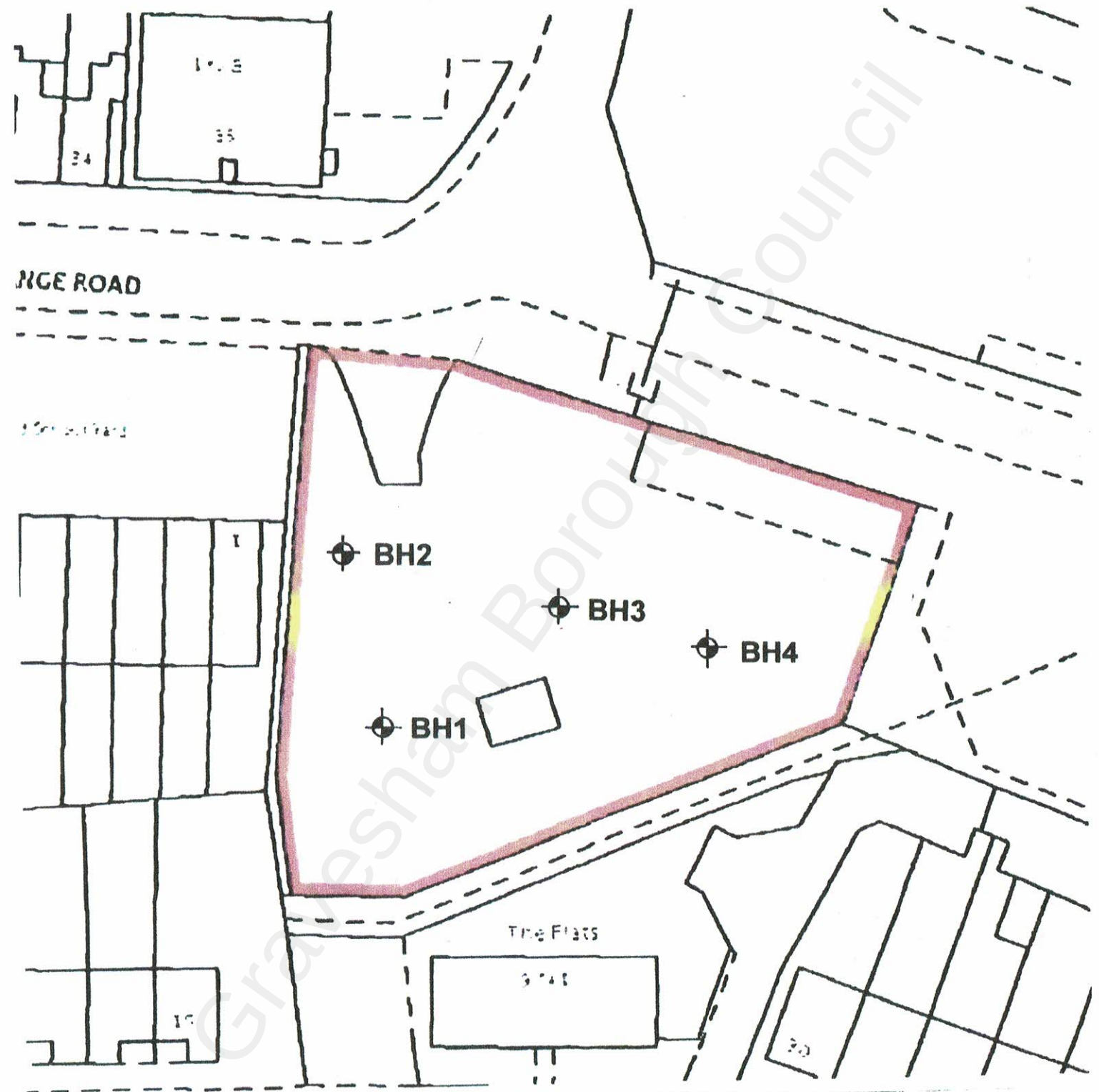


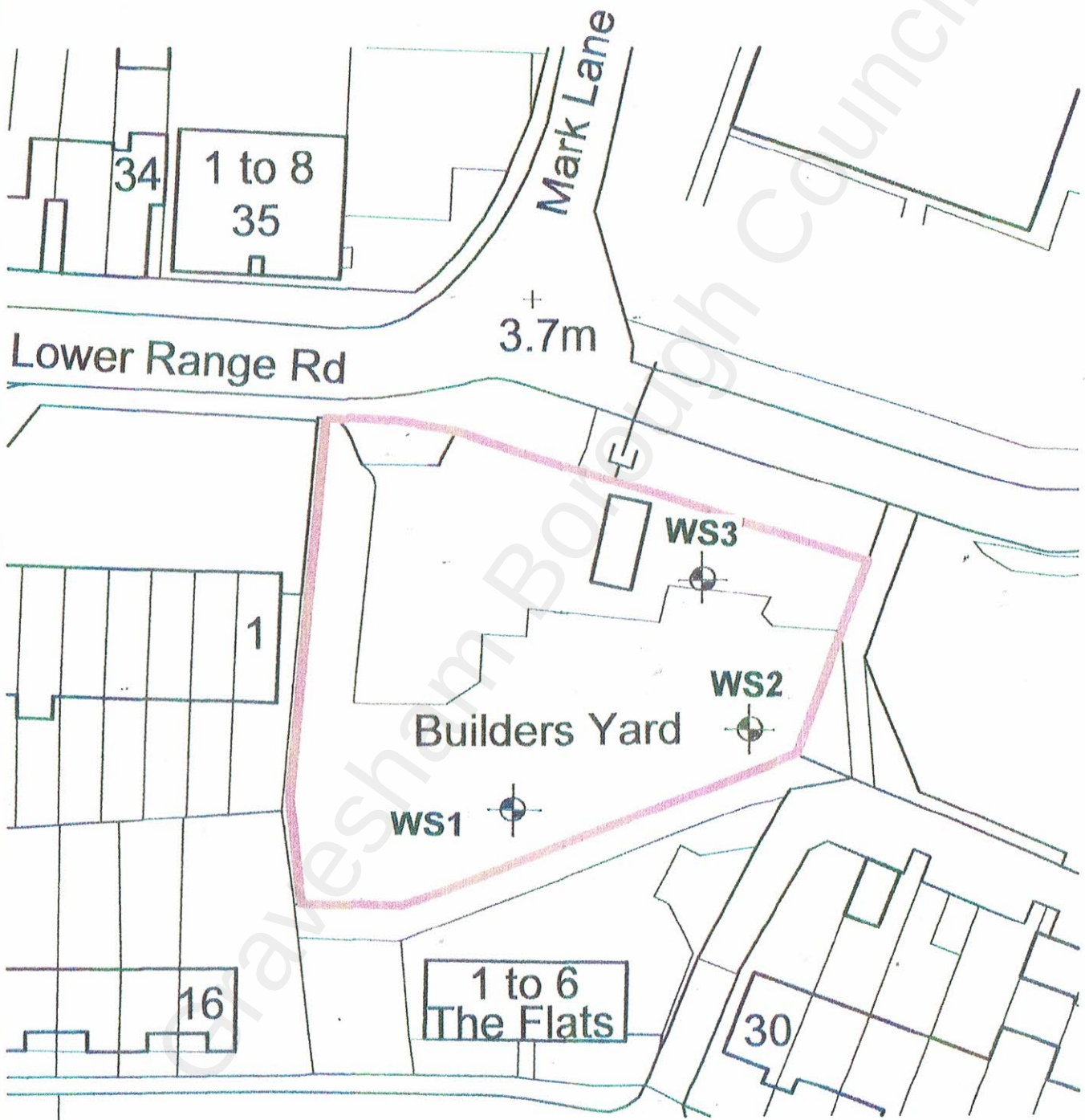
Appendix C

Subsoil Investigations



Lower Range Road, Gravesend.

Plan showing locations of 2014 boreholes.



Lower Range Road, Gravesend.

Plan showing locations of 2020 boreholes.

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. 1

Method of excavation: **Window Sampler**

Date: 09.10.14

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
	0.10		Weak concrete
•	0.30		Soft grey clay with occasional brick and chalk fragments
	0.50		
•	1.00	1.00	
•	1.50	1.50	Water entering at 2m
•	2.00	2.00	
•	2.50	2.50	
•	3.00	3.00	Soft, moist, becoming very soft with depth, orange-mottled grey CLAY (ALLUVIUM)
		End	Sides of borehole unstable below 2.5m • = Disturbed sample
		3.50	
		4.00	
		4.50	

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. 2

Method of excavation: **Window Sampler**

Date: 09.10.14

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
		0.10	Weak concrete
•	0.30		Soft grey clay with pockets of sand, gravel, chalk particles and brick fragments
		0.50	(FILL)
•	1.00	1.00	Soft grey-brown clay with occasional gravel, brick fragments and pieces of chalk
			(FILL)
•	1.50	1.50	
			Water entering at 1.8m
•	2.00	2.00	
•	2.50	2.50	
•	3.00	3.00	
		End	Sides of borehole unstable below 2m
		3.50	• = Disturbed sample
		4.00	
		4.50	

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. 3

Method of excavation: **Window Sampler**

Date: 09.10.14

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
		0.10	Weak concrete
•	0.30		Friable grey clay with abundant chalk fragments, pieces of brick and gravel
		0.50	(FILL)
			Soft grey clay with pockets of dark brown silty sand, occasional chalk particles and pieces of brick
•	1.00	1.00	(FILL)
•	1.50	1.50	
•	2.00	2.00	Water entering at 2m
•	2.50	2.50	
•	3.00	3.00	
		End	Sides of borehole unstable below 2m
		3.50	• = Disturbed sample
		4.00	
		4.50	

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. 4

Method of excavation: **Window Sampler**

Date: 09.10.14

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
	0.10		Concrete
•	0.30		Stiff grey-brown clay with abundant gravel, brick fragments and pieces of chalk
	0.50		
	0.60		
	0.70		Weak concrete
•	1.00		Friable grey silty clay with chalk fragments, pockets of dark brown silty sand and occasional pieces of brick
			(FILL)
•	1.50		
	1.70		
		End	Obstructions precluding further progress
	2.00		Borehole dry on completion Sides of borehole stable
	2.50		• = Disturbed sample
	3.00		
	3.50		
	4.00		
	4.50		

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. WS1

Method of excavation: **Tracked windowless sampler**

Date: 23.11.20

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
	0.10		Topsoil
•	0.30		Compact grey clay with abundant fine to coarse brick and chalk gravel (FILL)
	0.50		
•	1.00	1.00	
•	1.50	1.50	
	1.80		Soft, moist, brown-mottled grey CLAY (ALLUVIUM) Water seepage at around 2m Becoming slightly sandy at 3.8m
•	2.00	2.00	
•	2.50	2.50	
•	3.00	3.00	
•	3.50	3.50	
•	4.00	4.00	
		End	Borehole dry on completion Sides of borehole stable ● = Disturbed sample Standpipe installed to 4m
		4.50	

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. WS2

Method of excavation: **Tracked windowless sampler**

Date: 23.11.20

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
			Compact granular surfacing
	0.20		
•	0.30		
	0.50		Compact grey clay with abundant fine to coarse brick and chalk gravel and occasional pieces of carbon (FILL)
	1.00	1.00	
•	1.50	1.50	
	2.00	2.00	
•	2.00	2.10	Water seepage at around 2m
	2.50	2.50	Soft, moist, brown-mottled grey CLAY (ALLUVIUM)
			Occasional rootlets present at 2.5m
•	3.00	3.00	
	3.50	3.50	
•	3.50		
	4.00	4.00	
•	4.00		
		End	Borehole dry on completion Sides of borehole stable ● = Disturbed sample Standpipe installed to 4m
		4.50	

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: THE YARD, LOWER RANGE ROAD, GRAVESEND

No. WS3

Method of excavation: **Tracked windowless sampler**

Date: 23.11.20

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
	0.10		Compact granular surfacing
•	0.30		Compact grey clay with abundant fine to coarse brick and chalk gravel and occasional half bricks (FILL)
	0.50		
•	1.00	1.00	
•	1.50	1.50	Water seepage at around 1.8m
	1.80 ▼		
•	2.00	2.00	Soft, moist, brown-mottled grey CLAY (ALLUVIUM)
•	2.50	2.50	
•	3.00	3.00	
•	3.50	3.50	
•	4.00	4.00	Borehole dry on completion Sides of borehole stable ● = Disturbed sample
		End	
		4.50	

Appendix D
Laboratory Test Results

Company Registration 3028997

Company Registration 3028997



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618
Facsimile: (01424) 729911
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 14-00874

Issue: 1

Date of Issue: 24/10/2014

Contact: Ron Carr

Customer Details: R. Carr Geotechnical Services
9 The Mallows
Maidstone
Kent

Quotation No: Q14-00020

Order No: Not Supplied

Customer Reference: Not Supplied

Date Received: 10/10/2014

Date Approved: 24/10/2014

Details: The Yard, Lower Range Road, Gravesend

Approved by:

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 14-00874

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
5875	BH1 0.30	09/10/2014	13/10/2014	Silty clayey loam	
5876	BH2 0.30	09/10/2014	13/10/2014	Sandy clayey loam	
5877	BH3 0.30	09/10/2014	13/10/2014	Silty loam	
5878	BH4 0.30	09/10/2014	13/10/2014	Silty loam	

Results Summary

Report No.: 14-00874

ELAB Reference	5875	5876	5877	5878
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	BH1	BH2	BH3	BH4
Sample Depth (m)	0.30	0.30	0.30	0.30
Sampling Date	09/10/2014	09/10/2014	09/10/2014	09/10/2014

Determinand	Codes	Units	LOD				
Metals							
Arsenic	M	mg/kg	1	14.8	14.6	8.8	11.9
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	0.6
Chromium	M	mg/kg	5	37.5	35.1	30.9	36.2
Copper	M	mg/kg	5	26.3	24.5	18.3	31.7
Lead	M	mg/kg	5	44.7	85.8	47.6	77.0
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	24.2	24.2	21.8	24.9
Selenium	M	mg/kg	1	< 1.0	< 1.0	1.1	< 1.0
Zinc	M	mg/kg	45	122	176	64.6	106
Anions							
Water Soluble Sulphate	M	g/l	0.01	0.03	0.03	0.02	0.20
Inorganics							
Elemental Sulphur	N	mg/kg	20	< 20	< 20	41	99
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	6	4	9
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Boron	N	mg/kg	0.5	2.9	2.7	2.0	1.5
Miscellaneous							
pH	M	units	0.1	8.3	8.3	8.2	9.0

Results Summary

Report No.: 14-00874

ELAB Reference				5875	5876	5877	5878
Customer Reference							
Sample ID							
Sample Type				SOIL	SOIL	SOIL	SOIL
Sample Location				BH1	BH2	BH3	BH4
Sample Depth (m)				0.30	0.30	0.30	0.30
Sampling Date				09/10/2014	09/10/2014	09/10/2014	09/10/2014
Determinand	Codes	Units	LOD				
Phenols							
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5
Polyaromatic hydrocarbons							
Naphthalene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	M	mg/kg	0.5	< 0.5	2.3	< 0.5	< 0.5
Anthracene	M	mg/kg	0.5	< 0.5	0.8	< 0.5	< 0.5
Fluoranthene	M	mg/kg	0.5	1.4	5.1	0.7	1.5
Pyrene	M	mg/kg	0.5	1.2	4.1	0.5	1.2
Benzo (a) anthracene	M	mg/kg	0.5	0.8	2.3	< 0.5	0.7
Chrysene	M	mg/kg	0.5	1.0	2.6	< 0.5	1.0
Benzo (b) fluoranthene	M	mg/kg	0.5	0.7	1.7	< 0.5	0.7
Benzo (k) fluoranthene	M	mg/kg	0.5	1.0	2.4	0.5	1.1
Benzo (a) pyrene	M	mg/kg	0.5	0.9	2.3	< 0.5	0.9
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.5	0.6	1.6	< 0.5	0.7
Dibenzo(a,h)anthracene	M	mg/kg	0.5	< 0.5	0.6	< 0.5	< 0.5
Benzo(ghi)perylene	M	mg/kg	0.5	0.5	1.4	< 0.5	0.7
Total PAH(16) Speciated	M	mg/kg	2	9	28	4	9
BTEX							
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
TPH CWG							
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C21-C35 Aliphatic	N	mg/kg	1	< 1.0	2.0	< 1.0	1.6
>C35-C40 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aromatic	N	mg/kg	1	< 1.0	3.5	< 1.0	< 1.0
>C16-C21 Aromatic	N	mg/kg	1	5.0	17.1	< 1.0	< 1.0
>C21-C35 Aromatic	N	mg/kg	1	18.9	42.9	< 1.0	1.4
>C35-C40 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Total (>C5-C40) Ali/Aro	N	mg/kg	1	23.9	65.6	< 1.0	3.0



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY

Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 14-00874

Asbestos Qualitative Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Result
5875	0.30	BH1	Silty clayey loam	No asbestos detected
5876	0.30	BH2	Sandy clayey loam	No asbestos detected
5877	0.30	BH3	Silty loam	No asbestos detected
5878	0.30	BH4	Silty loam	Amosite

Method Summary

Report No.: 14-00874

Parameter	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil				
BTEX in solids	As submitted sample	15/10/2014		GC-MS
Sulphide	As submitted sample	14/10/2014	109	Colorimetry
Hexavalent chromium	As submitted sample	14/10/2014	110	Colorimetry
pH	Air dried sample	24/10/2014	113	Electromeric
Aqua regia extractable metals	Air dried sample	22/10/2014	118	ICPMS
Phenols in solids	As submitted sample	14/10/2014	121	HPLC
Elemental Sulphur	Air dried sample	22/10/2014	122	HPLC
Polyaromatic hydrocarbons (GC-FID)	As submitted sample	14/10/2014	133	GC-FID
Water soluble anions	Air dried sample	21/10/2014	172	Ion Chromatography
Water soluble boron	Air dried sample	22/10/2014	202	Colorimetry
Total cyanide	As submitted sample	15/10/2014	204	Colorimetry
Aliphatic hydrocarbons in soil	As submitted sample	14/10/2014	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	As submitted sample	15/10/2014	214	GC-FID
Aromatic hydrocarbons in soil	As submitted sample	14/10/2014	214	GC-FID
Low range Aliphatic hydrocarbons soil	As submitted sample	15/10/2014	214	GC-MS
Low range Aromatic hydrocarbons soil	As submitted sample	15/10/2014	214	GC-MS
Asbestos identification	As submitted sample	23/10/2014	PMAN	Microscopy



Report Information

Report No.: 14-00874

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Ron Carr
R Carr Geotechnical Services
9 The Mallows
Maidstone
Kent
ME14 2PX

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

DETS Report No: 20-13832

Site Reference: Lower Ranqe Road, Gravesend

Project / Job Ref: 3825/20

Order No: 3825

Sample Receipt Date: 24/11/2020

Sample Scheduled Date: 24/11/2020

Report Issue Number: 1

Reporting Date: 02/12/2020

Authorised by:

Kevin Old
General Manager

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

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



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



Soil Analysis Certificate					
DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20	23/11/20	
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS2	WS3	
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied	None Supplied	
Order No: 3825	Depth (m)	0.30	0.30	0.30	
Reporting Date: 02/12/2020	DETS Sample No	512362	512363	512364	

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Detected	
Sample Matrix ^(S)	Material Type	N/a	NONE			Chrysotile Present as bundles	
Asbestos Type ^(S)	PLM Result	N/a	ISO17025			Chrysotile	
pH	pH Units	N/a	MCERTS	8.0	8.0	8.2	
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	1234	1174	1070	
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.12	0.12	0.11	
Sulphide	mg/kg	< 5	NONE	< 5	< 5	60	
Organic Matter	%	< 0.1	MCERTS	1.2	2.6	1.6	
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.7	1.5	0.9	
Arsenic (As)	mg/kg	< 2	MCERTS	13	17	9	
W/S Boron	mg/kg	< 1	NONE	< 1	1	1.3	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1	0.5	0.5	
Chromium (Cr)	mg/kg	< 2	MCERTS	23	15	19	
Copper (Cu)	mg/kg	< 4	MCERTS	29	95	23	
Lead (Pb)	mg/kg	< 3	MCERTS	60	224	73	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	20	18	15	
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	
Zinc (Zn)	mg/kg	< 3	MCERTS	129	206	87	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	
EPH (C10 - C40)	mg/kg	< 6	MCERTS	34	27	139	

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



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



Soil Analysis Certificate - Speciated PAHs

DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20	23/11/20		
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS2	WS3		
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 3825	Depth (m)	0.30	0.30	0.30		
Reporting Date: 02/12/2020	DETS Sample No	512362	512363	512364		

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	0.12	0.20	0.14	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.24	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.29	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.47	0.73	2.03	
Anthracene	mg/kg	< 0.1	MCERTS	0.11	0.16	0.51	
Fluoranthene	mg/kg	< 0.1	MCERTS	1.07	1.38	5.22	
Pyrene	mg/kg	< 0.1	MCERTS	0.93	1.19	4.93	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.52	0.62	2.40	
Chrysene	mg/kg	< 0.1	MCERTS	0.67	0.70	2.44	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.02	0.78	3.15	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.34	0.31	1.18	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.65	0.54	2.59	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.52	0.32	1.43	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.27	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.51	0.32	1.33	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	6.9	7.2	28.1	



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



Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20	23/11/20		
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS2	WS3		
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 3825	Depth (m)	0.30	0.30	0.30		
Reporting Date: 02/12/2020	DETS Sample No	512362	512363	512364		

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	3	< 2	< 2	
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	14	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	27	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	42	
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	



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Soil Analysis Certificate - BTEX / MTBE

DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20	23/11/20		
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS2	WS3		
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 3825	Depth (m)	0.30	0.30	0.30		
Reporting Date: 02/12/2020	DETS Sample No	512362	512363	512364		

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene	ug/kg	< 5	MCERTS	10	8	6		
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene	ug/kg	< 2	MCERTS	7	5	5		
o-xylene	ug/kg	< 2	MCERTS	3	< 2	< 2		
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5		



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Leachate Analysis Certificate					
DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20		
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied		
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS3		
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied		
Order No: 3825	Depth (m)	2.00	2.00		
Reporting Date: 02/12/2020	DETS Sample No	512365	512366		

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	ISO17025	8.3	8.0		
Total Cyanide	ug/l	< 5	NONE	< 5	< 5		
Sulphate as SO ₄	mg/l	< 1	ISO17025	10	1		
Sulphide	mg/l	< 0.1	NONE	< 0.1	< 0.1		
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE	29.2	18.2		
Arsenic	ug/l	< 5	ISO17025	< 5	< 5		
Boron	ug/l	< 5	ISO17025	153	124		
Cadmium	ug/l	< 0.4	ISO17025	< 0.4	< 0.4		
Chromium	ug/l	< 5	ISO17025	< 5	< 5		
Copper	ug/l	< 5	ISO17025	16	14		
Lead	ug/l	< 5	ISO17025	< 5	< 5		
Mercury	ug/l	< 0.05	ISO17025	0.05	< 0.05		
Nickel	ug/l	< 5	ISO17025	< 5	< 5		
Selenium	ug/l	< 5	ISO17025	< 5	< 5		
Zinc	ug/l	< 2	ISO17025	3	2		
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10	< 10		
EPH (C10 - C40)	ug/l	< 10	NONE	< 10	< 10		

Subcontracted analysis ⁽³⁾



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Leachate Analysis Certificate - Speciated PAH

DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20			
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied			
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS3			
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied			
Order No: 3825	Depth (m)	2.00	2.00			
Reporting Date: 02/12/2020	DETS Sample No	512365	512366			

Determinand	Unit	RL	Accreditation			
Naphthalene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	0.06	
Anthracene	ug/l	< 0.01	NONE	< 0.01	0.01	
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	0.04	
Pyrene	ug/l	< 0.01	NONE	< 0.01	0.02	
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	
Benzo(ghi)perylene	ug/l	< 0.008	NONE	< 0.008	< 0.008	
Total EPA-16 PAHs	ug/l	< 0.01	NONE	< 0.01	0.13	



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Leachate Analysis Certificate - TPH CWG Banded

DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20			
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied			
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS3			
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied			
Order No: 3825	Depth (m)	2.00	2.00			
Reporting Date: 02/12/2020	DETS Sample No	512365	512366			

Determinand	Unit	RL	Accreditation			
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10	< 10	
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10	< 10	
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10	
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70	< 70	
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	< 10	
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	< 10	
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10	< 10	
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70	< 70	
Total >C5 - C35	ug/l	< 140	NONE	< 140	< 140	



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Leachate Analysis Certificate - BTEX / MTBE

DETS Report No: 20-13832	Date Sampled	23/11/20	23/11/20			
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied			
Site Reference: Lower Range Road, Gravesend	TP / BH No	WS1	WS3			
Project / Job Ref: 3825/20	Additional Refs	None Supplied	None Supplied			
Order No: 3825	Depth (m)	2.00	2.00			
Reporting Date: 02/12/2020	DETS Sample No	512365	512366			

Determinand	Unit	RL	Accreditation			
Benzene	ug/l	< 1	ISO17025	< 1	< 1	
Toluene	ug/l	< 5	ISO17025	< 5	< 5	
Ethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	
p & m-xylene	ug/l	< 10	ISO17025	< 10	< 10	
o-xylene	ug/l	< 5	ISO17025	< 5	< 5	
MTBE	ug/l	< 10	ISO17025	< 10	< 10	



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 20-13832	
R Carr Geotechnical Services	
Site Reference: Lower Range Road, Gravesend	
Project / Job Ref: 3825/20	
Order No: 3825	
Reporting Date: 02/12/2020	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
512362	WS1	None Supplied	0.30	9.9	Brown loamy sand with stones and chalk
512363	WS2	None Supplied	0.30	18.3	Brown loamy sand with chalk
512364	WS3	None Supplied	0.30	13.3	Brown loamy sand with chalk

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

Insufficient Sample ^{IS}

Unsuitable Sample ^{US}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 20-13832

R Carr Geotechnical Services

Site Reference: Lower Range Road, Gravesend

Project / Job Ref: 3825/20

Order No: 3825

Reporting Date: 02/12/2020

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

D Dried
AR As Received



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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 20-13832

R Carr Geotechnical Services

Site Reference: Lower Range Road, Gravesend

Project / Job Ref: 3825/20

Order No: 3825

Reporting Date: 02/12/2020

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

Key

F Filtered
UF Unfiltered