) with the nearest postcode being SW18 5ED.

An aerial photograph showing the location of the site is provided in Figure 1.

Figure 1: Aerial Photograph

SITE: Camborne Road, London, SW18 5ED	SCALE: NTS	Project NO: R0671	EARTH ENVIRONMENTAL & GEOTECHNICAL
FIGURE TITLE: Site Location Plan	REV: 01	FIGURE NO: 01	

2.2 Proposed Development

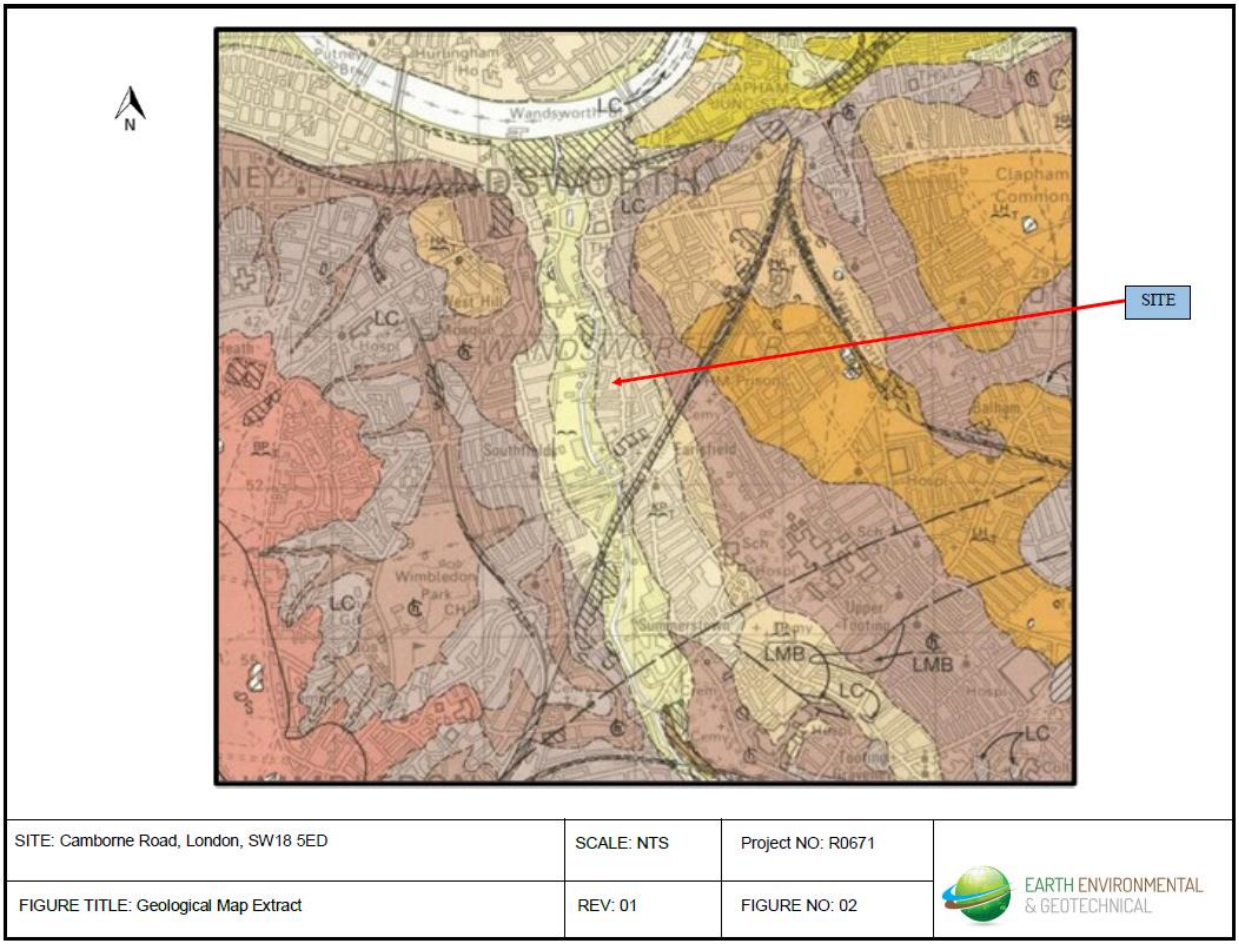
At the time of writing, specific development details were not available, however it is understood the client is looking to redevelop the site with a residential end use.

2.3 Published Geology

The British Geological Survey (BGS) and online maps identify the site is directly underlain by superficial deposits of the Kempton Park Gravel Member (Sand and Gravel) which formed during the Quaternary Period. The Kempton Park Gravel Member generally consists of sand and gravel, locally with lenses of silt, clay or peat. It is noted that the assessment site is in close proximity to superficial deposits of Head (Clay, Silt, Sand and Gravel) which could also be present beneath site.

The BGS and online maps indicate that the Kempton Park Gravel Member is underlain by the London Clay Formation (Clay and Silt) which formed during the Palaeogene Period. The London Clay Formation generally consist of bioturbated or poorly laminated, blue - grey or grey - brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. At the base, and at some other levels, thin beds of black rounded flint gravel occur.

Figure 2: Geological Map Extract



SITE: Camborne Road, London, SW18 5ED	SCALE: NTS	Project NO: R0671	EARTH ENVIRONMENTAL & GEOTECHNICAL
FIGURE TITLE: Geological Map Extract	REV: 01	FIGURE NO: 02	

3.0 SITE INVESTIGATION

3.1 Exploratory Fieldwork

The fieldwork was carried out by EEGSL between 24th November 2021 - 7th December and comprised:

- Four No. window sample boreholes (designated WS01 to WS04) were sunk to a maximum depth of 4.00m below existing ground level. Window sample boring is carried out with a small, track-mounted rig, which uses a chain-driven trip hammer to drive sampling tubes or penetrometers into the ground. These tools are coupled to the anvil of the hammer by solid drill rods. Sampling tubes comprise “windowless samplers”, which are plain sampler tubes in which a continuous disturbed sample is recovered within a semi-rigid plastic liner. To reduce friction within the borehole, sampling tubes of progressively smaller diameter are used as the borehole depth increases. Sampler diameters generally range from between approximately 90mm to 50mm. Exploratory Hole logs are included in Appendix 1.

- 50mm diameter standpipes were installed in WS02 and WS03 to the completed depth of the borehole. EEGSL carried out one round of groundwater level and ground gas monitoring within the standpipes after the fieldwork period, the results of which are presented in Appendix 3.

- A Falling Head Test was carried out in WS02 during the monitoring round.

The fieldwork was carried out generally in accordance with BS 5930:2015+A1:2020 Code of Practice for Site Investigations unless otherwise stated. The exploratory hole locations were determined on site by EEGSL and considered site restrictions present at the time. The investigation locations completed are shown approximately on the Exploratory Hole Location Plan overleaf (Figure 3).

Figure 3: Exploratory Hole Location Plan

Each exploratory location was scanned using a Cable Avoidance Tool (CAT) in order to locate unrecorded underground services, and the exploratory locations were repositioned if necessary. On completion, all samples recovered from the site were taken to a specialist laboratory for testing.

All site investigation work was supervised full time by a representative of EEGSL. The logging of soils and rocks has been carried out in accordance with BS5930(2015+A1:2020) except where superseded by the soil and rock description methodology in BS EN14688-1(2002), BS EN 14688-2(2004) and BS EN 14689-1(2003).

A summary of exploratory holes undertaken during the investigation is presented in Table 1.

Table 1: Summary of Exploratory Holes Undertaken

Hole	Type*	Depth (m)	Date Started	Date Finished	Backfill Details**
WS01	WS	0.80	24/11/21	24/11/21	A
WS02	WS	4.00	24/11/21	24/11/21	SP
WS03	WS	0.80	24/11/21	24/11/21	SP
WS04	WS	0.80	24/11/21	24/11/21	A
*WS= Window Sample Borehole, **A = Arisings, SP = Standpipe					

3.2 Laboratory Testing Programme

3.2.1 Geotechnical Testing

A programme of laboratory testing was carried out on samples taken from the various strata to assist in classification and determine the engineering properties of the materials underlying the site. The testing was scheduled by EEGSL and carried out by Geo Site & Testing Services Ltd. The test procedures used were generally in accordance with the methods described in BS1377:1990 and BS EN ISO 17892-1:2014. Details of the specific tests used in each case are given in Table 2 below:

Table 2: Summary of Geotechnical Testing

TEST	STANDARD	No.
Water Content	BS EN ISO 17892-1 : 2014	1
Atterburg Limit (four point method)	BS1377:1990 Part 2, Clause 4.4	1
PSD Sieve	BS1377:1990 Part 2, clause 9.2	3
pH	BS1377:1990 Part 3, Clause 9	5
Water Soluble Sulphate (SO_4)	BS1377:1990 Part 3, Clause 5	5

The results of the laboratory geotechnical tests are discussed in Section 7 and included in Appendix 4.

3.2.2 Environmental Testing

The environmental chemistry of the ground was investigated by specialist chemical analysis of selected samples, scheduled by EEGSL and carried out by DETS Ltd.

Chemical analyses were carried out on 4 soil samples and were submitted for the following suite of determinants:

- *Asbestos Screen, Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Cyanide, Thiocyanate, Sulphate (SO_4), Sulphide, pH, Sulphur, Soil Organic Matter, Speciated Petroleum Hydrocarbons (TPH) and Speciated Polyaromatic Hydrocarbons (PAH).*

One sample was also submitted for Waste Acceptance Criteria Testing (WAC testing Full suite).

The results of the laboratory contamination tests are discussed in Section 7 and included in Appendix 5.

4.0 GROUND CONDITIONS ENCOUNTERED

4.1 Soil Profile Encountered

A summary of the depths at which each stratum was encountered is provide below, whilst full details of the depths at which each stratum was encountered in each exploratory hole is provided within the borehole logs presented within Appendix 1.

The sequence of strata encountered beneath the site was generally:

- Asphalt or Concrete (encountered in all holes, proven to a maximum depth of 0.15mbgl)
- Made Ground (proven to a maximum depth of 0.80mbgl)
- Sandy GRAVEL / silty Sand of the Kempton Park Gravel Member (encountered to a maximum depth of 2.20mbgl)
- CLAY of the London Clay Formation (encountered in WS02 between 2.2m – 4.0m)

From the boreholes undertaken it was noted that Made Ground was present across the entire site, proven to a maximum depth of 0.80mbgl beneath the current building and 0.45mbgl outside of the current building's footprint.

Below the Made Ground were various layers of sand and gravel of the Kempton Park Gravel Member proven to a maximum depth of 2.20mbgl overlying clay of the London Clay Formation proven to a maximum depth of 4.00mbgl.

4.2 Observable Indications of Contamination

Made Ground was observed in all boreholes proven to a maximum thickness of 0.80mbgl. A strong hydrocarbon odour was present within Made Ground deposits recovered from WS04.

4.3 Obstructions

No obstructions were encountered during the site works.

4.4 Groundwater

During site investigation works groundwater was encountered only in WS02 at 2.20mbgl. During the subsequent groundwater monitoring visit no groundwater was encountered within any of the installed boreholes.

4.5 Ground Gas Monitoring

One round of ground gas monitoring of WS02 and WS03 was undertaken on the 7th December 2021. Detailed results from the monitoring are provided within Appendix 3.

During monitoring the atmospheric pressure was recorded as between 998-999mb. During the monitoring visit the following ranges of gas concentrations were identified: Oxygen (O_2) levels ranging from 18.4-19.9% by volume, and Carbon Dioxide (CO_2) levels ranging from 0.2-1.0% by volume. Concentrations of methane (CH_4), hydrogen sulphide (H_2S) and Carbon Monoxide (CO)

were not detected. Gas flows and borehole pressures were also recorded during the monitoring rounds. A maximum stabilised flow of 0.0 l/hr was recorded alongside a differential borehole pressure of -0.07 pa.

4.6 In-situ Falling Head Infiltration Testing

As part of site investigation works In-situ Falling Head Tests were undertaken to provide infiltrations rate data for the shallow underlying soils.

Table 3 summarises the results from the Falling Head infiltration test undertaken within WS02 on 7th December 2021.

Table 3: Falling Head Infiltration Tests Results

Hole	Test	Depth of Section (m)	Coefficient of Permeability (m/s)
WS02	1	2.00	5.57E-07
WS02	2	2.00	6.46E-07

4.7 Engineering Properties

The following section discusses the engineering properties of the underlying Sands and Gravels of the Kempton Park Gravel Member, and the Clay of the London Clay formation encountered beneath the assessment site. The assessment is based on results of insitu and laboratory testing obtained during this investigation. The results of laboratory geotechnical testing are summarised in Table 4, whilst full details are included within Appendix 2.

Table 4: Summary of Laboratory Geotechnical Test Results

Location	Depth	Stratum	Classification				Chemical	
			Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	pH Value	Water Soluble Sulphate (mg/l)
WS02	1.20-2.00	SAND					8.0	161
WS02	3.00-4.00	CLAY	29	62	21	41	7.6	81
WS04	0.15-0.75	Made Ground					8.4	<10
WS04	0.75-0.80	GRAVEL					8.2	335

4.7.1 Made Ground Deposits

During the ground investigation Made Ground materials were identified to a maximum depth of 0.80m bgl.

Laboratory tests have given values for **water-soluble sulphate** (SO_4) as <10mg/l with a **pH Value** of 8.4.

4.7.2 Sand & Gravel Materials of the Kempton Park Gravel Member (0.43mbgl to 2.20mbgl)

Results from 2 insitu SPT tests returned **SPT N Values** ranging from 5-6. These results would suggest the underlying Sands and Gravels are loose, as can be seen in Figure 4.

Laboratory **Particle Size Distribution** (PSD) tests undertaken on samples taken from WS02 and WS04 suggest the samples tested are Sand / Sand and Gravel, with only a minimal clay / silt content (less than 13%).

For geotechnical design in granular soils, it is recommended that for assessing ultimate bearing capacities, where the lower values are critical, the lower value of N is used, whereas for assessing settlements average ground conditions will give a more realistic value (therefore the average N value will be used to calculate settlement).

Design values derived from SPT N values for Sands and Gravel Materials of the Kempton Park Gravel Member are summarised in Table 5.

Table 5: Summary of Derived Design Values (Sand & Gravel of the Kempton Park Gravel Member)

Depth (m)	N Values			Angle of Shearing Resistance (ϕ)*
	Range	Average	Lower Value	
1.00m	5	5	5	28.3°
2.00m	6	6	6	28.6°
*Based on lower N Value and correlation by Peck, Hanson and Thornburn(1974)				

Laboratory tests have given values of **water-soluble sulphate** (SO_4) ranging from 81-335mg/l and **pH Values** ranging from 8.0-8.2.

4.7.3 Clay Material of the London Clay Formation (2.20mbgl to 4.00mbgl)

Results from 2 insitu SPT tests returned **SPT N Values** of 7. The results would suggest the underlying Clays are on the boundary between soft to firm, as can be seen in Figure 4.

One **Atterberg Limit** test was undertaken on the underlying natural Clay deposits. Test results have given values for **liquid limit** of 62%, **plastic limit** value of 21%, resulting in values of **plasticity index** of 41%. These results suggest the samples tested are clay of High plasticity. For design purposes, a value of plasticity index = 41% is recommended.

In accordance with NHBC Chapter 4.2 Building Near Trees(2003) soils can be classified in terms of **volume change potential**, using the relationship:

$$Ip' = Ip \times \frac{\%\ \text{less than } 425\mu m}{100\%}$$

….where Ip' = modified plasticity index, Ip = plasticity index.

Based on the laboratory test results, the above relationship and Table 1 of NHBC Chapter 4.2, the underlying natural Clay deposits are shown to have a predominantly **High volume change potential**.

Laboratory tests have given a value for **water-soluble sulphate** (SO_4) as 81mg/l with a **pH Value** of 7.6.

Design values derived from SPT N values and the above testing results for the London Clay Formation are summarised in Table 6.

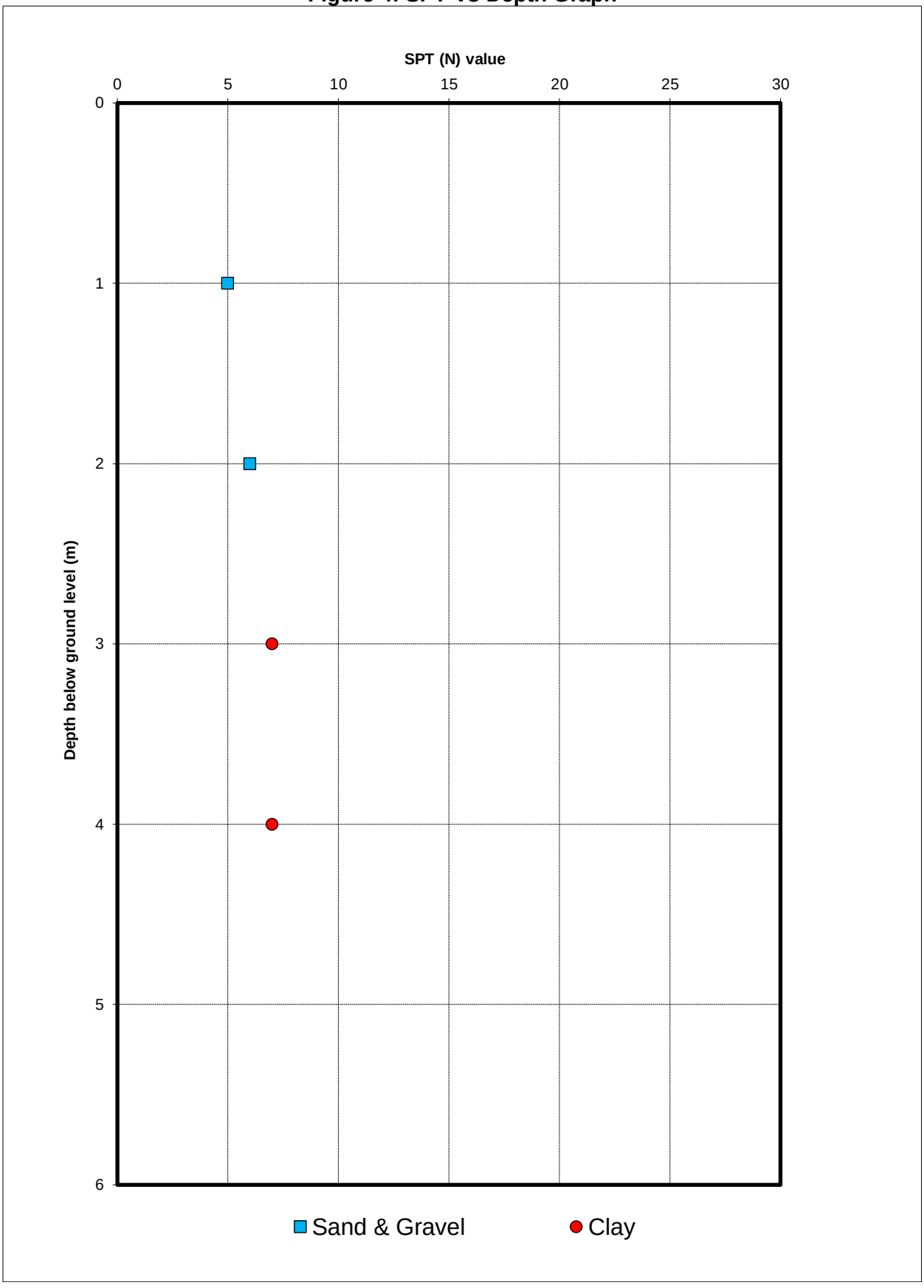
Table 6: Summary of Derived Design Values (CLAY of the London Clay Formation)

Depth	PI Design Value	N Values		Design Shear Strength** (kN/m2)	Design Coefficient of Volume Compressibility **
		Range	Design Value*		
3.0m	41	7	7	31.5kN/m^2	0.317
4.0m	41	7	7	31.5kN/m^2	0.317

***Based on lower quartile value**

****Based on design plasticity index and correlations by Stroud & Butler(1975)**

Figure 4: SPT Vs Depth Graph



5.0 GEOTECHNICAL ASSESSMENT

This section will discuss possible foundation design for the proposed development and considers the ground conditions identified within Section 4 alongside the design values generated form insitu and laboratory analysis.

Conventional strip and pad foundations may be suitable for for the proposed new development, depending on structural loadings and tolerance of structure to settlement. If structural loadings are too high or settlement too large for conventional foundations, alternative foundations such as piles will need to be used.

5.1 Ground Conditions Encountered

From the investigation undertaken across the assessment site, in general the ground conditions encountered can be summarised as variable Made Ground deposits of clay proven to a maximum depth of 0.80mbgl overlying natural sands and gravel of the Kempton Park Gravel Member proven to a maximum depth of 2.20mbgl overlying natural clay of the London Clay Formation proven to a maximum depth of 4.00m bgl.

5.2 Foundations

Strip and pad foundations should be placed within either the sands and gravels of the Kempton Park Gravel Member, or the clay of the London Clay Formation. If any Made Ground, particularly loose or soft materials are encountered at foundation level, this should be either excavated and replaced with suitable granular fill, or the foundation extended to suitable strata.

In this instance, due to the presence of Made Ground Deposits, it is recommended that foundations be taken to a depth of at least 1.0m below existing ground level. Taking foundations to these deaths will ensure foundations are below any Topsoil or Made Ground and placed in the underlying natural material.

Anticipated bearing capacities and settlement have been calculated for shallow strip and pad foundations between depths of 1-3mbgl. However, should the allowable bearing pressures or settlements be insufficient for the proposed development, it is suggested that shallow piled foundations would be suitable if taken down into the underlying London Clay formation. If piled foundations are considered, deeper ground investigation works may be required to provide the strength of the London Clay at depth.

The presence of groundwater was observed in WS02 during site works at a depth of 2.20mbgl. The subsequent monitoring round did not identify any groundwater to a depth of 2.0mbgl. It is suggested that groundwater is likely to be present at the base of the Kempton Park Gravel Member above the London Clay formation. The presence of shallow groundwater should be expected during the excavation of foundations below this depth. However, it is expected that a suitable sump and intermittent pumping should be sufficient to keep the materials dry during excavation.

For the purposes of this report, strip and pad foundations will be discussed at depths between 1.0mbgl and 3.0mbgl. Table 7 summarises anticipated allowable bearing pressures for strip and pad foundations across these depts. The bearing capacities are calculated based on Hansens[(1978)] method and assuming a factor of safety against bearing capacity failure of 3. Groundwater is assumed to be at 2.20mbgl.

Table 7: Summary of Allowable Bearing Pressures

Foundation Depth	Foundation Stratum	Design Value	Foundation Type	Foundation Width / Size	Allowable Bearing Pressure
1.00m	SAND & GRAVEL	ϕ = 28.3	Strip	0.6m	140kN/m^2
				1.0m	148kN/m^2
			Pad	0.75m x 0.75m	195kN/m^2
				1.5m x 1.5m	196kN/m^2
2.00m	SAND & GRAVEL	ϕ = 28.6	Strip	0.6m	278kN/m^2
				1.0m	277kN/m^2
			Pad	0.75m x 0.75m	409kN/m^2
				1.5m x 1.5m	392kN/m^2
3.00m	CLAY	c_u = 31.5kN/m^2	Strip	0.6m	99kN/m^2
				1.0m	96kN/m^2
			Pad	0.75m x 0.75m	114kN/m^2
				1.5m x 1.5m	108kN/m^2

Table 8 and Table 9 give estimates of anticipated settlements for the above foundations, based on correlations by Burland & Burbidge(1985) and design values discussed in Section 4 and assuming a foundation load equal to the allowable bearing pressure in Table 7.

Table 8: Summary of Anticipated Foundation Settlements (Sand & Gravel Material)

Foundation Depth	Foundation Stratum	Foundation Type	Foundation Size	Foundation Loading	Settlement (mm)		
					Lower Limit	Upper Limit	Best Guess
1.00m	SAND & GRAVEL	Strip	0.6m	140kN/m^2	15-20	150-160	40-45
			1.0m	148kN/m^2	25-30	230-240	60-65
		Pad	0.75m x 0.75m	195kN/m^2	15-20	160-170	40-45
			1.5m x 1.5m	196kN/m^2	25-35	260-270	65-75
2.00m	SAND & GRAVEL	Strip	0.6m	278kN/m^2	25-30	225-230	60-65
			1.0m	277kN/m^2	35-45	320-330	85-95
		Pad	0.75m x 0.75m	409kN/m^2	30-35	250-260	65-75
			1.5m x 1.5m	392kN/m^2	45-55	390-400	100-110

Table 9: Summary of Anticipated Foundation Settlements (Clay Material)

Foundation Depth	Foundation Stratum	Foundation Type	Foundation Size	Foundation Loading	Settlement (mm)		
					At centre	At corner	Average
3.00m	CLAY	Strip	0.6m	99kN/m^2	-	-	20-25
			1.0m	96kN/m^2	-	-	25-30
		Pad	0.75m x 0.75m	114kN/m^2	30-35	5-10	25-30
			1.5m x 1.5m	108kN/m^2	45-55	10-15	35-40

Settlements for other bearing pressures may be estimated on a pro-rata basis but bearing pressures should not exceed the allowable net bearing pressure based on ultimate bearing capacity.

All foundation excavations should be inspected by a suitable qualified engineer to prove that the founding strata is suitable and uniform along the length of the foundation, and capable of taking the anticipated structural loadings.

Should the anticipated structural loadings exceed the allowable bearing pressures above, or anticipated settlements are too large for the proposed structure, alternative foundation options such a piling should be considered.

5.3 Chemical Attack on Buried Concrete

Natural Sand & Gravel

Chemical tests show levels of water-soluble sulphates with values ranging from 161-355 mg/l and slightly alkaline ground conditions with pH values ranging from 8.0-8.2. Based on these conditions, it is recommended that for foundations the Design Sulphate Class, as defined in BRE Special Digest 1(2005), be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1d. The recommendations of BRE Special Digest 1 should be followed for concrete foundations and ground bearing floor slabs

Natural Clay

Chemical tests show low levels of water-soluble sulphates with a value of 81mg/l and near neutral ground conditions with a pH value of 7.6. Based on these conditions, it is recommended that for foundations the Design Sulphate Class, as defined in BRE Special Digest 1(2005), be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1d. The recommendations of BRE Special Digest 1 should be followed for concrete foundations and ground bearing floor slabs

5.4 Suitability of Excavated Materials

Acceptability criteria and testing, and methods of compaction/placement will depend on the type of contract and specification used for the construction of the proposed development and it is recommended that earthworks specifications are reviewed by a suitably qualified engineer once these have been prepared by the relevant parties.

5.5 Temporary Works

Formations will be susceptible to damage both by weather and trafficking, and should be protected immediately on exposure, particularly in areas where construction plant will access the site.

Excavations in the Made Ground and any loose sand and gravel have the potential to be unstable and should be battered back to an angle of 1 in 2, or a system of close sheeting and shoring adopted to ensure stability, and in particular where personnel are required to enter excavations.

All excavations should be adequately supported where personnel are required to enter.

All natural materials on site should be capable of being excavated using conventional excavating machinery.

6.0 SOIL CONTAMINATION RISK ASSESSMENT

6.1 Tier I Human Health Soil Risk Assessment – Future Site Users

As part of the contamination assessment, the chemical results obtained by EEGSL have been screened against accepted compliance criteria, namely:

- Defra C4SL Health Criteria Values (March 2014), where available; and
- Tier 1 assessment values - based on LQM/CIEH Suitable 4 Use Levels(2015) (S4ULs).

As a preliminary screening assessment, all results have been compared to residential end use criteria.

The comparison of results is summarised in Table 10 and 11 below:

Table 10: Soil Results Comparison with Defra C4SL HCV/LLTC Values

Determinand	C4SL (mg/kg)*			Min. (mg/kg)	Max. (mg/kg)	No. of Samples with Exceedances
	Residential with home grown produce (1)	**Residential** without home grown produce (2)	**Commercial** (3)			
Arsenic	37	40	640	7	28	0
Benzo(a)pyrene	5.0	5.3	76	<0.1	1.05	0
Cadmium	26	149	410	<0.2	3.8	0
Chromium VI	21	21	9.1	<2	<2	0
Lead	200	310	2300	141	4230	**1x (1, 2, 3)**
*Minimal risk Health Criteria Values						

The comparison within Table 10 has shown one instance of elevated levels of lead present in excess of the C4SLs for residential end use. The sample that identified the elevated levels of lead was taken from the Made Ground beneath WS02 (at a depth of 0.03-0.23mbgl). No other exceedances for all other relevant screening criteria have been identified.

The following contaminants were not assessed with respect to risks posed to Human Health as they are not generally considered to represent a significant risk to Human Health (CLR 8);

- sulphate and sulphide.

For contaminants not covered by the Defra C4SLs, reference is made to the Suitable for Use Levels (S4ULs) derived by The Land Quality Management Ltd & Chartered Institute of Environmental Health(2015) and summarised in Table 10. The S4ULs are based on 1% Soil Organic Matter (SOM).

Table 11: Soil Results Comparison with LQM/CIEH S4UL

Determinant	Suitable 4 Use Levels (mg/kg)*			Min. (mg/kg)	Max. (mg/kg)	No of Exceedances
	Residential		Commercial (3)			
	with homegrown produce (1)	without homegrown produce (2)				
Metals						
Boron	290	11000	240000	<1	1.2	0
Chromium	910	910	8600	9	18	0
Copper	2400	7100	68000	21	284	0
Mercury	1.2	1.2	58	<1	3	**1x (1, 2)**
Nickel	180	180	980	4	31	0
Selenium	250	430	12000	<3	<3	0
Vanadium	410	1200	9000	19	34	0
Zinc	3700	4000	730000	46	652	0
Polycyclic Aromatic Hydrocarbons						
Naphthalene	2.3	2.3	190	<0.1	<0.1	0
Acenaphthylene	170	2900	83000	<0.1	<0.1	0
Acenaphthene	210	3000	84000	<0.1	<0.1	0
Fluorene	170	2800	63000	<0.1	<0.1	0
Phenanthrene	95	1300	22000	<0.1	0.54	0
Anthracene	2400	31000	520000	<0.1	0.15	0
Fluoranthene	280	1500	23000	<0.1	1.74	0
Pyrene	620	3700	54000	<0.1	1.71	0
Benz(a)anthracene	7.2	11	170	<0.1	0.95	0
Chrysene	15	30	350	<0.1	0.79	0
Benzo(b)fluoranthene	2.6	3.9	44	<0.1	1.27	0
Benzo(k)fluoranthene	77	110	1200	<0.1	0.46	0
Indeno(1,2,3-cd)pyrene	27	45	500	<0.1	0.62	0
Dibenz(a,h)anthracene	0.24	0.31	3.5	<0.1	0.14	0
Benzo(ghi)perylene	320	360	3900	<0.1	0.73	0
Phenols						
Phenol	280	750	760	<2	<2	0
Speciated TPH						
Aliphatic >C5 - C6	42	42	3200	<0.01	<0.01	0
Aliphatic >C6 - C8	100	100	7800	<0.05	<0.05	0
Aliphatic >C8 - C10	27	27	2000	<2	<2	0
Aliphatic >C10 - C12	130	130	9700	<2	<2	0
Aliphatic >C12 - C16	1100	1100	59000	<3	11	0
Aliphatic >C16 – C21	65000	65000	260000	<3	82	0
Aromatic >C5 - C7	70	370	26000	<0.01	<0.01	0
Aromatic >C7 - C8	130	860	56000	<0.05	<0.05	0

Aromatic >C8 - C10	34	47	3500	<2	<2	0
Aromatic >C10 - C12	74	250	16000	<2	<2	0
Aromatic >C12 - C16	140	1800	36000	<2	12	0
Aromatic >C16 - C21	260	1900	28000	<3	109	0
Aromatic >C21 - C35	1100	1900	28000	<10	192	0
BTEX						
Benzene	0.087	0.38	27	<2	<2	0
Toluene	130	880	56000	<5	<5	0
Ethylbenzene	47	83	5700	<2	<2	0
m & p-xylene	60	88	6600	<2	<2	0
o-Xylene	59	82	6200	<2	<2	0
MTBE	56	79	5900	<5	<5	0

The comparison within Table 11 has shown one instance of elevated levels of mercury present in excess of the S4ULs for residential end use. The sample that identified the elevated levels of mercury was taken from the Made Ground below WS04 (at a depth of 0.15-0.75mbgl). no other elevated levels of Toxic Metals, TPH, PAH and BTEX in excess of the S4ULs for residential and end use have been identified.

6.2 Asbestos

Asbestos was not encountered in any of the samples analysed as part of this investigation.

7.0 GROUND GAS CONTAMINATION RISK ASSESSMENT

A preliminary gas risk assessment has been completed for the assessment site based on monitoring data collected from the two installations constructed as part of the recent ground investigation works. The two installations have slotted sections screened across the underlying made ground and superficial geology present beneath the assessment site.

One round of ground gas monitoring of WS02 and WS03 was undertaken on the 7th December 2021. Detailed results from the round are provided within Appendix 3. During monitoring the atmospheric pressure was recorded as between 998-1015mb. During the monitoring visit the following ranges of gas concentrations were identified: Oxygen (O_2) levels ranging from 18.4-19.9% by volume, and Carbon Dioxide (CO_2) levels ranging from 0.2-1.0% by volume. Concentrations of methane (CH_4), hydrogen sulphide (H_2S) and Carbon Monoxide (CO) were not detected.

Gas flows and borehole pressures were also recorded during the monitoring rounds. A maximum stabilised flow of 0.0 l/hr was recorded alongside a differential borehole pressure of -0.07 pa.

The potential risk associated with ground gases (whether from natural or man-made sources) is dependent on the concentration of gas and its flow rate to the surface. These factors are assessed by the monitoring of borehole installations over varying atmospheric conditions. The variable nature of gas generation and the effect of barometric pressure on gas flow, means that the volume of gas potentially reaching the ground surface can vary over time.

For the assessment of sites, in terms of the potential for ground gas to present a hazard, the risk-based methodology detailed in the CIRIA C665(2007) is used. This is a risk-based approach that is designed to allow the quick and easy design of gas protection for development by comparing the measured gas emission rates to Characteristic Situations, based on risk-based Gas Screening Values (GSVs). The GSVs equate to the borehole gas volume flow rate as defined by Wilson and Card (1999) and are calculated as the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered.

For the purposes of this evaluation, the calculations will be carried out for carbon dioxide only as methane was not detected during monitoring. In the absence of a positive flow rate, a peak flow rate of 0.1l/hr will be used as this represents the detection limit of the equipment used during the recent monitoring works.

- Carbon dioxide: maximum flow rate = 0.1 l/hr, max concentration = 1.0%

Based on the above figures, the GSVs are calculated as:

- Carbon dioxide: GSV = 0.1 x 0.01 = 0.001 l/hr

The above GSV results would suggest the site can be given a Characteristic Situation of (1), in accordance with Table 12 below, i.e., a ‘Very Low Risk’.

Table 12: Modified Wilson & Card Classification (CIRIA Report 665)

Characteristic Situation (CIRIA Report 149)	*Risk Classification*	*GSV (CH_4 or CO_2) (l/hr)*	*Additional Factors*	*Typical Source of Generation*
1	Very Low Risk	<0.07	Typically methane ≤1%v/v and/or carbon dioxide ≤5% v/v. Otherwise consider increase to Situation 2.	Natural Soils with low organic content. "Typical" Made Ground.
2	Low Risk	<0.7	Borehole flow rate not to exceed 70l/hr. Otherwise increase to Situation 3.	Natural soil, high peat/organic content. "Typical" Made Ground.
3	Moderate Risk	<3.5		Old landfill, inert waste, mineworking flooded.
4	Moderate to High Risk	<15	Quantitative risk assessment required to evaluate scope of measures required.	Mineworking susceptible to flooding, completed landfill (WMP 26B criteria)
5	High Risk	<70		Mineworking unflooded inactive with shallow workings near surface.
6	Very High Risk	>70		Recent landfill site.

Therefore, according to Table 8.6 of CIRIA Report 665, it is recommended that no special precautions will be required in terms of ground gas mitigation measures.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The following section provides a summary of the conclusions and recommendations based on the findings of the Site Investigation, Laboratory soil analysis and ground gas and groundwater level monitoring.

8.1 Ground conditions

Ground conditions encountered at the assessment site consisted of varying Made Ground, proven to a maximum depth of 0.80mbgl, overlying natural Sands and Gravels of the Kempton Park Gravel Member, proven to a maximum depth of 2.20mbgl, overlying natural Clay of the London Clay Formation, proven to a maximum depth of 4.00mbgl.

Groundwater was encountered in WS02 at a depth of 2.20mbgl.

8.2 Soil Contamination

As discussed in Section 6 of this report, chemical testing of soils representative of the materials beneath the assessment site has been undertaken, and the results of which are provided within Appendix 5.

Preliminary screening against currently accepted assessment criteria for residential end use has identified two instances of elevated concentrations of contamination within the Made Ground deposits in excess of the recommended soil guideline values. All other samples tested identified a lack of contamination present at the assessment site.

Lead Contamination

The first exceedance identified was an elevated concentration of Lead found present within the underlying Made Ground deposits from WS02. The sample was taken from a depth of 0.03-0.23mbgl and was described as a slightly sandy very gravelly CLAY with fragments of asphalt, red brick and concrete.

Given that the lead contamination was found within the shallow Made Ground deposits, it is likely likely that this contamination was introduced by the sites former historical use (former car garage). Given the levels of Lead present, it is suggest that some remediation will be required at the assessment site prior to occupation by a residential end use.

Mercury Contamination

The second exceedance identified was an elevated concentration of Mercury found present within the underlying Made Ground deposits from WS04. The sample was taken from a depth of 0.15-0.75mbgl and was described as a Brown slightly sandy gravelly CLAY.

Given that the mercury contamination was also found within the shallow Made Ground deposits, it is again considered likely that this contamination was introduced by the sites former historical use.

Given the levels of mercury present, it is again suggested that some remediation will be required at the assessment site prior to occupation by a residential end use.

Based on the above assessment, it is recommended that the shallow made ground beneath site is likely to be contaminated with both Lead and Mercury and therefore remediation across the assessment site will be required before any new development can be occupied.

However, remediation of the areas to be covered by proposed development is not deemed necessary, as the contamination present will be effectively capped by the new buildings and therefore will not pose a significant risk to future site users (as the source-pathway-receptor linkage would be broken).

Remediation should therefore be confined to garden areas or areas of soft landscaping.

Recommendations on the types of remediation works suitable for the assessment have been provided within Section 8.7 below.

8.3 Ground Gas

As discussed in Section 7 of this report, one preliminary round of ground gas monitoring was undertaken as part of this investigation. The current data shows an absence of significant concentrations of ground gasses and vapours at the assessment site. From an initial gas risk assessment, the site has been classed as a Characteristic Situation of (1) i.e. Very Low Risk. It is therefore recommended that no special precautions related to ground gas mitigation are required in this instance.

8.4 Groundwater

Taking into consideration the general lack of mobile contamination identified within shallow soils present beneath the assessment site, it is deemed that the potential for significant impacts to groundwater beneath the site is unlikely. Therefore, further investigative works to assess the quality of groundwater beneath site are not deemed necessary.

8.5 Site Personnel

As with all construction sites, personnel working on the site during the construction period should be encouraged to maintain a high standard of personal hygiene and on-site washing facilities should be available. The presence of elevated lead and mercury should be included within the sites health and safety file and all construction staff are to be made aware of its presence.

8.6 Other Matters

Due diligence is required during the construction period, and should any further evidence of contamination be found, appropriate investigation and assessment should be taken. The significance of any contamination not discovered by this investigation is outside the scope of this report.

8.7 Further works

Considering the contamination found present at the assessment site, and the proposed end use, it is recommended that further works will be required within any proposed garden or soft landscaping areas.

In this instance it is recommended that a capping system is employed to eliminate the pathway between the contamination present and the proposed receptors.

A suitable capping layer for the garden could consist of:

- The removal of the top 600mm of made ground present, the installation of a no dig barrier and then replacement of clean imported soils back to ground level:

Whilst a suitable capping layer for soft landscaping areas (outside of any private gardens) could consist of:

- The removal of the top 350mm of made ground present, the installation of a no dig barrier and then replacement of clean imported soils back to ground level:

Given the general lack of potentially mobile contamination present within the underlying made ground, soil remediation is not deemed necessary if the area is chosen to be covered in permanent hardstanding. This is due to the hard cover development effectively sealing contamination beneath site and breaking any potential source-pathway-receptor linkage.

Permanent hardstanding will also greatly reduce any surface water ingress and hence further reduce the potential for contamination to migrate off site via leaching.

It should be noted that the further works detailed above will need to be agreed with the local contaminated land officer prior to any works being undertaken. It should also be noted that validation of the works will also be required.

Evidence from these validation works, including photographs and/or certification of the materials used, will need to be presented as a validation report.

APPENDIX 1

EXPLORATORY BOREHOLE LOGS

Percussion Drilling Log

Project Name: Camborne Mews	Client:	Date: 24/11/2021
Location: Camborne Mews, Camborne Road, SW18 5ED	Contractor: LAS Drillings	
Project No. : R0671	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS01	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.05 - 0.45	D		0.05			MADE GROUND - Concrete Slab.
		0.05 - 0.45	ES					MADE GROUND - Dark Brown slightly sandy gravelly CLAY with fragments of asphalt and concrete. Gravel is angular-subrounded fine-coarse of flint. Sand is subangular subrounded fine-medium.
		0.45 - 0.80	D		0.45			
		0.45 - 0.80	ES					Light brown sandy very clayey subangular-subrounded fine-coarse GRAVEL of flint.
					0.80			End of Borehole at 0.800m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
0.80	87										

Remarks

Hand dug pit to 0.80 m bgl. No Groundwater was encountered.

Percussion Drilling Log

Project Name: Camborne Mews	Client:	Date: 24/11/2021
Location: Camborne Mews, Camborne Road, SW18 5ED	Contractor: LAS Drillings	
Project No. : R0671	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS02	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.03 - 0.23	ES		0.03			MADE GROUND - Asphalt
		0.23 - 0.43	ES		0.23			MADE GROUND - Black/dark drown slightly sandy very gravelly CLAY with fragments of asphalt, red brick and concrete. Gravel is angular-subrounded fine-coarse of flint. Sand is subangular-subrounded medium-coarse.
		0.43 - 1.00	B		0.43			
		0.43 - 1.00	ES					
		1.00	SPT	N=5 (1,2/1,1,1,2)				MADE GROUND - Dark brown slightly gravelly sandy CLAY with occasional fragments of asphalt and concrete. Gravel is angular-subrounded fine-medium of flint. Sand is subangular-subrounded fine-medium.
		1.20 - 2.00	D		1.20			
								Light brown slightly sandy very clayey subangular-subrounded fine-coarse GRAVEL of flint. Sand is subangular-subrounded fine-medium.
	▼	2.00	SPT	N=6 (1,2/2,1,2,1)	2.20			Dark yellow slightly silty subangular-subrounded fine-coarse SAND.
								Firm dark grey CLAY
		3.00 - 4.00	D					
		3.00	SPT	N=7 (1,1/2,2,1,2)				
		4.00	SPT	N=7 (1,2/2,2,1,2)	4.00			End of Borehole at 4.000m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.00	87										
4.00	66										

Remarks

Hand dug pit to 1.00 m bgl. Groundwater was encountered at 2.20m bgl.

Percussion Drilling Log

Project Name: Camborne Mews	Client:	Date: 24/11/2021
Location: Camborne Mews, Camborne Road, SW18 5ED	Contractor: LAS Drillings	
Project No. : R0671	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS03	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15 - 0.80	D		0.15			MADE GROUND - Concrete.
		0.15 - 0.80	ES					MADE GROUND - Brown slightly sandy gravelly CLAY.
					0.80			End of Borehole at 0.800m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
0.80	87										

Remarks

Hand dug pit to 0.80 m bgl. No Groundwater was encountered.

Percussion Drilling Log

Project Name: Camborne Mews	Client:	Date: 24/11/2021
Location: Camborne Mews, Camborne Road, SW18 5ED	Contractor: LAS Drillings	
Project No. : R0671	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS04	WLS			1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15 - 0.75	D		0.15			MADE GROUND - Concrete.
		0.15 - 0.75	ES					MADE GROUND - Dark brown gravelly sandy CLAY. Sand is subangular-subrounded fine-medium. Gravel is angular-subrounded fine-coarse.
		0.75 - 0.80	D		0.75			*Hydrocarbon Odour.*
		0.75 - 0.80	ES		0.80			Light brown sandy very clayey subangular-subrounded fine-coarse GRAVEL of flint. Sand is subangular-subrounded fine-medium.
								End of Borehole at 0.800m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
0.80	87										

Remarks

Hand dug pit to 0.80 m bgl. No Groundwater was encountered.

APPENDIX 2

GROUND GAS & GROUNDWATER MONITORING RESULTS

Gas Monitoring Record

Project Number:	R0671
Project Name:	Wandsworth, Camborne Mews
Date:	07/12/2021
Logger	KB

Weather:	

*mbgl - Meters below Ground Level

			Initial	10 secs	20 secs	30 secs	40 secs	50 secs	60 secs	70 secs	80 secs	90 secs	100 secs	110 secs	120 secs	130 secs	140 secs	150 secs	180 secs	300 secs	Groundwater Level (mbgl*)	Borehole Base (mbgl*)	Comments
Borehole ID	WS02	**CH4 (%)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Dry	2	
Flow Rate (l/hr)	-1.3	**CO2 (%)**	0.4	0.9	1	1	0.8	0.6	0.6	0.6	0.5	0.5	0.8	0.8	0.5	0.5	0.3	0.2	0.6				
Atmospheric Pressure (mbar)	998	**H2S (ppm)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Borehole Pressure (Pa)	-7	**O2 (%)**	19.5	19	18.6	18.4	18.8	19	19.2	19.3	19.3	19.4	18.8	18.8	18.9	19.7	19.7	19.8	19.3				
Time		**LEL (%)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Peak VOC	-	**CO (ppm)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

			Initial	10 secs	20 secs	30 secs	40 secs	50 secs	60 secs	70 secs	80 secs	90 secs	100 secs	110 secs	120 secs	130 secs	140 secs	150 secs	180 secs	300 secs	Groundwater Level (mbgl*)	Borehole Base (mbgl*)	Comments
Borehole ID	WS03	**CH4 (%)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Dry	0.85	. Groundwater was encoutnered at 0.85m bgl.
Flow Rate (l/hr)	0	**CO2 (%)**	0.2	0.3	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5			
Atmospheric Pressure (mbar)	999	**H2S (ppm)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Borehole Pressure (Pa)	-	**O2 (%)**	19.3	19.9	19.9	19.7	19.7	19.6	19.6	19.5	19.5	19.5	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8			
Time		**LEL (%)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Peak VOC	-	**CO (ppm)**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

			Initial	10 secs	20 secs	30 secs	40 secs	50 secs	60 secs	70 secs	80 secs	90 secs	100 secs	110 secs	120 secs	130 secs	140 secs	150 secs	180 secs	300 secs	Groundwater Level (mbgl*)	Borehole Base (mbgl*)	Comments
Borehole ID		**CH4 (%)**																					
Flow Rate (l/hr)		**CO2 (%)**																					
Atmospheric Pressure (mbar)		**H2S (ppm)**																					
Borehole Pressure (Pa)		**O2 (%)**																					
Time		**BAL (%)**																					
Peak VOC		**CO (ppm)**																					

			Initial	10 secs	20 secs	30 secs	40 secs	50 secs	60 secs	70 secs	80 secs	90 secs	100 secs	110 secs	120 secs	130 secs	140 secs	150 secs	180 secs	300 secs	Groundwater Level (mbgl*)	Borehole Base (mbgl*)	Comments
Borehole ID		**CH4 (%)**																					
Flow Rate (l/hr)		**CO2 (%)**																					
Atmospheric Pressure (mbar)		**H2S (ppm)**																					
Borehole Pressure (Pa)		**O2 (%)**																					
Time		**BAL (%)**																					
Peak VOC		**CO (ppm)**																					

APPENDIX 3

INSITU FALLING HEAD INFILTRATION TEST RESULTS

Earth Environmental
& Geotechnical Ltd

Tel / Fax:
Web: www.earthenvironmental.co.uk
Email: john@earthenvironmental.co.uk

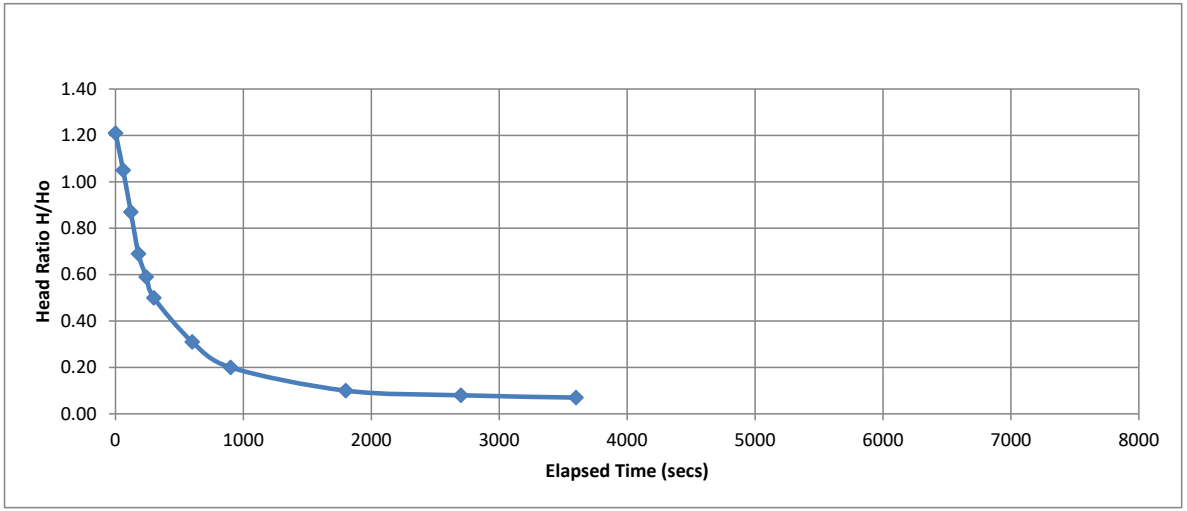
FALLING HEAD TEST

(To: BS5930 :1999 Page 50)

Job No:	R0671
Site:	Wandsworth Cambourne Mews
Client:	

Location Reference:	WS02	
Date	07 December 2021	
Geology in test section		
Depth of test section	2.00	metres
Depth to Standing Water Level (or base of well)	2	metres
Height of Casing	0.00	metres
Height of Casing above water level	2	metres
Depth to water at start of test below casing level (or base of well)	2.00	metres
Depth to water at end of test below casing level	1.93	metres
Response zone length	1.93	metres
Standpipe diameter in test section	0.05	metres
Cross sectional area of standpipe	1.96E-03	metres
Intake Factor (BS5930 p50) Figure d	2.79	
Basic Time Lag		
Coefficient of Permeability	5.57E-07	m/s

Time Elapsed (secs)	Depth of water below top of casing (m)	h(m)	h1/ho
0	0.79	1.21	0.61
60	0.95	1.05	0.53
120	1.13	0.87	0.44
180	1.31	0.69	0.35
240	1.41	0.59	0.30
300	1.50	0.50	0.25
600	1.69	0.31	0.16
900	1.80	0.20	0.10
1800	1.90	0.10	0.05
2700	1.92	0.08	0.04
3600	1.93	0.07	0.04
5400			
7200			



Earth Environmental & Geotechnical Ltd

Tel / Fax:
Web: www.earthenvironmental.co.uk
Email: john@earthenvironmental.co.uk

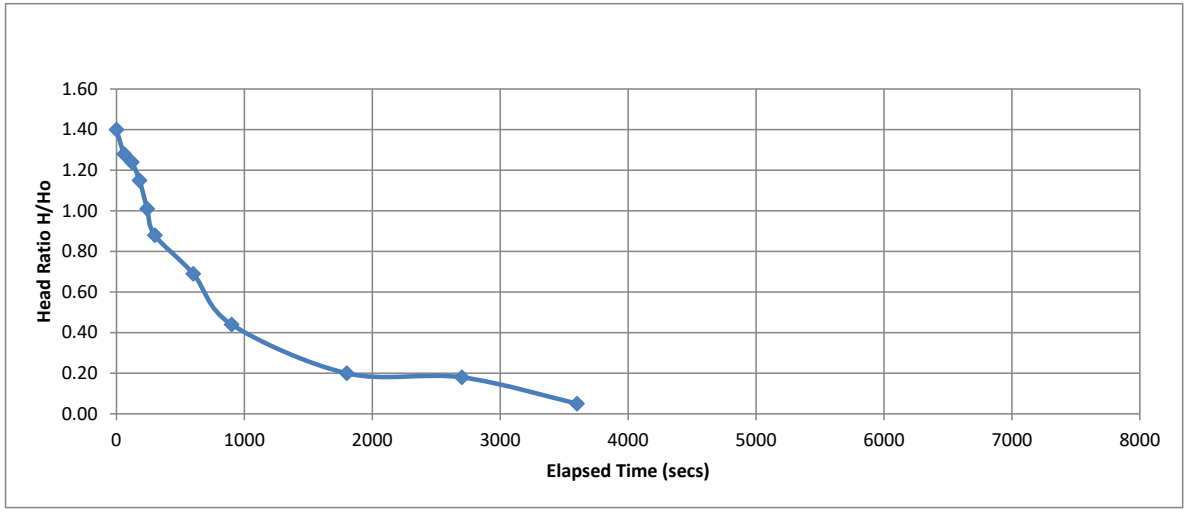
FALLING HEAD TEST

(To: BS5930 :1999 Page 50)

Job No:	R0671
Site:	Wandsworth Cambourne Mews
Client:	

Location Reference:	WS02	
Date	07 December 2021	
Geology in test section		
Depth of test section	2.00	metres
Depth to Standing Water Level (or base of well)	2	metres
Height of Casing	0.00	metres
Height of Casing above water level	2	metres
Depth to water at start of test below casing level (or base of well)	2.00	metres
Depth to water at end of test below casing level	1.95	metres
Response zone length	1.95	metres
Standpipe diameter in test section	0.05	metres
Cross sectional area of standpipe	1.96E-03	metres
Intake Factor (BS5930 p50) Figure d	2.81	
Basic Time Lag		
Coefficient of Permeability	6.46E-07	m/s

Time Elapsed (secs)	Depth of water below top of casing (m)	h(m)	h1/ho
0	0.60	1.40	0.70
60	0.72	1.28	0.64
120	0.76	1.24	0.62
180	0.85	1.15	0.58
240	0.99	1.01	0.51
300	1.12	0.88	0.44
600	1.31	0.69	0.35
900	1.56	0.44	0.22
1800	1.80	0.20	0.10
2700	1.82	0.18	0.09
3600	1.95	0.05	0.03
5400			
7200			



APPENDIX 4

LABORATORY TEST RESULTS (GEOTECHNICAL)

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 57072

Client Ref: **R0671**
Client PO: **R0671**

Report Date: **17-12-2021**

Client **Earth Environmental & Geotechnical**
Studio 3, Tollbridge Studios, Toll Bridge Road, Bath
BA1 7DE

Contract Title: **Camborne Mews, Camborne Road, SW18 5ED**
For the attention of: **John**

Date Received: **01-12-2021**
Date Completed: **17-12-2021**

Test Description	Qty
Samples Received - @ Non Accredited Test	10
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	1
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	1
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	2
Water Soluble Sulphate 2:1 extract Sub-contracted Test - @ Non Accredited Test	4
pH value of soil Sub-contracted Test - @ Non Accredited Test	4
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Emma Sharp (Business Support Manager) - Paul Evans (Director) - Richard John (Quality/Technical Manager)
Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager) - Wayne Honey (Quality Assistant / Administrator / Health and Safety Coordinator)

GEO Site & Testing Services Ltd
Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

GSTL	NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377:1990 - Part 2 : 4.3 & 5.3)	
Contract Number	57072	
Site Name	Camborne Mews, Camborne Road, SW18 5ED	
Date Tested	10/12/2021	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS02		D	3.00	-	4.00	Brown gravelly sandy CLAY.
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		

Operators	Checked	17/12/2021	Richard John (Advanced Testing Manager)
Clayton Jenkins	Approved	17/12/2021	Paul Evans (Quality/Technical Manager)

UKAS TESTING
2788

GSTL	NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377:1990 - Part 2 : 4.3 & 5.3)	
Contract Number	57072	
Project Location	Camborne Mews, Camborne Road, SW18 5ED	
Date Tested	10/12/2021	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
WS02		D	3.00	-	4.00	29	62	21	41	90	CH High Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
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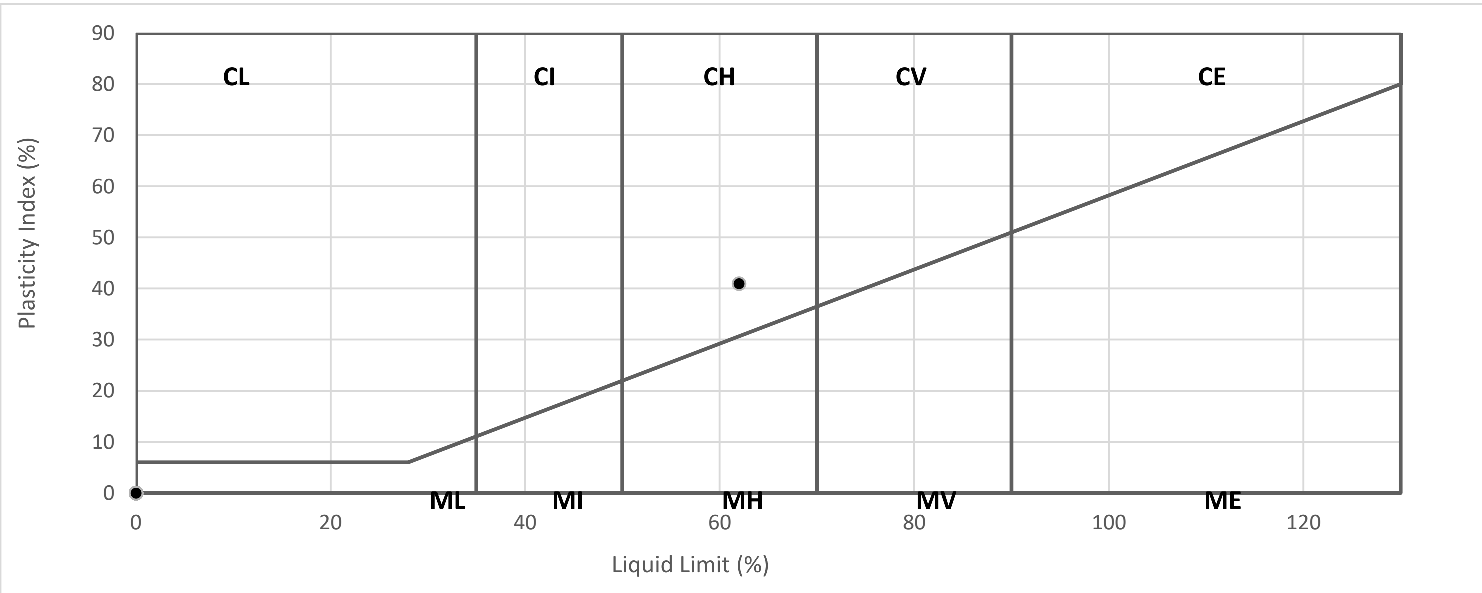
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

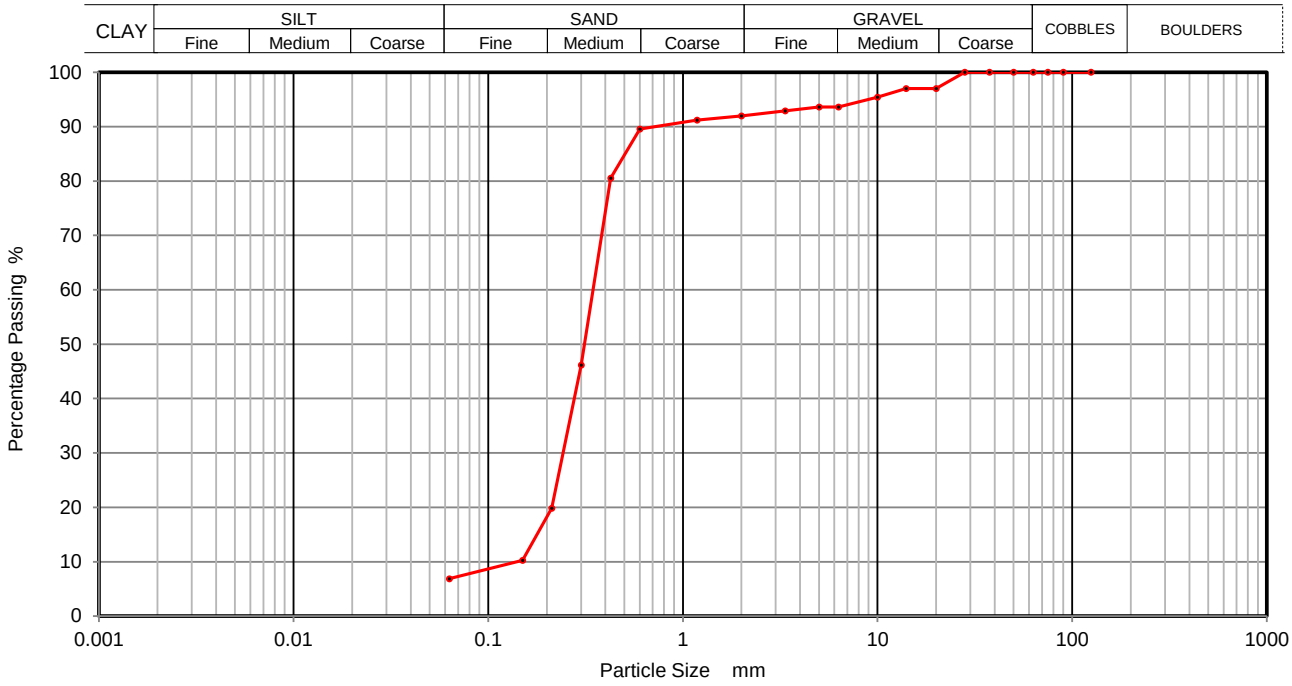
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:1999+A2:2010



Operators	Checked	17/12/2021	Richard John (Advanced Testing Manager)
Clayton Jenkins	Approved	17/12/2021	Paul Evans (Quality/Technical Manager)

UKAS TESTING 2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	57072
		Borehole/Pit No.	WS02
Site Name	Camborne Mews, Camborne Road, SW18 5ED	Sample No.	
Soil Description	Brown silty gravelly SAND.	Depth Top	1.20
		Depth Base	2.00
Date Tested	14/12/2021	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	97		
10	95		
6.3	94		
5	94		
3.35	93		
2	92		
1.18	91		
0.6	90		
0.425	81		
0.3	46		
0.212	20		
0.15	10		
0.063	7		

Sample Proportions	% dry mass
Cobbles	0
Gravel	8
Sand	85
Silt and Clay	7

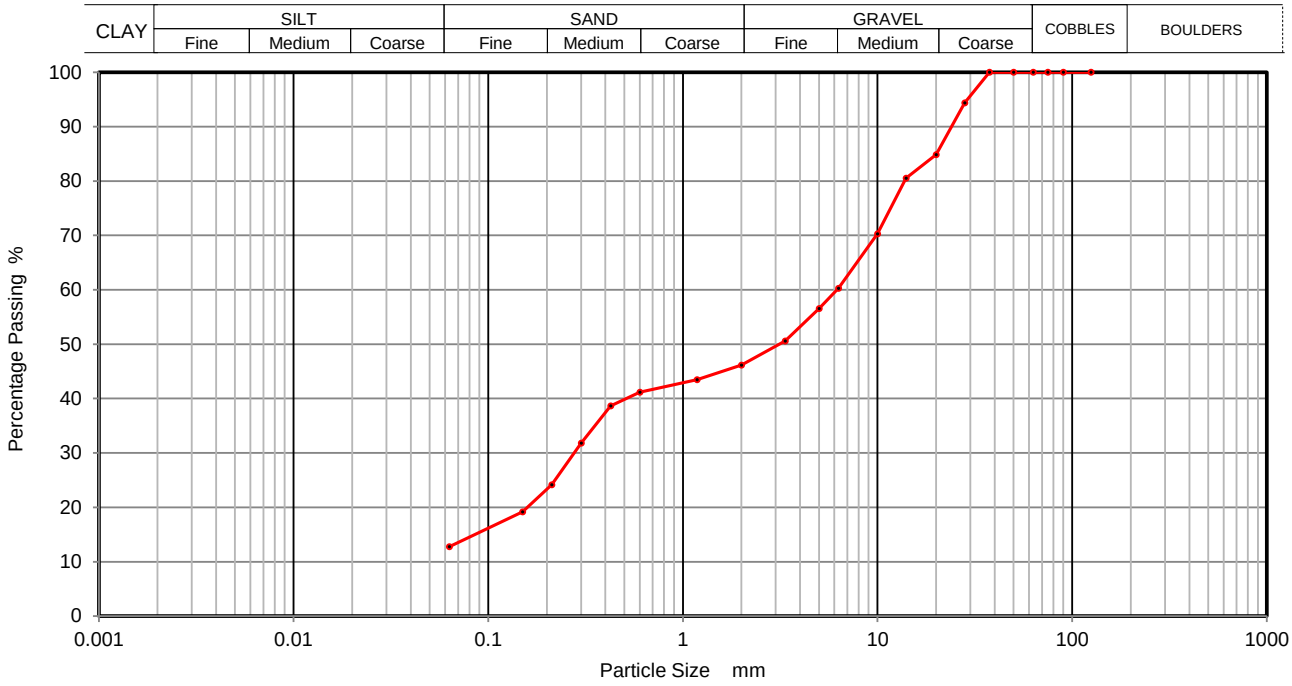
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	16/12/2021	Richard John	
David	Approved	17/12/2021	Paul Evans	

UKAS TESTING
2788

GSTL	PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve, Clause 9.2	Contract Number	57072
		Borehole/Pit No.	WS04
Site Name	Camborne Mews, Camborne Road, SW18 5ED	Sample No.	
Soil Description	Brown silty sandy GRAVEL.	Depth Top	0.75
		Depth Base	0.80
Date Tested	14/12/2021	Sample Type	D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	94		
20	85		
14	81		
10	70		
6.3	60		
5	57		
3.35	51		
2	46		
1.18	43		
0.6	41		
0.425	39		
0.3	32		
0.212	24		
0.15	19		
0.063	13		

Sample Proportions	% dry mass
Cobbles	0
Gravel	54
Sand	33
Silt and Clay	13

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	16/12/2021	Richard John	
David	Approved	17/12/2021	Paul Evans	

UKAS TESTING
2788

2531

ANALYTICAL TEST REPORT

Contract no: 103719

Contract name: Camborne Mews, Camborne Road, SW18 5ED

Client reference: R0671

Clients name: Geo Site & Testing Services

Clients address: Unit 3 and 4 Heol Aur
Dafen Industrial Estate, Dafen
Llanelli, Carmarthenshire
SA14 8QN

Samples received: 09 December 2021

Analysis started: 09 December 2021

Analysis completed: 16 December 2021

Report issued: 16 December 2021

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Rachael Burton

Reporting Team Lead

Chemtech Environmental Limited

SOILS

Lab number			103719-1	103719-2	103719-3	103719-4
Sample id			WS02	WS02	WS04	WS04
Depth (m)			1.20-2.00	3.00-4.00	0.15-0.75	0.75-0.80
Sample Type			D	D	D	D
Date sampled			-	-	-	-
Test	**Method**	**Units**				
pH	CE004 U	units	8.0	7.6	8.4	8.2
Sulphate (2:1 water soluble)	CE061 U	mg/l SO_4	161	81	<10	335

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO_4

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
103719-1	WS02	1.20-2.00	Y	All (NSD)
103719-2	WS02	3.00-4.00	Y	All (NSD)
103719-3	WS04	0.15-0.75	Y	All (NSD)
103719-4	WS04	0.75-0.80	Y	All (NSD)

Chemtech Environmental Limited

Additional Information

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.
For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones, where applicable.

APPENDIX 5

LABORATORY TEST RESULTS (CONTAMINATION)

John Grace
Earth Environmental & Geotechnical (Southern Ltd)
Studio 3,
Tollbridge Studios
Toll Bridge Road
Bath
BA1 7DE

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

DETS Report No: 21-14205

Site Reference:	Camborne Mews, Cambounre Road, SW18 5ED
Project / Job Ref:	R0671
Order No:	R0671
Sample Receipt Date:	30/11/2021
Sample Scheduled Date:	30/11/2021
Report Issue Number:	1
Reporting Date:	07/12/2021

Authorised by:

Dave Ashworth
Technical Manager

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

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

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

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

4480

Soil Analysis Certificate						
DETS Report No: 21-14205	**Date Sampled**	24/11/21	24/11/21	24/11/21	24/11/21	24/11/21
Earth Environmental & Geotechnical (Southern Ltd)	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED	**TP / BH No**	WS01	WS02	WS02	WS03	WS04
Project / Job Ref: R0671	**Additional Refs**	MG	MG	GRAVEL	MG	MG
Order No: R0671	**Depth (m)**	0.05 - 0.45	0.03 - 0.23	0.43 - 1.20	0.15 - 0.80	0.15 - 0.75
Reporting Date: 07/12/2021	**DETS Sample No**	577200	577201	577202	577203	577204

Determinand	Unit	RL	Accreditation		(n)	(n)	(n)	
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.4	7.1	7.3	7.0	7.6
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	883	44450	1632	3088	725
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.09	4.45	0.16	0.31	0.07
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	21	995	507	1370	104
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.02	0.99	0.51	1.37	0.10
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	6.4	11	2.6	3.7	5.1
Arsenic (As)	mg/kg	< 2	MCERTS	13	28	7	11	11
Barium (Ba)	mg/kg	< 2.5	MCERTS	148	102	37	73	83
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.7	1.2	< 0.5	0.6	0.6
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	1.2	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.5	3.8	< 0.2	0.3	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	14	18	9	16	13
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	59	284	21	45	53
Lead (Pb)	mg/kg	< 3	MCERTS	475	4230	236	141	191
Mercury (Hg)	mg/kg	< 1	MCERTS	3	< 1	< 1	< 1	1.3
Nickel (Ni)	mg/kg	< 3	MCERTS	10	31	4	6	17
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 1	MCERTS	32	32	19	34	32
Zinc (Zn)	mg/kg	< 3	MCERTS	217	652	46	77	71
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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

4480

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-14205	**Date Sampled**	24/11/21	24/11/21	24/11/21	24/11/21	24/11/21
Earth Environmental & Geotechnical (Souther	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED	**TP / BH No**	WS01	WS02	WS02	WS03	WS04
Project / Job Ref: R0671	**Additional Refs**	MG	MG	GRAVEL	MG	MG
Order No: R0671	**Depth (m)**	0.05 - 0.45	0.03 - 0.23	0.43 - 1.20	0.15 - 0.80	0.15 - 0.75
Reporting Date: 07/12/2021	**DETS Sample No**	577200	577201	577202	577203	577204

Determinand	Unit	RL	Accreditation		(n)	(n)	(n)	
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.29	0.54	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.85	1.74	< 0.1	< 0.1	0.17
Pyrene	mg/kg	< 0.1	MCERTS	0.71	1.71	< 0.1	< 0.1	0.15
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.41	0.95	< 0.1	< 0.1	0.12
Chrysene	mg/kg	< 0.1	MCERTS	0.38	0.79	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.52	1.27	< 0.1	< 0.1	0.17
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.27	0.46	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.44	1.05	< 0.1	< 0.1	0.13
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.33	0.62	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.33	0.73	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	4.5	10.1	< 1.6	< 1.6	< 1.6

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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

4480

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 21-14205	**Date Sampled**	24/11/21	24/11/21	24/11/21	24/11/21	24/11/21
Earth Environmental & Geotechnical (Souther	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED	**TP / BH No**	WS01	WS02	WS02	WS03	WS04
Project / Job Ref: R0671	**Additional Refs**	MG	MG	GRAVEL	MG	MG
Order No: R0671	**Depth (m)**	0.05 - 0.45	0.03 - 0.23	0.43 - 1.20	0.15 - 0.80	0.15 - 0.75
Reporting Date: 07/12/2021	**DETS Sample No**	577200	577201	577202	577203	577204

Determinand	Unit	RL	Accreditation		(n)	(n)	(n)	
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	11	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	3	31	< 3	82	23
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	73	438	< 10	48	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	77	469	< 21	141	23
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	12	2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	5	28	< 3	109	26
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	47	192	< 10	28	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	51	220	< 21	149	28
Total >C5 - C35	mg/kg	< 42	NONE	128	689	< 42	290	51

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-14205	**Date Sampled**	24/11/21	24/11/21	24/11/21	24/11/21	24/11/21
Earth Environmental & Geotechnical (Souther	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED	**TP / BH No**	WS01	WS02	WS02	WS03	WS04
Project / Job Ref: R0671	**Additional Refs**	MG	MG	GRAVEL	MG	MG
Order No: R0671	**Depth (m)**	0.05 - 0.45	0.03 - 0.23	0.43 - 1.20	0.15 - 0.80	0.15 - 0.75
Reporting Date: 07/12/2021	**DETS Sample No**	577200	577201	577202	577203	577204

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

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 21-14205		**Date Sampled**	24/11/21			**Landfill Waste Acceptance Criteria Limits**		
Earth Environmental & Geotechnical (Southern Ltd)		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED		**TP / BH No**	WS02					
Project / Job Ref: R0671		**Additional Refs**	GRAVEL					
Order No: R0671		**Depth (m)**	0.43 - 1.20					
Reporting Date: 07/12/2021		**DETS Sample No**	577202					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.9			3%	5%	6%
Loss on Ignition	%	< 0.01	2.18			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	7.3			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	< 0.02	< 0.02		0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum[U]	0.010	0.004		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	< 0.005	< 0.005		< 0.05	0.06	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.05	0.1	0.5	7
Zinc[U]	0.006	0.006		< 0.2	4	50	200
Chloride[U]	3	5		45	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	28	6		80	1000	20000	50000
TDS	101	51		552	4000	60000	100000
Phenol Index	< 0.01	< 0.01		< 0.5	1	-	-
DOC	7.6	12.1		118	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.18						
Dry Matter (%)	94.9						
Moisture (%)	5.4						
Stage 1							
Volume Eluate L2 (litres)	0.34						
Filtered Eluate VE1 (litres)	0.15						

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

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 21-14205	
Earth Environmental & Geotechnical (Southern Ltd)	
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED	
Project / Job Ref: R0671	
Order No: R0671	
Reporting Date: 07/12/2021	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
577200	WS01	MG	0.05 - 0.45	14.3	Brown sandy clay with stones
577201	WS02	MG	0.03 - 0.23	11.5	Brown sandy gravel with stones and concrete
577202	WS02	GRAVEL	0.43 - 1.20	5.1	Brown sandy gravel with stones
577203	WS03	MG	0.15 - 0.80	5.8	Brown sandy gravel with stones and concrete
577204	WS04	MG	0.15 - 0.75	13.4	Brown sandy clay with stones and concrete

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

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 21-14205
Earth Environmental & Geotechnical (Southern Ltd)
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED
Project / Job Ref: R0671
Order No: R0671
Reporting Date: 07/12/2021

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

D Dried
AR As Received

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 21-14205
Earth Environmental & Geotechnical (Southern Ltd)
Site Reference: Camborne Mews, Cambounre Road, SW18 5ED
Project / Job Ref: R0671
Order No: R0671
Reporting Date: 07/12/2021

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

Key

F Filtered
UF Unfiltered

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

APPENDIX 6

REPORT LIMITATIONS

REPORT LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget and staff resources allocated to the project.

Other than that expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2020 and should be read in light of any subsequent changes in legislation, statutory requirements and industry best practices. Ground conditions can also change over time and further investigations or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.
No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.