GEOTECHNICAL REPORT ON
GROUND INVESTIGATION

MOUNT COTTAGE, 47D NETHERHALL GARDENS, LONDON

FOR

CHAIM KLEIN

Giving our all

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APPROVAL & DISTRIBUTION SHEET

PROJECT DETAILS	
CET LEAD NO.	491846
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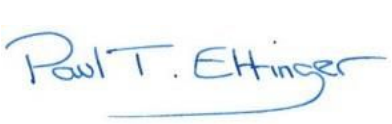

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FOREWORD

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1. INTRODUCTION

This interpretative report has been prepared upon the written instruction of Elite Designers Ltd. dated 18th December 2018 acting on behalf of the house owner Chaim Klein. The report was updated to incorporate the additional GI works, caried out on written instruction from William Tozer Associates dated 15th May 2020.

The subject site is located at Mount Cottage, 47d Netherhall Gardens, London and comprises a two-storey residential property. The proposed development includes the construction of a single storey basement c. 3m deep beneath the existing house footprint and extending into the private garden to the front of the property. A ground investigation was requested by the appointed structural engineer, Elite Designers, to provide information on the ground conditions underlying the site, with the additional works carried out as recommended by CET in light of the Campbell Reith Review.

The fieldwork comprised three foundation inspection pits and one window sampler borehole undertaken in January 2019 and May 2019, with the additional programme of works carried out in October 2020. This report is based upon the above fieldwork and subsequent geotechnical laboratory testing programme.

Attention is drawn to the fact that whilst every effort has been made to ensure the accuracy of the data supplied and any analysis derived from it, there is a potential for variations in ground and groundwater conditions between and beyond the specific locations investigated. No liability can be accepted for any such variations. Furthermore, any recommendations are specific to the client's requirements as detailed herein and no liability will be accepted should these be used by third parties without prior consultation with CET Infrastructure.

A desk study as recommended in BS5930 "Code of practice for site investigations" was not requested and has not therefore been carried out.

2. SITE SETTINGS

The subject site is located at approximate Ordnance Survey grid reference TQ263852 (see Figure 1) and comprises a two-storey residential property situated on Netherhall Gardens, London, NW3 5RJ. The house is semi-detached, with 47c Netherhall Gardens joined by a party wall to the north of the subject property. 47c Netherall Gardens, is of a similar size and construction to the subject property.

The existing house occupies the northern, or rear half, of the property's footprint with the remaining area to the south occupied by private gardens of hard and soft landscaping that border the public highway Netherhall Gardens. There are two London plane trees within the site boundary that are about 8m high and about 6m from the proposed development.

The general area of the property is situated on a south east sloping hillside at about 85mAOD. The site itself is essentially level with a gentle slope towards the south of about 4 degrees. A survey of the site, carried out by Chelmer Global Ltd., determined that there is a maximum change of elevation across the site of 1.72m and a slope dip of 6°.

A Network Rail tunnel (Hampstead Heath Tunnel) lies at depth under Netherhall Gardens and runs parallel with the roadway in a south west to north east direction. According to Network Rail drawings, the outside line or extrados of the tunnel is located close to the front property boundary at a level of around 50mAOD, suggesting it is about 35m below existing ground level. The tunnel contains a 15m wide 'zone of influence' on either side that in plan-view covers most of the 47d Netherhall Gardens curtilage except for a small area to the rear of the property.

Reference to the publications of the British Geological Survey indicates that the site is underlain by the deposits of the Claygate Member, which overlies the London Clay Formation. No superficial deposits are recorded. Typically, these deposits may be described as follows: -

Stratum	Description
Claygate Member	Dark grey CLAY with sand laminae, passing up into thin alternations of clay, silts and fine-grained sand, with beds of bioturbated silt. Ferruginous concretions and septarian nodules occur in places.
London Clay Formation	Grey over-consolidated CLAY that weathers to a characteristic brown colour near the surface. Layers of claystone (septarian) nodules are common within the London Clay Formation, as is the presence of selenite.

The clayey soils of the Claygate Member and London Clay Formation and soils derived from these strata typically exhibit high volume change potential and high plasticity and as a result significant volume changes

occur with variations in the natural moisture content. These volume changes may affect foundations and cause structural damage to buildings founded within the affected zone. Such changes can occur due to climatic and seasonal variations and, more significantly, as a result of the growth and removal of trees and shrubs. Seasonal moisture content variations are likely to occur within the top 1m to 1.5m of the subsoil, whilst trees may abstract moisture to depth of 4m to 5m or more. As a tree grows it abstracts moisture from the ground and as a result subsidence of the ground surface may occur. If the tree is removed, or dies, the ground will swell causing heave of the ground surface. Both subsidence and heave can cause significant damage to structures with inappropriate foundations.

The ground investigation ascertained that the site was underlain by deposits of the London Clay Formation mantled by deposits of the Claygate Member. These deposits were mantled by Made Ground to a maximum depth of 1.7m below ground level in TP03.

3. GROUND INVESTIGATION

The first phase of fieldwork comprised three foundation inspection pits and one window sampler borehole undertaken in January 2019 and May 2019. The second phase of fieldwork involved the drilling of a single cable percussion borehole, carried out in October 2020. The approximate locations of the exploratory holes are shown in Figure 2.

A 15m deep cable percussion borehole was planned to be undertaken to the front of the property but was deferred at the request of the client due to conditions imposed by Network Rail for drilling above a tunnel. The alternate window sampler borehole was located to the rear of the property outside of the Network Rail tunnel 'zone of influence'. In response to Campbell Reith's assessment of the report, a 12m cable percussion borehole was subsequently drilled under Network Rail's supervision.

Prior to commencing each exploratory hole, the locations were checked for services using a CAT (Cable Avoidance Tool) by the CET engineer on site and a hand dug inspection pit was carried out as a precautionary measure.

Details of the ground conditions encountered in the exploratory holes are presented on the engineer's logs in Appendix A. Reference should be made to these logs for detailed descriptions of the strata penetrated and the results of any in situ tests carried out.

The borehole logging in the first phase has been updated in light of the descriptions from BH01. It is considered unlikely that the deposits previously described as Bagshot Formation were encountered based on a comparison of the descriptions in WS01 and the new descriptions from BH01. A summary only of the updated ground conditions encountered in the boreholes is presented below:-

Strata name	Depth to top of strata (mbgl)	Thickness (m)	Description
Made Ground	0	0.6 to 1.7	Dark brown CLAY, with varying minor constituents of sand and gravel; clayey gravelly SAND or sandy GRAVEL of flint, brick, chalk, concrete, possible coal/clinker, and ceramic tile. A low to medium cobble content of brick was also encountered.
Claygate Member	0.6-1.7	2.5 to 5	Soft becoming firm with depth, light orange brown mottled light grey, fine sandy, silty CLAY; and Firm locally stiff and soft, greyish brown, light grey and orange brown mottled, slightly fine sandy, slightly gravelly, locally silty CLAY.

London Clay Formation	3.55 to 6	Proved to 12.45m depth	Firm becoming very stiff with depth, dark grey, locally micaceous, fine sandy, locally silty CLAY with localised shell fragments.

From ground level or beneath a mantle of possible Topsoil or asphalt, Made Ground was proved to a maximum depth of 1.7m below ground level in TP03. Typically, this material was encountered as a dark brown CLAY with varying minor constituents of sand and gravel, clayey gravelly SAND or sandy GRAVEL. The gravel typically comprised flint, brick, chalk, concrete, possible coal/clinker and ceramic tile. A low to medium cobble content of brick was also noted.

Underlying the Made Ground, deposits of the Claygate Member were encountered in BH01 to a maximum depth of 5m. Beneath the Claygate Member deposits of the London Clay Formation were encountered and proved to a maximum depth of 12.45m below ground level in BH01. WS01 and BH01 were terminated in this horizon.

Plots of pocket penetrometer resistance, hand vane and SPT values with depth are included in Appendix C. Hand vane values within the Claygate Member ranged from 36kN/m^2 to 70kN/m^2 whilst in the London Clay Formation the values were typically higher, ranging from 58kN/m^2 to 120kN/m^2. The plot of SPT results from BH01 also closely resembles the results of the hand vanes with N values ranging from 6 to 12 in the Claygate Member and 10 to 21 in the London Clay Formation. The general trend of the plots of hand vanes, pocket penetrometers and SPT values show a gradual increase in soil strength with depth.

Roots and rootlets were observed to maximum depth of 3.5m below ground level in BH01, with 'relict roots' to the top of the London Clay Formation.

Foundation pits were conducted to the party walls located to the west and east of the existing property as well as to the front elevation of 47d Netherhall Gardens. Reference should be made to the foundation inspection pit logs in Appendix B for detailed foundation dimensions and the strata penetrated. These foundation pit logs show the house is on shallow concrete foundations at about 0.95m below ground level and bearing within the Claygate Member.

Groundwater was not encountered when sinking WS01. However, a water strike was encountered at 7m below ground level in BH01, with no rise after 20 minutes. A groundwater level of 2.65m below ground level was measured during a post field work monitoring visit in a monitoring well installation on 6th June 2019. A reading of the well installed in BH01 on the 14th December 2020, yielded a reading of 2.13m. It should be appreciated that the groundwater table may vary both seasonally and in the long-term, and further

monitoring to establish a longer-term groundwater monitoring regime may be required as part of any planning condition and certainly prior to construction.

4. LABORATORY TESTING

The following geotechnical laboratory testing programme was carried out to provide further information on the engineering properties of the subsoil. Unless stated otherwise, these tests were carried out in accordance with BS 1377 “Methods of Test for Soils for Civil Engineering Purposes”.

No.	Test	UKAS Accreditation
7	Moisture content determination	CET
5	Atterberg limits	CET
1	Water soluble sulphate	CET Supplier
3	pH	CET Supplier
3	BRE SD1 Suite	CET Supplier
3	105mm quick-undrained triaxial test	CET Supplier
2	Oedometer consolidation test	CET Supplier

5. DISCUSSION AND RECOMMENDATIONS

GENERAL

The subject site is located at Mount Cottage, 47d Netherhall Gardens and comprises a semi-detached two-storey residential property. The proposed development comprises the construction of a single storey basement about 3m below ground level that will be beneath the footprint of the existing house as well as under the garden to the front. A ground investigation was requested by the appointed structural engineer, Elite Designers, to provide information on the ground conditions underlying the site. This was supplemented by a second site investigation requested by the project architect William Tozer Associates.

The fieldwork comprised three foundation inspection pits, one window sampler borehole and one cable percussion borehole undertaken in January 2019, May 2019 and October 2020 respectively. These found that at ground level below a mantle of asphalt or possible topsoil, Made Ground was encountered to a maximum depth of 1.7m below ground level. Below the Made Ground, deposits of the Claygate Member were encountered to a maximum depth of 5m below ground level. Below this stratum the London Clay Formation was encountered and proved to the base of BH01 at 12.45m below ground level.

No groundwater was encountered during drilling WS01 on the 14th May 2019. A groundwater level of 2.65m below ground level was measured during a post field work monitoring visit in a standpipe installation on 6th June 2019. On drilling BH01 in October 2020 a groundwater strike was noted at 7m below ground level. A reading of the installed groundwater monitoring standpipe yielded a groundwater level of 2.13m. Notwithstanding the above, the comments made in Section 3 of this report should be borne in mind.

Roots and rootlets were encountered to a maximum depth of 3.5m below ground level in BH01.

FOUNDATION RECCOMENDATIONS

The design of the selected foundation solution will need to take into consideration inter alia the following:

- The existing house and neighbouring property foundations that will need to be supported during construction of the basement. There must be no loss of lateral support to foundations or supporting soils;
- The interaction of the adjacent properties' foundations and potential surcharges. These properties are also likely to be on shallow foundations;
- The restricted access to some sides of the subject property;

- Potential restrictions or limitations caused by the Network Rail tunnel on construction techniques such as percussion piling;
- The relatively low and variable strength of the Claygate Member encountered to 5m below ground level, which may preclude it as a suitable founding stratum for traditional trench fill foundations; and
- The current recorded maximum groundwater level of 2.13m depth that will affect excavation stability/subgrade preparation and will require some form of groundwater control.

Shallow Foundations

The proposed basement level of about 3m below ground level is expected to encounter Claygate Member deposits that recorded highly variable shear strength values with areas of anomalously low values. Therefore, these deposits would likely have a low bearing value. If trench fill foundations and conventional hit-and-miss underpinning were to be adopted, then It is recommended that these extend into more competent deposits towards the base of the Claygate Member.

For typical residential loadings, a presumed net allowable bearing value, which takes no account of settlement, of 150kN/m^2 is considered appropriate for strip or pad foundations with a width of 1m at a formation level of 5m below ground level within the Claygate Member. This value incorporates an adequate factor of safety against bearing capacity failure but does not give an indication of settlement. Reference should be made to the BIA for an analysis of the likely settlements. Due to the variability of the strength of the Claygate member it is recommended that when exposed the foundation formation is inspected to confirm the design bearing value is achievable.

NHBC Standards Chapter 4.3 “Strip and trench fill foundations” should be consulted for the technical requirements of strip and trench fill foundations.

Pile Foundations

An alternative solution to shallow foundations is the use of pile foundations that may offer higher bearing capacity and reduced overall settlement. This option would likely offer the best load carrying capacity especially if new foundations are to support both the existing house as well as supporting the new basement walls.

A secant pile wall extending into the London Clay Formation would have the benefit of providing both temporary and permanent support to excavations, excluding groundwater and provide load carrying capacity.

BASEMENT HEAVE

The excavation of up to 3m of soil would result in a net unloading of around 60kN/m^2. This unloading may result in heave of the underlying Claygate Member and the deeper London Clay Formation, which will comprise short term elastic movement and long-term swelling that will continue over a number of years. The anticipated heave will be mitigated to some extent by the load of the new basement but the effects of this movement on the floor slab should be considered in more detail once the levels and loads have been finalised. To this end a suspended floor slab may be preferred. The effect of this heave on the Network Rail tunnel will also need to be considered.

BASEMENT EXCAVATION

The basement excavation is expected to encounter Made Ground from ground level to about 1.7m below ground level, which was the maximum depth encountered in the ground investigation. Below the Made Ground the Claygate Member, which is sandy silty CLAY with sand and clayey silt layers, in which the footings are to be founded. It is also expected that groundwater will be encountered during the excavation process.

Based on the ground and groundwater conditions encountered, continuous support will be required to maintain the stability of the excavation and to minimise the risk of loss of support and consequential movement of surrounding structures and services. The design of basement support in the temporary and permanent conditions will need to maintain the stability of both the excavation, existing house, and neighbouring properties. Groundwater ingress will also need to be mitigated.

The proposed series of reinforced concrete underpinning blocks should be constructed in a suitable sequence so that no significant length of soil is left unsupported for any period of time.

A bored pile wall would be the most robust method of constructing and supporting the basement excavation and it could also be incorporated into the permanent works to provide support for structural loads if the piles can be positioned under load bearing walls. If it can be shown that groundwater inflow is minimal then it could be possible to adopt a contiguous piled wall with the use of sump pumping to deal with any groundwater inflows, otherwise a secant bored pile wall would be required. If a contiguous pile system is adopted the permanent works will require additional measures to exclude groundwater from the basement.

A sheet pile wall located outside of the basement footprint could also be used, although due to high vibrations associated with driving sheet piles, they would need to be installed using a push method. The sheet piles could then be left in situ or removed upon completion of the permanent basement walls. If sheet piles

are adopted, they are likely to require propping at the head to prevent yielding and loss of support to the retained soils.

PERMANENT RETAINING WALLS

The design of retaining walls should adopt k_0, the lateral earth pressure at rest, to mitigate the risk of lateral movement and damage to adjacent structures.

With current recorded groundwater levels, the basement walls will need to be designed to form a water-tight seal with the load bearing walls. The retaining walls should also be designed to withstand groundwater pressures that may build up behind the walls over time. A specialist contractor should be consulted when ensuring that the basement is watertight.

As part of the proposed design of the basement structure and with reference to the laboratory test results and BS8002: 2015, the following design parameters are suggested for the soils to be retained: -

Material	Φ'_{crit}	C'_{cit}	Υ (kN/m^3)
Made Ground (Variable CLAY, SAND, and GRAVEL major constituents)	25	0	19
Claygate Member (Fine sandy silty CLAY with layers of fine sand and clayey silt)	25	0	19

FLOOR SLAB DESIGN

Consideration will need to be given to designing the basement floor slab to accommodate heave movements and groundwater pressures, hence a suspended basement slab is likely to be required. Due to the depth of the observed root penetration, and the presence of soils with medium volume change potential, it is recommended that should potential desiccation be observed at slab formation level these soils should be removed and replaced with a suitably engineered fill. Replacement with fill material may be conducted up to 600mm below the slab formation level.

Should desiccation exceed 600mm below the floor slab level it is recommended that a suspended floor slab design be adopted. Reference should be made to NHBC Standards Chapter 4.2 “Building Near Trees” for recommended void dimensions to be adopted beneath the floor slab.

Due to current recorded groundwater levels, the floor slab should be designed appropriately as to form a water-tight seal with the load bearing walls. In addition, the slab must be sufficiently stiff to resist the uplift forces due to the presence of ground water.

CONCRETE BELOW GROUND

Chemical testing has been carried out on soil samples recovered from the Claygate Member and London Clay Formation encountered in BH01 and WS01 and has been assessed in accordance with BRE Special Digest 1:2005 Third Edition "Concrete in Aggressive Ground", Table C2 "Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations".

Based on the observations within the boreholes and installed standpipes and descriptions of the soils encountered, the Claygate Member is likely to be described as 'mobile' while the underlying London Clay Formation is likely to be described as static as described in BRE Special Digest 1:2005 Third Edition "Concrete in Aggressive Ground".

Based on the testing results from the boreholes, for concrete penetrating the Claygate Member a Design Sulphate Class DS-1 and ACEC Class AC-1 be adopted. For concrete penetrating the London Clay Formation a Design Sulphate Class DS-1 and ACEC Class AC-1s could be adopted. However, based on the prevalence of selenite within the Claygate Member and London Clay Formation, it is recommended that that a Design Sulphate Class DS-3 and ACEC Class AC-2 and Design Sulphate Class DS-3 and ACEC Class AC-2s, respectively be adopted for the preliminary design.

FIGURES

CET INFRASTRUCTURE
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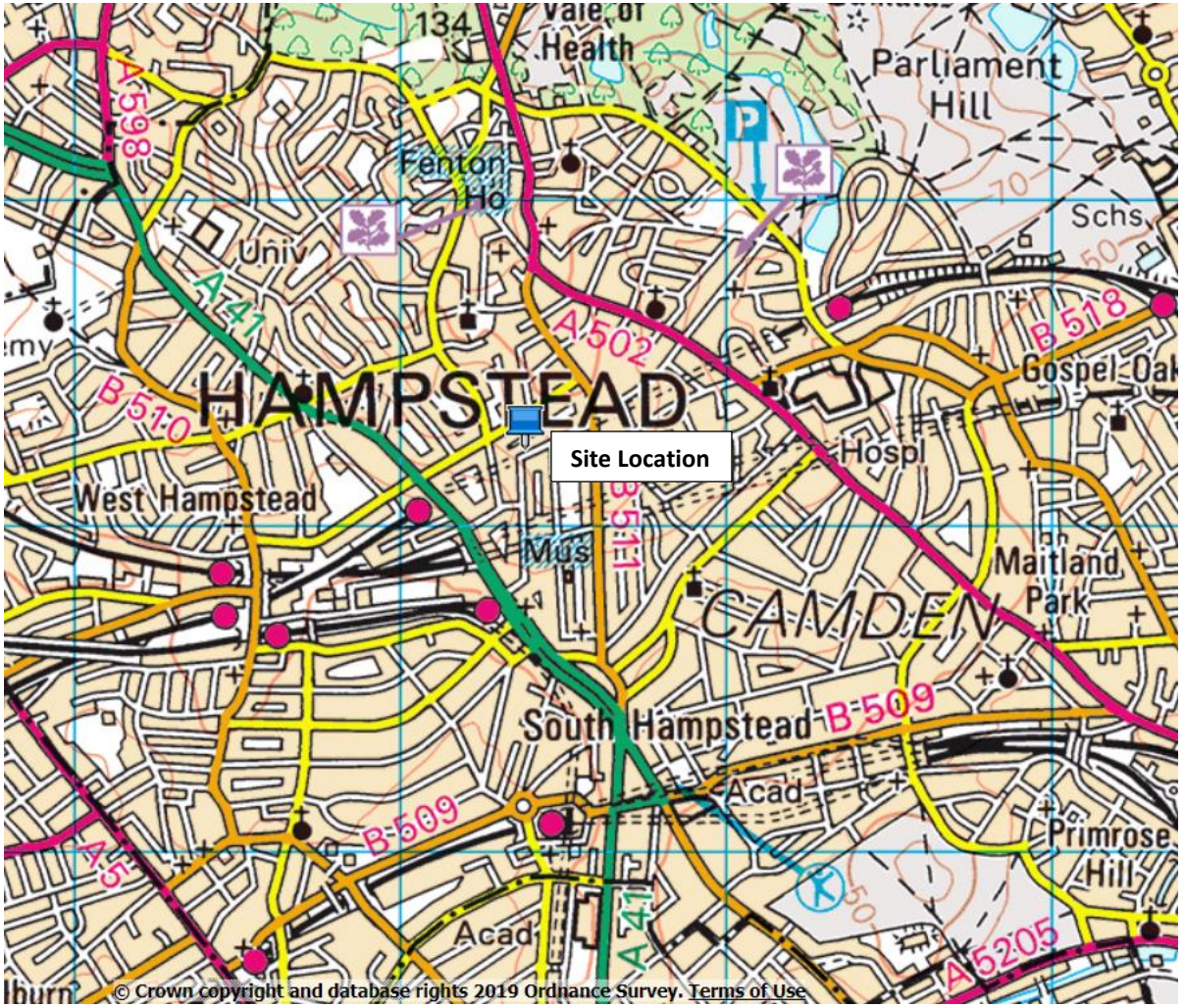
Northdown House, Ashford Road, Harrietsham, Maidstone
Kent, ME17 1QW
Telephone: 01622 858545 Facsimile: 01622 858544

47d Netherhall Gardens, Hampstead

Lead No.	Sheet 1 of 2
491846	

Created By: GRH	Checked: PJW	Approved: PJW	Date:
			May 2019



Site Location Plan

Scale: 1 square = 1km

FIGURE 1

CET INFRASTRUCTURE Giving our all

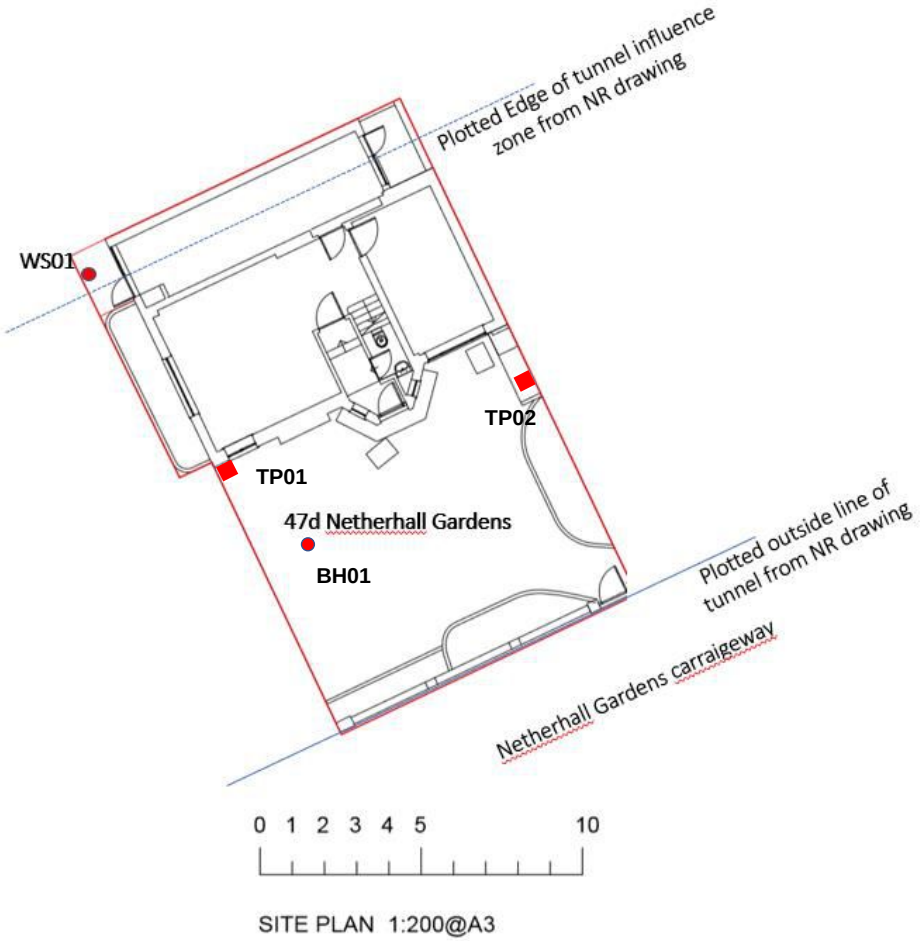
Northdown House, Ashford Road, Harrietsham, Maidstone
Kent, ME17 1QW
Telephone: 01622 858545 Facsimile: 01622 858544

47d Netherhall Gardens, Hampstead

Lead No. **491846**

Sheet 2 of 2

Created By: GRH	Checked: PJW	Approved: PJW	Date: **December 2020**



Approximate Exploratory Hole Location Plan

Scale: As shown

FIGURE 2

APPENDIX A

Fieldwork

Client: **Chaim Klein**	Hole Diameter (mm): 150 to 12.00m		BOREHOLE NUMBER **BH01**
Method: Cable Percussion	Casing Dia. (mm): 150 to 12.00m		Sheet 1 of 2
Date Started: 29/10/2020 Co-ordinates	Ground Level (m AOD)	Ref. No: **491846**	

Backfill/Well Depth (m)	Backfill/Well Legend	Water Depth (m)	Samples Depth (m)	Samples Type	In Situ Tests Type	In Situ Tests Results	Reduced Level (mAOD)	Depth & (Thickness) (m)	Description of Strata	Legend
0.10								(0.10)	Brick paving	
			0.50 - 1.00	B				0.10 (0.10) 0.20	Yellow, medium and coarse SAND. Common rootlets. (Made Ground)	
1.00								(0.35) 0.55 (0.45) 1.00	Soft, brown and orange brown, slightly fine and medium sandy CLAY. (Made Ground)	
			1.20 - 1.65	U					Soft, light orange brown mottled light grey, slightly medium and coarse sandy, gravelly CLAY. Gravel is angular fine to coarse tile, brick and asphalt. (Made Ground)	
			1.70	D						
			2.00	D	2.00	N =12				
			2.00 - 2.45	D						
			2.50	D						
			3.00	D					Soft locally firm light blue grey and orange brown, slightly fine sandy CLAY with rare, rounded fine and medium gravel size black flint. Rare fine sand size fragments of possible selenite.	
			3.00 - 3.45	U						
			3.50	D				(5.00)	(Claygate Member)	
			4.00	D	4.00	N =6				
			4.00 - 4.45	D						
			4.50	D						
			5.00	D						
			5.00 - 5.45	U						
			5.50	D						
6.00	W		6.00	D	6.00	N =10		6.00	Firm becoming stiff with depth, dark grey, silty CLAY with rare fine sand size possible selenite. Possible selenite becoming angular, fine and medium gravel size fragments with depth. From 10m below ground level rare sub-angular to sub-rounded, fine to coarse gravel size shell fragments. (London Clay Formation)	
			6.00 - 6.45	D						
			6.50	D						
		7.00 ▼	7.00	D						
			7.00 - 7.50	B						
			7.50	D						
			8.00	D	8.00	N =12				
			8.00 - 8.45	D						
			8.50	D						
			9.00	D						
			9.00 - 9.50	B				(6.45)		
			9.50	D						

General Remarks:

1. Groundwater seepage encountered at 7m below ground level.
2. Roots and rootlets observed to 3.5m below ground level.

Driller:	SL	**BOREHOLE RECORD** Scale 1:50 See Key Sheet for explanation of symbols, etc.	CET INFRASTRUCTURE Giving our all
Logged:	HGD		
Checked:		**Mount Cottage, 47d Netherall Gardens**	**FIG A1**
Appr'd:			

Client: **Chaim Klein**	Hole Diameter (mm): 150 to 12.00m	BOREHOLE NUMBER **BH01**
Method: Cable Percussion	Casing Dia. (mm): 150 to 12.00m	
Date Started: 29/10/2020 Co-ordinates	Ground Level (m AOD) Ref. No: **491846**	Sheet 2 of 2

Backfill/Well Depth (m)	Backfill/Well Legend	Water Depth (m)	Samples Depth (m)	Samples Type	In Situ Tests Type	In Situ Tests Results	Reduced Level (mAOD)	Depth & (Thickness) (m)	Description of Strata	Legend
			10.00	D	10.00	N =22			Firm becoming stiff with depth, dark grey, silty CLAY with rare fine sand size possible selenite. Possible selenite becoming angular, fine and medium gravel size fragments with depth. From 10m below ground level rare sub-angular to sub-rounded, fine to coarse gravel size shell fragments. (London Clay Formation)	
			10.00 - 10.45	D						
			10.50	D						
			11.00	D						
			11.50	D						
			12.00	D	12.00	N =21				
12.45								12.45	End of Borehole at 12.45m	

General Remarks:
1. Groundwater seepage encountered at 7m below ground level.
2. Roots and rootlets observed to 3.5m below ground level.

Driller:	SL	**BOREHOLE RECORD** Scale 1:50 See Key Sheet for explanation of symbols, etc.	CET INFRASTRUCTURE Giving our all
Logged:	HGD		
Checked:		**Mount Cottage, 47d Netherall Gardens**	**FIG A1**
Appr'd:			

Client: **Chaim Klein**	Hole Diameter (mm): 75mm tapering with depth to 6.1m		BOREHOLE NUMBER **WS01**
Method: Window Sampler			Sheet 1 of 2
Date Started: 14/05/2019	Co-ordinates E 526379.000 N 185227.000	Ground Level (m AOD)	Ref. No: **491846**

Backfill/Well Depth (m)	Backfill/Well Legend	Water Depth (m)	Samples Depth (m)	Samples Type	In Situ Tests Type	In Situ Tests Results	Reduced Level (mAOD)	Depth & (Thickness) (m)	Description of Strata	Legend
0.10								(0.05) 0.05	Asphalt.	
			0.60	D				(0.55)	Dark brown to black, fine to coarse sandy, angular fine to coarse GRAVEL with a medium cobble content of bricks. Gravel is composed of flint, clinker, and ceramic tile. (Made Ground)	
1.00			1.00	D				0.60	Soft becoming firm with depth, light orange brown mottled light grey, fine sandy silty CLAY, with thin laminations and partings of orange brown fine sand and light grey clayey silt. (Claygate Member)	
			1.50	D						
			2.00	D	1.90	pp = 0.5 Vh = 40.0				
					2.10	pp = 0.8 Vh = 42.0		(2.95)		
					2.30	pp = 1.5 Vh = 70.0				
			2.50	D						
					2.60	pp = 1.5 Vh = 55.0				
			3.00	D	2.90	pp = 0.5 Vh = 36.0				
					3.10	pp = 0.8 Vh = 65.0				
					3.30	pp = 1.5 Vh = 72.0				
			3.60	D				3.55	Firm becoming stiff with depth, dark grey, micaceous fine sandy silty CLAY. (London Clay Formation)	
					3.70	pp = 1.0 Vh = 58.0				
			4.00	D						
					4.10	pp = 1.2 Vh = 78.0				
					4.30	pp = 1.5 Vh = 74.0				
			4.50	D						
					4.70	pp = 2.0 Vh = 95.0		(2.55)		
		5.00 ▼	5.00	D	5.00	pp = 1.5 Vh = 78.0				
					5.10	pp = 1.5 Vh = 65.0				
					5.40	pp = 2.0 Vh = 100.0				
					5.80	pp = 2.2 Vh = 120.0				

General Remarks:
1. Groundwater seepage encountered at 5m below ground level with no rise after 20 minutes.
2. Rootlets observed to 0.6m below ground level.

Driller:	DI	BOREHOLE RECORD Scale 1:30 See Key Sheet for explanation of symbols, etc.	CET INFRASTRUCTURE Giving our all
Logged:	GRH		
Checked:		**Mount Cottage, 47d Netherall Gardens**	**FIG A2**
Appr'd:			

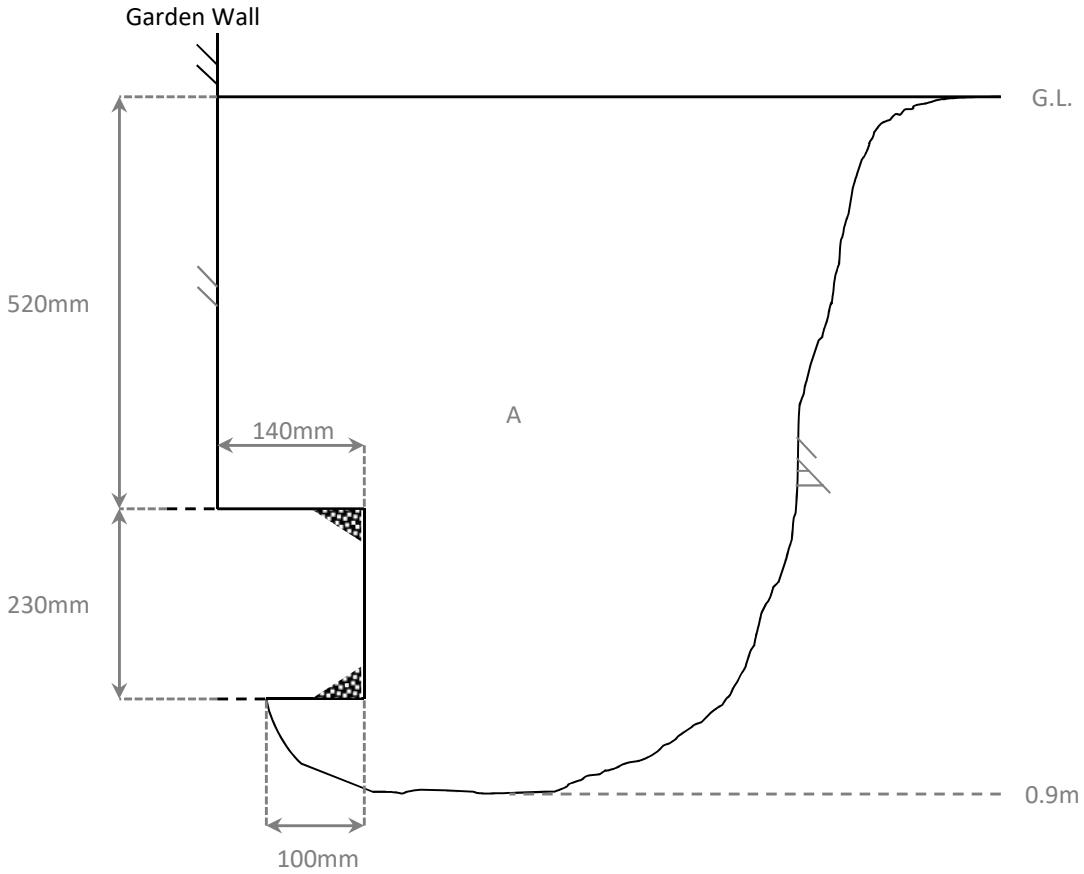
Client: **Chaim Klein**			Hole Diameter (mm): 75mm tapering with depth to 6.1m		BOREHOLE NUMBER **WS01**
Method: Window Sampler					Sheet 2 of 2
Date Started: 14/05/2019	Co-ordinates E 526379.000 N 185227.000		Ground Level (m AOD)	Ref. No: **491846**	

Backfill/Well		Water	Samples		In Situ Tests		Reduced Level (mAOD)	Depth & (Thickness) (m)	Description of Strata	Legend
Depth (m)	Legend	Depth (m)	Depth (m)	Type	Type	Results				
6.10			6.00	D				6.10	Firm becoming stiff with depth, dark grey, micaceous fine sandy silty CLAY. (London Clay Formation)	
									End of Borehole at 6.10m	

General Remarks:
1. Groundwater seepage encountered at 5m below ground level with no rise after 20 minutes.
2. Rootlets observed to 0.6m below ground level.

Driller:	DI	BOREHOLE RECORD Scale 1:30 See Key Sheet for explanation of symbols, etc.	CET INFRASTRUCTURE Giving our all
Logged:	GRH		
Checked:		**Mount Cottage, 47d Netherall Gardens**	**FIG A2**
Appr'd:			

Lead No:	491846	Scale:	N.T.S	Date:	Drawn by:	Checked:	Approved:
Project:	Mount Cottage			17/01/2019	JM	PTE	PTE



Ground Conditions:

A. Soft, dark grey, slightly fine to coarse sandy, slightly gravelly CLAY. Gravel is angular to rounded, fine to coarse brick, chalk, concrete, flint and possible coal. (Made Ground)

Notes:

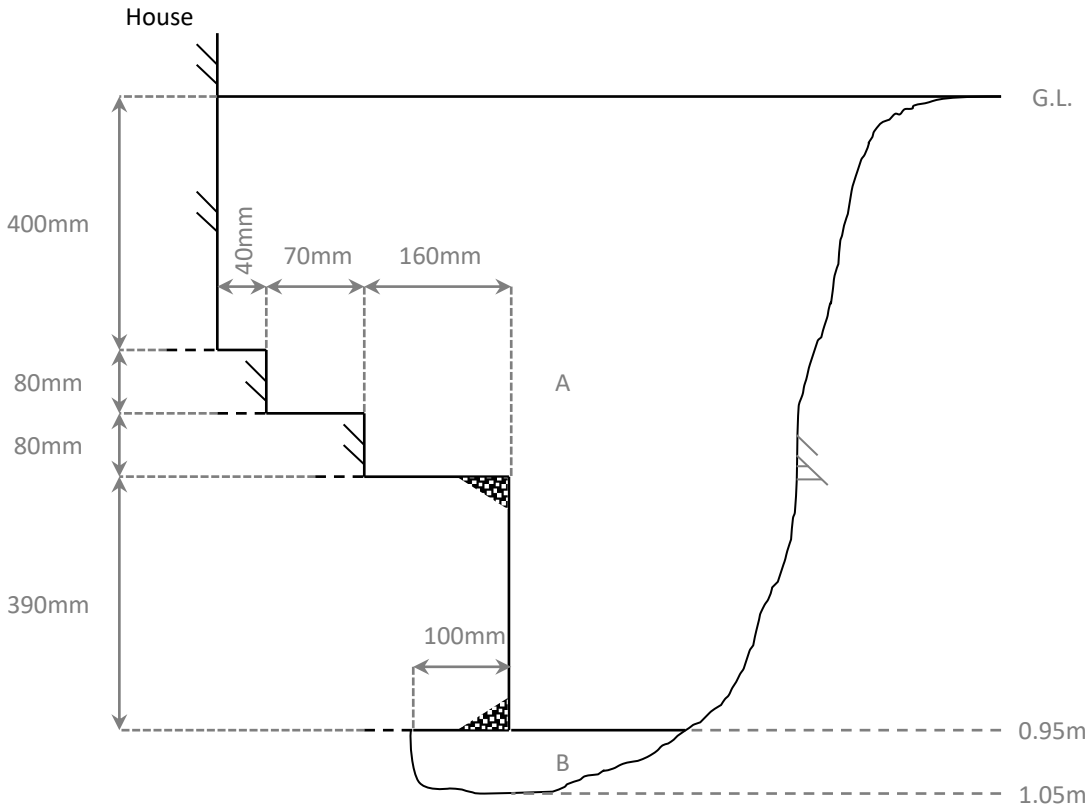
1. Exploratory hole remained stable and dry during excavation.

2. Roots and rootlets not observed to 0.9m

TP01
GARDEN WALL

INFRASTRUCTURE
Giving our all

Lead No:	491846	Scale:	N.T.S	Date:	Drawn by:	Checked:	Approved:
Project:	Mount Cottage			17/01/2019	JM	PTE	PTE



Ground Conditions:

A. Soft, dark grey, slightly fine to coarse sandy, slightly gravelly CLAY. Gravel is angular to rounded, fine to coarse brick, chalk, concrete, flint and possible coal. (Made Ground)

B. Firm, brown mottled grey, slightly gravelly CLAY. Gravel is angular to rounded, fine to coarse flint. (Claygate Member)

Notes:

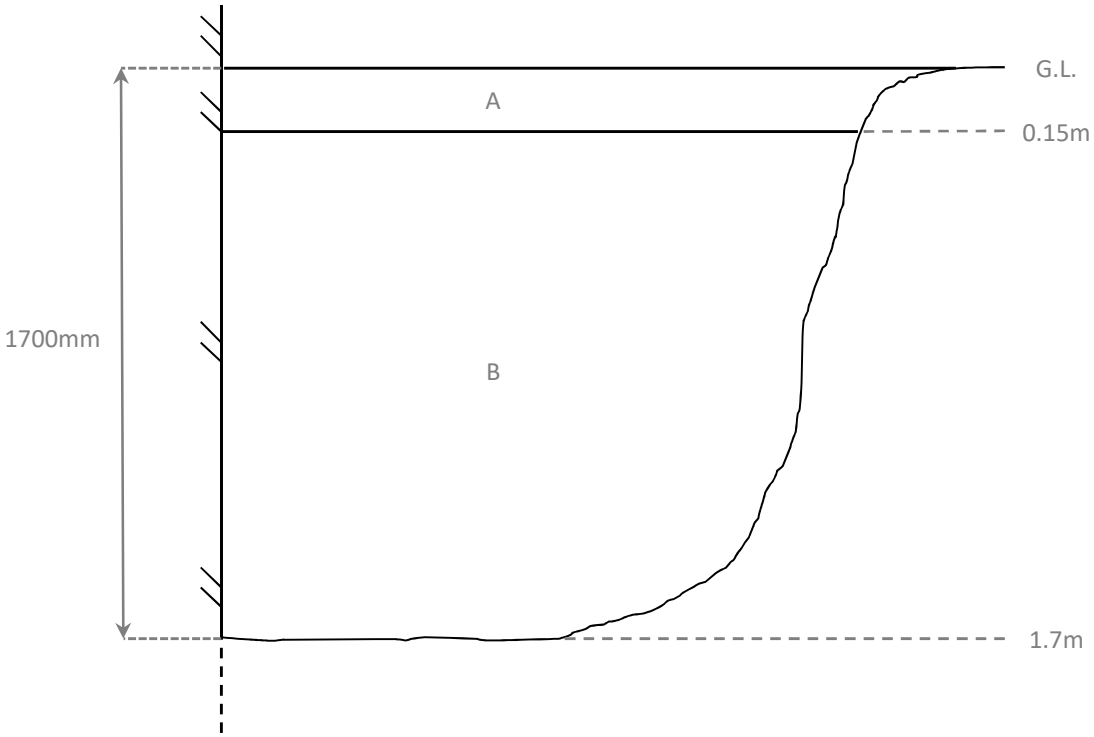
1. Exploratory hole remained stable and dry during excavation.

2. Roots and rootlets not observed to 1.05m

TP01
HOUSE

INFRASTRUCTURE
Giving our all

Lead No:	491846	Scale:	N.T.S	Date:	Drawn by:	Checked:	Approved:
Project:	Mount Cottage			17/01/2019	JM	PTE	PTE



Ground Conditions:

A. Possible Topsoil.

B. Light grey, clayey, slightly gravelly, fine and medium SAND. Gravel is sub-rounded and rounded, fine to coarse flint. (Made Ground)

Notes:

1. Exploratory hole remained stable and dry during excavation.

2. Roots and rootlets observed to 0.5m

Garden WALL
TP02

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APPENDIX B

Laboratory Testing

ATTERBERG LIMITS AND MOISTURE CONTENT DETERMINATIONS							
Borehole	**Depth (m bgl)**	**Moisture Content (%)**	**Liquid Limit (%)**	**Plastic Limit (%)**	**Plasticity Index (%)**	**Volume change Potential to NHBC Standards Chapter 4.2**	**Classification to BS5930**
WS01	1.0	28	51	16	35	Medium	CI
WS01	2.0	31	51	17	34	Medium	CI
WS01	2.5	28	N/A	N/A	N/A	N/A	N/A
WS01	3.0	30	48	17	31	Medium	CI
WS01	3.6	30	N/A	N/A	N/A	N/A	N/A
WS01	4.0	27	51	16	35	Medium	CI
WS01	5.0	25	50	17	33	Medium	CI

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.1.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	31/05/2019	MATERIAL:	See Below
TESTED BY:	CD, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117503	WS01 1.00		Brown Clay	28	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Chris Davidson - Laboratory Manager

Approved Signatory
31-May-19

UKAS TESTING
0927

Report Format: L/Rep S2(Multi)/7

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.3.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	31/05/2019	MATERIAL:	See Below
TESTED BY:	CD, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117504	WS01 2.00		Brown Clay	31	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Chris Davidson - Laboratory Manager

Approved Signatory
31-May-19

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0927

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.5.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	31/05/2019	MATERIAL:	See Below
TESTED BY:	CD, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117505	WS0 2.50		Brown Clay	28	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Chris Davidson - Laboratory Manager

Approved Signatory
31-May-19

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.6.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	31/05/2019	MATERIAL:	See Below
TESTED BY:	CD, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117506	WS01 3.00		Brown Clay	30	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Chris Davidson - Laboratory Manager

Approved Signatory
31-May-19

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.8.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	31/05/2019	MATERIAL:	See Below
TESTED BY:	CD, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117507	WS01 3.60		Dark Brown Clay	30	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Chris Davidson - Laboratory Manager

Approved Signatory
31-May-19

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0927

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.9.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	10/06/2019	MATERIAL:	See Below
TESTED BY:	CD, DG, JI, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117508	WS01 4.00		Dark Brown Clay	27	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Dan Gay - Laboratory Supervisor

Approved Signatory
10-Jun-19

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0927

Report Format: L/Rep S2(Multi)/7

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TEST REPORT:	**DETERMINATION OF THE MOISTURE CONTENT OF SOILS** BS 1377:Part 2:1990 clause 3.2 - oven drying method		
REPORT NUMBER:	491846 / 72315.11.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	
CLIENT REF:	See Below	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	SOURCE:	Unknown
DATE COMPLETED:	31/05/2019	MATERIAL:	See Below
TESTED BY:	CD, RB, MW	LOCATION:	See Below
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS 1377-1: 1990 clause 7

TEST RESULT:

SAMPLE NO.	CLIENT REF.	LOCATION OF TEST	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	LOWER LIMIT	UPPER LIMIT
117509	WS01 5.00		Dark Brown Clay	25	NA	NA

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Chris Davidson - Laboratory Manager

Approved Signatory
31-May-19

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TEST REPORT:	**DETERMINATION OF THE PLASTICITY INDEX OF SOIL** BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	491846 / 72315.2.1.1		
SAMPLE NUMBER:	117503	CLIENT:	
CLIENT REF:	WS01 1.00	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	MATERIAL:	Brown Clay
DATE COMPLETED:	03/06/2019	LOCATION:	Unknown
TESTED BY:	DG, WH, MW	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	51%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	16%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	35%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	100%		
Sample History:	**The material was tested in the natural state**		

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Dan Gay - Laboratory Supervisor

Approved Signatory
03-Jun-19

UKAS TESTING
0927

Report Format: L/Rep S4/rev.6

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TEST REPORT:	**DETERMINATION OF THE PLASTICITY INDEX OF SOIL** BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	491846 / 72315.4.1.1		
SAMPLE NUMBER:	117504	CLIENT:	
CLIENT REF:	WS01 2.00	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	MATERIAL:	Brown Clay
DATE COMPLETED:	11/06/2019	LOCATION:	Unknown
TESTED BY:	MD, DG, WH, MW	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	51%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	17%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	34%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	100%		
Sample History:	**The material was tested in the natural state**		

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Dan Gay - Laboratory Supervisor

Approved Signatory
12-Jun-19

UKAS TESTING
0927

Report Format: L/Rep S4/rev.6

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TEST REPORT:	**DETERMINATION OF THE PLASTICITY INDEX OF SOIL** BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	491846 / 72315.7.1.1		
SAMPLE NUMBER:	117506	CLIENT:	
CLIENT REF:	WS01 3.00	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	MATERIAL:	Brown Clay
DATE COMPLETED:	11/06/2019	LOCATION:	Unknown
TESTED BY:	MD, DG, WH, JI, MW	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	48%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	17%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	31%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	100%		
Sample History:	**The material was tested in the natural state**		

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Dan Gay - Laboratory Supervisor

Approved Signatory
12-Jun-19

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0927

Report Format: L/Rep S4/rev.6

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TEST REPORT:	**DETERMINATION OF THE PLASTICITY INDEX OF SOIL** BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	491846 / 72315.10.1.1		
SAMPLE NUMBER:	117508	CLIENT:	
CLIENT REF:	WS01 4.00	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	MATERIAL:	Dark Brown Clay
DATE COMPLETED:	11/06/2019	LOCATION:	Unknown
TESTED BY:	MD, DG, WH, MW	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	51%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	16%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	35%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	100%		
Sample History:	**The material was tested in the natural state**		

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Dan Gay - Laboratory Supervisor

Approved Signatory
12-Jun-19

UKAS TESTING
0927

Report Format: L/Rep S4/rev.6

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TEST REPORT:	**DETERMINATION OF THE PLASTICITY INDEX OF SOIL** BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	491846 / 72315.12.1.1		
SAMPLE NUMBER:	117509	CLIENT:	
CLIENT REF:	WS01 5.00	ADDRESS:	Top Flat, 13 Thurlow Road, London, NW3 5PL
DATE SAMPLED:	Unknown	SITE:	Mount Cottage, 47d Netherall Gardens
SAMPLED BY:	Unknown	SUPPLIER:	Unknown
DATE RECEIVED:	22/05/2019	MATERIAL:	Dark Brown Clay
DATE COMPLETED:	10/06/2019	LOCATION:	Unknown
TESTED BY:	MD, DG, MW	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	50%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	17%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	33%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	100%		
Sample History:	**The material was tested in the natural state**		

Remarks:
Remaining sample will be retained for a minimum of 28 days from date of report.

For and on behalf of CET
Dan Gay - Laboratory Supervisor

Approved Signatory
10-Jun-19

UKAS TESTING
0927

Report Format: L/Rep S4/rev.6

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SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression				Chemical Tests			Other tests and comments
Location	Depth (m)	Sample Ref	Type	Description	WC %	LL %	PL %	PI %	<425 µm %	Bulk Mg/m³	Dry Mg/m³	Condition	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 g/L	W/S Mg mg/L	
BH1	1.20-1.65		U	Firm brown mottled orange slightly gravelly silty CLAY with rare organic matter. Gravel is fine to medium.	16.2					1.93	1.66	Undisturbed	30	66	33				
BH1	3.00-3.45		U	Firm orangish brown, brown and grey mottled silty sandy CLAY. Sand is fine.	27.3					1.96	1.54	Undisturbed	60	102	51				One Dimensional Consolidation
BH1	5.00-5.45		U	Firm to stiff fissured brown mottled orangish brown silty sandy CLAY. Sand is fine to medium.	27.0					1.97	1.55	Undisturbed	100	145	73				One Dimensional Consolidation

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

Checked and Approved by

J Sturges - Operations Manager
07/12/2020

Project Number:

GEO / 32182

Project Name:

47D NETHERALL GARDENS
970711

GEOLABS®

BS EN ISO 17892-8 : 2018

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location	BH1
Depth (m)	1.20-1.65
Sample Type	U

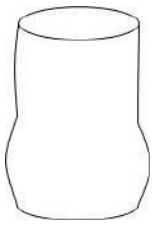
Description:

Firm brown mottled orange slightly gravelly silty CLAY with rare organic matter. Gravel is fine to medium.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.7
Diameter	(mm)	100.6
Moisture content	(%)	16.2
Bulk density	(Mg/m³)	1.93
Dry density	(Mg/m³)	1.66
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	201.6
Membrane correction	(kPa)	0.5
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	30
Strain at failure	(%)	7.4
Maximum deviator stress	(kPa)	66
Shear Stress Cu	(kPa)	33

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	70

Processed by SB
Checked and Approved by

J Sturges - Operations Manager
07/12/2020

Project Number:

GEO / 32182

Project Name:

47D NETHERALL GARDENS
970711

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-8 : 2018

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location	BH1
Depth (m)	3.00-3.45
Sample Type	U

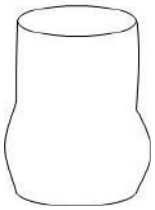
Description:

Firm orangish brown, brown and grey mottled silty sandy CLAY. Sand is fine.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.6
Diameter	(mm)	102.3
Moisture content	(%)	27.3
Bulk density	(Mg/m³)	1.96
Dry density	(Mg/m³)	1.54
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	202.6
Membrane correction	(kPa)	0.9
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	60
Strain at failure	(%)	14.8
Maximum deviator stress	(kPa)	102
Shear Stress Cu	(kPa)	51

Mode of failure



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

Processed by SB
Checked and Approved by

J Sturges - Operations Manager
07/12/2020

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Project Name:

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GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-8 : 2018

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

Location	BH1
Depth (m)	5.00-5.45
Sample Type	U

Description:

Firm to stiff fissured brown mottled orangish brown silty sandy CLAY. Sand is fine to medium.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	102.5
Moisture content	(%)	27.0
Bulk density	(Mg/m³)	1.97
Dry density	(Mg/m³)	1.55
Test Details		
Latex membrane thickness	(mm)	0.3
Specimen height prior to shearing	(mm)	201.4
Membrane correction	(kPa)	0.6
Mean rate of shear	(%/min)	2.0
Cell pressure	(kPa)	100
Strain at failure	(%)	7.9
Maximum deviator stress	(kPa)	145
Shear Stress Cu	(kPa)	73

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	100

Processed by SB
Checked and Approved by

J Sturges - Operations Manager
07/12/2020

Project Number:

GEO / 32182

Project Name:

47D NETHERALL GARDENS
970711

GEOLABS

UKAS TESTING 1982

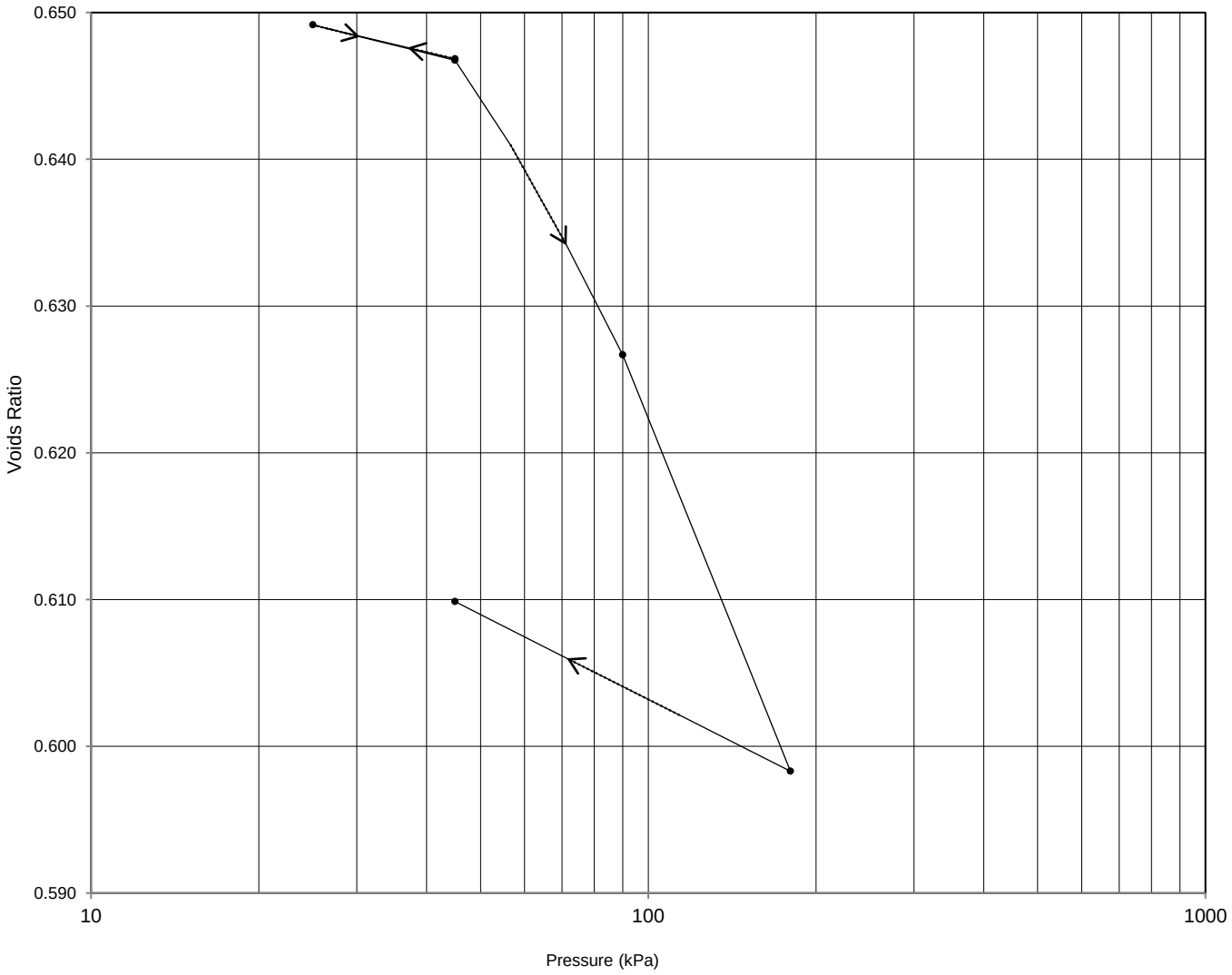
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

Location	BH1
Depth (m)	3.00-3.45
Sample Type	U
Depth within original (mm)	5
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm orangish brown, brown and grey mottled silty sandy CLAY. Sand is fine.



Initial Conditions:

Height	(mm)	17.00	Water Content	(%)	28.2	(from trimmings)
Diameter	(mm)	74.88	Voids Ratio		0.680	
Area	(mm^2)	4404	Bulk Density	(Mg/m^3)	2.02	
Volume	(cm^3)	74.86	Dry Density	(Mg/m^3)	1.58	
Laboratory Temperature	(ºC)	17.8	Particle density	(Mg/m^3)	2.65 (Assumed)	
			Degree of Saturation	(%)	100.0	

Results have been corrected for equipment deformation

Checked and Approved by

J Sturges - Operations Manager
07/12/2020

Project Number:

GEO / 32182

Project Name:

47D NETHERALL GARDENS
970711

GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

Location	BH1
Depth (m)	3.00-3.45
Sample Type	U
Depth within original (mm)	5
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm orangish brown, brown and grey mottled silty sandy CLAY. Sand is fine.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 45	0.44	1.7	t50	4.34	0.647
45 - 25	0.070	6.5 (Sv)	t50	1.11	0.649
25 - 45	0.073	8.8	t50	0.825	0.647
45 - 90	0.27	2.8	t50	2.53	0.627
90 - 180	0.19	2.4	t50	2.83	0.598
180 - 45	0.054	3.2 (Sv)	t50	2.15	0.610

Checked and Approved by

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07/12/2020

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UKAS TESTING 1982

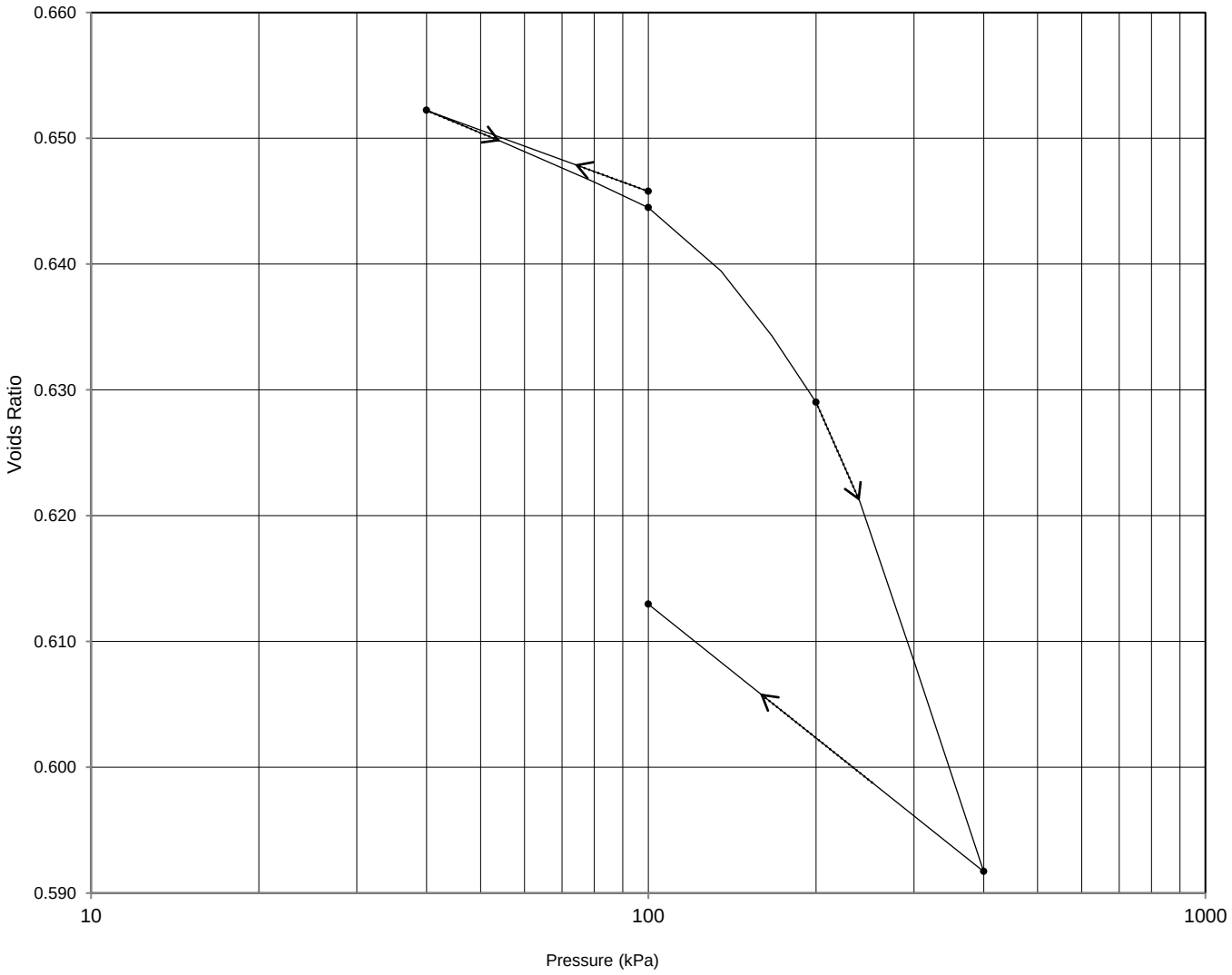
BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

Location	BH1
Depth (m)	5.00-5.45
Sample Type	U
Depth within original (mm)	10
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm to stiff slightly fissured brown mottled orangish brown sandy silty CLAY. Sand is fine to medium.



Initial Conditions:

Height	(mm)	17.00	Water Content	(%)	28.0	(from trimmings)
Diameter	(mm)	74.77	Voids Ratio		0.696	
Area	(mm^2)	4391	Bulk Density	(Mg/m^3)	2.00	
Volume	(cm^3)	74.64	Dry Density	(Mg/m^3)	1.56	
Laboratory Temperature	(ºC)	20.4	Particle density	(Mg/m^3)	2.65 (Assumed)	
			Degree of Saturation	(%)	100.0	

Results have been corrected for equipment deformation

Checked and Approved by

J Sturges - Operations Manager
07/12/2020

Project Number:

GEO / 32182

Project Name:

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GEOLABS

UKAS TESTING 1982

BS EN ISO 17892-5 : 2017

INCREMENTAL LOADING OEDOMETER TEST

Location	BH1
Depth (m)	5.00-5.45
Sample Type	U
Depth within original (mm)	10
Orientation within original	Vertical
Specimen preparation	Undisturbed

Description:

Firm to stiff slightly fissured brown mottled orangish brown sandy silty CLAY. Sand is fine to medium.

Pressure Range (kPa)	m_v (m^2/MN)	c_v (m^2/year)	Time Fitting		Voids Ratio
			Method	minutes	
0 - 100	0.30	4.8	t50	1.53	0.646
100 - 40	0.065	3.2 (Sv)	t50	2.24	0.652
40 - 100	0.078	5.6	t50	1.28	0.644
100 - 200	0.094	1.5	t50	4.58	0.629
200 - 400	0.11	1.8	t50	3.85	0.592
400 - 100	0.045	2.0 (Sv)	t50	3.38	0.613

Checked and Approved by

J Sturges - Operations Manager
07/12/2020

Project Number:

GEO / 32182

Project Name:

47D NETHERALL GARDENS
970711

GEOLABS

UKAS TESTING 1982

James Maness
CET UK Ltd
Northdown House
Ashford Road
Harrietsham
Maidstone
Kent
ME17 1QW

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

DETS Report No: 19-07500

Site Reference:	Mount Cottage
Project / Job Ref:	491846
Order No:	None Supplied
Sample Receipt Date:	29/05/2019
Sample Scheduled Date:	29/05/2019
Report Issue Number:	1
Reporting Date:	04/06/2019

Authorised by:

Dave Ashworth
Deputy Quality Manager

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

4480

Soil Analysis Certificate						
DETS Report No: 19-07500	**Date Sampled**	None Supplied	None Supplied			
CET UK Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Mount Cottage	**TP / BH No**	WS01	WS01			
Project / Job Ref: 491846	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	1.50	4.50			
Reporting Date: 04/06/2019	**DETS Sample No**	410953	410954			

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected				
pH	pH Units	N/a	**MCERTS**	6.9	7.4			
Free Cyanide	mg/kg	< 2	NONE	< 2				
Total Sulphate as SO_4	mg/kg	< 200	NONE		2026			
Total Sulphate as SO_4	%	< 0.02	NONE		0.20			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	99	459			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.10	0.46			
Total Sulphur	%	< 0.02	NONE		0.26			
Total Organic Carbon (TOC)	%	< 0.1	**MCERTS**	0.2				
Ammonium as NH_4	mg/kg	< 0.5	NONE		< 0.5			
Ammonium as NH_4	mg/l	< 0.05	NONE		< 0.05			
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**		14			
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**		7.2			
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**		< 3			
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**		< 1.5			
Arsenic (As)	mg/kg	< 2	**MCERTS**	8				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2				
Chromium (Cr)	mg/kg	< 2	**MCERTS**	28				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	**MCERTS**	8				
Lead (Pb)	mg/kg	< 3	**MCERTS**	12				
W/S Magnesium	mg/l	< 0.1	NONE		32			
Mercury (Hg)	mg/kg	< 1	NONE	< 1				
Nickel (Ni)	mg/kg	< 3	**MCERTS**	14				
Selenium (Se)	mg/kg	< 3	NONE	< 3				
Zinc (Zn)	mg/kg	< 3	**MCERTS**	43				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				
TPH - Aliphatic >C35 - C40	mg/kg	< 10	**MCERTS**	< 10				
TPH - Aromatic >C35 - C40	mg/kg	< 10	**MCERTS**	< 10				
TPH - Aliphatic / Aromatic (C6 - C40) - Total	mg/kg	< 42	NONE	< 42				
Tentative Petroleum Type	N/a	N/a	NONE	N/a				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)

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

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 19-07500	**Date Sampled**	None Supplied				
CET UK Ltd	**Time Sampled**	None Supplied				
Site Reference: Mount Cottage	**TP / BH No**	WS01				
Project / Job Ref: 491846	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.50				
Reporting Date: 04/06/2019	**DETS Sample No**	410953				

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1				
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1				
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1				
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Fluoranthene	mg/kg	< 0.1	MCERTS	0.17				
Pyrene	mg/kg	< 0.1	MCERTS	0.15				
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.18				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1				
Coronene	mg/kg	< 0.1	NONE	< 0.1				
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1				
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 19-07500	**Date Sampled**	None Supplied				
CET UK Ltd	**Time Sampled**	None Supplied				
Site Reference: Mount Cottage	**TP / BH No**	WS01				
Project / Job Ref: 491846	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.50				
Reporting Date: 04/06/2019	**DETS Sample No**	410953				

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01				
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05				
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2				
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2				
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3				
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3				
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10				
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21				
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01				
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05				
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2				
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2				
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2				
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3				
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10				
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21				
Total >C5 - C35	mg/kg	< 42	NONE	< 42				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 19-07500	**Date Sampled**	None Supplied				
CET UK Ltd	**Time Sampled**	None Supplied				
Site Reference: Mount Cottage	**TP / BH No**	WS01				
Project / Job Ref: 491846	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.50				
Reporting Date: 04/06/2019	**DETS Sample No**	410953				

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

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Soil Analysis Certificate - PCB (7 Congeners)						
DETS Report No: 19-07500	**Date Sampled**	None Supplied				
CET UK Ltd	**Time Sampled**	None Supplied				
Site Reference: Mount Cottage	**TP / BH No**	WS01				
Project / Job Ref: 491846	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.50				
Reporting Date: 04/06/2019	**DETS Sample No**	410953				

Determinand	**Unit**	**RL**	**Accreditation**					
PCB Congener 28	mg/kg	0.008	NONE	< 0.008				
PCB Congener 52	mg/kg	0.008	NONE	< 0.008				
PCB Congener 101	mg/kg	0.008	NONE	< 0.008				
PCB Congener 118	mg/kg	0.008	NONE	< 0.008				
PCB Congener 138	mg/kg	0.008	NONE	< 0.008				
PCB Congener 153	mg/kg	0.008	NONE	< 0.008				
PCB Congener 180	mg/kg	0.008	NONE	< 0.008				
Total PCB (7 Congeners)	mg/kg	< 0.1	NONE	< 0.1				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

DETS Ltd
: 1, Rose Lane Industrial Estate
Rose Lane
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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

				Landfill Waste Acceptance Criteria Limits		
DETS Report No: 19-07500	**Date Sampled**	None Supplied		**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
CET UK Ltd	**Time Sampled**	None Supplied				
Site Reference: Mount Cottage	**TP / BH No**	WS01				
Project / Job Ref: 491846	**Additional Refs**	None Supplied				
Order No: None Supplied	**Depth (m)**	1.50				
Reporting Date: 04/06/2019	**DETS Sample No**	410953				
Determinand	**Unit**	**MDL**				
TOC[MU]	%	< 0.1	0.2	3%	5%	6%
Loss on Ignition	%	< 0.01	1.60	--	--	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	6.9	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 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			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]	< 0.001			< 0.01	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.0060			< 0.06	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	0.019			0.19	4	50	200
Chloride[U]	< 1			< 10	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	2			24	1000	20000	50000
TDS	19			190	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	17.3			173	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.11						
Dry Matter (%)	82.6						
Moisture (%)	21.2						
Stage 1							
Volume Eluate L10 (litres)	0.88						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
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

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 19-07500	
CET UK Ltd	
Site Reference: Mount Cottage	
Project / Job Ref: 491846	
Order No: None Supplied	
Reporting Date: 04/06/2019	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 410953	WS01	None Supplied	1.50	17.5	Orange loamy sand
^ 410954	WS01	None Supplied	4.50	15.2	Brown loamy sand

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
^ no sampling date provided; unable to confirm if samples are within acceptable holding times

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

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 19-07500
CET UK Ltd
Site Reference: Mount Cottage
Project / Job Ref: 491846
Order No: None Supplied
Reporting Date: 04/06/2019

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

D Dried
AR As Received

James Maness
CET UK Ltd
Northdown House
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ME17 1QW

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Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 20-13402

Site Reference:	47d Netherall Gardens
Project / Job Ref:	970711
Order No:	None Supplied
Sample Receipt Date:	13/11/2020
Sample Scheduled Date:	13/11/2020
Report Issue Number:	1
Reporting Date:	19/11/2020

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.

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Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 20-13402	**Date Sampled**	None Supplied	None Supplied			
CET UK Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: 47d Netherall Gardens	**TP / BH No**	BH01	BH01			
Project / Job Ref: 970711	**Additional Refs**	None Supplied	None Supplied			
Order No: None Supplied	**Depth (m)**	2.50	11.00			
Reporting Date: 19/11/2020	**DETS Sample No**	510545	510546			

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.8	7.4			
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	365	1078			
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.04	0.11			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	76	434			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.08	0.43			
Total Sulphur	%	< 0.02	NONE	0.04	0.68			
Ammonium as NH_4	mg/kg	< 0.5	NONE	1	12.9			
Ammonium as NH_4	mg/l	< 0.05	NONE	0.10	1.29			
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	26	60			
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	13.2	30.2			
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	MCERTS	< 3	3			
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	MCERTS	< 1.5	1.7			
W/S Magnesium	mg/l	< 0.1	NONE	4	14			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 20-13402	
CET UK Ltd	
Site Reference: 47d Netherall Gardens	
Project / Job Ref: 970711	
Order No: None Supplied	
Reporting Date: 19/11/2020	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 510545	BH01	None Supplied	2.50	16.7	Light brown sandy clay
^ 510546	BH01	None Supplied	11.00	20	Brown clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
^ no sampling date provided; unable to confirm if samples are within acceptable holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 20-13402

CET UK Ltd

Site Reference: 47d Netherall Gardens

Project / Job Ref: 970711

Order No: None Supplied

Reporting Date: 19/11/2020

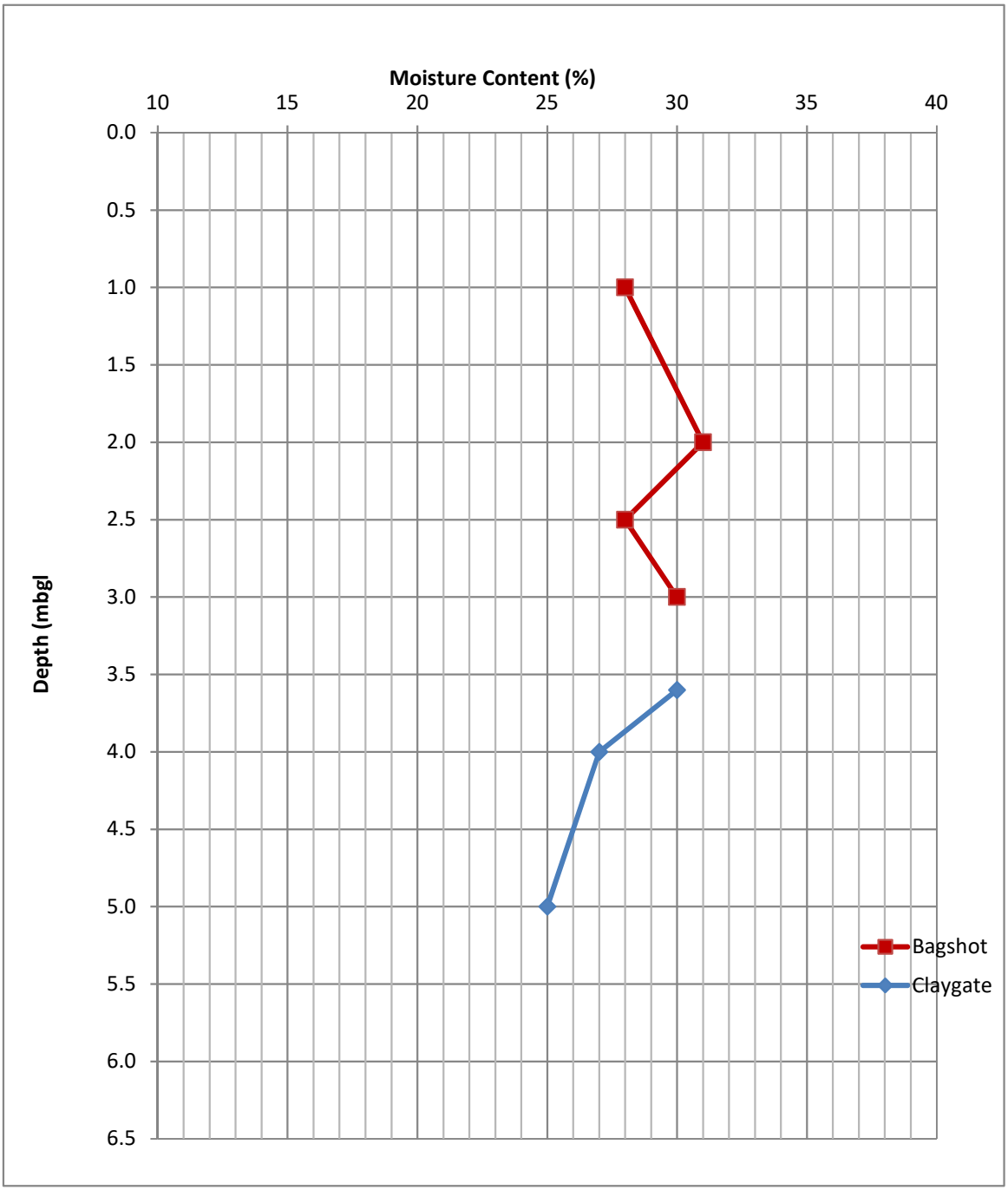
Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia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

D Dried
AR As Received

APPENDIX C

Field and Laboratory Testing Profiles

Lead No.: 491846	Scale: As shown	Date	Drawn by	Checked	Approved
Site: **47d Netherhall Gardens**		12/06/19	JM	GRH	GRH

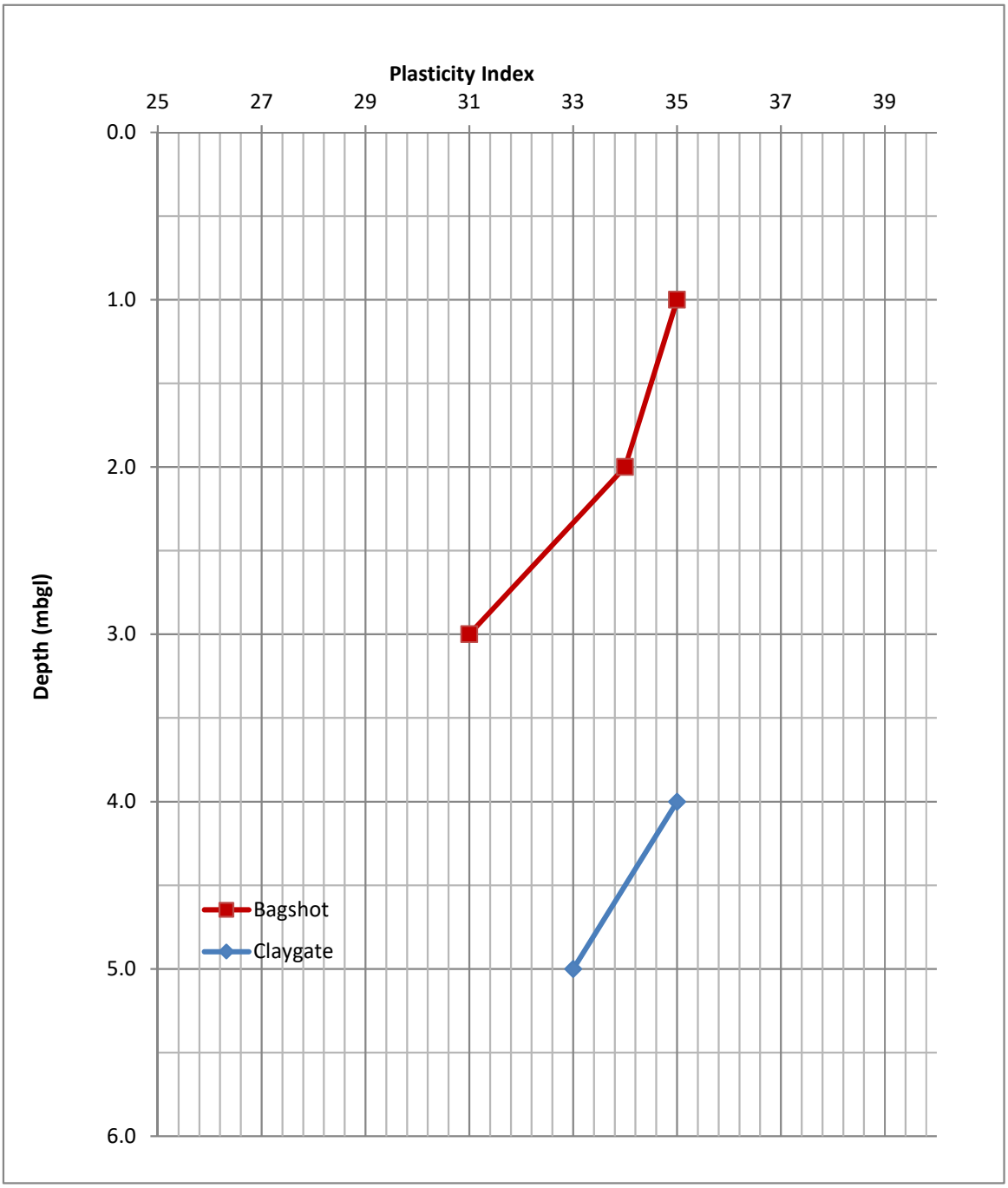


C1
MOISTURE CONTENT PROFILE

CET INFRASTRUCTURE Giving our all

\\CET-HAR-SVR05\Geo Tech\Projects\Projects 2019\491846 - Mount Cottage, 47d Netherall Gardens (LON)\Field Data\MC & PP Profiles

Lead No.: 491846	Scale: As shown	Date	Drawn by	Checked	Approved
Site: **47d Netherhall Gardens**		12/06/19	JM	GRH	GRH

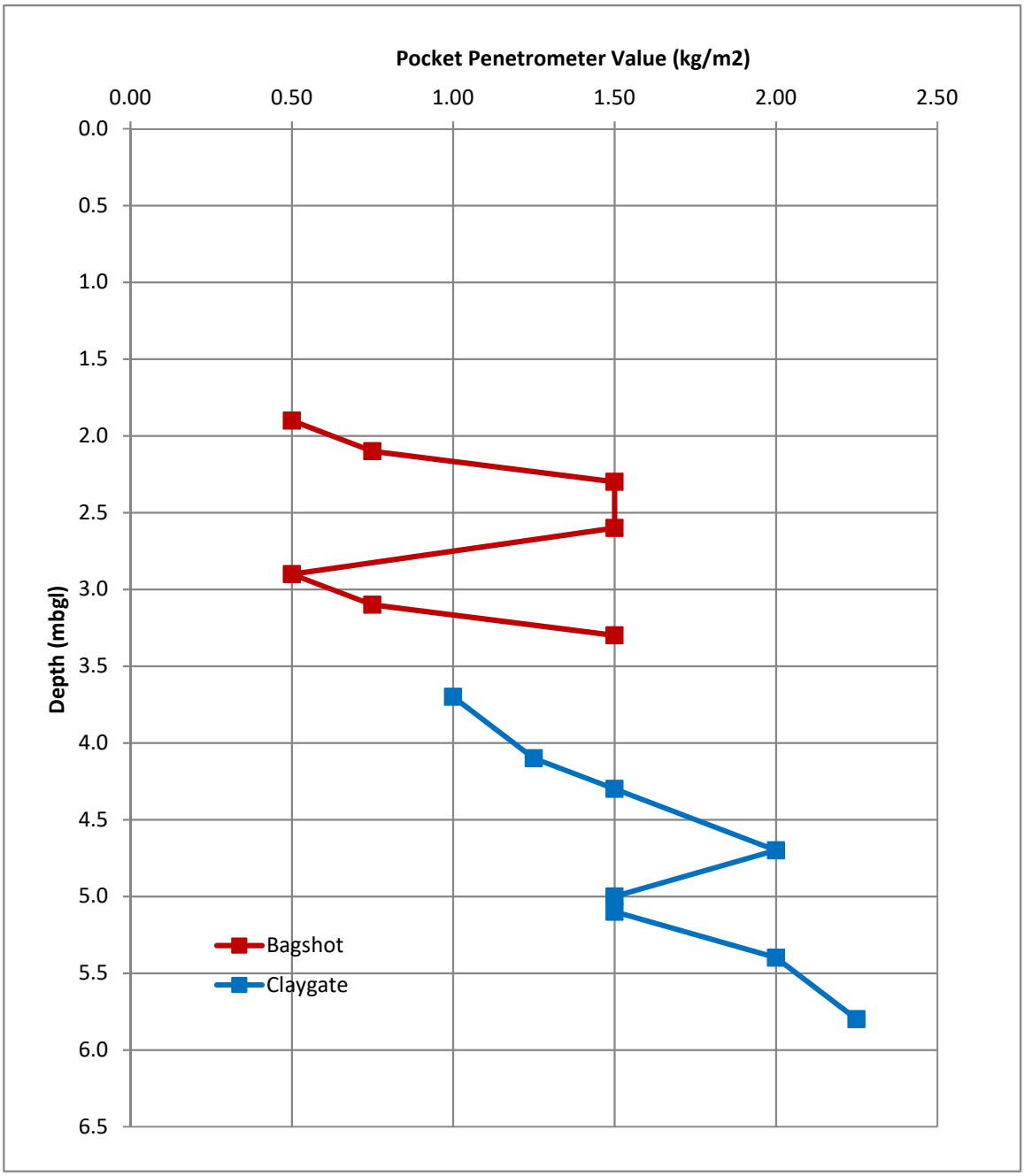


C2
PLASTICITY INDEX PROFILE

CET INFRASTRUCTURE Giving our all

\\CET-HAR-SVR05\Geo Tech\Projects\Projects 2019\491846 - Mount Cottage, 47d Netherall Gardens (LON)\Field Data\MC & PP Profiles

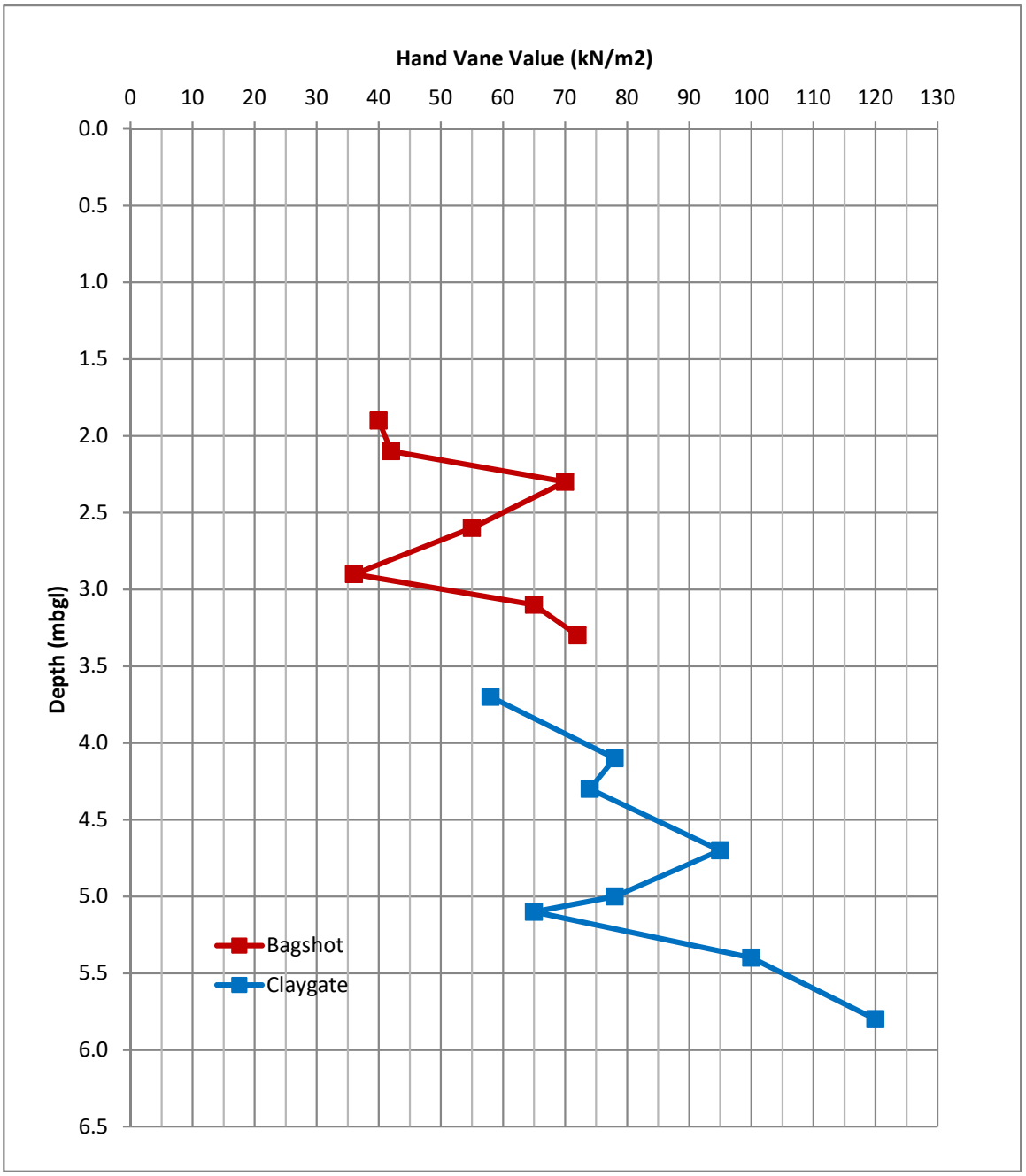
Lead No.: 491846	Scale: As shown	Date	Drawn by	Checked	Approved
Site: **47d Netherhall Gardens**		12/06/19	JM	GRH	GRH



C3
POCKET PENETROMETER PROFILE

CET INFRASTRUCTURE
Giving our all

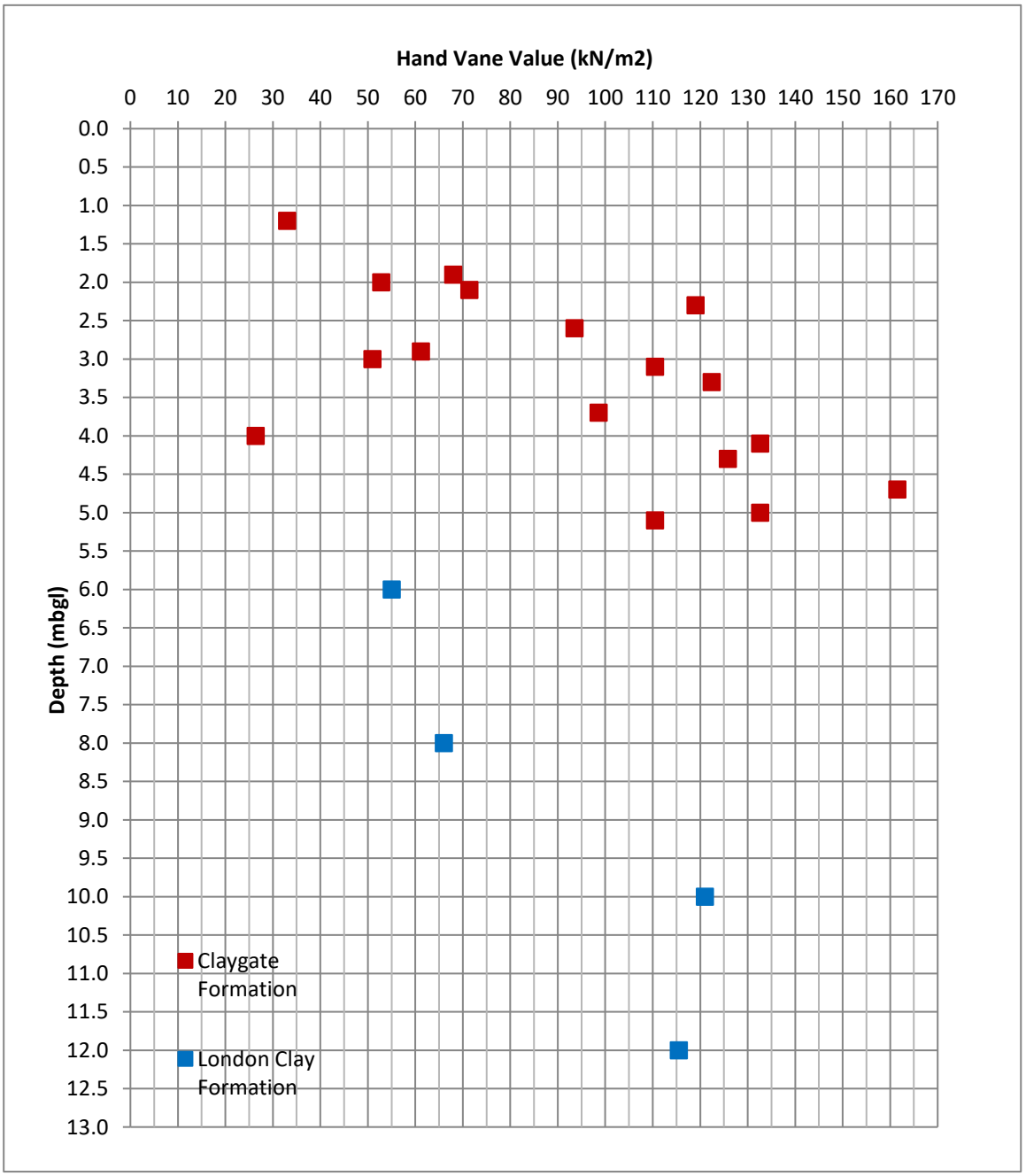
Lead No.: 491846	Scale: As shown	Date	Drawn by	Checked	Approved
Site: **47d Netherhall Gardens**		12/06/19	JM	GRH	GRH



C4
POCKET PENETROMETER PROFILE

CET INFRASTRUCTURE
Giving our all

Lead No.: 491846	Scale: As shown	Date	Drawn by	Checked	Approved
Site: **47d Netherhall Gardens**		21/12/20	JM	GRH	GRH



C5

Cu PROFILE

INFRASTRUCTURE
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