

Cambridge Waste Water Treatment Plant Relocation Project Anglian Water Services Limited

Appendix 14.6: Groundwater Investigation Report Waterbeach

Application Document Reference: 5.4.14.6 PINS Project Reference: WW010003 APFP Regulation No. 5(2)a

Revision No. 01 September2023

A REPORT ON A GROUND INVESTIGATION FOR THE WATERBEACH GROWTH SCHEME, CAMBRIDGESHIRE (FACTUAL)

CLIENT: Anglian Water Services Limited

Date: 2 March 2022

Reference: AHm/21.393

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1. INTRODUCTION

It is proposed to install a new water main between Waterbeach and Horningsea just to the north-east of Cambridge in Cambridgeshire (Drawing 21.393/01). This will include sections where the main will be laid by directional drilling and others in open cut excavation.

At the instruction of Anglian Water Services Limited, an investigation was carried out under the Ground Investigation Period Contract, to provide information on the subsoil conditions and relevant geotechnical parameters, and also to assess the characteristics of the ground with respect to potential contamination.

This report provides the factual details of the fieldwork and laboratory testing undertaken during the investigation.



2. FIELDWORK

The fieldwork was carried out between 10 and 26 January 2022 and comprised nine cable percussive boreholes, referenced BH01 to BH09. The exploratory hole positions were selected and set out in general accordance with the requirements of Anglian Water Services Limited, as shown approximately on Drawings 21.393/02a, 02b and 02c.

The National Grid reference and, elevation of the hole locations relative to Ordnance Datum, were measured using a Hemisphere S320 VRS GPS (RTK) system.

A cable avoidance tool (gCAT4+) was used to sweep the borehole positions and the immediate surrounding area to locate any potential services with the position adjusted as necessary. A starter pit was also excavated by hand to a depth of 1.2 m to provide direct inspection for services at the borehole locations.

The **boreholes** were taken to depths between 10 m and 20 m below ground level, using conventional cable percussive techniques ('shell and auger') in 150 mm diameter casing. During advance, sampling and *in situ* testing were carried out in general accordance with BS EN1997-2:2007 Eurocode 7 and its UK National Annex supported by BS 5930:2015+A1:2020. Standard disturbed samples were taken for laboratory testing and to allow later inspection of the materials encountered and facilitate accurate logging.

Open drive samples (U100) were taken in cohesive deposits to allow laboratory testing of undisturbed material. These were generally alternated with standard penetration tests (SPT) which were carried out using a split barrel sampler or a solid cone as appropriate to obtain additional strength information, but were also undertaken in granular deposits to assess their condition. The SPT N value was taken as the number of blows for 300 mm of penetration, following a seating drive of 150 mm or 25 blows.

Hand vane tests (HV) were carried out in suitable material within the inspection pit depth using a Pilcon hand vane to provide an estimate of the undrained shear strength. This is achieved using a four-bladed cruciform stainless steel vane which is pushed into the ground. The torque head is attached to the 19 mm (or 33 mm) diameter vane and is rotated at the rate of one revolution per minute until the material fails. The equipment includes a direct reading scale to give the undrained shear strength.



Dedicated **environmental samples** were taken representative of the strata encountered at the exploratory hole position. They were placed in suitable containers, stored temporarily in cool boxes and delivered to a UKAS accredited facility for analysis of potential contaminants.

The boreholes were monitored for **groundwater** ingress during advance. Upon encountering water, work was temporarily stopped to allow the level to stabilise, recording the water level every five minutes for a period of twenty minutes. On completion, a slotted standpipes piezometer were installed in BH01, BH06 and BH09, which comprised a slotted PVC access tube, surrounded by a granular filter, and sealed at the top and bottom by bentonite. Subsequent to the completion of the fieldwork AFHA returned to site to carry out groundwater monitoring on four separate occasions.

Details of the strata encountered, the sampling, piezometer installation, *in situ* and laboratory testing are shown on records appended to this report.



3. LABORATORY TESTING

3.1 GENERAL

Subsequent to the fieldwork, a programme of laboratory testing was carried out to provide additional quantitative data on the materials encountered. The tests were completed in accordance with the procedures laid down in BS EN ISO 17892 and BS1377: 1990, unless stated otherwise, and consisted of:

- Natural moisture content
- Atterberg limits
- Particle size distribution
- Unconsolidated undrained triaxial testing
- Sulphate content and pH value
- Total sulphur content
- Contamination testing
- WAC testing

3.2 TEST PROCEDURES

3.2.1 NATURAL MOISTURE CONTENT

The natural moisture content (also known as water content) is determined according to BS EN ISO 17892: Part 1: 2014: clause 5.2. This represents the mass of moisture content retained by the soil in its natural state as a percentage of its dry mass. For organic soils and peats care should be taken to avoid heating the sample above 50°C to prevent irreversible physical changes to the material.

3.2.2 ATTERBERG LIMITS

The Atterberg limits are determined in the laboratory by the procedures given in BS EN ISO 17892: Part 12: 2018. The liquid limit (LL) is the moisture content of the soil at the point that its behaviour passes from that of a plastic solid to that of a liquid. The test procedure given as clause 5.3 was used based on the cone penetrometer in which the penetration of a free-fall cone into moistened and cured samples of the soil is measured. The plastic limit (PL) is the moisture content of the soil at the point that its behaviour passes from a plastic solid to a brittle solid. This point is measured according to clause 5.5 and is the point at which a thread of the soil rolled to 3 mm diameter begins to crumble.

Together the Atterberg limits can be used to define the plastic range of the soil. The plasticity index (PI) is the difference between the liquid and plastic limit and is broadly correlated to the engineering behaviour of the soil. When used with the natural moisture content of the soil they can also give an indication of its *in situ* condition.

3.2.3 PARTICLE SIZE DISTRIBUTION

A quantitative assessment of the particle size distribution of the soil down to the fine grained sand size is made according to BS EN ISO 17892: Part 4: 2016: clause 5.2. In this the percentage of certain sized fractions of the soil are found by determining the weight retained on a variety of sieve sizes through which the material is allowed to pass. The combined silt and clay fraction is determined by the difference between the sum of the retained weights and the original sample weight. Variations of the test procedure allow the silt and clay fraction to be removed from the coarser fraction by wet sieving during which the fine material is washed from the surface of the coarser material.

The quantitative determination of the particle size distribution for fine soils, from coarse silt to clay size, is made according to BS EN ISO 17892: Part 4: 2016: clause 5.3 or 5.4, using either the sedimentation by hydrometer method or pipette method. These tests are generally carried out if greater than 10% of the material passes the BS test sieve size of 63 μ m. The percentages of the constituents of the fine soil can be linked to the curve obtained by sieving to provide a single curve for the whole material.

3.2.4 UNCONSOLIDATED UNDRAINED TRIAXIAL TESTING

The undrained shear strength of the soil was measured, as stated in BS EN ISO 17892: Part 8: 2018 or BS 1377: Part 7: 1990: clause 8, by axial compression of 100 mm diameter cylindrical specimens cut from the U100 undisturbed samples. The nature of the test is such that no change in moisture content of the specimen is allowed during shear.

The theory of behaviour of saturated clay materials in undrained shear failure gives that the strength will not be influenced by the confining pressure such that the measured angle of internal friction for the material will apparently be equal to zero. Experience has shown that this is true only for samples of unweathered heavily overconsolidated pure clays. Where the material is weathered or it contains a significant granular content a plastic rather than a brittle failure develops which produces a strain hardening during shear. In this



situation measurable apparent undrained angle of internal friction is produced. A similar situation develops in partially saturated materials. The test results are also influenced by sample variation, and in particular the presence of natural fissures or inclusions within the sample.

The use of large diameter specimens is preferred as this compensates for the scale effects of random features in smaller specimens. One of two tests are carried out according to the soil characteristic. Unweathered specimens of heavily overconsolidated clays which have a brittle failure in shear are tested in a single stage according to BS EN ISO 17892: Part 8: 2018. The confining pressure is taken as the total overburden pressure of the sample *in situ*. It is then failed by axial compression and the measured deviator stress reported as the apparent undrained cohesion. Specimens of weathered clay or the clays with granular contents are tested in a multistage manner according to BS 1377: Part 7: 1990: clause 9.

The test procedure is similar to the single stage but at the point that failure begins the confining pressure is increased and the specimen compressed for a further 2% of vertical strain at which point the confining pressure is again increased and held for a further 2% strain. The deviator stresses at each of the confining pressures are used to plot the Mohr envelope and the apparent undrained cohesion and if appropriate the undrained angle of internal friction.

3.2.5 SULPHATE CONTENT AND pH VALUE

In order to aid the evaluation of any aggressive tendency of the subsoil or groundwater to buried concrete, the pH, water soluble and total sulphate concentrations in a number of samples were determined using in-house procedures based on other methodologies.

The pH of a groundwater sample or a soil filtrate was established electrometrically according to BS 1377: Part 3: 1990: clause 9.5, while water soluble sulphate and groundwater sulphate were determined using procedures based on Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition (AWWA & WEF, 2005). This requires the preparation of a soil extract using deionised water at a 2:1 ratio. The filtered extract of the soil, or a water sample, are then injected into an ion exchange chromatograph with a conductivity detector. The samples are compared against commercially available standards to evaluate the sulphate concentration.



The total sulphate content of a soil was measured on a filtrate following digestion of the soil by 10% hydrochloric acid, as shown by BS 1377: Part 3: 1990: clause 5.5 and TRL 447 (Reid *et al* 2005). Subsequently the soil filtrate is introduced into ICP-OES equipment to determine sulphate concentration.

3.2.6 TOTAL SULPHUR CONTENT

To aid the evaluation of aggressive tendency of the subsoil to buried concrete as a result of its pyritic potential, the total potential sulphate content can be determined from the relationship between the total (acid soluble) sulphate content and the amount of total sulphur present. The total sulphur content is determined by a laboratory in-house methodology based on Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition (AWWA & WEF, 2005).

A dried portion of the soil is extracted at 115 °C for 75 minutes using 100% aqua regia. The digest solution is filtered and analysed by ICP-OES. The results are expressed as % S, and include water soluble and acid soluble sulphates and total reduced sulphur, as well as insoluble sulphates and organic sulphur.

3.2.7 CONTAMINATION TESTING

In order to determine the presence of other chemical contamination not otherwise naturally present in the ground, a signature suite of tests was undertaken to provide data on a broad mix of inorganic and organic potential contaminants. This comprised the total content of arsenic, cadmium, chromium, chromium VI, lead, mercury, selenium, copper, nickel, cyanide and zinc, together with pH, phenols, speciated polycyclic aromatic hydrocarbons (PAH) and total organic carbon (TOC).

The samples were also subject to specific hydrocarbon analysis which took place in the form of total petroleum hydrocarbon analysis using the Land Quality Management (LQM) suite, which is based on the Criterial Working Group (CWG) methodology. This provides the split between the aliphatic and aromatic fractions in the C₅ to C₄₄ ranges. The total concentration of petroleum hydrocarbons between C₆ and C₄₀ is also provided, together with the specified hydrocarbons: benzene, toluene, ethylbenzene, xylenes (collectively known as BTEX) and methyl tertiary butyl ether (MTBE).



Additionally, selected samples were screened for the presence of asbestos, but none detected.

Throughout, testing was undertaken using a variety of analytical techniques, and was carried out to MCERTS accredited methods, where applicable, or to UKAS accredited or other acceptable methodologies.

3.2.8 WASTE ACCEPTANCE CRITERIA TESTING

Waste Acceptance Criteria (WAC) assessment was undertaken to assist with waste characterisation and disposal of excavated material. Waste materials fall into three categories, namely 'inert', 'non-hazardous' and 'hazardous', with each category defined by leaching limit values for acceptance at the relevant landfill site. Leaching is carried out to determine the 10:1 liquid/solid ratio. The components analysed are arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium, zinc, chloride, fluoride, sulphate, together with dissolved organic carbon and total dissolved solids; phenols are only relevant to the inert waste category.

Additionally, the inert classification requires the determination of BTEX (a combination of the volatile organic hydrocarbons, as defined previously), polychlorinated biphenyls (total of the EC7 PCBs), mineral oil (in the C_{10} to C_{40} range), and polycyclic aromatic hydrocarbons. These suites of tests are not required for the non-hazardous and hazardous categories. pH is determined for non-hazardous waste acceptance and loss on ignition for the hazardous class, while the acid neutralisation capacity is measured for both, and total organic carbon for all three.



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A F HOWLAND ASSOCIATES 2 March 2022



APPENDIX A: REFERENCES

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APPENDIX B: CABLE PERCUSSIVE BOREHOLE RECORDS

В	Bulk disturbed sample									
D	Small disturbed sample									
ES	Environmental sample									
U	100 mm diameter undisturbed open tube drive sample									
W	Water sample									
X blows	The associated figure 'X' is the number of blows to drive the sample tube over the given depth range									
SPT(C)	Standard penetration test using a solid cone. N Value is uncorrected, but the hammer energy ratio is provided (in remarks)									
SPT	Standard penetration test using a split spoon sampler. N Value is uncorrected, but the hammer energy ratio is provided (in remarks)									
X,X/X,X,X,X	Blows per increment during the standard penetration test. The initial value relates to the seating drive (150 mm) and the remaining four to the 75 mm increments of the test length									
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300 mm)									
X*/Y	Incomplete standard penetration test where the seating drive could not be completed. The blows 'X' represent the total blows for the given length of seating drive 'Y' (mm)									
X/Z	Incomplete standard penetration test where the seating drive was achieved but the full test length was not. The blows 'X' represent the total blows for the given test length 'Z' (mm)									
dd/mm/yy: 1.0 dd/mm/yy: dry	Date, water level at the borehole depth at the end of shift and the start of the following shift									

Each sample type is numbered sequentially with depth and relates to the depth range quoted

All depths and measurements are given in metres, except as noted

Strata descriptions complied by visual examination of samples obtained during boring, after BS 5930:2015+A1:2020 and modified in accordance with laboratory test results where applicable.

			AFH	owland As	socia	tes	Site WATERBEACH GROWTH SCHEME	Borehole Number
		<u> </u>	Jeote	echnical Eng	gineer	S		BH01
Machine : Da	ando 2500 able Percussion	Casing 15 Op	Diameter 0mm cas ben hole t	r ed to 2.50m o 20.00m	Ground	Level (mOD) 2.04	Client Anglian Water Services Limited	Job Number 21.393
		Locatio	o n 60513 E 2	66169 N	Dates 10 12	0/01/2022- 2/01/2022	Engineer	Sheet 1/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness	Description	Legend S
0 50 1 00	B1				1.58	(0.46) 0.46	PLOUGHED SOIL (Black to dark brown slightly gravelly silty clay. Gravel is angular to subrounded fine to coarse flint. With rootlets)	
0.65	ES1						Gravel is subangular to rounded fine to medium flint	× ** ▼1
1.00-1.20	D1			Moderate(1) at		[(1.14) []		.×
1.20-1.60	B2			1.10m, rose to 0.70m in 20 mins,				×
1.20-1.65 1.60-1.70	SPT(C) N=8 D2	1.20	0.70	sealed at 2.50m. 1,1/2,2,2,2	0.44	1.60	Stiff bluish grey mottled greenish grey silty calcareous CLAY	×
1.80 2.00-2.45	W1 U1		DRY	39 blows			indistinctly fissured with rare relic rootlets from 1.90 m	×
						(1.40)		× ×
2.50	D3							××
3 00-3 45	SPT N=10	2 50	DRY	1 2/2 2 3 3	-0.96	3.00	Stiff indistinctly fissured bluish arey silty calcareous CLAY	×
3.00-3.45	D4	2.50	DITI	1,2/2,2,0,0		E		×
						E-		× ×
						E		××
4.00-4.45	U2		DRY	43 blows			becoming very stiff in places	×
								××
4.50	D5					E-		×
						E		× ×
5.00-5.45	SPT N=15	2.50	DRY	2,3/3,3,4,5		= =		× ×
5.00-5.45	D6					E F-		××
						E		×
								××
6.00-6.45	U3		DRY	49 blows		<u>-</u>		×
								×
6.50	D7					(7.00)		× ×
								× ×
								××
						E E		×
7.50-7.95	SPT N=15	2.50	DRY	1,2/3,3,4,5		E		××
1.00-1.00						E		×
								× ×
						E		<u>×</u>
						E		××
								×
9.00-9.45	U4		DRY	66 blows		=	becoming very stiff and fissured from 9.00 m	×
0.55								×
9.50	D9							×
						E- 		<u>×</u>
Remarks 1. Location C	CAT scanned prior to	excavatio	on				Scale (approx	Logged By
3. Groundwa 4. Water add	ter struck at 1.10 m led from 1.20 m to 2	and rose .00 m app	to 1.00 m rox 50 litr	in 5 mins, 0.80 m in ⁻ es	10 mins, 0	.70 m in 15 m	ins and 20 mins 1:50	JAH
6. SPT Ham	mer Energy Ratio =	70.17%					Figure 21.	No. 893.BH01

\square	A F H Geote	owland Ass echnical Eng	s ocia ineer	tes s		Site WATERBEACH GROWTH SCHEME		Borehole Number BH01		
Machine : Da	ando 2500 able Percussion	Casing 15 Or	Diamete Omm cas ben hole t	r ed to 2.50m to 20.00m	Ground	Level 2.04	(mOD)	Client Anglian Water Services Limited		Job Number 21.393
		Locatio	n 0513 E 2	66169 N	Dates 1(12)/01/20 2/01/20)22-)22	Engineer		Sheet 2/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Do (Thic	epth (m) :kness)	Description		Legend
10.50-10.95 10.50-10.95	SPT N=48 D10	2.50	DRY	3,4/8,10,13,17	-7.96		10.00	Very stiff fissured bluish grey silty calcareous CLAY		× × × × × × ×
12.00-12.45 12.50	U5 D11		DRY	100 blows				with rare light grey speckles between 11.50 m and 13.00 m	d	xx xx xx xx xx xx xx
13.50-13.95 13.50-13.95	SPT N=27 D12	2.50	DRY	2,3/4,6,8,9					-	
15.00-15.45 15.50	U6 D13		DRY	93 blows			(10.00)		-	×
16.50-16.95 16.50-16.95	SPT N=38 D14	2.50	DRY	3,4/7,9,10,12 10/01/2022:DRY						× × × × × × × × × × × × × × × × × × ×
18.00-18.45 18.00-18.45	SPT N=32 D15	2.50	DRY	2,3/4,6,9,13						× × × × × × × × × × × × × × × × × × ×
19.50-19.95 19.50-20.00	SPT N=39 D16	2.50	DRY	3,3/5,8,12,14 12/01/2022:DRY	-17.96		20.00		-	
Remarks								(a	Scale approx)	Logged By JAH
									Figure No. 21.39	0. 3 BH01

Legend Execution Internal Diameter of Tube (A) = 50 mm Client Anglan Water Services Limited Or Anglan Water Services Limited Sever Anglan Water Services Sever Anglan Water Services		/				A F Howland A	ssocia	ates	:	Site WATERBE	EACH GF	ROWTH	SCHEME				Borehole Number
Discription number information South Series 200 Distance Anglan Witter Services Limited Distance Anglan Witter Services Limited Distance 213333 Legend 500 104 00013E 200100 N Ground Level (mOD) 2.04 Engineer State 111 State 111 <td>Installe</td> <td></td> <td></td> <td></td> <td></td> <td>Geotechnical Li</td> <td>nginee</td> <td>rs</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>BH01</td>	Installe					Geotechnical Li	nginee	rs									BH01
Location Location Ground Level (mOD) Engineer State 2 56159 N Sheet 1/1 Lagond B 104 1.04 0.20 \$286788 Seat Date Time Consultant Since 7 State 7 Since 7	Single	e Ins	tallation		Interna	al Diameter of Tube [A] = 50	mm			Client Anglian W	/ater Serv	vices Lim	ited				Job Number 21.393
Logend Interview Logend Interview Social E 20010 N 2_04 Concurdwater Strikes During Drilling Readings No Readings					Location	1	Ground	Level (m	OD) I	Engineer							Sheet
Logond 2 104 0.00 Description Groundwater Strikes During Drilling 21 1.04 1.04 0.00 Example					55051	3 E 266169 N	2	2.04								1/1	
Image: second	Legend	Vater	Instr (A)	Level (mOD)	Depth (m)	Description				G	roundwa	ater Strik	es Durin	g Drilling	9	I	
Image: Signal with the string of the stri		~	<u>، ، ا : ، ،</u>	1.84	0.20	Concrete Bentonite Seal			Depth	Casing			Readings			Depth	
Matrix Soluted Standpipe 100/1/2 111 1.10 Moderate 1.00 0.80 0.70 0.70 2.50 111 1.01 1.01 1.01 1.01 1.01 1.01 0.80 0.70 0.70 2.50 111 1.01 1.01 1.01 1.01 1.01 0.80 0.70 0.70 2.50 111 1.01 1.01 1.01 1.01 1.01 1.01 0.80 0.70 0.70 2.50 111 1.01 1.	×	▼ 1		1.04	1.00		Date	Time	Struck (m)	Depth (m)	Inflo	w Rate	5 min	10 min	15 min	20 min	Sealed (m)
Image: Second outcomparison Image: Second outcomparison <t< td=""><td>× × · · · ×</td><td>⊻1</td><td></td><td></td><td></td><td>Slotted Standnine</td><td>10/01/22</td><td>1115</td><td>1.10</td><td colspan="2">.10 Moderate</td><td>ate</td><td>1.00</td><td>0.80</td><td>0.70</td><td>0.70</td><td>2.50</td></t<>	× × · · · ×	⊻ 1				Slotted Standnine	10/01/22	1115	1.10	.10 Moderate		ate	1.00	0.80	0.70	0.70	2.50
-1-1 -0.96 3.00 -1-1 -0.96 3.00 -1-1 -1-1 -1-1 -1-1 -1-1 <t< td=""><td>×</td><td></td><td></td><td></td><td></td><td>Slotted Standpipe</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	×					Slotted Standpipe											
Image: Subsection of the section of the sec	×			0.06	2.00												
General Backfill Instrument (A) Remarks 10/01/22 0.947 0.92 1.42 10/01/22 1.42 1.32 1.32	×			-0.96	3.00												
Groundwater Observations During Drilling Date Start of Shift End of Shift 1	×																
	×						Groundwater Observations During Drilling										
Date Time Departs Casing Weter (me) Time Departs Casing Weter (me) Departs	×									Start of Shift			End of Shift			hift	
Image: Second	×						Date	Time	Depth Hole	Casing Depth	Water Depth	Water Level	Time	Depth Hole	Casing Depth	Water	Water Level
General Backfill Image: Construction of the second of	×						10/01/22		(m)	(ṁ)	(ṁ)	(mOD)		(m) 17.00	(ṁ) 2.50	(mi) DRY	(mOD)
Image: Solution of the second seco	×						12/01/22		17.00	2.50	10.30	-8.26		20.00	2.50	DRY	
General Backfill Instrument Groundwater Observations Inst. [A] Type : Slotted Standpipe Instrument [A] Date Instrument [A] 04/02/22 09-47 0.62 1.42 1002/22 1005 0.65 1.39 25/02/22 09-44 0.30 1.74	×																
General Backfill Inst. [A] Type : Slotted Standpipe	×																
General Backfill General Back	×																
General Backfill General Back	×																
Image: Second and Second	×									Instru	ument G	roundwa	ter Obse	ervations			
×	×						Inst.	[A] Type	: Slotte	d Standpip	e						
Normalization Date Time Depth Level (mob) 04/02/22 09:47 0.62 1.42 04/02/22 10:05 0.66 1.39 10/02/22 10:05 0.62 1.62 10/02/22 25/02/22 09:44 0.30 1.74	×					General Backfill		Ins	trument	: [A]							
x x x x x x x x x x x x x x <t< td=""><td>×</td><td></td><td></td><td></td><td></td><td></td><td>Date</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Rem</td><td>arks</td><td></td><td></td></t<>	×						Date							Rem	arks		
x x x x <t< td=""><td>×</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Time</td><td>Depth (m)</td><td>Level (mOD)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	×							Time	Depth (m)	Level (mOD)							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	×						04/02/22	09:47	0.62	2 1.42							
	×						10/02/22 18/02/22	10:05	0.65	5 1.39 2 1.62							
	×						25/02/22	09.44	0.30	1.74							
	×																
	×																
	×																
	×																
	×																
	×																
	×																
	×																
	×			47.00	20.00												
x 2000 2000 2000 2000 2000 2000 200	×			-17.96	20.00												

				owland As	socia	tes		Site WATERBEACH GROWTH SCHEME		Boreho Numbe	ole er 2
		<u> </u>			liteer	3					
Machine : D	ando 2500 Cable Percussion	Casing 15 O	Diamete 0mm cas pen Hole	r ed to 2.50m to 20.00m	Ground	Leve 0.99	l (mOD)	Client Anglian Water Services Limited		Job Number 21.393	
		Locatio 55	on 50586 E 2	66176 N	Dates 13 14	3/01/2 4/01/2	022- 022	Engineer		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	C (Thi	Depth (m) ckness)	Description		Legend	Water
							(0.65)	PLOUGHED SOIL (Dark brown to black silty slightly clay. With rootlets)	sandy		
0.70-0.90	D1				0.34	Ē	0.65 (0.35)	Firm grey silty slightly sandy CLAY		××	▼ 1
0.80	ES1 W1			Slow(1) at 1.00m,	-0.01	-	1.00	Orange-brown slightly silty gravelly fine to coarse SA	AND.	×	V 1
1.00-1.20 1.10	D2 ES2			rose to 0.80m in 20 mins, sealed at	-0.31		(0.30) 1.30	Gravel is subangular to rounded occasionally angula medium flint	ar fine to	× **	ļ
1.30-1.80 1.20-1.65	B1 SPT(C) N=14	1.20	1.00	2.50m. 2,2/3,3,4,4		Ē	(0.70)	Medium dense orange-brown slightly silty very sand	у	×	
						E	(0.70)			×	
2.00-2.45	SPT N=8	2.00	1.80	1,1/2,2,2,2	-1.01	-	2.00	Stiff indistinctly fissured bluish grey silty calcareous	CLAY	×	
2.00-2.50 2.00-2.50	ES3					Ē				×	
						Ē				×	
						Ē				× ×	
3.00-3.45	U1	2.50	DRY	43 blows		-				×	
						Ē				××	
3.50	D4					Ē				××	ļ
						Ē				×	
4.00-4.45 4.00-4.45	D5	2.50	DRY	2,2/3,3,4,4						×	
										×	
						Ē				×	
5 00-5 45	U2	2 50	DRY	50 blows						× ×	
		2.00	2			E				×	
5.50	D6					E				× ×	1
										××	
6.00-6.45	SPT N=18	2.50	DRY	2,3/3,4,5,6		E	(8.00)			×	
6.00-6.45						Ē				×	
						-				×	
						Ē				×	
						E				× ×	
						Ē				× ×	
7.50-7.95	U3	2.50	DRY	90 blows		E		becoming very stiff from 7.50 m		× ×	
						_				××	l
8.00	D8			13/01/2022:DRY		E				×	
				14/01/2022:5.60m		E				×	
										×	
9 00-9 45	SPT N=27	2 50	DRY	3 3/4 5 8 10		Ē				×	
9.00-9.45	D9	2.00	Bitti	0,0,1,0,0,10		E				× ×	
										× ×	
						Ē				×	1
De ser l'						Ē				×	
1. Location (CAT scanned prior to	excavatio	on						Scale (approx)	Logge By	d
3. Groundwa	ater struck at 1.00 m ded from 1.20 m to 2	and rose	to 0.90 m prox 50 litr	in 5 mins and 10 min	s, 0.80 m	in 15	mins and	1 20 mins	1:50	JAH	
5. SPT Ham 6. Borehole	mer Energy Ratio =	66.38%						-	Figure N	0.	
		0							21.20	3 8003	

	$\sqrt{\gamma}$		A F H Geote	owland As echnical Eng	s <mark>ocia</mark> gineer	tes s	Site WATERBEACH GROWTH SCHEME	Boreho Number BH02
Machine : Da Method : Ca	ando 2500 able Percussion	Casing 15 Op	Diamete 0mm cas ben Hole t	r ed to 2.50m to 20.00m	Ground	Level (mOD) 0.99	Client Anglian Water Services Limited	Job Number 21.393
		Locatio 55	n 0586 E 2	66176 N	Dates 13 14	3/01/2022- 1/01/2022	Engineer	Sheet 2/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
10.50-10.95 11.00	U4 D10	2.50	DRY	73 blows	-9.01		Very stiff indistinctly fissured bluish grey silty calcareous CLAY	×x ×x ×x ×x ×x
12.00-12.45 12.00-12.45	SPT N=26 D11	2.50	DRY	2,3/4,6,8,8			becoming fissured from 12.50 m	× × × × × × × ×
13.50-13.95 13.50-13.95	SPT N=30 D12	2.50	DRY	3,4/6,6,7,11				× × × × × × × × × × × × × × × × × × ×
15.00-15.45 15.00-15.45	SPT N=33 D13	2.50	DRY	2,3/5,7,9,12				
16.50-16.95 16.50-16.95	SPT N=34 D14	2.50	DRY	3,3/6,8,9,11			rare fine lithorelics at 16.80 m	× × × × × × × × × × × × × × × × × × ×
18.00-18.45 18.00-18.45	SPT N=38 D15	2.50	DRY	4,5/7,9,10,12			rare light grey speckles from 17.50 m	× × × × × × × × × × × × × × × × × × ×
19.50-19.95 19.50-20.00	SPT N=37 D16	2.50	DRY	5,5/6,8,10,13 14/01/2022:DRY	19.01	20.00		× × × × × × × × × × × × × × × × × × ×
Remarks							Sc (app	ale Logged rox) By
							1: Fig	50 JAH jure No. 21 393 BH02

			A F H	owland As	socia	tes	Site		Borehole Number	
		<u> </u>	Geote	echnical Eng	ineer	S	WATERBEACH GROWTH SCHEME		BH03	
Machine : D	ando 2500 Cable Percussion	Casing 15 Ol	Diamete 50mm cas pen Hole	r ed to 2.50m to 15.00m	Ground	Level (mOD) 1.31	Client Anglian Water Services Limited		Job Number 21.393	
		Locatio 55	on 50522 E 2	65816 N	Dates 12 13	2/01/2022- 3/01/2022	Engineer		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend S	
0.60.0.80	P1				0.71	(0.60)	PLOUGHED SOIL (Dark brown to black silty slight clay. With rootlets) Firm grevish brown silty sandy CLAY	ly sandy		
0.75 0.75 1.00-1.10	HV 25kPa ES1 D1			24, 26, 24/Av. 24.67		(0.90)	mottled orange-brown from 1.10 m		× × ×	
1.20-1.65 1.20-1.65 1.50 1.50-1.90	SPT N=19 D2 W1 B2	1.20	DRY	1,3/4,4,5,6 Slow(1) at 1.50m, rose to 1.40m in 20	-0.19	1.50	Orange-brown slightly silty very sandy subangular rounded occasionally angular fine to coarse flint G	to RAVEL	× <u>×</u>	
2.00-2.45 2.00	SPT(C) N=10 D3	2.00	1.80	2.50m. 2,2/2,2,3,3	-0.64	1.95 (0.45)	Firm grey silty slightly gravelly CLAY. Gravel is sub fine flint	angular	× • • •	
					-1.09	2.40	Stiff indistinctly fissured bluish grey silty calcareous	s CLAY	×	
3.00-3.45	U1	2.80	DRY	61 blows			sample recovered in a softened condition		× × ×	
3.50	D4								× ×	
4.00-4.45	D5			12/01/2022:DRY					×	
4.00-4.45	SPT N=13	2.80	DRY	2,3/3,3,3,4					× × ×	
5.00-5.45	U2	2.80	DRY	56 blows					× ×	
5.50	D6								××	
6.00-6.45 6.00-6.45	SPT N=15 D7	2.80	DRY	2,3/3,3,4,5						
7.50-7.95	U3	2.80	DRY	68 blows					× × ×	
8.00	D8								×	
9.00-9.45 9.00-9.45	SPT N=21 D9	2.80	DRY	2,4/4,5,5,7			very stiff and fissured from 9.00 m		x x x x x x x x x x x x x x x x x x x x	
Remarks 1. Location (2. Hand dug	CAT scanned prior to inspection pit to 1.2	o excavatio	on	in 5 mins 1 40 m in 4	10 mina a	ad 15 mins ==	d 20 mins	Scale (approx)	Logged By	
3. Groundwa 4. SPT Ham 5. SPT Ham	ater struck at 1.50 m mer Energy Ratio = mer Energy Ratio =	and rose 70.17% [1 66.38% [1	to 1.50 m 2/01/2022 3/01/2022	ાn ວ mins, 1.40 m in 1 2] 2]	i u mins ar	nd 15 mins and	a zu mins	1:50	JAH	
6. Hand van 7. Borehole	e tests (HV) carried backfilled with arising	out in insp gs	pection pit	[Serial No. DR-2743]				Figure N	l o.	

\sum	$\sqrt{2}$	$\sum_{i=1}^{n} d_{i}$	A F H Geote	owland As echnical Eng	s ociates Bineers	Site WATERBEACH GROWTH SCHEME		Borehole Number BH03 Job Number 21.393	
Machine : Da	ando 2500 able Percussion	Casing 15 Op	Diamete 0mm cas ben Hole t	r ed to 2.50m to 15.00m	Ground Level (mOD) 1.31	Client Anglian Water Services Limited			
		Locatio 55	n 0522 E 20	65816 N	Dates 12/01/2022- 13/01/2022	Engineer		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level Depth (mOD) (m) (Thickness)	Description		Legend	
10.50-10.95 11.00	U4 D10	2.80	DRY	100 blows	-8.69 - 10.00	Very stiff fissured bluish grey silty calcareous CLAY	3	× × × × × ×	
12.00-12.45 12.00-12.45	SPT N=24 D11	2.80	DRY	1,3/4,6,6,8		with rare light grey speckles between 11.50 m ar 13.00 m	1d >		
13.50-13.95 13.50-13.95	SPT N=39 D12	2.80	DRY	2,4/5,7,8,19			- - - - - - - - - - - - - - 		
15.00-15.45 15.00-15.45	SPT N=29 D13	2.80	DRY	3,3/4,6,8,11	-14.14 5 15.45		>	× × × × × × × × × × × × × × × × × × ×	
				13/01/2022:DRY		Complete at 15.45m			
Remarks							Scale (approx)	Logged By	
						_	1:50 Figure No 21.393	JAH 5. 3.BH03	

	\mathcal{M}		A F H Geote	owland Ass echnical Eng	s <mark>ocia</mark> ineer	tes s	5	Site WATERBEACH GROWTH SCHEME	Borehole Number BH04
Machine : D	Dando 2500	Casing	Diamete	r C	Ground	Leve	el (mOD)	Client	Job
Method : C	Cable Percussion	15 Op	0mm cas pen Hole	ed to 2.50m to 20.00m		1.65	5	Anglian Water Services Limited	Number 21.393
		Locatio 55	on 60422 E 2	65028 N	Dates 17 18	7/01/2 3/01/2	2022- 2022	Engineer	Sheet 1/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	l (Th	Depth (ṁ) iickness)	Description	Kater Kater
					1.45		(0.20) 0.20	TOPSOIL (Grass over dark brown silty slightly sandy clay	
0.20-0.30 0.30-0.60	ES1 B1						(0.60)	Plastic dark brown pseudo-fibrous PEAT with rare rootlets and brown plant fibres trending to organic silty clay	X <i>ik_</i> X <i>ik</i> X <i>ika</i> X X <i>ik</i> X <i>ik</i>
0.80 0.80-1.20	W1 ES2			Slight seepage(1) at 0.80m, no rise	0.85	Ē	0.80	Very soft light grey mottled brown silty CLAY with rare sand pockets and siltstone gravels	× ^{∞W/} , ▼1
1.00 0.80 1.10 1.20-1.65	D1 HV 15kPa HV 17kPa B2 D2			after 20 mins. 20,14,12/Av. 15.33 18,18,16/Av. 17.33 17/01/2022:0.80m			(1.50)	becoming bluish grey with some semi-decomposed plant remains	×
1.20-1.65	SPT N=4	1.20	0.80	18/01/2022:0.40m 1,0/1,1,1,1			(1.00)		×
2.00-2.45 2.00-2.45	SPT N=24 D3	2.00	DRY	1,1/2,7,8,7					
2.30 2.30-2.60	W2 B3			fast(2) at 2.30m, rose to 0.50m in 20 mins.	-0.65	lulu lulu lulu	2.30	Medium dense brown slightly silty very sandy subangular to rounded occasionally angular fine to medium flint GRAVEL. Occasional coarse flint and rare fine quartzite	× × × × ×
3.00-3.45 3.00-3.45	SPT(C) N=14 B4	3.00	0.80	2,3/5,3,3,3			(1.40)		******* ******
					-2.05	E	3.70		*× •×
3.70-3.90	D4	4.00	0.50	4 0/0 0 0 0	-2.35	È.	(0.30) 4.00	Firm grey silty slightly gravelly CLAY. Gravel is subangular fine flint	× • • • •
4.00-4.45 4.00-4.45	D5	4.00	3.50	1,2/2,3,3,3				Firm thickly laminated bluish grey silty calcareous CLAY	× ×
							(1.00)		× ×
5 00 5 45		4.50	DDV	CC blows	-3.35	È.	5.00		× ×
5.00-5.45		4.50	DRY	66 DIOWS				calcareous CLAY with occasional crystal flecks and rare pyritic pockets and black subrounded medium nodules	× ×
5.45	D6								× ×
		4.50	551			Ē			× ×
6.00-6.45 6.00-6.45	SPT N=26 D7	4.50	DRY	3,5/6,6,6,8					×
									×
						Ē			×
						Ē			×
									× ×
7.50-7.95	U2	4.50	DRY	69 blows				becoming very stiff, with rare fossil shell fragments	× ×
7.05	08					Ē			×
7.55	20					Ē			× ×
						E			××
						Ē			××
9.00-9.45	SPT N=31	4.50	DRY	4,5/7,8,7,9		E			××
3.00-3.40	53					Ē			××
						Ē	(9.00)		××
									×
Remarks 1. Location 2. Hand dug	CAT scanned prior to	o excavatio 0 m	on					Scale (approx)	Logged By
4. Groundwa 5 SPT Ham	ater struck at 0.80 m ater struck at 2.30 m mer Energy Ratio =	and rose	to 0.50 m	in 5 mins and 10 min	s and 15 r	nins	and 20 m	nins 1:50	PJM
6. Hand van 7. Borehole	backfilled with arisin	out in insp gs	ection pit	[Serial No. DR-2743]				Figure	No.

			A F H	owland As	socia	tes	Site	Borehole
		7 (Geote	echnical Eng	ineer	S	WATERBEACH GROWTH SCHEME	BH04
Machine : Da	ando 2500	Casing	Diamete	r	Ground	Level (mOD)	Client	Job Number
Method : Ca	able Percussion	15 Op	0mm cas oen Hole t	ed to 2.50m to 20.00m		1.65	Anglian Water Services Limited	21.393
		Locatio	n 0422 E 2	65028 N	Dates	7/01/2022-	Engineer	Sheet
Donth		Casing	Watar	03020 N		Depth		2/2
(m)	Sample / Tests	Depth (m)	Depth (m)	Field Records	(mOD)	(m) (Thickness)	Description	Legend S
10.50-10.95	U3	4.50	DRY	90 blows			Very stiff fissured bluish grey silty calcareous CLAY with occasional crystal flecks and rare pyritic pockets and black subrounded medium nodules	× × ×
								× <u>×</u>
10.95 12.00-12.45 12.00-12.45	D10 SPT N=35 D11	4.50	DRY	4,7/8,8,9,10			becoming grey with rare fossil shell fragments	
13.50-13.95 13.95	U4 D12	4.50	DRY	75 blows	-12.35		Very stiff fissured dark bluish grey silty calcareous CLAY with rare black subrounded medium nodules and fossil shell fragments	
15.00-15.45 15.00-15.45	SPT N=41 D13	4.50	DRY	5,8/9,10,10,12				×
16.50-16.95 16.95	U5 D14	4.50	DRY	80 blows		(5.00)	with some fossil fragments and whole ammonites	× × × × × × × × × × × × × × × × × × ×
18.00-18.45 18.00-18.45	SPT N=50 D15	4.50	DRY	5,8/10,12,14,14				
19.50-19.95 19.95	U6 D16	4.50	DRY	100 blows 18/01/2022:DRY	-17.35	19.00 (1.00) 20.00	Very stiff fissured dark grey calcareous CLAY with rare fossil fragments and light grey silt and pyritic pockets	×
Remarks							Scale (approx)	Logged Bv
							1:50	PJM
							Figure	No.
1							21.3	93.BH04

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			A F H	owland As	socia	tes		Site	Borehole Number
		$\overline{7}$ (Geote	echnical Eng	gineer	S		WATERBEACH GROWTH SCHEME	BH05
Boring Meth Cable Percu	n od ssion	Casing 15 op	Diamete 0mm cas en hole to	r ed to 6.00m o 20.00m	Ground	Leve 1.82	l (mOD)	Client Anglian Water Services Limited	Job Number 21.393
		Locatio 55	n 0520 E 2	64914 N	Dates 21	1/01/2	022	Engineer	Sheet 1/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	C (Thi	Depth (m) ckness)	Description	Legend Safe
0.30 0.35 0.60-1.00 0.70	D1 ES1 B1 ES2				1.22		(0.60) 0.60	PLOUGHED SOIL (Dark brown very sandy slightly gravelly clay. Gravel is subangular fine to medium flint and occasional rootlets) Plastic dark brown to black clayey slightly sandy pseudo-fibrous PEAT, with occasional brown wood fragments	
1.20-1.65 1.20-1.65	SPT N=0 D2		DRY	1,0/0,0,0,0			(1.40)		ste ste ste ste ste ste ste
2.00-2.45 2.00-2.45 2.10 2.50-3.00	SPT N=0 D3 ES3 B2	1.50	DRY	0,0/0,0,0,0	-0.18		2.00	Very soft greyish brown silty organic CLAY. With occasional shell fragments, semi-decomposed plant matter and wood fragments (10-40 mm) with frequent pockets of black mottled grey	×. ×. ×. ×. ×. ×. ×. ×. ×. ×.
3.00-3.45 3.00-3.45	SPT N=0 D4	3.00	DRY	0,0/0,0,0,0			(2.30)	amorphous peat	
4.00-4.45 4.00-4.45 4.50-5.00	SPT N=0 D5 B3	4.00	DRY	0,0/0,0,0,0 Quick(1) at 4.10m, rose to 0.95m in 20 mins, sealed at 6.00m.	-2.48		4.30	with occasional sand pockets Greyish brown silty very sandy subangular to subrounded fine to coarse flint and quartzite GRAVEL. Occasional shell fragments	$\nabla_{\mathbf{x}}^{\mathbf{x},\mathbf{y}_{\mathbf{x}}} = \sum_{\mathbf{x},\mathbf{y}_{\mathbf{x}},\mathbf{y}_{\mathbf{x}},\mathbf{y}_{\mathbf{x}},\mathbf{y}_{\mathbf{x}},\mathbf{y}_{\mathbf{x}}} \mathbf{y}_{\mathbf{x}}$
5.00-5.45 5.00 5.20-5.30	SPT(C) N=13 W1 D6	5.00	1.50	1,1/2,3,4,4	-3.38		(0.90) 5.20	Firm indistinctly fissured grey silty calcareous CLAY	· · · · · · · · · · · · · · · · · · ·
6.00-6.45	U1 D7	6.00	DRY	52 blows				becoming stiff and fissured	
7.00	D8								
7.50-7.95 7.50-7.95	SPT N=25 D9	6.00	DRY	3,5/6,6,7,6					
9.00-9.45	U2	6.00	DRY	60 blows					
9.45	D10								
Remarks 1. Location (2. Hand dug 3. SPT rods	CAT scanned prior to inspection pit to 1.2 sank under self weic	excavatic 0 m 10t at 2.00	on , 3.00 an	d 4.00 m depths				Scale (approx	Logged By
4. Groundwa 5. Groundwa 6. SPT Hami	ater struck at 4.10 m ater seepage at 13.0 mer Energy Ratio = (and rose f 0 m 66.38%	to 1.72 m	in 5 mins, 1.25 m in $^{\prime}$	10 mins, 1	.00 m	ı in 15 mi	ins and 0.95 m in 20 mins 1:50 Figure 21.3	AHm No. 393.BH05

	$\sqrt{\gamma}$		A F H Geote	owland Ass echnical Eng	s ocia ineers	t es	Site WATERBEACH GROWTH SCHEME		Borehole Number BH05
Boring Meth Cable Percus	od ssion	Casing 15	Diamete 0mm cas en hole to	r ed to 6.00m o 20.00m	Ground	Level (mOD) 1.82	Client Anglian Water Services Limited		Job Number 21.393
		Locatio	n 0520 E 2	64914 N	Dates 21	/01/2022	Engineer		Sheet 2/2
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend S
10.50-10.95 10.50-10.95	SPT N=26 D11	6.00	DRY	4,5/6,6,7,7			Stiff fissured grey silty calcareous CLAY with rare fragments	e fossil	
12.00-12.45 12.45	U3 D12	6.00		75 blows		(14.80)	becoming very stiff		
13.50-13.95 13.50-13.95	SPT N=37 D13	6.00	13.00	Seepage(2) at 13.00m. 5,6/8,9,9,11					
15.00-15.45 15.45	U4 D14	6.00		90 blows					
16.50-16.95 16.50-16.95	SPT N=41 D17	6.00	16.00	6,8/9,9,11,12					
18.00-18.45 18.00-18.45	SPT N=45 D18	6.00	17.20	4,8/9,10,12,14					
19.50-19.92 19.50-19.95 Remarks	SPT 50/265 D19	6.00	18.50	6,8/11,12,15,12 21/01/2022:18.50m	-18.18	20.00		Scale	
							·	(approx)	AHm
								Figure N 21.39	o. 3 BH05

	\mathbf{V}		A F H Geote	owland As echnical Eng	socia Bineer	tes s	Site WATERBEACH GROWTH SCHEME	Borehole Number BH06
Boring Meth Cable Percus	nod ssion	Casing 15 op	Diamete Omm cas en hole to	r ed to 4.50m o 10.00m	Ground	Level (mOD) 6.93	Client Anglian Water Services Limited	Job Number 21.393
		Locatio	n 0515 E 2	64248 N	Dates	9/01/2022	Engineer	Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness	Description	Legend S
0.25 0.30 0.50-1.00 0.60 1.20-1.65 1.20-1.65 1.30 1.50 2.00-2.45 2.10 3.00-3.45 3.00-3.45 4.00-4.45 4.00-4.45 4.00-4.45 4.00-4.45 5.00-5.45 5.45 6.00-6.45 6.00-6.45 6.00-6.45 6.00-6.45 6.00-6.45 8.50 7.95 8.50	ES1 D1 B1 ES2 SPT N=7 D2 ES3 D3 U1 No recovery D4 SPT N=3 D5 SPT (C) N=6 E2 D6 U2 D7 SPT N=25 D8 N=25 D8 U3 D10 D11	 3.00 4.00 4.50 4.50 	DRY DRY DRY DRY DRY DRY	1,2/1,2,2,2 10 blows 1,1/1,0,1,1 1,0/1,1,2,2 55 blows 3,4/6,6,6,7 80 blows	6.43 5.73 2.43	(0.50) (0.70)	PLOUGHED SOIL (Dark brown very sandy clay. Occasional fine to medium finit gravel and rootlets) Light brown clayey sandy slightly gravelly SILT. With roots. Gravel is subangular to subrounded mainly fine to medium and a little coarse chalk and flint Off-white mottled light yellowish brown structureless CHALK recovered as sitty slightly sandy subangular to rounded fine to coarse extremely weak to very weak low density gravel and with occasional subrounded cobbles of chalk and flint. White chalk cobbles are very weak to weak low to medium density. With occasional disturbed pockets of very soft chalk matrix Firm to stiff fissured grey silty calcareous CLAY becoming stiff becoming very stiff	
9.00-9.45	D13	4.00		19/01/2022:DRY				×
Remarks 1. Location C	CAT scanned prior to	excavatio			-3.07	<u> </u>	Scale (approx)	Logged Bv
2. Hand dug 3. No ground 4. Slotted Sta 5. SPT Hamr	inspection pit to 1.2 dwater encountered, andpipe installed to mer Energy Ratio =	0 m but damp 4.00 m 66.38%	ness note	ed at 3.00 m			1:50 Figure	AHm No.

	/	\mathcal{M}			A F Howland Geotechnical E	Associa Inginee	ites rs	5	S ite WATERBE	EACH GF	ROWTH S	SCHEME				Borehole Number BH06
Installa Single	atio Ins	n Type tallation		Dimensi Interna	ons al Diameter of Tube [A] = 50) mm		C	Client Anglian W	ater Ser	vices Limi	ited				Job Number 21.393
				Location 55051	5 E 264248 N	Ground I	L evel (m 6.93	OD) E	Engineer							Sheet 1/1
Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description				G	roundwa	ater Strik	es Durin	g Drilling	J		
		\$	6.73	0.20	Concrete	Date	Time	Depth Struck	Casing Depth	Inflo	w Rate		Read	lings		Depth
					Bentonite Seal			(m)	(m)			5 min	10 min	15 min	20 mii	n (m)
× • • • • • • • • • • • • • • • • • • •			5.93	1.00												
× · · · · · · · · · · · · · · · · · · ·																
┱┲┲┲┲ ┲┲┲┲ ┙╔╝┲																
					Slotted Standnine				Gr	oundwa	ter Obse	rvations	During D	rilling		
					Slotted Standpipe				Start of S	hift			I	End of SI	hift	
						Date	Time	Depth Hole	Casing Depth	Water Depth	Water Level	Time	Depth Hole	Casing Depth	Wate Dept	r Water h Level
						19/01/22		(11)	(11)	(11)	(IIIOD)		10.00	4.50	DRY	(IIIOD)
			2 93	4 00												
			2.00		Gravel Filter											
			2.43	4.50	Bentonite Seal											
×			1.93	5.00					Instru	iment G	roundwa	ter Obse	rvations			
×						Inst.	[А] Туре	: Slotted	d Standpip	e						
××							Ins	trument	[A]							
×						Date	Time	Depth (m)	Level (mOD)				Rem	arks		
××						04/02/22	10:15	2.22	4.71							
×						18/02/22 25/02/22	12:33 10:54	2.16 2.09	4.03							
×																
×					General Backfill											
××																
××																
× ×																
× ×																
××																
×																
×																
			-3.07	10.00												
Remar	ks															

			A F H Geote	owland As echnical Eng	socia ineer	tes s	Site WATERBEACH GROWTH SCHEME	Borehole Number BH07
Boring Met	hod ussion	Casing 15 op	Diamete Omm cas	r ed to 3.00m o 10.00m	Ground	Level (mOl 7.55	D) Client Anglian Water Services Limited	Job Number 21.393
		Locatio 55	n 0127 E 2	63647 N	Dates 24 25	/01/2022- 5/01/2022	Engineer	Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thicknes	s) Description	Legend S
0.10-0.20	ES1						MADE GROUND (Dark brown slightly sandy gravelly clay. Gravel is subangular to subrounded fine to coarse flint with some whole brick and fragments)	
0.50-1.00	B1					(1.10))mainly brick fragments to 0.4 m	
0.90	HV 68kPa			80,58,66/Av. 68.00	6.45		becoming firm	
1.10-1.20 1.20-1.65 1.20-1.65	ES2 SPT N=6 D1		DRY	1,2/1,2,1,2	0.43		Firm light brown slightly mottled light grey sandy slightly gravelly CLAY. Gravel is subangular fine to coarse flint with occasional chalk and dark brown organic silt lenses	••••••••••••••••••••••••••••••••••••••
							damp	· · · · · · · · · · · · · · · · · · ·
2.00-2.45 2.00-2.45 2.00-2.45	SPT N=26 B2 D2	1.50	DRY	5,6/7,6,6,7		(1.70)) with some grey mottling with flint cobble	· · · · · · · · · · · · · · · · · · ·
							from 2.70 m: becoming light grey slightly mottled brown silty, with occasional mudstone lithorelics	· · · · · · · · · · · · · · · · · · ·
2.70-2.80	D3				4.75	2.8	O Stiff fissured grey silty calcareous CLAY	×
				24/01/2022:DRY				× <u>×</u> ×
3.00-3.45 3.45	U1 D4	3.00	DRY	55 blows		E-		×
								××
4.00-4.45 4.00-4.45	SPT N=13 D5	3.00	DRY	1,2/2,3,4,4				×
								×
								×
5.00-5.45	U2	3.00	DRY	68 blows		E E	becoming stiff to very stiff, locally with fine gravel	×
								×
5.45	D6							×
6.00-6.45	SPT N=20	3.00	DRY	2,4/4,4,6,6				×
6.00-6.45	D7					L (7.2)		×
								××
7.00	Da							××
7.00	08							×
7.50-7.95	U3	3.00	DRY	70 blows		E- E-		×
								×
7.95	D9						with rare fossil shell fragments	×
								× ×
								× ×
9.00-9.45	SPT N=35	3.00	DRY	4,6/6,8,10,11		-		× ×
								× ×
				25/01/2022:DRY				× ×
10.00	D11				-2.45	10.0	0	× ×
1. Location (2. Hand dug 3. No ground	CAT scanned prior to inspection pit to 1.2 dwater encountered	excavatio 0 m	on				Scale (approx)	Logged By
5. SPT Ham	imer Energy Ratio =	66.38%					1:50 Eigure 1	AHm/PJM
							21.3	93.BH07

Boing Method Code Personant Called		\mathcal{M}		A F H Geote	owland As	s ocia gineer	tes s		Site WATERBEACH GROWTH SCHEME	Borehole Number BH08
Calcule Percentation Light manual of 200 m last of 200 m las	Boring Met	hod	Casing	Diamete	r	Ground	Level	(mOD)	Client	Job Number
Location 942800 Control 942800 Control 942800 Control 942800 Point 20021 Project 20021 Proje	Cable Percu	ission	15 op	0mm cas oen hole to	ed to 3.00m o 10.00m		5.60		Anglian Water Services Limited	21.393
Optim Sample / Tests Cetage (m) Description Legent B 0.0 D1 D1 <th></th> <th></th> <th>Locatio</th> <th>on 9860 E 2</th> <th>63087 N</th> <th>Dates</th> <th>4/01/20 5/01/20</th> <th>022- 022</th> <th>Engineer</th> <th>Sheet 1/1</th>			Locatio	on 9860 E 2	63087 N	Dates	4/01/20 5/01/20	022- 022	Engineer	Sheet 1/1
9.33 P1 Image: P1	Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	D (Thic	epth (m) ckness)	Description	Legend S
0 0.0.00 P1 S2 P1	0.30 0.35	D1 ES1						(0.60)	MADE GROUND (Dark brown sandy slightly gravelly clay. Occasional rootlets. Gravel is subangular fine to medium flint and rare brick fragments)	
	0.60-1.00 0.80	B1 ES2				5.00		0.60	Medium dense orange-brown silty slightly gravelly fine to medium SAND. Gravel is subrounded fine flint	
1.80-2.00 D3 D3 D7	1.20-1.65 1.20-1.65 1.20-1.65	SPT N=17 B2 D2		DRY	1,2/4,4,4,5			(1.20)	absence of gravel	
2002.46 2002.46 2003.45 SPT N=9 04 1.50 04 DRY 1.11.2.3.3 1.11.2.3.3 0.00 3.00 2.30 2.30 Stiff fisured gray sity calcareous CLAY 1.11.2.3.4 3.00-3.45 U1 3.00 DRY 3.70 1.00.4 Stiff fisured gray sity calcareous CLAY 1.11.2.3.4 3.45 D5 J J J J J J 3.40 D5 J J J J J J 5.00-5.45 U2 3.00 DRY 5.21 blows I	1.80-2.00	D3				3.80		1.80	Soft to firm grey silty slightly sandy CLAY	×
3.00-3.45 U1 3.00 DRY 37 blows Image: state of the stat	2.00-2.45 2.00-2.45	SPT N=9 D4	1.50	DRY	1,1/1,2,3,3	2.20		(0.50)		× ×
3.00-3.45 U1 3.00 DRY 37 blows Image: state in the sta						3.30	Ē	2.30	Stiff fissured grey silty calcareous CLAY	×
3.00-3.45 U1 3.00 DRY 37 blows Image: constraint of the second priority of th										×
3.45 D5 J <td>3.00-3.45</td> <td>U1</td> <td>3.00</td> <td>DRY</td> <td>37 blows</td> <td></td> <td>-</td> <td></td> <td></td> <td>×</td>	3.00-3.45	U1	3.00	DRY	37 blows		-			×
3.45 D5 Image: SPT N=14 3.00 DRY 1.20,3,4,4 Image: SPT N=14 3.00 DRY 1.20,3,4,4 5.00-5.45 U2 3.00 DRY 52 blows Image: SPT N=12 Image: SPT N=12 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>×</td>										×
4.00-4.45 SPT N=14 3.00 DRY 1.283.3.4.4 Image: second sec	3.45	D5								×
4.00-4.45 D0 D0 DrY 1.23,3,4,4 Image: state of the state	4 00 4 45		2.00	DDV	4.0/0.0.4.4		Ē			×
5.00-5.45 U2 3.00 DRY 52 blows $\left \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $	4.00-4.45	D6	3.00	DRY	1,2/3,3,4,4		Ē			×
5.00-5.45 U2 3.00 DRY 52 blows 1 5.45 D7 1 1 1 6.00-6.45 SPT N=20 3.00 DRY 2,3(4,4,6,6) 1 7.50-7.95 U3 3.00 DRY 2,3(4,4,6,6) 1 1 7.50-7.95 U3 3.00 DRY 70 blows 1 1 9.00-9.45 SPT N=32 3.00 DRY 4,5(6,8,8,10) 1 1 1.00 D11 1 1 1 1 1 1 1.10 Altin Figure No. 1 1 1										××
5.00-5.45 U2 3.00 DRY 52 blows Image: state in the stat							Ē			××
5.45 D7 6.00-6.45 SPT N=20 3.00 DRY 2,3/4,4,6,6 7.50-7.95 U3 3.00 DRY 70 blows 7.50-7.95 U3 3.00 DRY 70 blows 9.00-9.45 SPT N=32 3.00 DRY 70 blows 9.00-9.45 SPT N=32 3.00 DRY 4,5/6,8,8,10 9.00-9.45 SPT N=32 3.00 DRY 4,5/6,8,8,10 10.00 D11 25/01/2022:DRY 4.40 10.00	5.00-5.45	U2	3.00	DRY	52 blows					××
5.45 D7 6.00-6.45 SPT N=20 3.00 DRY 2.3/4.4.6.6 Image: constraint of the second of th							Ē			×
6:00-6:45 6:00-6:45 8 PT N=20 8 00 PT N=20 10:0 DRY 2:3/4:4.6.6 0 PRY 70 blows 7:50-7:95 0 9 9.00-9:45 9.00-9:45 9.00-9:45 10:0 DRY 70 blows 10:0 DRY 70	5.45	D7								×
0.00-0.42 6.00-6.45 3.00 DRY 2.54.4.6.0 (7.70) 7.50-7.95 U3 3.00 DRY 70 blows 7.50-7.95 D9 becoming very stiff ***** 9.00-9.45 SPT N=32 3.00 DRY 4,5/6,8,8,10 9.00-9.45 D10 D11 25/01/2022:DRY becoming very stiff ***** 10.00 D11 10.00 5 10.00 ***** Figure No. Figure No. Figure No.	6 00 6 45	SDT N-20	2.00		224466		Ē			×
7.50-7.95 U3 3.00 DRY 70 blows Image: state	6.00-6.45 6.00-6.45	D8	3.00	DRT	2,3/4,4,0,0			(7.70)		×
7.50-7.95 U3 3.00 DRY 70 blows Image: state										×
7.50-7.95 U3 3.00 DRY 70 blows Image: constrained prior to the second prior to							Ē			× ×
7.50-7.95 U3 3.00 DRY 70 blows Image: constraint of the second c							-			× ×
7.50-7.95 U3 3.00 DRY 70 blows Image: constraint of the second co							Ē			×
7.95 D9 becoming very stiff 9.00-9.45 SPT N=32 3.00 DRY 4.5/6.8.8.10 9.00-9.45 D10 D11 25/01/2022:DRY becoming very stiff 10.00 D11 25/01/2022:DRY becoming very stiff Scale 10.00 D11 25/01/2022:DRY becoming very stiff Scale 10.00 D11 Scale Logged 10.00 D11 Scale Logged 10.00 D11 Scale Logged 10.00 D11 Scale Logged 10.00 D11 Scale Scale 10.00 D11 Scale Scale 10.00 D11 Scale Scale 10.00 Scale Scale Scale 10.00 D11 Scale Scale Scale 10.00 Scale Scale Scale Scale 10.00 Scale Scale Scale Scale 10.00 Scale Scale Scale Scale 1.50 AHm <td>7.50-7.95</td> <td>U3</td> <td>3.00</td> <td>DRY</td> <td>70 blows</td> <td></td> <td>Ē</td> <td></td> <td></td> <td>××</td>	7.50-7.95	U3	3.00	DRY	70 blows		Ē			××
7.95 D9 D9 becoming very stift ************************************	7.05	50					Ē			×
9.00-9.45 9.00-9.45 SPT N=32 D10 3.00 DRY 4,5/6,8,8,10 10.00 D11 25/01/2022:DRY -4.40 10.00 Remarks 1. Location CAT scanned prior to excavation 2. Hand dug inspection pit to 1.20 m 3. No groundwater encountered 5. SPT Hammer Energy Ratio = 66.38% Scale (approx) Logged By 1.50 AHm	7.95	Da							becoming very stiff	×
9.00-9.45 9.00-9.45 9.00-9.45 9.00-9.45 9.00-9.45 D10 DRY 4,5/6,8,8,10 25/01/2022:DRY 4,5/6,8,8,10 25/01/2022:DRY 4,4,0 10.00 Remarks 1. Location CAT scanned prior to excavation 2. Hand dug inspection pit to 1.20 m 3. No groundwater encountered 5. SPT Hammer Energy Ratio = 66.38% Key Comparison of the function of the							-			×
9.00-9.45 SPT N=32 D10 DRY 4,5/6,8,8,10 9.00-9.45 D10 D1 DRY 4,5/6,8,8,10 10.00 D11 25/01/2022:DRY 4,40 10.00 Remarks 1. Location CAT scanned prior to excavation 2. Hand dug inspection pit to 1.20 m 3. No groundwater encountered 5. SPT Hammer Energy Ratio = 66.38% Second Second Se							Ē			×
9.00-9.45 D10 10.00 D11 10.00 D11 10.00 D11 10.00 D11 1. Location CAT scanned prior to excavation 2. Hand dug inspection pit to 1.20 m 3. No groundwater encountered 5. SPT Hammer Energy Ratio = 66.38% Figure No.	9.00-9.45	SPT N=32	3.00	DRY	4,5/6,8,8,10		-			×
10.00 D11 25/01/2022:DRY 4.40 10.00 x × × × Remarks 1. Location CAT scanned prior to excavation Scale (approx) Logged 2. Hand dug inspection pit to 1.20 m 3. No groundwater encountered 1:50 AHm 3. No groundwater encountered 1:50 AHm	ອ.ບບ-ອ.45	010								×
10.00 D11 25/01/2022:DRY Image: second secon							Ē			×
Remarks Location CAT scanned prior to excavation 1. Location CAT scanned prior to excavation Logged 2. Hand dug inspection pit to 1.20 m Logged 3. No groundwater encountered 1:50 5. SPT Hammer Energy Ratio = 66.38% AHm Figure No.	10.00	D11			25/01/2022:DRY	-4.40		10.00		×
3. No groundwater encountered 1:50 AHm 5. SPT Hammer Energy Ratio = 66.38% Figure No.	Remarks 1. Location 2. Hand due	CAT scanned prior to inspection pit to 1.2	o excavatio 0 m	on					Scal (appro	e Logged x) By
Figure No.	3. No groun 5. SPT Ham	dwater encountered mer Energy Ratio =	66.38%						1:50	AHm
									Figur	e No.

			A F H	owland As	socia	tes	;	Site		Borehole
L		7 (Geote	echnical Eng	lineer	S		WATERBEACH GROWTH SCHEME		BH09
Boring Meth Cable Percu	n od ssion	Casing 15 op	Diameter 0mm cas	r ed to 3.00m o 10.00m	Ground	Leve 7.92	l (mOD)	Client Anglian Water Services Limited		Job Number 21.393
		Locatio	9596 E 2	62555 N	Dates 26	6/01/2	022	Engineer		Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	C (Thi	Depth (m) ickness)	Description		Legend S
0.25 0.40-0.80	ES1 B1				7.72		(0.20) 0.20 (1.00)	TOPSOIL (Dark brown very sandy clay. Occasional subrounded fine to coarse flint gravel and rootlets) Light brown clayey silty very gravelly fine to coarse Gravel is subangular to rounded fine to coarse cha	I SAND. Ik and flint	
1.00 1.20-1.65 1.20-1.65 1.35 1.50	D1 SPT N=4 D2 ES2 D3		DRY	1,0/1,1,1,1	6.72		1.20	Soft light yellowish brown silty sandy slightly gravel calcareous CLAY. Gravel is subangular to rounded coarse mainly chalk and occasional flint	ly fine to	
2.00-2.45	SPT N=3	1.50	DRY	1,0/1,0,1,1			(1.50)			× · · · · · · · · · · · · · · · · · · ·
2.45 2.50 2.60	D4 D5 ES3			Seepage(1) at 2.50m, not sealed.	5.42		2.50	Stiff fissured grey silty calcareous CLAY		× ···· ¥
3.00-3.45	U1	3.00	DRY	50 blows						× × ×
3.45	D6									×
4.00-4.45 4.00-4.45	SPT N=14 D7	3.00	DRY	1,2/2,3,4,5						× × × ×
5.00-5.45	U2	3.00	DRY	61 blows						×
5.45	D8									××
6.00-6.45 6.00-6.45	SPT N=21 D9	3.00	DRY	2,3/5,5,6,5			(7.50)			× × ×
7.00	D10									× × ×
7.50-7.95	U3	3.00	DRY	65 blows						×
7.95	D11									× × ×
9.00-9.45 9.00-9.45	SPT N=32 D12	3.00	DRY	4,4/6,7,9,10				becoming stiff to very stiff		× × ×
10.00	D13			26/01/2022:DRY	-2.08		10.00			×
Remarks 1. Location (2. Hand dug	CAT scanned prior to inspection pit to 1.20	excavatio	on						Scale (approx)	Logged By
3. Groundwa 4. Slotted St 5. SPT Ham	ater seepage at 2.50 andpipe installed to mer Energy Ratio = 0	m 4.00 m 66.38%							1:50	AHm
									Figure N	o.

	\land				A F Howland Geotechnical I	Associa Enginee	ates rs	S	Site WATERBE	EACH GF	ROWTH S	SCHEME				Borehole Number BH09
Install Single	ation 1 e Instal	Type lation		Dimensi Interna	ons al Diameter of Tube [A] = 5	0 mm		C	:lient Anglian W	ater Serv	vices Limi	ited			ì	Job Number 21.393
				Location 54959	n 6 E 262555 N	Ground	Level (m 7.92	OD) E	ingineer							Sheet 1/1
Legend	Vater	nstr (A)	Level (mOD)	Depth (m)	Description				Gi	roundwa	ater Strik	es Durin	g Drilling	1		
			7.72	0.20	Concrete			Depth	Casing		Bata		Read	ings		Depth
× *					Bentonite Seal	Date	Time	(m)	Depth (m)	Inflo	w Rate	5 min	10 min	15 min	20 min	Sealed (m)
ו•••••						26/01/22		2.50		Seepa	ge					NOT
× ···	25	3	6.92	1.00												
ו × • • • • • ×																
× · · · ·	000000															
×	00,000															
× · · · ·					Slotted Standpipe				Gn	Junawai		rvations	During D	rning		
× • • • • • • • • • • • • • • • • • • •	V 1					Date		Denth	Start of S	Water	Water		E	End of SI	lift Water	Water
××	000000000000000000000000000000000000000					0.010.1/0.0	Time	Hole (m)	Depth (m)	Depth (m)	Level (mOD)	Time	Hole (m)	Depth (m)	Depth (m)	Level (mOD)
××						26/01/22							10.00	3.00	DRY	
××	000000000000000000000000000000000000000															
××	00000000000000000000000000000000000000		3.92	4.00	Gravel Filter											
×			3.72	4.20	Graver Filter											
×					Bentonite Seal											
×									Instru	iment Gi	roundwa	ter Obse	rvations			
×			2.72	5.20		Inst.	[A] Type	: Slotted	l Standpip	e						
×							Ins	trument	[A]							
×						Date							Rema	arks		
×							Time	Depth (m)	Level (mOD)							
×						04/02/22 10/02/22	10:50 10:30	1.08 1.11	6.84 6.81							
×						18/02/22 25/02/22	13:11 11:36	0.88 0.77	7.04 7.15							
××																
××					General Backfill											
××																
××																
××																
×																
×																
××																
××																
××			-2.08	10.00												
Remar	ks															

APPENDIX C: LABORATORY TESTING

Natural moisture content Atterberg limits Particle size distribution Unconsolidated undrained triaxial testing Sulphate, sulphur and pH values Contamination testing WAC testing





A F Howland Associates Geotechnical Engineers

Site : WATERBEACH GROWTH SCHEME

Client : Anglian Water Services Limited

Engineer :

Job Number

21.393

Sheet 1 / 1

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX

Barabala/	Donth		Natural	Sample 425µm	Sieve	Liquid	Plastic	Plasticity	Liquidity	Crown	
Trial Pit	(m)	Sample	Content %	Percentage %	Moisture Content %	Limit %	Limit %	Index %	Index	Symbol	Laboratory Description
BH01	2.00	U1	36.2	100	36.2	74	30	44	0.14	CV	Stiff grey mottled brown fissured CLAY.
BH01	4.00	U2	34.5	100	34.5	83	34	49	0.02	CV	Very stiff fissured grey CLAY.
BH02	3.00	U1	34.4	100	34.4	78	29	49	0.10	CV	Very stiff grey CLAY.
BH02	5.00	U2	33.0	100	33.0	78	30	48	0.06	CV	Very stiff grey CLAY.
BH03	0.60	B1	28.2	100	28.2	40	19	21	0.43	CI	Multicoloured slightly sandy CLAY.
BH03	5.00	U2	33.0	100	33.0	82	35	47	-0.04	CV	Grey CLAY with pockets of black slightly sandy CLAY.
BH04	1.20	B2	43.2	99	43.6	67	27	40	0.43	СН	Grey slightly gravelly silty CLAY. Gravel is fine to medium chalk.
BH04	3.70	D4	29.2	79	37.0	69	27	42	0.24	СН	Grey mottled greenish grey slightly gravelly silty CLAY.
BH04	5.00	U1	29.5	100	29.5	72	27	45	0.07	CV	Very stiff fissured dark grey silty CLAY.
BH05	2.50	B2	177.0	100	177.0	230	140	90	0.41	ME	Black mottled grey amorphous PEAT.
BH05	6.00	U1	32.5	100	32.5	73	27	46	0.13	CV	Stiff fissured grey silty CLAY.
BH06	5.00	U2	27.7	100	27.7	69	23	46	0.11	СН	Very stiff fissured grey silty CLAY.
BH07	2.00	B2	13.7	82	16.7	20	13	7	0.57	CL	Brown and grey slightly gravelly sandy silty CLAY. Sand is fine. Gravel is fine to medium chalk.
BH07	3.00	U1	31.2	100	31.2	64	24	40	0.18	СН	Stiff grey silty CLAY.
BH08	3.00	U1	34.5	100	34.5	76	30	46	0.11	CV	Stiff fissured grey silty CLAY.
BH09	1.50	D3	14.4	72	20.0	24	14	10	0.60	CL	Brown and grey slightly gravelly sandy silty CLAY. Sand is fine. Gravel is fine to medium chalk.
BH09	3.00	U1	33.0	100	33.0	71	23	48	0.21	CV	Stiff fissured grey silty CLAY.
Method o	of Prepara	tion:B	S EN ISO	17892:PAF ation tests	RT 1:2014:5	5.1 Test sp	ecimen pr	reparation	(moisture	content).	BS EN ISO 17892:PART 1:2018:5.2 Preparation of samples
Method o	of Test	: B	S EN ISO	17892:PAF	RT 1:2014:5	5.2 Test ex	ecution (n	noisture co	ontent) BS	EN ISO	17892: PART 12:5.3 & 6.2 Determination of the liquid limit BS
		Ē	N ISO 178	392:PART 5	.5, 6.4 & 6.	5 Determi	nation of t	the plastic	limit and p	lasticity in	idex
Remarks	5	:									

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Client	• Anali		tor Sor	vicos I	imitor	Ч																												2	1.393	
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Engineer	:																																	1	/8	
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Borehole Trial Pit	e / De	epth m)	Sam	nple														Lab	ora	ory	De	scri	iptio	on												
BH01	0	.50	E	31	Brow	'n gra	avell	ly SAN	ID.																											
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40																															Ħ		1.18 ו	nm	78.0	_
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20																																	425 µ	m	59.0	
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Method	of Test		; BS	EN IS	O 178	892:	Part	: 4: 20 ⁻	16: CI	ause	95.2	We	et o	r dr	y sie	eve.	Cla	use	5.4	Sed	ime	entat	tion	bv r	pipe	tte										
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Engineer :																		2/8
				DETERI	MINATION	N OF PA	ARTICL	E SI	ZE DI	STRIE	3U1	ΓΙΟΝ						
Borehole / Trial Pit	Depth (m)	Sam	ble					Labora	atory De	scriptio	'n							
BH02	1.30	B1	Dark brow	wn very sand	dy GRAVEL.													
																	Sieve / Particle Size	% Passing
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90																-	20 mm	99.0
																	14 mm	96.0
80																1	10 mm	85.0
70																1	6.3 mm	66.0
60																-	5 mm	57.0
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30																-	425 µm	19.0
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20																1	212 µm	4.0
10											+				+	+	150 µm	3.0
0	0.002	0.0063	0.02	0.063	0.2 0	.63	2	6.3	2	0	63	2	00	6	630		63 µm	2.0
CLA	AY Fine SILT	М	edium Coars	se Fine SAND	Medium	Coarse	Fine GRAV	EL M	edium	Coarse	<u> </u>	COBBLE	S BOI	JLDE	RS			
			Grad	ding Analys	is			Particl	e Propo	rtions								
			D85		10.0 mm		Cobble	s + Bo	ulders	-								
			D60		5.4 mm		Gravel			62.0	0%							
			D10		312.5 µm		Sand			36.0	0%							
		-					Silt			-		_						
			Uniformity C	oefficient	17.4		Clay			-								
Method of	Preparatio	n:BS	EN ISO 17892::	2016 Part 4.	Determination	n of particle	e size dist	ribution	1								1	
Method of	Test	: BS I	EN ISO 17892:	Part 4: 2016	6: Clause 5.2	Wet or dry	sieve. Cla	ause 5.4	I Sedime	entation	by pi	pette						
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Client : A	Anglian Wat	ter Servic	es Limited													F	Sheet																					
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			DETE	RMINATION	N OF P#	ARTICL	.E SIZ	E DIST	RIBU	ΙΤΙΟ	N					1																						
Borehole / Trial Pit	Depth (m)	Sample	e				Laborat	ory Desc	ription																													
BH03	1.50	B2	Dark brown very sa	andy GRAVEL.																																		
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			D85	17.7 mm		Cobble	s + Boul	ders	-																													
			 D60	8.3 mm		Gravel	5 . Boui		64.0%																													
			D10	300.0 µm		Sand			32.0%																													
						Silt			-																													
			Uniformity Coefficient	27.6		Clay			-																													
Method of	Preparatio	n : BS EI	N ISO 17892:2016 Part	4. Determinatio	n of particle	e size dist	ribution																															
Method of	Test	: BS EI	N ISO 17892: Part 4: 20	16: Clause 5.2	Wet or dry	sieve. Cla	ause 5.4 S	Sedimenta	ation by	pipette	Э																											
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Client	: Ang	lian W	ater	Ser	vices	Limit	ed																												s	Sheet	
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Borehole Trial Pi	e/ I	Depth (m)		Sam	ple														I	Lab	ora	tory	y De	scri	ptio	n											
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Borehole / Trial Pit	Dep (m	oth 1)	s	amı	ole																La	boi	rato	ory	De	scr	ipti	on													
BH06	0.5	60		B1		Grey	ish b	orow	vn s	light	ly gi	ave	ly s	an	dy (cla	yey	SIL	T w	ith	root	s.																			
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A F Howland Associates Geotechnical Engineers

Job Number

21.393

Client : Anglian Water Services Limited

: WATERBEACH GROWTH SCHEME

Engineer :

Site

Sheet

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DETERMINATION OF DENSITY, MOISTURE CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole/ Trial Pit	Depth (m)	Sample	Moisture Content %	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Cell Pressure (kN/m²)	Deviator Stress (kN/m²)	Apparent Cohesion (kN/m²)	Angle of Shearing Resistance (degrees)	Laboratory Description
BH01	2.00	U1	36.2	1.91	1.40	40	111	55		Stiff grey mottled brown fissured CLAY.
BH01	4.00	U2	34.5	1.88	1.40	80	164	82		Very stiff fissured grey CLAY.
BH01	6.00	U3	31.6	1.95	1.48	120	291	145		Very stiff grey CLAY.
BH02	3.00	U1	34.4	1.83	1.36	60	126	63		Very stiff grey CLAY.
BH02	5.00	U2	33.0	1.89	1.42	100	105	52		Very stiff grey CLAY.
BH03	3.00	U1	37.3	1.84	1.34	60	36	18		Soft greyish mottled brown CLAY with rare fine gravel.
BH04	5.00	U1	29.5	1.99	1.53	100	128	64		Very stiff fissured dark grey silty CLAY.
BH04	7.50	U2	30.5	1.92	1.47	150	168	84		Very stiff fissured grey slightly gravelly silty CLAY. Gravel is fine to medium.
BH04	10.50	U3	28.9	1.88	1.46	210	97	49		Very stiff fissured grey silty CLAY.
BH05	6.00	U1	32.5	1.91	1.44	120	112	56		Stiff fissured grey silty CLAY.
BH05	9.00	U2	34.7	1.93	1.43	180	65	33		Stiff fissured grey silty CLAY.
BH05	12.00	U3	30.3	1.94	1.49	240	251	126		Very stiff fissured grey silty CLAY.
BH06	5.00	U2	27.7	1.98	1.55	100	173	86		Very stiff fissured grey silty CLAY.
BH06	7.50	U3	30.2	1.93	1.49	150	194	97		Very stiff fissured grey silty CLAY
BH07	3.00	U1	31.2	1.94	1.48	60	221	111		Stiff grey silty CLAY.
BH07	5.00	U2	29.9	1.92	1.48	100	155	77		Very stiff fissured grey mottled brown slightly gravelly silty CLAY. Gravel is fine.
BH08	3.00	U1	34.5	1.90	1.41	60	127	63		Stiff fissured grey silty CLAY.
BH09	3.00	U1	33.0	1.94	1.46	60	207	104		Stiff fissured grey silty CLAY.
BH09	5.00	U2	30.6	1.94	1.48	100	162	81		Stiff fissured grey silty CLAY.
Method o	of Prepara	i tion :B	S EN ISO 1 ndisturbed s	7892:PAR amples fo	T 1:2014:5 r testing	5.1 Test spe	ecimen prep	paration (mo	isture conte	ent). BS EN ISO 17892:PART 8:2018: 6.2 Preparation of
Method o	of Test	: B 20	S EN ISO 1 018: 6,7 + 8	7892:PAR Undrained	T 1:2014:5 d shear str	5.2 Test exe ength (Sing	ecution (mo gle stage).	isture conte BS 1377:PA	nt) and PA RT 7:1990:	RT 2:2014 Determination of density. BS EN ISO 17892: PART 8: 9 Multistage loading
Remarks	;	:								

A F Howland Associates Geotechnical Engineers

Site : WATERBEACH GROWTH SCHEME

Client : Anglian Water Services Limited

Engineer :

DETERMINATION OF pH, SULPHATE CONTENT AND TOTAL SULPHUR OF SOIL AND GROUNDWATER

			Concentr	ation of Solubl	e Sulphate		Percentage		
Borehole/ Trial Pit	Depth (m)	Sample	S Total S04 %	oil S03 in 2:1 water:soil g /l	Groundwater g /I	Total Sulphur %	of sample passing 2mm Sieve %	рН	Laboratory Description
BH01	0.65	ES1	0.02	0.03		< 0.02		8.2	Light brown sandy clay with stones
BH01	1.80	W1			0.02			8.3	Water sample
BH02	1.00	W1			0.03			7.0	Water sample
BH02	1.10	ES2	0.04	0.03		< 0.02		7.9	Brown gravelly sand with stones
BH03	0.75	ES1	0.28	0.97		0.12		7.4	Brown sandy clay
BH03	1.50	W1			0.00			7.3	Water sample
BH04	0.20	ES1	0.26	0.11		0.29		6.8	Brown loamy clay with vegetation
BH04	0.80	W1			0.02			7.0	Water sample
BH05	0.70	ES2	0.35	0.62		0.32		6.5	Brown loamy clay
BH05	2.10	ES3	0.15	0.19		0.77		6.9	Brown loamy clay
BH06	1.30	ES3	0.05	0.03		0.02		7.8	Brown sandy clay with stones
BH07	1.10	ES2	0.05	0.03		< 0.02		7.9	Brown sandy clay with stones
BH07	2.70	D3	0.05	0.06		< 0.02		7.8	Grey sandy clay
BH08	0.80	ES2	0.02	<0.01		< 0.02		8.0	Brown sand
BH09	2.60	ES3	0.13	0.38		0.13		7.9	Grey clay
Method o	of Prepara	tion : B	S 1377:PART	1:1990:7.5 Pi	reparation of sc	il for chemica	l tests		
Method	of Test	•] •	aboratory in-b	ouse methode	s based on BS1	377 [.] Part 3 fr	or ph and total	sulnhate a	nd TRI 447 (2005) for total sulphate. Standard Methods for the
Remarks		:	xamination of	Water and Water	astewater Part	3120 B – 21s	t Edition (2005	5) for water	soluble sulphate and total sulphur.

Job Number

21.393

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Sheet



Gill Bond AF Howland Associates Ltd The Old Exchange Newmarket Road Cringleford Norwich Norfolk NR4 6UF



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

DETS Report No: 22-00319

Site Reference:	Waterbeach Growth Scheme - AFHA Suites
Project / Job Ref:	21.393
Order No:	GNB/21.393/00/01/02/04/05
Sample Receipt Date:	14/01/2022 - 28/01/2022
Sample Scheduled Date:	14/01/2022 - 28/01/2022
Report Issue Number:	3
Reporting Date:	09/02/2022



Dates of laboratory activities for each tested analyte are available upon request. This report supersedes 22-00319, issue no.2. Reason for re-issue: Job details amended Sample descriptions amended

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.



Call Analysia Cantificate

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



Juli Analysis Certificate								
DETS Report No: 22-00319			Date Sampled	10/01/22	13/01/22	12/01/22	17/01/22	21/01/22
AF Howland Associates Ltd			Time Sampled	None Supplied				
Site Reference: Waterbeach Grow	vth Scheme - AFHA		TP / BH No	BH01	BH02	BH03	BH04	BH05
Suites								
Project / Job Ref: 21.393			Additional Refs	ES1	ES3	ES1	ES2	ES1
Order No: GNB/21.393/00/01/02	2/04/05		Depth (m)	0.65	2.00	0.75	0.80	0.35
Reporting Date: 09/02/2022		D	ETS Sample No	581934	582337	582338	582979	584135
Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected		Not Detected		Not Detected
рН	pH Units	N/a	MCERTS	7.8	8.3	7.6	7.3	
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	0.3	0.7	0.4	2.6	
Arsenic (As)	mg/kg	< 2	MCERTS	7	3	17	17	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	10	12	15	17	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	< 4	27	12	24	
Lead (Pb)	mg/kg	< 3	MCERTS	5	12	9	18	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	8	54	24	32	
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	
Zinc (Zn)	mg/kg	< 3	MCERTS	18	52	38	73	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
TPH - Aliphatic >C35 - C40	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	
TPH - Aromatic >C35 - C40	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	
TPH - Aliphatic / Aromatic (C6 - C40)	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	





Soil Analysis Certificate								
DETS Report No: 22-00319			Date Sampled	21/01/22	19/01/22	19/01/22	24/01/22	25/01/22
AF Howland Associates Ltd			Time Sampled	None Supplied				
Site Reference: Waterbeach Grov	vth Scheme - AFHA		TP / BH No	BH05	BH06	BH06	BH07	BH08
Suites								
Project / Job Ref: 21.393		1	Additional Refs	ES3	ES1	ES3	ES1	ES1
Order No: GNB/21.393/00/01/02	2/04/05		Depth (m)	2.10	0.25	1.30	0.10 - 0.20	0.35
Reporting Date: 09/02/2022		D	ETS Sample No	584136	582980	583531	584137	584138
Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.2	7.4	8.1	7.8	
Total Cyanide	mg/kg	< 2	NONE	6	< 2	< 2	< 2	
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	10.7	2.7	2.2	1.5	
Arsenic (As)	mg/kg	< 2	MCERTS	< 2	11	4	9	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	5	15	5	16	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	22	13	7	12	
Lead (Pb)	mg/kg	< 3	MCERTS	4	27	3	24	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	14	15	8	14	
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	
Zinc (Zn)	mg/kg	< 3	MCERTS	44	41	11	47	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
TPH - Aliphatic >C35 - C40	mg/kg	< 10	NONE	< 10	< 10		< 10	< 10
TPH - Aromatic >C35 - C40	mg/kg	< 10	NONE	< 10	< 10		< 10	< 10
TPH - Aliphatic / Aromatic (C6 - C40)	ma/ka	< 42	NONE	< 42	< 42		< 42	< 42

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Soil Analysis Certificate								
DETS Report No: 22-00319			Date Sampled	25/01/22	26/01/22			
AF Howland Associates Ltd			Time Sampled	None Supplied	None Supplied			
Site Reference: Waterbeach Grov	vth Scheme - AFHA		TP / BH No	BH08	BH09			
Suites								ļ
Project / Job Ref: 21.393		A	Additional Refs	ES2	ES2			Ļ
Order No: GNB/21.393/00/01/02	2/04/05		Depth (m)	0.80	1.35			<u> </u>
Reporting Date: 09/02/2022		D	IS Sample No	584139	584140			L
Determinand	Unit	DI	Accreditation					
	Unit N/a	N/a	ISO17025			I I I I I I I I I I I I I I I I I I I	I	
nH ¹	nH Units	N/a	MCERTS	8.2	7 0			
Total Cvanide	ma/ka	< 2	NONE	< 2	< 2			
TOC (Total Organic Carbon)	//////////////////////////////////////	< 0.1	MCERTS	0.3	0.4			
Arsenic (As)	ma/ka	< 2	MCERTS	11	6			
Cadmium (Cd)	ma/ka	< 0.2	MCERTS	< 0.2	< 0.2		I	
Chromium (Cr)	ma/ka	< 2	MCERTS	11	9			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	5	7			
Lead (Pb)	mg/kg	< 3	MCERTS	5	5			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	13	13			
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	22	18			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			
TPH - Aliphatic >C35 - C40	mg/kg	< 10	NONE					
TPH - Aromatic >C35 - C40	mg/kg	< 10	NONE					
TPH - Aliphatic / Aromatic (C6 - C40)	mg/kg	< 42	NONE					

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





Soil Analysis Certificate	e - Speciated PAHs							
DETS Report No: 22-003	19		Date Sampled	10/01/22	13/01/22	12/01/22	17/01/22	21/01/22
AF Howland Associates Lt	td		Time Sampled	None Supplied				
Site Reference: Waterbea	ach Growth Scheme -		TP / BH No	BH01	BH02	BH03	BH04	BH05
AFHA Suites								
Project / Job Ref: 21.393	3	ŀ	Additional Refs	ES1	ES3	ES1	ES2	ES3
Order No: GNB/21.393/0	00/01/02/04/05		Depth (m)	0.65	2.00	0.75	0.80	2.10
Reporting Date: 09/02/2	2022	DI	ETS Sample No	581934	582337	582338	582979	584136
Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7





Soil Analysis Certificate	e - Speciated PAHs							
DETS Report No: 22-003	19		Date Sampled	19/01/22	19/01/22	24/01/22	25/01/22	26/01/22
AF Howland Associates Lt	td	Time Sampled		None Supplied				
Site Reference: Waterbea	ach Growth Scheme ·		TP / BH No	BH06	BH06	BH07	BH08	BH09
AFHA Suites								
Project / Job Ref: 21.393	3	1	Additional Refs	ES1	ES3	ES1	ES2	ES2
Order No: GNB/21.393/0	00/01/02/04/05		Depth (m)	0.25	1.30	0.10 - 0.20	0.80	1.35
Reporting Date: 09/02/2	2022	D	ETS Sample No	582980	583531	584137	584139	584140
Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.18	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.12	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7





Soil Analysis Certificate - T	PH LQM Banded	t k						
DETS Report No: 22-00319			Date Sampled	10/01/22	13/01/22	12/01/22	17/01/22	21/01/22
AF Howland Associates Ltd			Time Sampled	None Supplied				
Site Reference: Waterbeach	Growth Scheme -		TP / BH No	BH01	BH02	BH03	BH04	BH05
AFHA Suites								
Project / Job Ref: 21.393		ŀ	Additional Refs	ES1	ES3	ES1	ES2	ES3
Order No: GNB/21.393/00/0	1/02/04/05		Depth (m)	0.65	2.00	0.75	0.80	2.10
Reporting Date: 09/02/2022	-	DI	ETS Sample No	581934	582337	582338	582979	584136
Determinend	11-14	DI						
Determinand	Unit	RL	Accreditation	0.01	0.04	0.01	0.01	0.01
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C44)	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (>C5 - C44)	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Total >C5 - C44	mg/kg	< 60	NONE	< 60	< 60	< 60	< 60	< 60





Soil Analysis Certificate	 TPH LQM Banded 	t k					
DETS Report No: 22-003	19		Date Sampled	19/01/22	24/01/22	25/01/22	
AF Howland Associates Lt	d		Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Waterbea	ach Growth Scheme		TP / BH No	BH06	BH07	BH08	
AFHA Suites							
Project / Job Ref: 21.393		/	Additional Refs	ES1	ES1	ES1	
Order No: GNB/21.393/C	0/01/02/04/05		Depth (m)	0.25	0.10 - 0.20	0.35	
Reporting Date: 09/02/2	.022	D	ETS Sample No	582980	584137	584138	
		-					
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 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	
Aliphatic >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	
Aliphatic (C5 - C44)	mg/kg	< 30	NONE	< 30	< 30	< 30	
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 >C35 - C44	mg/kg	< 10	NONE	< 10	< 10	< 10	
Aromatic (>C5 - C44)	mg/kg	< 30	NONE	< 30	< 30	< 30	
Total >C5 - C44	mg/kg	< 60	NONE	< 60	< 60	< 60	





Soil Analysis Certificate	- BTEX / MTBE							
DETS Report No: 22-003	19		Date Sampled	10/01/22	13/01/22	12/01/22	17/01/22	21/01/22
AF Howland Associates Lt	d		Time Sampled	None Supplied				
Site Reference: Waterbea	ach Growth Scheme	rowth Scheme TP / BH No		BH01	BH02	BH03	BH04	BH05
AFHA Suites								
Project / Job Ref: 21.393	roject / Job Ref: 21.393		Additional Refs	ES1	ES3	ES1	ES2	ES3
Order No: GNB/21.393/0	Order No: GNB/21.393/00/01/02/04/05		Depth (m)	0.65	2.00	0.75	0.80	2.10
Reporting Date: 09/02/2022		DETS Sample No		581934	582337	582338	582979	584136
Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	4	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTRE	ua/ka	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5





Soil Analysis Certificate	- BTEX / MTBE						
DETS Report No: 22-0031	9		Date Sampled	19/01/22	24/01/22	25/01/22	
AF Howland Associates Ltd	b		Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Waterbea	ch Growth Scheme		TP / BH No	BH06	BH07	BH08	
AFHA Suites							
Project / Job Ref: 21.393		A	Additional Refs	ES1	ES1	ES1	
Order No: GNB/21.393/0	0/01/02/04/05		Depth (m)	0.25	0.10 - 0.20	0.35	
Reporting Date: 09/02/2022		DETS Sample No		582980	584137	584138	
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	





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 22-00319	
AF Howland Associates Ltd	
Site Reference: Waterbeach Growth Scheme - AFHA Suites	
Project / Job Ref: 21.393	
Order No: GNB/21.393/00/01/02/04/05	
Reporting Date: 09/02/2022	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
581934	BH01	ES1	0.65	18.9	Light brown clayey sand
582337	BH02	ES3	2.00	22.4	Grey clay
582338	BH03	ES1	0.75	18.7	Brown sandy clay
582979	BH04	ES2	0.80	34.4	Brown clay
584136	BH05	ES3	2.10	46.5	Brown loamy clay
582980	BH06	ES1	0.25	14.4	Brown sandy clay
583531	BH06	ES3	1.30	12.7	Light grey clay with chalk
584137	BH07	ES1	0.10 - 0.20	10.4	Brown sandy clay with stones
584138	BH08	ES1	0.35	12.9	Brown sandy clay with stones
584139	BH08	ES2	0.80	7.1	Brown sand
584140	BH09	ES2	1.35	9.7	Brown sandy clay with stones

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





Soil Analysis Certificate - Methodology & Miscellaneous Information DETS Report No: 22-00319 AF Howland Associates Ltd Site Reference: Waterbeach Growth Scheme - AFHA Suites roiect / Job Ref: 21.393 Order No: GNB/21.393/00/01/02/04/05 Reporting Date: 09/02/2022 Method Determinand Brief Method Description Matrix Analysed No Soil D Boron - Water Solubl Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES E012 Determination of BTEX by headspace GC-MS Soil AR BTE E001 Soil D Catior Determination of cations in soil by aqua-regia digestion followed by ICP-OES E002 Water Determination of chloride by extraction with water & analysed by ion chromatography E009 Soluble (2: Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of Soil AR E016 Chromium - Hexavalen ,5 diphenylcarbazide followed by colorimetry AR Cyanide - Comple Determination of complex cyanide by distillation followed by colorimetry Soil Soil AR Cyanide Determination of free cyanide by distillation followed by colorimetry E015 Soil AR Cyanide - Tota Determination of total cyanide by distillation followed by colorimetry E015 Soil D Cyclohexane Extractable Matter (CEN Gravimetrically determined through extraction with cyclohexane E011 ٨D Determination of hexane/acetone extractable hydrocarbons by GC-FID Soil Diesel Range Organics (C10 - C24 F004 Determination of electrical conductivity by addition of saturated calcium sulphate followed by Soil AR Electrical Conductivity F022 electrometric measurement Soil AR Electrical Conductivity Determination of electrical conductivity by addition of water followed by electrometric measurement E023 D Elemental Sulphu Determination of elemental sulphur by solvent extraction followed by GC-MS Soil AR EPH (C10 - C40) Determination of acetone/hexane extractable hydrocarbons by GC-FIC E004 Soil ΔR EPH Product IE Determination of acetone/hexane extractable hydrocarbons by GC-FID F004 EPH TEXAS (C6-C8, C8-C10, C10-C12 Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by AR E004 Soil C12-C16, C16-C21, C21-C40 neadspace GC-MS Soil D Fluoride - Water Soluble Determination of Fluoride by extraction with water & analysed by ion chromatography E009 D Determination of TOC by combustion analyse Soil Fraction Organic Carbon (FOC E027 Soil Organic Matter (SOM) Determination of TOC by combustion analyser E027 Soil TOC (Total Organic Carbon) Determination of TOC by combustion analyser E027 Soil AR Exchangeable Ammonium Determination of ammonium by discrete analyser E029 Determination of fraction of organic carbon by oxidising with potassium dichromate followed by Soil D FOC (Fraction Organic Carbon) F010 itration with iron (II) sulphate Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle Soil D Loss on Ignition @ 4500 F019 urnace Soil D Determination of water soluble magnesium by extraction with water followed by ICP-OES F025 Magnesium - Water Solubl Soil D Metal Determination of metals by aqua-regia digestion followed by ICP-OES E002 Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE AR Mineral Oil (C10 - C40) F004 Soil artridge Moisture content; determined gravimetrically Soil AR E003 Moisture Conten Soil D Nitrate - Water Soluble (2:1) Determination of nitrate by extraction with water & analysed by ion chromatography E009 Determination of organic matter by oxidising with potassium dichromate followed by titration with D F010 Soil Organic Matter ron (II) sulphate Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the Soil AR PAH - Speciated (EPA 16) F005 use of surrogate and internal standards PCB - 7 Congeners Soil AR 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 F011 Soil AR 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 D Phosphate - Water Soluble (2:1) E009 Soil Determination of phosphate by extraction with water & analysed by ion chromatography Soil D Sulphate (as SO4) - Tota Determination of total sulphate by extraction with 10% HCI followed by ICP-OES F013 Sulphate (as SO4) - Water Soluble (2:1) Soil D Determination of sulphate by extraction with water & analysed by ion chromatography F009 Soil 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 F018 Soil D Sulphur - Total Determination of total sulphur by extraction with aqua-regia followed by ICP-OES F024 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by Soil AR SVOC E006 GC-MS Determination of thiocyanate by extraction in caustic soda followed by acidification followed by Soil AR Thiocyanate (as SCN F017 addition of ferric nitrate followed by colorimetry Soil D Toluene Extractable Matter (TEM) Gravimetrically determined through extraction with toluene E011 Determination of organic matter by oxidising with potassium dichromate followed by titration with D Soil Total Organic Carbon (TOC E010 iron (II) sulphate TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE F004 Soil AR aro: C5-C7, C7-C8, C8-C10, C10-C12, cartridge for C8 to C35. C5 to C8 by headspace GC-MS C12-C16, C16-C21, C21-C35 TPH LQM (ali: C5-C6, C6-C8, C8-C10 C10-C12, C12-C16, C16-C35, C35-C44, Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE F004 Soil AR aro: C5-C7, C7-C8, C8-C10, C10-C12, cartridge for C8 to C44. C5 to C8 by headspace GC-MS C12-C16, C16-C21, C21-C35, C35-C44 F001

 Soil
 AR
 VOCs
 Determination of volatile organic compounds by headspace GC-MS

 Soil
 AR
 VPH (C6-C8 & C8-C10)
 Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID

 D
 Dried
 Dried
 Drived
 Drived

AR As Received

E001



Gill Bond AF Howland Associates Ltd The Old Exchange Newmarket Road Cringleford Norwich Norfolk NR4 6UF



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

DETS Report No: 22-00320

Site Reference:	Waterbeach Growth Scheme - WAC Analysis
Project / Job Ref:	21.393
Order No:	GNB/21.393/00/01/02/04/05
Sample Receipt Date:	14/01/2022 - 28/01/2022
Sample Scheduled Date:	14/01/2022 - 28/01/2022
Report Issue Number:	3
Reporting Date:	09/02/2022



Dates of laboratory activities for each tested analyte are available upon request. This report supersedes 22-00320, issue no.2. Reason for re-issue: Job details amended Sample descriptions amended

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





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Waste Acceptance Criteria	Analytical Ce	ertificate - BS	S EN 12457	/2			
DETS Report No: 22-00320		Date Sampled	10/01/22		Landfill Wast	te Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied				
Site Reference: Waterbeach (Scheme - WAC Analysis	Growth	TP / BH No	BH01			Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES1		Inert Waste	HAZARDOUS waste in non	Hazardous Waste
Order No: GNB/21.393/00/07	1/02/04/05	Depth (m)	0.65			hazardous Landfill	Landfill
Reporting Date: 09/02/2022		DETS Sample No	581935				
Determinand	Unit	MDL					
TOC ^{MU}	%	< 0.1	0.4		3%	5%	6%
Loss on Ignition	%	< 0.01	0.90				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		
^{UM} Hq	pH Units	N/a	7.8			>6	
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			To be	To be
1 5	5.			Our second at the second secon	I for the college of	evaluated	evaluated
Elucto Apolycic			10:1	Cumulative	Limit values		e leaching test
Eluate Analysis			··· · · / l	10:1	USING BS E	IN 12457-3 at 1	L/S 101/kg
			mg/I	mg/kg		(mg/kg)	
Arsenic	_		< 0.01	< 0.1	0.5	2	25
Barium			< 0.02	< 0.2	20	100	300
Cadmium			< 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	< 0.005	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			< 0.005	< 0.05	0.06	0.7	5
Selenium ^u			< 0.005	< 0.05	0.1	0.5	7
Zinc ^u			0.007	0.07	4	50	200
Chloride ^U			6.8	68	800	15000	25000
Eluoride ^U			< 0.5	< 5	10	150	500
Sulphate ^U			6.1	61	1000	20000	50000
TDS			64	640	4000	60000	100000
Phenol Index			< 0.01	< 0.1	1	-	-
DOC			16	160	500	800	1000
Leach Test Information			10	100	000	000	1000
Sample Mass (kg)			0 11		1		
Dry Mattar (9/)			01.1		1		
Dry Matter (%)			81.1	 	4		
Moisture (%)			23.4		1		
Stage 1			0.00		1		
volume Eluate L10 (litres)			0.88	<mark>├───<mark>├</mark>───<mark>├</mark>────</mark>			
					1		
					1		
					1		

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

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Waste Acceptance Criteria	Analytical Ce	ertificate - B	S EN 12457	/2			
DETS Report No: 22-00320		Date Sampled	13/01/22		Landfill Wast	te Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied				
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH02			Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES3		Inert Waste	HAZARDOUS waste in non	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	2.00			hazardous Landfill	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	582339				
Determinand	Unit	MDL					
TOC ^{MU}	%	< 0.1	0.7		3%	5%	6%
Loss on Ignition	%	< 0.01	4.90				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		
^{UM} Hq	pH Units	N/a	8.2			>6	
Acid Noutralisation Canacity	mol/kg (+/)	. 1	2.2			To be	To be
Actu Neutralisation Capacity	11101/Kg (+/-)	< 1	3.3			evaluated	evaluated
			10.1	Cumulative	Limit values	for compliance	e leaching test
Eluate Analysis			10.1	10:1	using BS E	EN 12457-3 at	L/S 10 I/kg
			mg/l	mg/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	< 0.005	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
Zipc ^U			< 0.005	< 0.05	4	50	200
Chloride ^U			3.5	35	800	15000	25000
Chioride	-		< 0.5	- 5	10	15000	500
Fluoride			10.1	101	1000	20000	5000
Suprate	_		0.1	101	1000	20000	100000
TDS Bhopol Index			< 0.01		4000	00000	100000
POC			11.1	111	F00	200	1000
			11.1		500	000	1000
					4		
Sample Mass (kg)			0.12		4		
Dry Matter (%)			77.6		1		
Moisture (%)			29				
Stage 1							
Volume Eluate L10 (litres)			0.87		1		
					1		
					1		

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Waste Acceptance Criteria	Analytical Ce	rtificate - B	S EN 12457	/2			
DETS Report No: 22-00320		Date Sampled	12/01/22		Landfill Wast	te Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied				
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH03			Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES1		Inert Waste	HAZARDOUS waste in non	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	0.75			hazardous Landfill	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	582340				
Determinand	Unit	MDL					
TOC ^{MU}	%	< 0.1	0.6		3%	5%	6%
Loss on Ignition	%	< 0.01	4.60				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		
^{UM} Hq	pH Units	N/a	7.5			>6	
Acid Neutralization Consults	mal/lim (, ()	. 1	1.0			To be	To be
Acid Neutralisation Capacity	moi/kg (+/-)	< 1	1.2			evaluated	evaluated
			10.1	Cumulative	Limit values	for compliance	e leaching test
Eluate Analysis			10:1	10:1	using BS E	N 12457-3 at	L/S 10 l/kg
-			mg/l	mg/kg	0	(mg/kg)	0
Arsenic ^u			< 0.01	< 0.1	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	< 0.000	0.5	10	70
Connor ^U	_		< 0.000	< 0.00	2.0	50	100
Manaumu	_		< 0.01	< 0.005	0.01	0.2	100
Melub depuse	_		< 0.0005	< 0.005	0.01	10	20
Morybaenum	_		0.002	0.02	0.5	10	30
NICKEI	_		< 0.007	< 0.07	0.4	10	40
Lead	_		< 0.005	< 0.05	0.5	10	50
Antimony	_		< 0.005	< 0.05	0.06	0.7	5
Selenium	_		< 0.005	< 0.05	0.1	0.5	/
Zinc ^o	_		0.009	0.09	4	50	200
Chloride			3.4	34	800	15000	25000
Fluoride			< 0.5	< 5	10	150	500
Sulphate			215.3	2153	1000	20000	50000
TDS			253	2529	4000	60000	100000
Phenol Index			< 0.01	< 0.1	1	-	-
DOC			15.4	154	500	800	1000
Leach Test Information							
Sample Mass (kg)			0.11				
Dry Matter (%)			81.3				
Moisture (%)			23]		
Stage 1					1		
Volume Eluate L10 (litres)			0.88		1		
					1		
					1		
					1		
					1		

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Waste Acceptance Criteria	a Analytical Ce	ertificate - B	S EN 12457	/2			
DETS Report No: 22-00320		Date Sampled	17/01/22		Landfill Wast	te Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied				
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH04			Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES2		Inert Waste	HAZARDOUS waste in non	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	0.80			hazardous Landfill	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	582981				
Determinand	Unit	MDL					
TOC ^{MU}	%	< 0.1	2		3%	5%	6%
Loss on Ignition	%	< 0.01	9.10				10%
BTEX ^{MU}	mg/kg	< 0.05	< 0.05		6		
Sum of PCBs	mg/kg	< 0.1	< 0.1		1		
Mineral Oil ^{MU}	ma/ka	< 10	< 10	1	500		
	mg/kg	< 1.7	< 1.7		100		
	nH Units	N/a	7.1		100	>6	
B H	prioritta	14/ 4	7.1			To be	To be
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			beteulevo	beteveluated
				Cumulative	Limit values	for compliance	leaching test
Eluate Analysis			10:1	10:1			
Eldate Analysis			ma /l	10.1 mg/kg	using b5 L	_N 12407-3 at	L/ 3 10 1/ Kg
			111g/1	IIIg7 Kg	0.5	(Hig/kg)	25
Arsenic			< 0.01	< 0.1	0.5	2	25
Barium			< 0.02	< 0.2	20	100	300
Cadmium			< 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	< 0.005	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			< 0.005	< 0.05	0.06	0.7	5
Selenium ^U			< 0.005	< 0.05	0.1	0.5	7
Zipe ^U			0.006	0.06	4	50	200
Chlorido ^U			0.000	0.00	900	15000	200
chionae			4.0	48	10	15000	25000
Fluoride			< 0.5	< 0	1000	150	500
Sulphate			17.9	179	1000	20000	50000
TDS			/9	/90	4000	60000	100000
Phenol Index			< 0.01	< 0.1	1	-	-
DOC			17	170	500	800	1000
Leach Test Information							
					-		
	4						
					-		
Sampla Mass (kg)			0.14	1 1 1	-		
Sample Mass (kg)			0.14		-		
Dry Matter (%)			65.6		-		
Moisture (%)			52.4		-		
Stage 1					-		
Volume Eluate L10 (litres)			0.85				

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Waste Acceptance Criteria	Analytical Ce	ertificate - B	S EN 12457	/2				
DETS Report No: 22-00320		Date Sampled	21/01/22			Landfill Wast	e Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied					
Site Reference: Waterbeach Scheme - WAC Analysis	Site Reference: Waterbeach Growth Scheme - WAC Analysis		BH05				Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES3			Inert Waste	HAZARDOUS	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	2.10			Editorini	hazardous	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	584141					
Determinand	Unit	MDL						
TOC ^{MU}	%	< 0.1	10.7			3%	5%	6%
Loss on Ignition	%	< 0.01	67.40					10%
BTEX ^{MU}	ma/ka	< 0.05	< 0.05			6		
Sum of PCBs	ma/ka	< 0.1	< 0.1			1		
Mineral Oil ^{MU}	ma/ka	~ 10	< 10	1		500		
	mg/kg	< 10	< 17	-		100		
TOLALPAH	nly/kg	< 1.7	< 1.7			100		
pH	pH Units	IN/a	7.0	-			>0	Ta ha
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.9				evaluated	evaluated
			10:1		Cumulative	Limit values	for compliance	leaching test
Eluate Analysis					10:1	using BS E	N 12457-3 at	_/S 10 I/kg
11	-		mg/I		mg/kg		(mg/kg)	
Arsenic	_		< 0.01		 < 0.1	0.5	2	25
Barium	_		0.06		0.6	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		< 0.005	0.01	0.2	2
Molybdenum ^U			0.004		0.04	0.5	10	30
Nickel ^u			< 0.007		< 0.07	0.4	10	40
Lead			< 0.005		< 0.05	0.5	10	50
Antimony			< 0.005		< 0.05	0.06	0.7	50
Solonium	_		< 0.005		< 0.05	0.00	0.5	7
	-		< 0.005		< 0.05	0.1	0.5	200
	_		0.008		 0.08	4	50	200
Chloride	_		11.5		115	800	15000	25000
Fluoride	_		< 0.5		 < 5	10	150	500
Sulphate	_		30.2		302	1000	20000	50000
TDS	_		226		2259	4000	60000	100000
Phenol Index			< 0.01		 < 0.1	1	-	-
DOC			34.5		345	500	800	1000
Leach Test Information				1				
	-							
Sample Mass (kg)			0.17	1	 t in the second s			
Dry Matter (%)			53.4	1				
Moleturo (%)			07 N	1	 			
			07.2		 l			
			0.00					
volume Eluate LTO (litres)			0.82	ł				
				İ	İ			
				1	İ			

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

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Waste Acceptance Criteria	Analytical Ce	ertificate - BS	S EN 12457	/2			
DETS Report No: 22-00320		Date Sampled	19/01/22		Landfill Wast	te Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied				
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH06			Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES1		I nert Waste	HAZARDOUS	Hazardous Waste
Order No: GNB/21.393/00/0)1/02/04/05	Depth (m)	0.25		Landini	hazardous	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	582982				
Determinand	Unit	MDL					
TOC ^{MU}	%	< 0.1	3.6		3%	5%	6%
Loss on Ignition	%	< 0.01	5.20				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}	ma/ka	< 1.7	< 1.7		100		
pH ^{MU}	pH Units	N/a	7.4			>6	
						To be	To be
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.3			evaluated	evaluated
			10.1	Cumulative	Limit values	for compliance	e leaching test
Eluate Analysis			10:1	10:1	using BS E	N 12457-3 at	L/S 10 I/kg
5			ma/l	ma/ka	9	(ma/ka)	5
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	< 0.000	0.5	10	70
Connor ^U			< 0.000	< 0.00	2	50	100
Managuru	_		< 0.01	< 0.005	0.01	0.2	100
Melub depune	_		< 0.0005	< 0.005	0.01	10	20
Niekel ^U			< 0.007	< 0.01	0.5	10	40
	-		< 0.007	< 0.0F	0.4	10	40 E0
Leau Archimeran II	_		< 0.005	< 0.05	0.5	10	50
Antimony ²	-		< 0.005	< 0.05	0.06	0.7	C
Selenium			< 0.005	< 0.05	0.1	0.5	/
Zinco	_		< 0.005	< 0.05	4	50	200
Chloride			2.5	25	800	15000	25000
Fluoride	_		< 0.5	< 5	10	150	500
Sulphate			4.9	49	1000	20000	50000
TDS			58	580	4000	60000	100000
Phenol Index	_		< 0.01	< 0.1	1	-	-
DOC			20.1	201	500	800	1000
Leach Test Information					•		
Sample Mass (kg)			0.11		1		
Dry Matter (%)			85.6		1		
Moisture (%)			16.8		1		
Stage 1			10.0				
Volume Fluate 10 (litres)			0.88				
volume Lludle LTO (IIIIes)			0.00		1		
					1		
					-		
					I		

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Waste Acceptance Criteria	Analytical Ce	ertificate - B	S EN 12457	/2				
DETS Report No: 22-00320		Date Sampled	19/01/22			Landfill Wast	e Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied					
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH06				Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES3			Inert Waste	HAZARDOUS waste in non-	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	1.30				hazardous Landfill	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	583532					
Determinand	Unit	MDL			i			
TOC ^{MU}	%	< 0.1	0.7			3%	5%	6%
Loss on Ignition	%	< 0.01	1.37					10%
BTEX ^{MU}	mg/kg	< 0.05	< 0.05			6		
Sum of PCBs	mg/kg	< 0.1	< 0.1			1		
Mineral Oil ^{MU}	ma/ka	< 10	< 10			500		
Total PAH ^{MU}	ma/ka	< 1.7	< 1.7			100		
nH ^{MU}	nH Units	N/a	79				>6	
	priorito						To be	To be
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	2.3				evaluated	evaluated
		•			Cumulative	Limit values	for compliance	leaching test
Eluate Analysis			10:1		10:1	using BS F	N 12457-3 at I	/S 10 I/ka
3			ma/l		ma/ka	J 1	(ma/ka)	
Arsonic ^U			< 0.01		< 0.1	0.5	2	25
Arsenic			< 0.07		< 0.1	20	100	300
Codmium ^U	_		< 0.02		< 0.2	0.04	100	5
Caumium	-		< 0.0003		< 0.005	0.04	10	70
			< 0.005		< 0.05	0.5	10	70
Copper"			< 0.01		< 0.1	2	50	100
Mercury	_		< 0.0005		< 0.005	0.01	0.2	2
Molybdenum			< 0.001		< 0.01	0.5	10	30
Nickel			< 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			3.2		32	800	15000	25000
Fluoride ^U			< 0.5		< 5	10	150	500
Sulphate ^U			4.9		49	1000	20000	50000
TDS			71		710	4000	60000	100000
Phenol Index			< 0.01		< 0.1	1	-	-
DOC			9.5		95	500	800	1000
Leach Test Information			7.0	1	70	000	000	1000
Eeden rest miormation		I						
	-							
		<u> </u>						
				↓ ↓				
				↓ ↓				
Sample Mass (kg)			0.10					
Dry Matter (%)			87.3	I I				
Moisture (%)			14.6					
Stage 1								
Volume Eluate L10 (litres)			0.89					
				l i				
				1				
				1				

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Waste Acceptance Criteria	Analytical Ce	ertificate - B	S EN 12457	/2				
DETS Report No: 22-00320		Date Sampled	24/01/22			Landfill Wast	e Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied					
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH07				Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES1			Inert Waste	HAZARDOUS	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	0.10 - 0.20			Editorini	hazardous	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	584142					
Determinand	Unit	MDL						
TOC ^{MU}	%	< 0.1	1.4			3%	5%	6%
Loss on Ignition	%	< 0.01	4.23					10%
BTEY ^{MU}	ma/ka	< 0.05	< 0.05			6		
Sum of DCPc	mg/kg	< 0.1	< 0.00			1		
	my/kg	< U. I	< U.I	1		Г Г С С		
Mineral Oil	mg/kg	< 10	< 10	4		500		
Total PAH ^{MU}	mg/kg	< 1.7	< 1.7			100		
рН ^{MU}	pH Units	N/a	7.7				>6	
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1				To be evaluated	To be evaluated
			10.1		Cumulative	Limit values	for compliance	e leaching test
Eluate Analysis			10.1		10:1	using BS E	N 12457-3 at	L/S 10 I/kg
			mg/l		mg/kg	-	(mg/kg)	-
Arsenic ^U			< 0.01		< 0.1	0.5	2	25
Basium			< 0.02	1 1	< 0.2	20	100	300
Dallulli Castesturell			< 0.02	 	0.2	20	100	500
			< 0.0005		< 0.005	0.04	10	0
Chromium			< 0.005	↓	< 0.05	0.5	10	70
Copper			< 0.01		< 0.1	2	50	100
Mercury ^u			< 0.0005		< 0.005	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			< 0.005		< 0.05	0.06	0.7	5
Selenium ^U			< 0.005		< 0.05	0.1	0.5	7
Zipc ^U			< 0.005	1 1	< 0.05	4	50	200
Chlorida	-		< 0.005		< 0.05	900	15000	200
			< 1.0		< 10	600	15000	25000
Fluoride	_		< 0.5		< 5	10	150	500
Sulphate	_		2.8		28	1000	20000	50000
TDS			60		600	4000	60000	100000
Phenol Index			< 0.01		< 0.1	1	-	-
DOC			23.9		239	500	800	1000
Leach Test Information								
	-							
<u> </u>								
Sample Mass (kg)			0.10	┞────┞				
Dry Matter (%)			89.6	ļļ				
Moisture (%)			11.6					
Stage 1								
Volume Eluate L10 (litres)			0.89					

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

Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation M Denotes MCERTS accredited test





Waste Acceptance Criteria	Analytical Ce	ertificate - B	S EN 12457	/2			
DETS Report No: 22-00320		Date Sampled	25/01/22		Landfill Wast	te Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied				
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH08			Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES2		Inert Waste	HAZARDOUS	Hazardous Waste
Order No: GNB/21.393/00/0)1/02/04/05	Depth (m)	0.80		Landini	hazardous	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	584143				
Determinand	Unit	MDL					
TOC ^{MU}	%	< 0.1	0.4		3%	5%	6%
Loss on Ignition	%	< 0.01	1.70				10%
BTFX ^{MU}	mg/kg	< 0.05	< 0.05		6		
Sum of PCBs	ma/ka	< 0.1	< 0.1		1		
Mineral Oil ^{MU}	ma/ka	< 10	< 10		500		
	ma/ka	< 17	< 17	1	100		
	nH Units	N/2	Q 1.7		100	>6	
pri	prioritta	14/ 4	0.1			To be	To be
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			beteulevo	beteulevo
				Cumulativo	Limit values	for compliance	leaching test
Eluato Analysis			10:1	10.1			
Eldate Analysis			ma /l	10.1	using bo L	(ma/ka)	L/ 3 10 1/ Kg
	-		111g/1	iliy/kg	0.5	(Hg/kg)	25
Arsenic	_		< 0.01	< 0.1	0.5	2	25
Barium	_		< 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	< 0.005	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			< 0.005	< 0.05	0.06	0.7	5
Selenium ^U			< 0.005	< 0.05	0.1	0.5	7
Zipc ^U	_		< 0.005	< 0.05	1	50	200
Chlorido ^U	_		~ 0.000	22	900	15000	25000
chionde	-		3.3		10	15000	25000
Fluoride			0.0	0.3	1000	100	500
Sulphate	_		4.2	42	1000	20000	50000
TDS	_		65	650	4000	60000	100000
Phenol Index			< 0.01	< 0.1	1	-	-
DOC			16.7	167	500	800	1000
Leach Test Information							
Sampla Mass (kg)			0.10		1		
			0.10	l l l l	1		
Dry Matter (%)			92.9	├ ──┤	4		
Moisture (%)			/.8		4		
Stage 1					4		
Volume Eluate L10 (litres)			0.89		ł		
					1		
]		

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

Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation M Denotes MCERTS accredited test





Waste Acceptance Criteria	Analytical Ce	ertificate - BS	S EN 12457	/2				
DETS Report No: 22-00320		Date Sampled	26/01/22			Landfill Wast	e Acceptance	Criteria Limits
AF Howland Associates Ltd		Time Sampled	None Supplied					
Site Reference: Waterbeach Scheme - WAC Analysis	Growth	TP / BH No	BH09				Stable Non-	
Project / Job Ref: 21.393		Additional Refs	ES2	4		Inert Waste	HAZARDOUS waste in non-	Hazardous Waste
Order No: GNB/21.393/00/0	01/02/04/05	Depth (m)	1.35			Lanam	hazardous	Landfill
Reporting Date: 09/02/2022	2	DETS Sample No	584144					
Determinand	Unit	MDL						
TOC ^{MU}	%	< 0.1	0.4			3%	5%	6%
Loss on Ignition	%	< 0.01	1.89					10%
BTEX ^{MU}	mg/kg	< 0.05	< 0.05	1		6		
Sum of PCBs	ma/ka	< 0.1	< 0.1	1		1		
Mineral Oil ^{MU}	ma/ka	< 10	< 10	1		500		
	ma/ka	< 17	< 17	1		100		
	nH Units	N/2	7.8	1		100	>6	
рп	prioritta	TN/ CI	7.0	1			To be	To be
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	4.7				boteulevo	ovaluated
					Cumulative	Limit values	for compliance	evaluated
Eluate Analysis			10:1		10.1		N 12457 3 at 1	
Eldate Analysis			ma/l		ma/ka	using D5 L	(ma/ka)	L/S TO T/ Kg
· · · · · ·	-		1119/1	+ + +	ing/kg	0.5	(Hg/kg)	25
Arsenic			< 0.01		< 0.1	0.5	2	25
Barium	_		< 0.02		< 0.2	20	100	300
Cadmium	_		< 0.0005		< 0.005	0.04		5
Chromium	_		< 0.005		< 0.05	0.5	10	70
Copper			< 0.01		< 0.1	2	50	100
Mercury ^U			< 0.0005		< 0.005	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			< 0.005		< 0.05	0.06	0.7	5
Selenium ^u			< 0.005		< 0.05	0.1	0.5	7
Zinc ^U			< 0.005	1 1 1	< 0.05	4	50	200
Chloride ^U	_		1.9		19	800	15000	25000
Elucrido ^U	_		< 0.5		< 5	10	150	500
Fluoride			2.6		25	1000	20000	5000
Sulphate	-		2.0	1 1 1	20	1000	20000	100000
TDS Descal Index	_		08	1 1 1	080	4000	60000	100000
Phenol Index	-		< 0.01		< 0.1	500	-	-
			12.5		125	500	800	1000
Leach lest Information								
Sample Mass (kg)			0.10	Ⅰ				
Dry Matter (%)			90.4	<u> </u>				
Moisture (%)			10.8					
Stage 1								
Volume Eluate L10 (litres)			0.89					
				1 1				

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

Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation M Denotes MCERTS accredited test





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 22-00320	
AF Howland Associates Ltd	
Site Reference: Waterbeach Growth Scheme - WAC Analysis	
Project / Job Ref: 21.393	
Order No: GNB/21.393/00/01/02/04/05	
Reporting Date: 09/02/2022	

Sample Matrix Description	Moisture Content (%)	Depth (m)	Additional Refs	TP / BH No	DETS Sample No
Light brown clayey sand	18.9	0.65	ES1	BH01	581935
Grey clay	22.4	2.00	ES3	BH02	582339
Brown sandy clay	18.7	0.75	ES1	BH03	582340
Brown clay	34.4	0.80	ES2	BH04	582981
Brown loamy clay	46.5	2.10	ES3	BH05	584141
Brown sandy clay	14.4	0.25	ES1	BH06	582982
Light brown clay with chalk	12.7	1.30	ES3	BH06	583532
Brown sandy clay with stones	10.4	0.10 - 0.20	ES1	BH07	584142
Brown sand	7.1	0.80	ES2	BH08	584143
Brown sandy clay with stones	9.7	1.35	ES2	BH09	584144

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

Insufficient Sample^{1/S} Unsuitable Sample^{U/S}



Soil Analysis Certificate - Methodology & Miscellaneous Information

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



DETS Re	port No: 2	2-00320		
AF Howl	and Associ	ates Ltd		
Site Ref	erence: Wa	aterbeach Growth Scheme - WAC Ana	Ilysis	
Order N	/ JOD REF:	21.393		
Deportir	J. GND/21	2/02/2022		
Reportin	ig Date. Of	7/02/2022		
Matrix	Analysed	Determinand	Brief Method Description	Method
ind crime	On	Dotormiland		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
Soli	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content: determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (11) subbate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the	E005
Soil	۸D	DCR 7 Congonors	use of surrogate and internal standards.	EUUO
Soil	AR D	Petroleum Ether Extract (PEE)	Cravimetrically determined through extraction with petroleum ether	E008
Soil	AR	nH	Determination of pH by addition of water followed by electrometric measurement	E011
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% HCI 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 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by	E024
2011	AK	SVUC	GC-MS Determination of thiocyanate by extraction in caustic soda followed by acidification followed by	E006
Soil	AR	Thiocyanate (as SCN)	addition of error nitrate followed by colorimetry	E017
2011	D	I Oluene Extractable Matter (TEM)	Gravimetrically determined through extraction with hotoscium distrements followed by titration with	EUTT
Soil	D	Total Organic Carbon (TOC)	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





Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 22-00320
AF Howland Associates Ltd
Site Reference: Waterbeach Growth Scheme - WAC Analysis
Project / Job Ref: 21.393
Order No: GNB/21.393/00/01/02/04/05
Reporting Date: 09/02/2022

Matrix	Analysed	Determinand	Brief Method Description	Method
	On			No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cvclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	F123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
		EPH TEXAS (C6-C8, C8-C10, C10-C12	Determination of liquid-liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by	
Water	F		hardshare GC-MS	E104
Water	F	Fluoride	Determination of Eluoride by filtration & analysed by ion chromatography	F109
Water	F	Hardness	Determination of Ca and Ma by Infection & analysed by calculation	E102
Leachate	F	Leachate Prenaration - NRA	Based on National Rivers Authority leaching test 100/	E 301
Leachate	F	Leachate Preparation - WAC	Resort on RS EN 12/57 Pt1 2 3	E302
Wator	F	Motals	Datemination of motals by filtration followed by ICD MS	E102
Water	F	Mineral Oil (C10 C40)	Determination of liquid-liquid attraction with bayage followed by CLEID	E102
Water	F	Nitrato	Determination of hitrote by filtration 8, applyed by ion obcenting applyed by GI-1 D	E104
Water	I	Monohydric Dhonol	Determination of minate by mination & analysed by onlying the onlying the second	E109
vvatei	01	Monoriyane Phenor	Determination of DAL expression for the properties through SDE contridge collection in	LIZI
Water	F	PAH - Speciated (EPA 16)	dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethan	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid: liquid extraction with petroleum ether	E111
Water	UF	Ha	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	F109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	F113
Water	F	Sulphate (as SO4)	Determination of subhate by filtration & analysed by ion chromatography	F109
Water	UF	Sulphate (as 5047	Determination of sulphide by distillation followed by colorimetry	F118
		Salpride	Determination of semi-volatile organic compounds by concentration through SPE cartridge collection	2110
Water	F	SVOC	in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TFM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	I ow heat with persulphate addition followed by IR detection	E110
				2110
		IPH CWG (ali: C5-C6, C6-C8, C8-C10, C10 C12 C12 C16 C16 C21 C21 C24	Datarmination of liquid-liquid extraction with beyong, fractionating with SDE followed by CC_ELD for	
Water	F	are: CE C7 C7 C9 C9 C10 C10 C10	Ce to C25. C5 to C9 by beadspace CC MS	E104
			Co to Cool to Co by Headspace GC-MS	
		UTZ-UT6, CT6-C21, C21-C35)		
		TPH LOM (all: 05-06, 06-08, 08-010		
		C10-C12 C12-C16 C16-C35 C35-C44	Determination of liquid-liquid extraction with becape, fractionating with SPE followed by GC-ELD for	
Water	F	aro: C5-C7 C7-C8 C8 C10 C10 C10	C8 to C/A. C5 to C8 by beadspace GC-MS	E104
			ou to ott. Ou to ou by headspace do-100	
		012-010, 010-021, 021-030, 030-044)		
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101
Kov				

F Filtered UF Unfiltered

TOC Soil BS EN 12457 20.0 % Loss on Ignition Soil BS EN 12457 35.0 % BTEX Soil BS EN 12457 14.0 % Sum of PCBs Soil BS EN 12457 14.0 % Mineral Oli Soil BS EN 12457 9.0 % Total PAH Soil BS EN 12457 0.28 Units Aid Neutralisation Capacity Soil BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 18.7 % Cadmium Leachate BS EN 12457 18.3 % Corper Leachate BS EN 12457 14.7 % Molyodenum Leachate BS EN 12457 14.7 % Molyodenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 14.7 % Nickel Leachate BS	Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
Loss on Ignition Soil BS EN 12457 35.0 % BTEX Soil BS EN 12457 14.0 % Sum of PCBs Soil BS EN 12457 23.0 % Mineral Oli Soil BS EN 12457 9.0 % Total PAH Soil BS EN 12457 0.28 Units Acid Neutralisation Capacity Soil BS EN 12457 0.28 Units Acid Neutralisation Capacity Soil BS EN 12457 18.7 % Arsenic Leachate BS EN 12457 18.7 % Cadmium Leachate BS EN 12457 20.3 % Copper Leachate BS EN 12457 24.3 % Copper Leachate BS EN 12457 24.3 % Molydenum Leachate BS EN 12457 18.7 % Molydenum Leachate BS EN 12457 16.1 % Solenium Leachate BS EN 12457 17.7 % Antimony <	ТОС	Soil	BS EN 12457	20.0	%
BTEX Soil BS EN 12457 14.0 % Sum of PCBs Soil BS EN 12457 23.0 % Mineral Oil Soil BS EN 12457 23.0 % Total PAH Soil BS EN 12457 9.0 % Total PAH Soil BS EN 12457 11.6 % Acid Neutralisation Capacity Soil BS EN 12457 11.6 % Arsenic Leachate BS EN 12457 11.6 % Cadmium Leachate BS EN 12457 11.6 % Cadmium Leachate BS EN 12457 11.6 % Marcury Leachate BS EN 12457 11.6 % Mercury Leachate BS EN 12457 18.7 % Mercury Leachate BS EN 12457 18.7 % Mercury Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 15.7 % Antimony Leachate BS EN	Loss on Ignition	Soil	BS EN 12457	35.0	%
Sum of PCBs Soil BS EN 12457 23.0 % Mineral Oli Soil BS EN 12457 9.0 % Total PAH Soil BS EN 12457 9.0 % Arisenic Des EN 12457 0.28 Units Arisenic Leachate BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 18.7 % Cadmium Leachate BS EN 12457 18.7 % Cadmium Leachate BS EN 12457 18.3 % Cadmium Leachate BS EN 12457 23.3 % Chromium Leachate BS EN 12457 18.7 % Molybdenum Leachate BS EN 12457 18.7 % Nickel Leachate BS EN 12457 14.7 % Lead Leachate BS EN 12457 17.4 % Steinum Leachate BS EN 12457 17.4 % Steinum Leachate BS EN 12457 17.4 </td <td>BTEX</td> <td>Soil</td> <td>BS EN 12457</td> <td>14.0</td> <td>%</td>	BTEX	Soil	BS EN 12457	14.0	%
Mineral Oil Soil BS EN 12457 9,0 % Total PAH Soil BS EN 12457 11.6 % pH Soil BS EN 12457 0.28 Units Acid Neutralisation Capacity Soil BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 11.6 % Cadmium Leachate BS EN 12457 18.3 % Copper Leachate BS EN 12457 23.3 % Mercury Leachate BS EN 12457 14.7 % Melybdenum Leachate BS EN 12457 14.7 % Mercury Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Choirde Leachate BS EN 12457 15.3 % Fluoride Leachate <t< td=""><td>Sum of PCBs</td><td>Soil</td><td>BS EN 12457</td><td>23.0</td><td>%</td></t<>	Sum of PCBs	Soil	BS EN 12457	23.0	%
Total PAH Soil BS EN 12457 11.6 % pH Soil BS EN 12457 0.28 Units Acid Neutralisation Capacity Soil BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 18.7 % Barium Leachate BS EN 12457 18.7 % Cadmium Leachate BS EN 12457 18.3 % Copper Leachate BS EN 12457 23.3 % Molybdenum Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 14.7 % Malybdenum Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 15.3 % Choride Leachate BS EN 12457 16.4 % Sulphate Leachate	Mineral Oil	Soil	BS EN 12457	9.0	%
pH Soil BS EN 12457 0.28 Units Acid Neutralisation Capacity Soil BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 18.0 % Barium Leachate BS EN 12457 18.7 % Cadmium Leachate BS EN 12457 20.3 % Chromium Leachate BS EN 12457 20.3 % Copper Leachate BS EN 12457 18.3 % Molybdenum Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 15.7 % Lead Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Choride Leachate BS EN 12457 17.4 % Sulphate Leachate BS EN 12457 15.3 % Fluoride Leachate <td< td=""><td>Total PAH</td><td>Soil</td><td>BS EN 12457</td><td>11.6</td><td>%</td></td<>	Total PAH	Soil	BS EN 12457	11.6	%
Acid Neutralisation Capacity Soil BS EN 12457 18.0 % Arsenic Leachate BS EN 12457 18.7 % Barium Leachate BS EN 12457 11.6 % Cadmium Leachate BS EN 12457 20.3 % Chromium Leachate BS EN 12457 22.3 % Copper Leachate BS EN 12457 22.3 % Mercury Leachate BS EN 12457 22.3 % Molybdenum Leachate BS EN 12457 23.7 % Molybdenum Leachate BS EN 12457 14.7 % Antimony Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 15.3 % Eluoride Leachate BS EN 12457 14.0 % DOC Leachate	рН	Soil	BS EN 12457	0.28	Units
Arsenic Leachate BS EN 12457 18.7 % Barium Leachate BS EN 12457 11.6 % Cadmium Leachate BS EN 12457 20.3 % Chromium Leachate BS EN 12457 24.3 % Copper Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 24.3 % Molybdenum Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 17.7 % Selenium Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % DOC Leachate BS EN 12457 14.0 % DOC Leachate BS S182 2015	Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Barium Leachate BS EN 12457 11.6 % Cadmium Leachate BS EN 12457 20.3 % Chromium Leachate BS EN 12457 20.3 % Copper Leachate BS EN 12457 24.3 % Molybdenum Leachate BS EN 12457 23.7 % Molybdenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 17.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Choride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 10.0 % Doc Leachate BS EN 12457 14.0 % Sulphate Leachate BS EN 1245	Arsenic	Leachate	BS EN 12457	18.7	%
Cadmium Leachate BS EN 12457 20.3 % Chromium Leachate BS EN 12457 18.3 % Copper Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 23.7 % Molybdenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.4 % Selenium Leachate BS EN 12457 17.4 % Choride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 10.0 % Doc Leachate BS EN 12457 10.0 % Sulphate Leachate BS EN 12457 10.0 % Doc Leachate BS EN 12457	Barium	Leachate	BS EN 12457	11.6	%
Chromium Leachate BS EN 12457 18.3 % Copper Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 23.7 % Molybdenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Choride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Doc Leachate BS EN 12457 16.0 % Sulphate Leachate BS EN 12457 10.0 % Doc Leachate BS EN 12457 14.0 % Sulphate Leachate BS EN 12457 <td>Cadmium</td> <td>Leachate</td> <td>BS EN 12457</td> <td>20.3</td> <td>%</td>	Cadmium	Leachate	BS EN 12457	20.3	%
Copper Leachate BS EN 12457 24.3 % Mercury Leachate BS EN 12457 23.7 % Molydenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 16.1 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Choride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 10.0 % DOC Leachate BS EN 12457 14.0 % Sulphate Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 14.0 % Sulphate Soil BS 3882: 2015	Chromium	Leachate	BS EN 12457	18.3	%
Mercury Leachate BS EN 12457 23.7 % Molybdenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 17.9 % Antimony Leachate BS EN 12457 7.9 % Selenium Leachate BS EN 12457 7.9 % Choride Leachate BS EN 12457 7.1 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 10.0 % DOC Leachate BS EN 12457 10.0 % Sill Content Soil BS 3882: 2015 14.0 % Sill Content Soil BS 3882: 2015 13.0 % Ph Soil BS 3882: 2015	Copper	Leachate	BS EN 12457	24.3	%
Molybdenum Leachate BS EN 12457 14.7 % Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % DS Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % DDC Leachate BS EN 12457 12.0 % DOC Leachate BS EN 12457 14.0 % Sulphate Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 14.0 % Sulphate Soil BS 3882: 2015	Mercury	Leachate	BS EN 12457	23.7	%
Nickel Leachate BS EN 12457 16.1 % Lead Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 10.0 % DOC Leachate BS EN 12457 14.0 % Sulphate Soil BS 3882: 2015 15.0 % Clay Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882:	Molybdenum	Leachate	BS EN 12457	14.7	%
Lead Leachate BS EN 12457 15.7 % Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 22.0 % Zinc Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 17.4 % Fluoride Leachate BS EN 12457 15.3 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % DDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % Silt Content Soil BS 3882: 2015 15.0 % Sand Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3	Nickel	Leachate	BS EN 12457	16.1	%
Antimony Leachate BS EN 12457 17.9 % Selenium Leachate BS EN 12457 22.0 % Zinc Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 17.4 % Fluoride Leachate BS EN 12457 15.3 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 16.4 % Phenol Index Leachate BS EN 12457 16.4 % DOC Leachate BS EN 12457 10.0 % DOC Leachate BS EN 12457 14.0 % DOC Leachate BS 12457 10.0 % Silt Content Soil BS 3882: 2015 15.0 % Sand Content Soil BS 3882: 2015 13.0 % pH Soil BS 3882: 2015 16.0 % Carbonate Soil BS 3882: 2015	Lead	Leachate	BS EN 12457	15.7	%
Selenium Leachate BS EN 12457 22.0 % Zinc Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 15.3 % Sulphate Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 20.6 % TDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 13.0 % Less on Ignition Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable)	Antimony	Leachate	BS EN 12457	17.9	%
Zinc Leachate BS EN 12457 17.4 % Chloride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 20.6 % TDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % DOC Leachate BS 2802: 2015 15.0 % Clay Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 14.0 % Potassium (Extractable) Soil BS 3882: 2015 24.0 % Magnesium (Extractable	Selenium	Leachate	BS EN 12457	22.0	%
Chloride Leachate BS EN 12457 15.3 % Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 20.6 % TDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Zinc Soil BS 3882: 2015 26.0 % Qopper	Zinc	Leachate	BS EN 12457	17.4	%
Fluoride Leachate BS EN 12457 16.4 % Sulphate Leachate BS EN 12457 20.6 % TDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 14.0 % Loss on Ignition Soil BS 3882: 2015 13.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 14.9 % Copper </td <td>Chloride</td> <td>Leachate</td> <td>BS EN 12457</td> <td>15.3</td> <td>%</td>	Chloride	Leachate	BS EN 12457	15.3	%
Sulphate Leachate BS EN 12457 20.6 % TDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil <td>Fluoride</td> <td>Leachate</td> <td>BS EN 12457</td> <td>16.4</td> <td>%</td>	Fluoride	Leachate	BS EN 12457	16.4	%
TDS Leachate BS EN 12457 12.0 % Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 16.0 % Nickel	Sulphate	Leachate	BS EN 12457	20.6	%
Phenol Index Leachate BS EN 12457 14.0 % DOC Leachate BS EN 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Phosphorus (Extractable) Soil BS 3882: 2015 12.0 % Potassium (Extractable) Soil BS 3882: 2015 24.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Available Sodium Soil BS 3882: 2015 16.0 % Available Sodium Soil BS 3882: 2015 16.0 % <	TDS	Leachate	BS EN 12457	12.0	%
DOC Leachate BS EN 12457 10.0 % Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Total Nitrogen Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 14.9 % Nickel Soil BS 3882: 2015 16.0 % Available Sodium Soil BS 3882: 2015 16.0 % Available Calcium	Phenol Index	Leachate	BS EN 12457	14.0	%
Clay Content Soil BS 3882: 2015 15.0 % Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Total Nitrogen Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 14.9 % Nickel Soil BS 3882: 2015 16.0 % Nickel Soil BS 3882: 2015 16.0 % Available Sodium	DOC	Leachate	BS EN 12457	10.0	%
Silt Content Soil BS 3882: 2015 14.0 % Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Total Nitrogen Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 14.9 % Nickel Soil BS 3882: 2015 14.9 % Available Sodium Soil BS 3882: 2015 14.9 % Available Calcium Soil BS 3882: 2015 17.7 % Available Calcium Soil BS 3882: 2015 23.0 % Electri	Clay Content	Soil	BS 3882: 2015	15.0	%
Sand Content Soil BS 3882: 2015 13.0 % Loss on Ignition Soil BS 3882: 2015 35.0 % pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Total Nitrogen Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 14.9 % Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 23.0 %	Silt Content	Soil	BS 3882: 2015	14.0	%
Loss on IgnitionSoilBS 3882: 201535.0%pHSoilBS 3882: 20150.14UnitsCarbonateSoilBS 3882: 201516.0%Total NitrogenSoilBS 3882: 201512.0%Phosphorus (Extractable)SoilBS 3882: 201524.0%Potassium (Extractable)SoilBS 3882: 201520.0%Magnesium (Extractable)SoilBS 3882: 201526.0%ZincSoilBS 3882: 201514.9%CopperSoilBS 3882: 201516.0%NickelSoilBS 3882: 201517.7%Available SodiumSoilBS 3882: 201523.0%Electrical ConductivitySoilBS 3882: 201523.0%	Sand Content	Soil	BS 3882: 2015	13.0	%
pH Soil BS 3882: 2015 0.14 Units Carbonate Soil BS 3882: 2015 16.0 % Total Nitrogen Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 14.9 % Nickel Soil BS 3882: 2015 16.0 % Available Sodium Soil BS 3882: 2015 17.7 % Available Calcium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 23.0 %	Loss on Ignition	Soil	BS 3882: 2015	35.0	%
CarbonateSoilBS 3882: 201516.0%Total NitrogenSoilBS 3882: 201512.0%Phosphorus (Extractable)SoilBS 3882: 201524.0%Potassium (Extractable)SoilBS 3882: 201520.0%Magnesium (Extractable)SoilBS 3882: 201526.0%ZincSoilBS 3882: 201514.9%CopperSoilBS 3882: 201516.0%NickelSoilBS 3882: 201517.7%Available SodiumSoilBS 3882: 201523.0%Electrical ConductivitySoilBS 3882: 201510.0%	рН	Soil	BS 3882: 2015	0.14	Units
Total Nitrogen Soil BS 3882: 2015 12.0 % Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 16.0 % Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 23.0 %	Carbonate	Soil	BS 3882: 2015	16.0	%
Phosphorus (Extractable) Soil BS 3882: 2015 24.0 % Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 16.0 % Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 23.0 %	Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Potassium (Extractable) Soil BS 3882: 2015 20.0 % Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 14.9 % Nickel Soil BS 3882: 2015 16.0 % Available Sodium Soil BS 3882: 2015 17.7 % Available Calcium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 10.0 %	Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Magnesium (Extractable) Soil BS 3882: 2015 26.0 % Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 16.0 % Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 23.0 %	Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Zinc Soil BS 3882: 2015 14.9 % Copper Soil BS 3882: 2015 16.0 % Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Available Calcium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 10.0 %	Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Copper Soil BS 3882: 2015 16.0 % Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Available Calcium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 10.0 %	Zinc	Soil	BS 3882: 2015	14.9	%
Nickel Soil BS 3882: 2015 17.7 % Available Sodium Soil BS 3882: 2015 23.0 % Available Calcium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 10.0 %	Copper	Soil	BS 3882: 2015	16.0	%
Available Sodium Soil BS 3882: 2015 23.0 % Available Calcium Soil BS 3882: 2015 23.0 % Electrical Conductivity Soil BS 3882: 2015 10.0 %	Nickel	Soil	BS 3882: 2015	17.7	%
Available CalciumSoilBS 3882: 201523.0%Electrical ConductivitySoilBS 3882: 201510.0%	Available Sodium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity Soil BS 3882: 2015 10.0 %	Available Calcium	Soil	BS 3882: 2015	23.0	%
	Electrical Conductivity	Soil	BS 3882: 2015	10.0	%

APPENDIX D: DRAWINGS

Drawing 21.393/01	Site Location Plan
Drawings 21.393/02a	Exploratory Hole Location Plan
Drawings 21.393/02b	Exploratory Hole Location Plan
Drawings 21.393/02c	Exploratory Hole Location Plan






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Borehole location and reference						Geotechnical Engineers	BEACH GROWTH SCHEME
	A F Howland Associates Ltd		A F Howland Associates Ltd Job No.:	: 21.393			
						Newmarket Road Drawing	Title:
						Cringleford Norwich EXPLOF NR4 6UF	RATORY HOLE LOCATION PLAN
						Tel: 01603 250754 Fax: 01603 250749 Date: Ma	arch 2022
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You can contact us by:



Emailing at info@cwwtpr.com

Calling our Freephone information line on **0808 196 1661**

Writing to us at Freepost: CWWTPR

You can view all our DCO application documents and updates on the application on The Planning Inspectorate website:

https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambri dge-waste-water-treatment-plant-relocation/

