

GEOTECHNICAL REPORT ON GROUND INVESTIGATION

At

EAST FARLEIGH

For

STEVENS CONSTRUCTION



Giving our all

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APPROVAL & DISTRIBUTION SHEET

PROJECT DETAILS	
CET LEAD NO.	447689
JOB NAME	East Farleigh
CLIENT	Stevens Construction
STATUS	Final
VERSION	V0

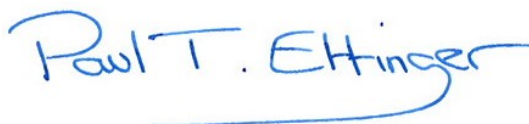
DISTRIBUTION			
Date:	Issued to:	Name:	No:
June 2018	Stevens Construction	Barry Stevens	1
June 2018	File		1

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FOREWORD

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1. INTRODUCTION

This interpretative report has been prepared on the instruction of Stevens Construction, email dated 31st May 2018.

The subject site is located to the rear of 1 Barkers Cottages, East Farleigh and at the time of the investigation comprised an essentially undeveloped parcel of land. It is proposed to construct a single storey residential house upon the plot with related car parking and areas of soft landscaping. A ground investigation was requested by the client to provide parameters for the design of the proposed scheme.

The fieldwork comprised a series of mechanically excavated trial pits carried out at agreed locations in June 2018. This report is based upon the fieldwork and the subsequent geotechnical and chemical analysis carried out on the recovered samples.

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 Ltd.

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

2. SITE SETTINGS

The subject site is located to the east and rear of 1 Barker Cottages and comprises an approximately rectangular plot of land situated at the junction of Dean Street and New Cut, East Farleigh. Reference should be made to Figure 1 that depicts the position of the site, which is located at the approximate National Grid Reference TQ 745 531.

The site is bounded to the north by an existing storage building, which as part of the proposed developed it understood to be converted to domestic storage and a garage. To the south of the proposed residential dwelling there is another existing storage unit that is bounded by a high limestone wall of varying height. Bakers Cottage forms the western site boundary and further residential properties separated by a conifer hedge are located to the south.

At the time of the investigation, the site was essentially undeveloped and mantled with areas of grass. A number of trees of varying maturity were noted on and around the site. A conifer hedge was noted along the eastern and southern site boundaries.

The subject site is located towards the east of East Farleigh, which is on top of a ridge dipping down at about 10° to 15° to the horizontal towards the south east.

Reference to the publications of the British Geological Survey indicates that the site is underlain by the Hythe Formation, which typically comprises interbedded sandstone and limestone that weathers to sandy clay with cobbles and boulders of limestone and/or sandstone.

Where the Hythe Formation is present above valleys it is frequently subject to cambering, the downslope movement of blocks of rock, that results in the formation of deep fissures or “gulls”. These features are often open with the “void” arched over by superficial deposits. If the arching material is subjected to an increase in stress, vibration or inundation by water, it may collapse into the gull forming a solution feature or swallow at ground surface. The collapse of solution features is a common occurrence in the Maidstone area.

The ground investigation established that the site is underlain by the weathered zone of the Hythe Formation, which was mantled by a varying thickness of Made Ground.

3. GROUND INVESTIGATION

The ground investigation comprised three agreed mechanically excavated trial pits that were carried out on 13th June 2018 at the approximate locations shown on Figure 2.

Details of the ground conditions encountered in the trial pits are presented on the engineer's logs included in Appendix A. Reference should be made to these logs for detailed descriptions of the strata encountered, the depth and type of recovered samples, the results of any in situ testing and a summary only is presented below.

Below a mantle of grass, Made Ground was encountered at each trial pit location as typically soft, dark brown CLAY with rare gravel size fragments of limestone, siltstone, sandstone, brick and clay pipe. Made Ground was encountered to a maximum depth of 0.5m below ground level in TP01.

Beneath the Made Ground, firm, brown, fine sandy, locally clayey SILT was encountered at each trial pit location at depths of 2.29m (TP01), 2.3m (TP03) and 2.31m (TP01) below ground level. This stratum has been tentatively described as the Weathered Hythe Formation.

Below the Silt, the Weathered Hythe Formation was encountered in each trial pit as yellow mottled brown, silty, gravelly SAND and was proved to the base of each pit at depths from 2.5m (TP01 and TP02) and 2.7m (TP03) below ground level. The low cobble content of sandstone/limestone within this stratum and the limitations of the provided excavator prevented further progress in each of the trial pits.

Roots and rootlets were observed in each of the trial pits to a maximum depth of 2.3m below ground level in TP01.

All the trial pits remained dry during excavation however the absence of seepages does not indicate the absence of a groundwater table since the trial were only open for a short period of time. Furthermore groundwater levels may vary both seasonally and in the long term.

4. LABORATORY TESTING

A 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”. CET Structures Limited has been accredited for specific tests as indicated below, by the United Kingdom Accreditation Service, UKAS. Individual full format reports for tests are available, if required. Other tests have been carried out by UKAS accredited suppliers to CET Structures Limited. The following tests are carried out and the results are included in Appendix B.

No.	Test	UKAS Accreditation
12	Moisture content determinations	CET
6	Atterberg Limits tests	CET
2	Water soluble sulphate and pH determinations	CET Supplier
3	Environmental soil suite with WAC	CET Supplier

5. DISCUSSION

General

The subject site is located to the rear of 1 Barkers Cottages, East Farleigh and at the time of the investigation comprised an essentially undeveloped parcel of land. It is proposed to construct a single storey residential house upon the plot with related car parking and areas of soft landscaping. A ground investigation was requested by the client to provide parameters for the design of the proposed scheme.

The fieldwork comprised a series of mechanically excavated trial pits carried out at agreed locations in June 2018. This report is based upon the fieldwork and the subsequent geotechnical and chemical analysis carried out on the recovered samples.

The ground investigation established that below Made Ground, which was encountered to a maximum depth of 0.5m below ground level, the site is underlain by the Weathered Hythe Formation. This stratum was proved to the base of each trial pit to a maximum depth of 2.7m below ground level in TP03.

Groundwater was not observed in the trial pits however the comments made in Section 3 of this report should be borne in mind.

Roots and rootlets were observed in each borehole to a maximum depth of 2.3m below ground level in TP01.

Whilst the engineer's logs for the three trial pits describe the near surface deposits of the Weathered Hythe Formation as SILT, locally this stratum was encountered as clayey SILT. The results of the Atterberg Limits tests carried out on the samples recovered from the cohesive Weathered Hythe Formation indicates that this stratum is generally non-plastic however the localised higher clay content has resulted in two of the Atterberg Limits tests recording soils having low plasticity as defined by BS 5930; "Code of practice for site investigations" and a low volume change potential as defined by the National House Building Council (NHBC) Standards Chapter 4.2 "Building near trees".

The varying percentage content of the clay/silt within the cohesive Weathered Hythe Formation makes it difficult to ascertain whether or not these cohesive soils have been or are impacted by desiccation.

The topographical location of the site in conjunction with the underlying geology may have resulted in the formation of "gulls" within the Hythe Formation. However, the unweathered Hythe Formation was not encountered and therefore the absence of such features has not been established.

Foundations

Made Ground is not recommended as a bearing stratum due to the unpredictable settlement and strength characteristics of this material and the inherent risk of collapse settlement.

The presence of roots to depths of 2m to 2.3m below ground level would suggest that the foundations for the proposed development may be impacted by desiccation however if it can be established that either there has been no mature trees on the site or that, if recorded, the trees have been removed more than 25 years ago, then the soils may be considered as currently not being desiccated.

It should be noted that the above does not rule out the possibility of desiccation as a result of future tree growth. Reference to drawing 793c, provided by the client, indicates the possible planting of a beech tree about 10m from the south east corner of the proposed building.

In light of the above and with reference to the NHBC Standards Chapter 4.2 “Building near trees” as well as assuming the absence of trees within the past 25 years on the site, foundations for the proposed residential property may bear wholly within the cohesive Weathered Hythe Formation by at least 0.3m or at a minimum depth of 1.1m below ground level, whichever is the greater. At this depth, the cohesive Weathered Hythe Formation would be expected to have a presumed nett bearing value, which takes not account of settlement, of 75kN/m².

It is recommended that trench fill or strip foundations incorporate measures to protect the foundations from heave or settlement as detailed in NHBC Standards Chapter 4.2 for soils possessing medium volume change potential.

A presumed nett bearing value, which takes no account of settlement of 75kN/m² is considered appropriate for foundations bearing within the Weathered Hythe Formation.

Due to the potential presence of rock of the Hythe Formation at relatively shallow depth beneath the foundations it is recommended that the foundations include mesh reinforcement in the top and bottom to limit the risk of the foundations being affected by differential settlement.

In the event that the intact limestone and/or sandstone of the Hythe Formation is encountered within the recommended founding depths, advice should be sought from a geotechnical specialist as to suitable construction depths and mitigation measures implemented to limit the risks associated with differential settlement.

Ground Floor Slab

Made Ground is not recommended as a bearing stratum due to the unpredictable settlement and strength characteristics of this material and the inherent risk of collapse settlement.

Whilst reference to the engineer's logs indicates that the Weathered Hythe Formation comprises SILT, the laboratory testing carried out on the recovered samples indicates that locally this material has a low volume change potential. In light of this it is recommended that suspended ground floors incorporating an underlying void as indicated in the NHBC Standards Chapter 4.2 "Building near trees" are adopted for the proposed scheme.

Surface Water Disposal

The topographical location of the site in conjunction with the underlying geology may have resulted in the formation of "gulls" within the Hythe Formation. However, the unweathered Hythe Formation was not encountered and therefore the absence of such features has not been established. In light of this, water disposal to conventional soakaways is not recommended due to the risk of initiating collapse.

The preferred solution for disposal of surface water would be to existing sewers although consideration could be given to investigating disposal of water entirely within the intact Hythe Formation via deep bore soakaways. However the use of borehole soakaways discharging to strata potentially containing an aquifer will require approval from the Environment Agency and local authority.

In the event that boreholes soakaways are adopted it should be noted that the attenuation chamber must be sealed through the superficial Weathered Hythe Formation.

Stability of Temporary Excavations

The trial pit excavations remained stable whilst open however the nature of the soils is such that the silt may be susceptible to collapse if the excavation walls and/or base are impacted by wet weather. Notwithstanding the above, excavation should remain stable in the short term but will require support if left open for extended periods of time. Close support would also have to be adopted for a man-entry however the method used to support the excavation walls will depend upon the nature of the soils at the time of construction.

Pavement Construction

Made Ground is not considered suitable as a formation for roads and hardstanding due to the unpredictable settlement characteristics of this material.

The shallow thickness of Made Ground is such that it is likely that this material will be removed with the formation level of any pavement being within the underlying cohesive Weathered Hythe Formation.

It should be noted that the localised non-plastic nature of the cohesive Weathered Hythe Formation suggests that these deposits are likely to be frost susceptible and a minimum construction thickness of 450mm will therefore be required to protect the subgrade from frost heave. This level of construction thickness is consistent with a CBR value of 2.5% but this should be confirmed prior to construction.

Construction of pavements etc., would best be undertaken during “dry” months as the exposure to water of the formation level prior to construction may have a detrimental impact upon this material.

Concrete Below Ground

Chemical testing has been scheduled to be carried out on soil samples recovered from the strata encountered in the exploratory trial hole.

The ground investigation established that the underlying groundwater condition is likely to be classified as ‘static.’

Reference to BRE Special Digest 1:2005 Third Edition “Concrete in Aggressive Ground”, Table C1 “Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations”, would suggest a Design Sulphate Class and an ACEC Class of DS-1 and AC-1s for the deposits related to the Weathered Hythe Formation.

FIGURES

FIGURE 1 SITE LOCATION PLAN

East Farleigh
Maidstone, ME15 0HR

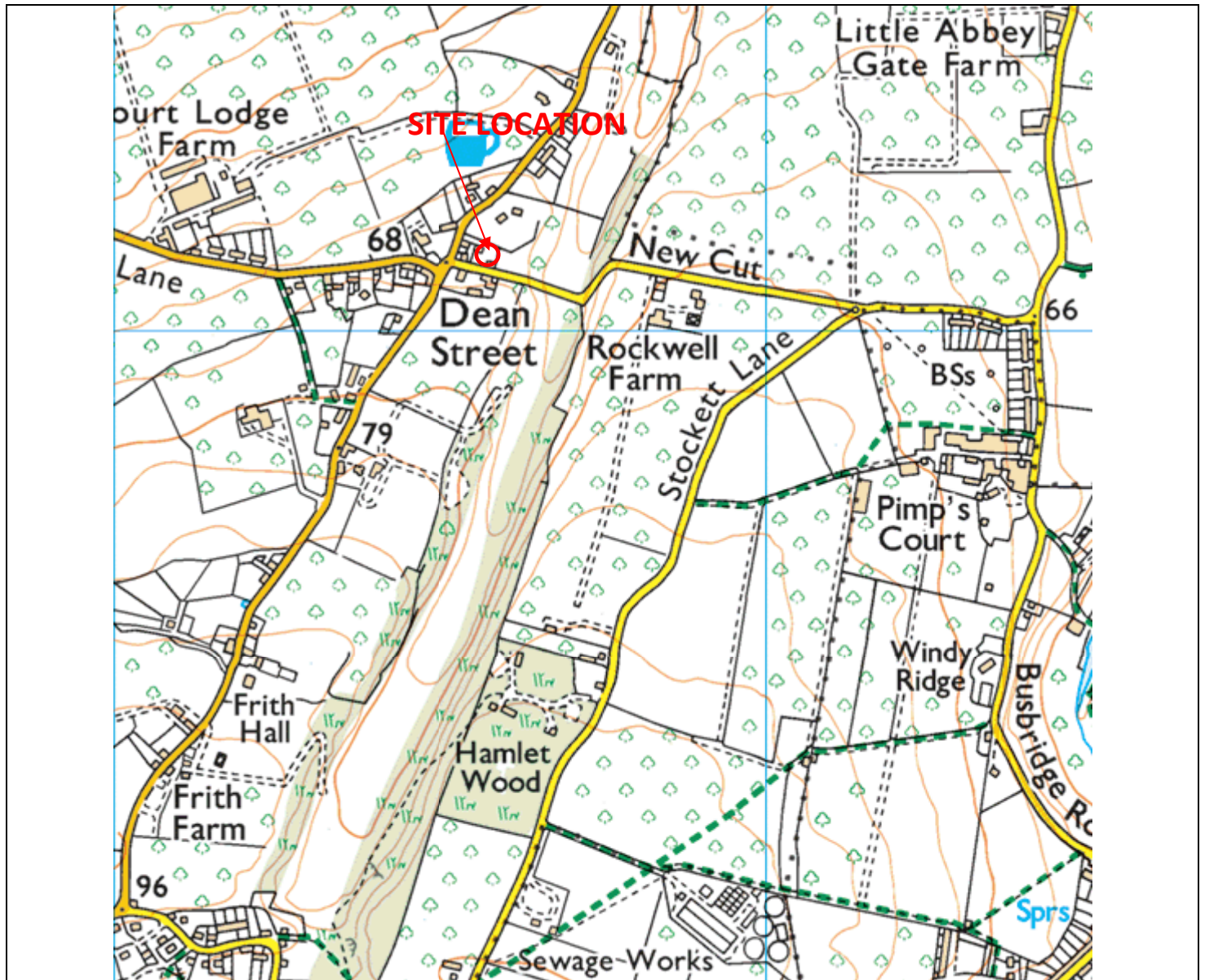




FIGURE 2: APPROXIMATE BOREHOLE LOCATION PLAN
East Farleigh

Lead No.447650

Created By:
AN

Checked: 

Approved: 

Date:
13/06/2018



Scale: Not to Scale

FIGURE 2: APPROXIMATE BOREHOLE LOCATION PLAN

APPENDIX A

Fieldwork

KEY TO BOREHOLE AND TRIAL PIT LOGS

Samples

D	Small disturbed sample
U	Undisturbed sample, 100mm nominal diameter
UT	Undisturbed thin walled sample, 100mm nominal diameter
B	Bulk disturbed samples (bar indicates sample range)
U38	Hand driven 'undisturbed' sample, 38mm nominal diameter
P	Undisturbed piston sample (bar indicates sample range)
W	Water sample
ICBR	In-situ California Bearing Ratio sample
*	No recovery sample
T	Tub sample
V	Vial sample
J	Jar sample

Tests

S	Standard penetration test
C	Cone penetration tests
N =	SPT/CPT 'N' Value (number of blows for 300mm full penetration)
80/150	Number of blows/total penetration(mm) for SPT/CPT test
25/25SP	As above for seating drive only
*	N value obtained over 450mm penetration
U =	Blows to achieve 450mm penetration for a U sample
$V_h =$	In-situ hand vane test in kN/m^2
m	In-situ CBR test by Mexe probe
$V =$	In-situ field vane test in kN/m^2
ppm =	Parts per million of flammable gas as methane equivalents
pp =	Pocket Penetrometer in kg/cm^2

Observations, Backfill and Installations



Water strike – depth shown in metres below ground level.



Gravel backfill



Bentonite backfill



Arisings backfill



Concrete



Plain Pipe



Slotted Pipe

Client: Stevens Construction				Depth (m) 2.50		Plant used:360		TRIAL PIT NUMBER TP01 Sheet 1 of 1		
Width (m) 0.60		Length (m) 2.60		Method of Excavation :		Shoring: None				
Co-ordinates <div>E N</div>		Ground Level (mAOD)		Mechanical Excavator		Date Started :13/06/2018				
Samples/In Situ Tests			Change of Strata		Description of Strata					Legend
Depth (m)	Type	Test/Field Records	Reduced Level (mAOD)	Depth & (Thickness) (m)						
0.20	TJ			(0.21) 0.21	Soft, friable, dark brown CLAY with rare gravel size fragments of angular to rounded, fine to coarse limestone and siltstone. (Made Ground)					
0.50	TJ B			(0.29) 0.50	Firm, brown, fine sandy SILT. Low cobble content of angular sandstone. (Made Ground?)					
1.00	TJ B				Firm, brown, locally clayey, fine sandy SILT. (Weathered Hythe Formation)					
1.50	B			(1.81)						
2.20	B									
2.50	B			2.31 (0.19) 2.50	Yellow mottled brown, slightly gravelly, silty SAND. Low cobble content of angular sandstone and limestone. (Weathered Hythe Formation)					
					End of Trial Pit at 2.50 m					
General Remarks: 1. Trial pit remained stable during the exploratory hole. 2. No groundwater encountered. 3. Roots and rootlets observed to 2.3m below maximum depth.										
Ref:	447689	TRIAL PIT RECORD Scale 1:25 Symbols and abbreviations in accordance with AGS				CET INFRASTRUCTURE Giving our all				
Logged:	AN	East Farleigh				FIG A1				
Check'd:										
Appr'd:										

Client: Stevens Construction				Depth (m) 2.50		Plant used:360		TRIAL PIT NUMBER TP02 Sheet 1 of 1		
Width (m) 0.60		Length (m) 2.60		Method of Excavation :		Shoring: None				
Co-ordinates <div>E N</div>		Ground Level (mAOD)		Mechanical Excavator		Date Started :13/06/2018				
Samples/In Situ Tests			Change of Strata		Description of Strata					Legend
Depth (m)	Type	Test/Field Records	Reduced Level (mAOD)	Depth & (Thickness) (m)						
0.20	TJ			(0.30)	Soft, friable, dark brown CLAY with rare gravel size fragments of angular to rounded, fine to coarse limestone, siltstone, brick and clay pipe. (Made Ground)					
0.30										
0.50	TJ B				Firm, sandy, clayey, fine brown SILT. (Weathered Hythe Formation)					
1.00	TJ B			(1.60)						
1.50	B									
				1.90	Firm, brown, fine sandy SILT. Low cobble content of angular sandstone and limestone. (Weathered Hythe Formation)					
				(0.39)						
2.30	B			2.29	Brown mottled yellow, slightly gravelly, silty, fine SAND. Low cobble content of angular sandstone and limestone. (Weathered Hythe Formation)					
				(0.21)						
				2.50	End of Trial Pit at 2.50 m					
General Remarks: 1. Trial pit remained stable during the exploratory hole. 2. No groundwater encountered. 3. Roots and rootlets observed to 2.0m maximum depth.										
Ref:	447689	TRIAL PIT RECORD Scale 1:25 Symbols and abbreviations in accordance with AGS				INFRASTRUCTURE Giving our all				
Logged:	AN	East Farleigh				FIG A2				
Check'd:										
Appr'd:										

Client: Stevens Construction				Depth (m) 2.70		Plant used:360		TRIAL PIT NUMBER TP03 Sheet 1 of 1		
Width (m) 0.60		Length (m) 2.80		Method of Excavation :		Shoring: None				
Co-ordinates E N		Ground Level (mAOD)		Mechanical Excavator		Date Started :13/06/2018				
Samples/In Situ Tests			Change of Strata			Description of Strata				Legend
Depth (m)	Type	Test/Field Records	Reduced Level (mAOD)	Depth & (Thickness) (m)						
0.10	TJ			(0.35)	Soft, friable, dark brown CLAY with rare angular to rounded, fine to coarse sandstone gravel. (Made Ground)					
0.50	TJ B			0.35	Firm, sandy, clayey, fine brown SILT. (Weathered Hythe Formation)					
1.00	TJ B			(1.60)						
1.50	B									
				1.95	Firm, brown mottled, fine sandy SILT. (Weathered Hythe Formation)					
2.29	B			2.30	Yellow mottled brown, slightly gravelly, silty SAND. Low cobble content of angular sandstone and limestone. (Weathered Hythe Formation)					
2.50	B			(0.40)						
				2.70	----- End of Trial Pit at 2.70 m					
General Remarks: 1. Trial pit remained stable during the exploratory hole. 2. No groundwater encountered. 3. Roots and rootlets observed to 2.0m maximum depth.										
Ref:	447689	TRIAL PIT RECORD Scale 1:25 Symbols and abbreviations in accordance with AGS				 INFRASTRUCTURE Giving our all				
Logged:	AN									
Check'd:		East Farleigh				FIG A3				
Appr'd:										

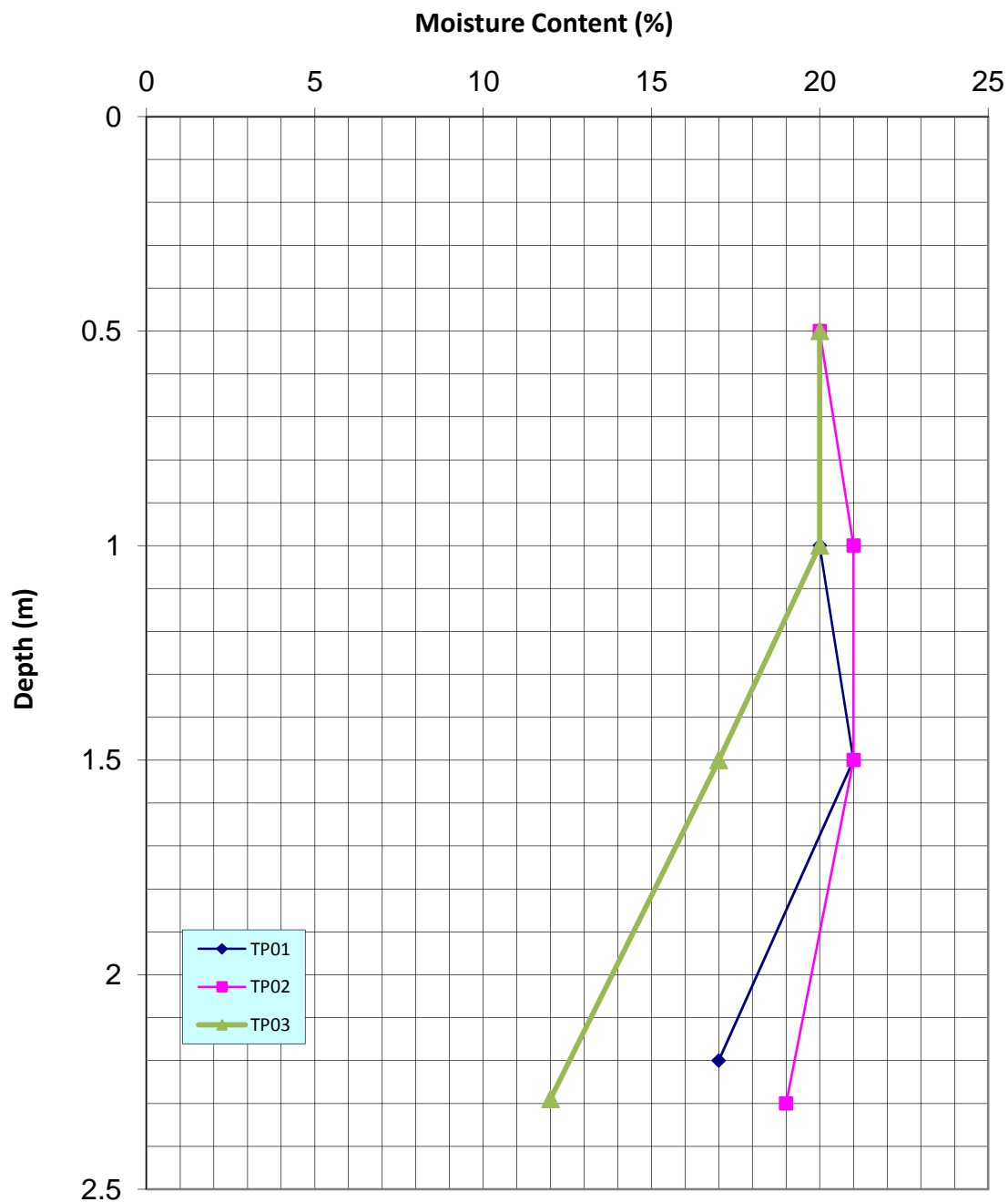
APPENDIX B

Laboratory Testing

Atterberg Limits and Moisture Content Determinations							
Borehole	Depth (m bgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Classification to BS 5930	Volume Change Potential to NHBC Standards Chapter 4.2
TP01	0.50	20					
TP01	1.00	20	35	19	16	CL	Low
TP01	1.50	21					
TP01	2.20	17	29	-	-	Non Plastic	
TP02	0.50	20					
TP02	1.00	21	32	-	-	Non Plastic	
TP02	1.50	21					
TP02	2.30	19	28	-	-	Non Plastic	
TP03	0.50	20					
TP03	1.00	20	35	18	17	CL	Low
TP03	1.50	17					
TP03	2.29	12	30	-	-	Non Plastic	

Water Soluble Sulphate and pH determinations					
Borehole	Depth (m bgl)	Water Soluble Sulphate (g/l)	pH	Design Sulphate Class for Location	ACEC Class for Location
TP01	1.00	0.02	7.3	DS-1	AC-1s
TP02	1.00	0.02	7.1	DS-1	AC-1s

Lead No.:	447689	Scale:	N.T.S	Date	Drawn by	Checked	Approved
Site:	East Farleigh			29/06/18	AN	PE	PE



MOISTURE CONTENT PROFILE





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t: 01622 850410
russell.jarvis@qtsenvironmental.com

DETS Report No: 18-76815

Site Reference: East Farleigh

Project / Job Ref: 447689

Order No: C-004093/G2

Sample Receipt Date: 15/06/2018

Sample Scheduled Date: 15/06/2018

Report Issue Number: 1

Reporting Date: 22/06/2018

Authorised by:

Russell Jarvis
Associate Director of Client Services

Authorised by:

Dave Ashworth
Deputy Quality Manager



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



Soil Analysis Certificate						
DETS Report No: 18-76815	Date Sampled	13/06/18	13/06/18	13/06/18		
CET UK Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: East Farleigh	TP / BH No	TP01	TP02	TP03		
Project / Job Ref: 447689	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: C-004093/G2	Depth (m)	0.50	0.20	1.00		
Reporting Date: 22/06/2018	QTSE Sample No	340336	340337	340338		

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	7.5	7.1	7.4		
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	3.1	3.1	0.4		
Arsenic (As)	mg/kg	< 2	MCERTS	24	20	11		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.8	0.3	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	28	28	27		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	71	38	19		
Lead (Pb)	mg/kg	< 3	MCERTS	281	82	14		
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	34	30	29		
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3		
Zinc (Zn)	mg/kg	< 3	MCERTS	725	121	53		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

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: 18-76815	Date Sampled	13/06/18	13/06/18	13/06/18		
CET UK Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: East Farleigh	TP / BH No	TP01	TP02	TP03		
Project / Job Ref: 447689	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: C-004093/G2	Depth (m)	0.50	0.20	1.00		
Reporting Date: 22/06/2018	QTSE Sample No	340336	340337	340338		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.33	< 0.1		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.29	< 0.1		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	< 0.1		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.19	< 0.1		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.11	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Coronene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1		
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6		
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7	< 1.7	< 1.7		

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



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 18-76815	Date Sampled	13/06/18	13/06/18	13/06/18		
CET UK Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: East Farleigh	TP / BH No	TP01	TP02	TP03		
Project / Job Ref: 447689	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: C-004093/G2	Depth (m)	0.50	0.20	1.00		
Reporting Date: 22/06/2018	QTSE Sample No	340336	340337	340338		

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

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 18-76815	Date Sampled	13/06/18	13/06/18	13/06/18		
CET UK Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: East Farleigh	TP / BH No	TP01	TP02	TP03		
Project / Job Ref: 447689	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: C-004093/G2	Depth (m)	0.50	0.20	1.00		
Reporting Date: 22/06/2018	QTSE Sample No	340336	340337	340338		

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

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Soil Analysis Certificate - PCB (7 Congeners)						
DETS Report No: 18-76815	Date Sampled	13/06/18	13/06/18	13/06/18		
CET UK Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: East Farleigh	TP / BH No	TP01	TP02	TP03		
Project / Job Ref: 447689	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: C-004093/G2	Depth (m)	0.50	0.20	1.00		
Reporting Date: 22/06/2018	QTSE Sample No	340336	340337	340338		

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

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



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2																																							
DETS Report No: 18-76815		Date Sampled	13/06/18		<table border="1"> <thead> <tr> <th colspan="3">Landfill Waste Acceptance Criteria Limits</th> </tr> <tr> <th>Inert Waste Landfill</th> <th>Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill</th> <th>Hazardous Waste Landfill</th> </tr> </thead> <tbody> <tr> <td>3%</td> <td>5%</td> <td>6%</td> </tr> <tr> <td>--</td> <td>--</td> <td>10%</td> </tr> <tr> <td>6</td> <td>--</td> <td>--</td> </tr> <tr> <td>1</td> <td>--</td> <td>--</td> </tr> <tr> <td>500</td> <td>--</td> <td>--</td> </tr> <tr> <td>100</td> <td>--</td> <td>--</td> </tr> <tr> <td>--</td> <td>>6</td> <td>--</td> </tr> <tr> <td>--</td> <td>To be evaluated</td> <td>To be evaluated</td> </tr> </tbody> </table>					Landfill Waste Acceptance Criteria Limits			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill	3%	5%	6%	--	--	10%	6	--	--	1	--	--	500	--	--	100	--	--	--	>6	--	--	To be evaluated	To be evaluated
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100	--	--																																					
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CET UK Ltd		Time Sampled	None Supplied																																				
Site Reference: East Farleigh		TP / BH No	TP01																																				
Project / Job Ref: 447689		Additional Refs	None Supplied																																				
Order No: C-004093/G2		Depth (m)	0.50																																				
Reporting Date: 22/06/2018		QTSE Sample No	340336																																				
Determinand	Unit	MDL																																					
TOC ^{MU}	%	< 0.1	3.1																																				
Loss on Ignition	%	< 0.01	6.76																																				
BTEX ^{MU}	mg/kg	< 0.05	< 0.05																																				
Sum of PCBs	mg/kg	< 0.1	< 0.1																																				
Mineral Oil ^{MU}	mg/kg	< 10	< 10																																				
Total PAH ^{MU}	mg/kg	< 1.7	< 1.7																																				
pH ^{MU}	pH Units	N/a	7.5																																				
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1																																				
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			0.02			0.2	0.5	2	25																														
Barium ^U			0.04			0.4	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			0.0006			< 0.01	0.01	0.2	2																														
Molybdenum ^U			0.003			0.03	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			< 0.005			< 0.05	0.06	0.7	5																														
Selenium ^U			< 0.005			< 0.05	0.1	0.5	7																														
Zinc ^U			0.049			0.49	4	50	200																														
Chloride ^U			2			15	800	15000	25000																														
Fluoride ^U			< 0.5			< 5	10	150	500																														
Sulphate ^U			3			25	1000	20000	50000																														
TDS			82			820	4000	60000	100000																														
Phenol Index			< 0.01			< 0.1	1	-	-																														
DOC			7.6			76.1	500	800	1000																														
Leach Test Information																																							
Sample Mass (kg)			0.10																																				
Dry Matter (%)			92.3																																				
Moisture (%)			8.4																																				
Stage 1																																							
Volume Eluate L10 (litres)			0.89																																				

Results are expressed on a dry weight basis, after correction for moisture content where applicable
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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2																																							
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Landfill Waste Acceptance Criteria Limits																																							
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--	>6	--																																					
--	To be evaluated	To be evaluated																																					
CET UK Ltd		Time Sampled	None Supplied																																				
Site Reference: East Farleigh		TP / BH No	TP02																																				
Project / Job Ref: 447689		Additional Refs	None Supplied																																				
Order No: C-004093/G2		Depth (m)	0.20																																				
Reporting Date: 22/06/2018		QTSE Sample No	340337																																				
Determinand	Unit	MDL																																					
TOC ^{MU}	%	< 0.1	3.1																																				
Loss on Ignition	%	< 0.01	6.70																																				
BTEX ^{MU}	mg/kg	< 0.05	< 0.05																																				
Sum of PCBs	mg/kg	< 0.1	< 0.1																																				
Mineral Oil ^{MU}	mg/kg	< 10	< 10																																				
Total PAH ^{MU}	mg/kg	< 1.7	< 1.7																																				
pH ^{MU}	pH Units	N/a	7.1																																				
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1																																				
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			0.002			0.02	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			< 0.005			< 0.05	0.06	0.7	5																														
Selenium ^U			< 0.005			< 0.05	0.1	0.5	7																														
Zinc ^U			< 0.005			< 0.05	4	50	200																														
Chloride ^U			1			13	800	15000	25000																														
Fluoride ^U			< 0.5			< 5	10	150	500																														
Sulphate ^U			1			12	1000	20000	50000																														
TDS			60			600	4000	60000	100000																														
Phenol Index			< 0.01			< 0.1	1	-	-																														
DOC			6.5			64.6	500	800	1000																														
Leach Test Information																																							
Sample Mass (kg)			0.10																																				
Dry Matter (%)			90.2																																				
Moisture (%)			11																																				
Stage 1																																							
Volume Eluate L10 (litres)			0.89																																				

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 18-76815		Date Sampled	13/06/18				Landfill Waste Acceptance Criteria Limits		
CET UK Ltd		Time Sampled	None Supplied				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Site Reference: East Farleigh		TP / BH No	TP03						
Project / Job Ref: 447689		Additional Refs	None Supplied						
Order No: C-004093/G2		Depth (m)	1.00						
Reporting Date: 22/06/2018		QTSE Sample No	340338						
Determinand		Unit	MDL						
TOC ^{MU}		%	< 0.1	0.4			3%	5%	6%
Loss on Ignition		%	< 0.01	1.70			--	--	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	7.4			--	>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			0.002		0.02	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			< 0.005		< 0.05	0.06	0.7	5	
Selenium ^U			< 0.005		< 0.05	0.1	0.5	7	
Zinc ^U			< 0.005		< 0.05	4	50	200	
Chloride ^U			1		13	800	15000	25000	
Fluoride ^U			< 0.5		< 5	10	150	500	
Sulphate ^U			< 1		< 10	1000	20000	50000	
TDS			30		300	4000	60000	100000	
Phenol Index			< 0.01		< 0.1	1	-	-	
DOC			3.2		32.4	500	800	1000	
Leach Test Information									
Sample Mass (kg)				0.10					
Dry Matter (%)				89.1					
Moisture (%)				12.2					
Stage 1									
Volume Eluate L10 (litres)				0.89					

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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 18-76815	
CET UK Ltd	
Site Reference: East Farleigh	
Project / Job Ref: 447689	
Order No: C-004093/G2	
Reporting Date: 22/06/2018	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
340336	TP01	None Supplied	0.50	7.7	Brown sandy clay
340337	TP02	None Supplied	0.20	9.8	Brown sandy clay
340338	TP03	None Supplied	1.00	10.9	Light brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

& samples received in inappropriate containers for hydrocarbon analysis

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 18-76815

CET UK Ltd

Site Reference: East Farleigh

Project / Job Ref: 447689

Order No: C-004093/G2

Reporting Date: 22/06/2018

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