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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 17-13412

Issue: 2

Date of Issue: 23/08/2017

Contact: Melanie Lipsham

Customer Details: Leap Environmental Ltd
The Atrium
Curtis Road
Dorking
Surrey RH4 1X4

Quotation No: Q14-00063

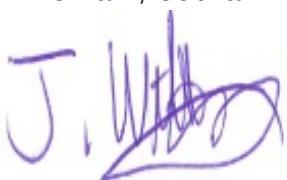
Order No: LPO6409

Customer Reference: LP1436

Date Received: 04/08/2017

Date Approved: 23/08/2017

Details: The Barn, Cobham

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.: 17-13412

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
108143	HA101 0.00 - 0.30	03/08/2017	04/08/2017	Silty loam	
108144	HA102 0.00 - 0.40	03/08/2017	04/08/2017	Silty loam	
108145	HA103 0.00 - 0.40	03/08/2017	17/08/2017	Silty loam	g
108146	HA104 0.00 - 0.35	03/08/2017	04/08/2017	Silty loam	
108147	HA105 0.00 - 0.20	03/08/2017	04/08/2017	Silty loam	
108148	HA106 0.00 - 0.30	03/08/2017	04/08/2017	Silty loam	
108149	HA101 0.30 - 0.50	03/08/2017	04/08/2017		
108150	HA102 0.40 - 0.60	03/08/2017	04/08/2017		
108151	HA104 0.35 - 0.60	03/08/2017	04/08/2017		
108152	HA105 0.20 - 0.40	03/08/2017	04/08/2017		
108153	HA106 0.30 - 0.45	03/08/2017	04/08/2017		

Results Summary

Report No.: 17-13412

ELAB Reference	108143	108144	108145	108146	108147	108148
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	HA101	HA102	HA103	HA104	HA105	HA106
Sample Depth (m)	0.00 - 0.30	0.00 - 0.40	0.00 - 0.40	0.00 - 0.35	0.00 - 0.20	0.00 - 0.30
Sampling Date	03/08/2017	03/08/2017	03/08/2017	03/08/2017	03/08/2017	03/08/2017

Determinand	Codes	Units	LOD						
Metals									
Arsenic	M	mg/kg	1	16.7	11.4	20.8	10.8	10.3	13.6
Cadmium	M	mg/kg	0.5	0.8	0.7	0.6	0.7	0.7	0.6
Chromium	M	mg/kg	5	40.7	33.8	36.0	30.2	34.6	41.4
Copper	M	mg/kg	5	160	36.4	139	38.6	47.1	52.3
Lead	M	mg/kg	5	155	131	286	108	101	87.3
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	38.6	31.4	42.8	33.2	24.5	39.4
Selenium	M	mg/kg	1	1.3	1.1	1.2	1.1	< 1.0	1.7
Zinc	M	mg/kg	5	276	131	123	122	106	140
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
Acid Neutralisation Capacity	N	mol/kg	0.1	n/t	n/t	< 0.1	n/t	n/t	n/t
Loss On Ignition (450°C)	M	%	0.01	n/t	n/t	5.68	n/t	n/t	n/t
pH	M	pH units	0.1	8.1	8.2	8.2	8.2	7.8	8.8
Total Organic Carbon	N	%	0.01	11	2.2	10	4.0	7.9	7.7
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	0.1	0.2	0.2	< 0.1	< 0.1	0.2
Acenaphthylene	M	mg/kg	0.1	0.1	0.2	0.7	0.1	0.2	0.6
Acenaphthene	M	mg/kg	0.1	0.2	< 0.1	0.6	< 0.1	0.4	0.2
Fluorene	M	mg/kg	0.1	0.1	0.1	0.4	< 0.1	0.2	0.1
Phenanthrene	M	mg/kg	0.1	1.4	2.1	3.5	0.6	2.3	2.2
Anthracene	M	mg/kg	0.1	0.4	0.7	1.1	0.1	0.5	0.9
Fluoranthene	M	mg/kg	0.1	3.3	5.3	15.7	2.0	7.0	9.2
Pyrene	M	mg/kg	0.1	3.1	4.5	14.6	1.8	5.9	8.8
Benzo(a)anthracene	M	mg/kg	0.1	2.2	2.5	9.4	1.2	3.4	6.9
Chrysene	M	mg/kg	0.1	2.6	2.6	9.5	1.3	4.0	7.8
Benzo (b) fluoranthene	M	mg/kg	0.1	2.8	2.2	9.7	1.2	3.6	10.7
Benzo(k)fluoranthene	M	mg/kg	0.1	2.7	2.2	10.1	1.4	3.7	9.4
Benzo (a) pyrene	M	mg/kg	0.1	3.2	2.5	11.3	1.4	3.8	10.6
Indeno (1,2,3-cd) pyrene	M	mg/kg	0.1	2.9	1.8	8.3	1.2	2.9	10.3
Dibenzo(a,h)anthracene	M	mg/kg	0.1	0.7	0.5	2.1	0.4	0.7	2.5
Benzo[g,h,i]perylene	M	mg/kg	0.1	2.8	1.7	7.4	1.4	2.7	10.7
Total PAH(16)	M	mg/kg	0.4	28.5	29.1	105	14.1	41.4	91.2
Total PAH (Including Coronene)	N	mg/kg	2	n/t	n/t	107	n/t	n/t	n/t
BTEX									
Total BTEX	M	mg/kg	0.01	n/t	n/t	g < 0.01	n/t	n/t	n/t



Results Summary

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ELAB Reference				108143	108144	108145	108146	108147	108148
Customer Reference									
Sample ID									
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				HA101	HA102	HA103	HA104	HA105	HA106
Sample Depth (m)				0.00 - 0.30	0.00 - 0.40	0.00 - 0.40	0.00 - 0.35	0.00 - 0.20	0.00 - 0.30
Sampling Date				03/08/2017	03/08/2017	03/08/2017	03/08/2017	03/08/2017	03/08/2017
Determinand	Codes	Units	LOD						
TPH CWG									
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t	n/t	n/t
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t	n/t	n/t
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C10-C12 Aliphatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C12-C16 Aliphatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C16-C21 Aliphatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C21-C35 Aliphatic	N	mg/kg	1	4.7	n/t	n/t	n/t	n/t	n/t
>C35-C40 Aliphatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t	n/t	n/t
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	n/t	n/t	n/t	n/t	n/t
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C10-C12 Aromatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C12-C16 Aromatic	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	n/t
>C16-C21 Aromatic	N	mg/kg	1	1.5	n/t	n/t	n/t	n/t	n/t
>C21-C35 Aromatic	N	mg/kg	1	18.0	n/t	n/t	n/t	n/t	n/t
>C35-C40 Aromatic	N	mg/kg	1	1.8	n/t	n/t	n/t	n/t	n/t
Total (>C5-C40) Ali/Aro	N	mg/kg	1	26.0	n/t	n/t	n/t	n/t	n/t
Total Petroleum Hydrocarbons									
Mineral Oil	U	mg/kg	5	n/t	n/t	g 153	n/t	n/t	n/t
PCB (ICES 7 congeners)									
PCB (Total of 7 Congeners)	M	mg/kg	0.03	n/t	n/t	< 0.03	n/t	n/t	n/t

Results Summary

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WAC Analysis

Elab Ref:	108145					Landfill Waste Acceptance Criteria Limits		
Sample Date:	03/08/2017					Inert Waste Landfill	Stable Non-reactive Hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:	HA103							
Depth (m)	0.00 - 0.40							
Site:	The Barn, Cobham							
Determinand		Code	Units					
Total Organic Carbon		N	%		10.00	3	5	6
Loss on Ignition		M	%		5.7	--	--	10
Total BTEX		M	mg/kg		< 0.01	6	--	--
Total PCBs (7 congeners)		M	mg/kg		< 0.03	1	--	--
TPH Total WAC		M	mg/kg		153	500	--	--
Total (of 17) PAHs		N	mg/kg		107.0	100	--	--
pH		M			8.2	--	>6	--
Acid Neutralisation Capacity		N	mol/kg		< 0.1	--	To evaluate	To evaluate

Eluate Analysis

			10:1	10:1	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg		
			mg/l	mg/kg			
Arsenic		N	0.018	0.18	0.5	2	25
Barium		N	0.048	0.48	20	100	300
Cadmium		N	< 0.001	< 0.01	0.04	1	5
Chromium		N	< 0.005	< 0.05	0.5	10	70
Copper		N	0.014	0.14	2	50	100
Mercury		N	< 0.005	< 0.01	0.01	0.2	2
Molybdenum		N	< 0.005	< 0.05	0.5	10	30
Nickel		N	0.002	< 0.05	0.4	10	40
Lead		N	0.001	< 0.05	0.5	10	50
Antimony		N	< 0.005	< 0.05	0.06	0.7	5
Selenium		N	< 0.005	< 0.05	0.1	0.5	7
Zinc		N	0.006	0.06	4	50	200
Chloride		N	< 5	< 50	800	15000	25000
Fluoride		N	< 5	< 10	10	150	500
Sulphate		N	6	57.00	1000	20000	50000
Total Dissolved Solids		N	< 10	< 100	4000	60000	100000
Phenol Index		N	< 0.01	< 0.10	1	-	-
Dissolved Organic Carbon		N	12.800	128.00	500	800	1000

Leach Test Information

pH		N	7.6				
Conductivity (uS/cm)		N	180				
Dry mass of test portion (g)			102.000				
Dry Matter (%)			83				
Moisture (%)			21				
Eluent Volume (ml)			980				

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

Stated limits are for guidance only and ELAB cannot be held responsible for any discrepancies with current legislation



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Results Summary

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Asbestos 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 #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
108143	0.00 - 0.30	HA101	Brown soil,stones,clinker	No asbestos detected	n/t	n/t	n/t	n/t
108144	0.00 - 0.40	HA102	Brown soil,Stones,brick,clinker	No asbestos detected	n/t	n/t	n/t	n/t
108145	0.00 - 0.40	HA103	Brown soil,Stones,clinker	No asbestos detected	n/t	n/t	n/t	n/t
108146	0.00 - 0.35	HA104	Brown soil,Stones	No asbestos detected	n/t	n/t	n/t	n/t
108147	0.00 - 0.20	HA105	Brown soil,Stones	No asbestos detected	n/t	n/t	n/t	n/t
108148	0.00 - 0.30	HA106	Brown soil,Stones,rubber	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 17-13412

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	08/08/2017	110	Colorimetry
Aqua regia extractable metals	M	Air dried sample	08/08/2017	118	ICPMS
PAH (GC-FID)	M	As submitted sample	07/08/2017	133	GC-FID
Aliphatic hydrocarbons in soil	N	As submitted sample	07/08/2017	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	N	As submitted sample	08/08/2017	214	GC-FID
Aromatic hydrocarbons in soil	N	As submitted sample	07/08/2017	214	GC-FID
Low range Aliphatic hydrocarbons soil	N	As submitted sample	08/08/2017	214	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	08/08/2017	214	GC-MS
Asbestos identification	U	As submitted sample	08/08/2017	PMAN	Microscopy
Leachate					
Arsenic*	N		23/08/2017	101	ICPMS
Cadmium*	N		23/08/2017	101	ICPMS
Chromium*	N		23/08/2017	101	ICPMS
Lead*	N		23/08/2017	101	ICPMS
Nickel*	N		23/08/2017	101	ICPMS
Copper*	N		23/08/2017	101	ICPMS
Zinc*	N		23/08/2017	101	ICPMS
Mercury*	N		23/08/2017	101	ICPMS
Selenium*	N		23/08/2017	101	ICPMS
Antimony	N		23/08/2017	101	ICPMS
Barium*	N		23/08/2017	101	ICPMS
Molybdenum*	N		23/08/2017	101	ICPMS
pH Value*	N		23/08/2017	113	Electrometric
Electrical Conductivity*	N		23/08/2017	136	Probe
Dissolved Organic Carbon	N		23/08/2017	102	TOC analyser
Chloride*	N		23/08/2017	131	Ion Chromatography
Fluoride*	N		23/08/2017	131	Ion Chromatography
Sulphate*	N		23/08/2017	131	Ion Chromatography
Total Dissolved Solids	N		23/08/2017	144	Gravimetric
Phenol index	N		23/08/2017	121	HPLC
WAC Solids analysis					
pH Value**	M	Air dried sample	09/08/2017	113	Electrometric
Total Organic Carbon	N	Air dried sample	09/08/2017	210	IR
Loss on Ignition**	M	Air dried sample	21/08/2017	129	Gravimetric
Acid Neutralization Capacity to pH 7	N	Air dried sample	18/08/2017	NEN 737	Electrometric
Total BTEX**	M	As submitted sample	21/08/2017	181	GCMS
Mineral Oil**	U	As submitted sample	18/08/2017	117	GCFID
Total PCBs (7 congeners)	M	Air dried sample	18/08/2017	120	GCMS
Total PAH (17)**	N	As submitted sample	17/08/2017	133	GCFID

Tests marked N are not UKAS accredited

Report Information

Report No.: 17-13412

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
*	UKAS 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"

Soil sample results are expressed on an air dried basis (dried at < 30°C)

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

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

APPENDIX G – TRIAL HOLE LOGS

Trial Hole Logs



Leap Environmental Ltd
The Atrium, Curtis Road
Dorking, Surrey RH4 1XA
Tel: 01306 646510
www.leapenvironmental.com

Borehole Log

Borehole No.

HA101

Sheet 1 of 1

Project Name: Cobham Barn

Project No.
LP1436

Co-ords: -

Hole Type
HA

Location: Cobham, Kent, DA13 9BL

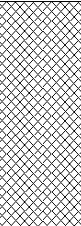
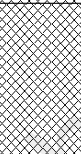
Level:

Scale
1:10

Client: Mr Nichols

Dates: 03/08/2017 - 03/08/2017

Logged By
ML

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.30	ES					MADE GROUND: Dark brown gravelly sand. Gravel is fine to coarse flint, clinker, concrete and brick. <i>Metal nail encountered @ 0.1m.</i>
		0.30 - 0.50	ES		0.30			MADE GROUND: Off-white and brown gravel of chalk and occasional pockets of brown clay.
					0.50			End of borehole at 0.50 m

1

2

Remarks

Borehole remained dry and stable.





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Tel: 01306 646510
www.leapenvironmental.com

Borehole Log

Borehole No.

HA102

Sheet 1 of 1

Project Name: Cobham Barn

Project No.
LP1436

Co-ords: -

Hole Type
HA

Location: Cobham, Kent, DA13 9BL

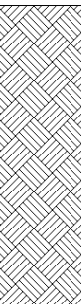
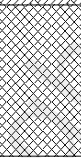
Level:

Scale
1:10

Client: Mr Nichols

Dates: 03/08/2017 - 03/08/2017

Logged By
ML

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.40	ES					TOPSOIL of brown gravelly sandy clay. Gravel is fine to coarse flint, ceramic, chalk, wood fragments and rare ash.
		0.40 - 0.60	ES		0.40			MADE GROUND: Off-white and grey gravel of chalk and pockets of grey brown clay.
					0.60			End of borehole at 0.60 m

1

2

Remarks

Borehole remained dry and stable.





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Borehole Log

Borehole No.

HA103

Sheet 1 of 1

Project Name: Cobham Barn

Project No.
LP1436

Co-ords: -

Hole Type
HA

Location: Cobham, Kent, DA13 9BL

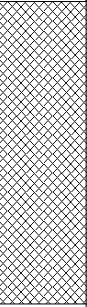
Level:

Scale
1:10

Client: Mr Nichols

Dates: 03/08/2017 - 03/08/2017

Logged By
ML

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.40	ES		0.40			MADE GROUND: Dark brown very gravelly sand. Gravel is fine to coarse flint, brick and chalk with occasional clinker.
								End of borehole at 0.40 m

1

2

Remarks

Borehole remained dry and stable. No further progress - too gravelly.





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Borehole Log

Borehole No.

HA104

Sheet 1 of 1

Project Name: Cobham Barn

Project No.
LP1436

Co-ords: -

Hole Type
HA

Location: Cobham, Kent, DA13 9BL

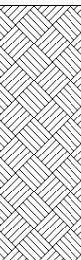
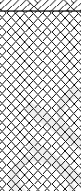
Level:

Scale
1:10

Client: Mr Nichols

Dates: 03/08/2017 - 03/08/2017

Logged By
ML

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.35	ES					TOPSOIL of dark brown gravelly sandy clay. Gravel is fine to coarse flint, chalk, clinker and rootlets.
		0.35 - 0.60	ES		0.35			MADE GROUND: Off-white and orange brown mottled gravel of chalk and pockets of brown clay.
					0.60			End of borehole at 0.60 m

1

2

Remarks

Borehole remained dry and stable.





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Borehole Log

Borehole No.

HA105

Sheet 1 of 1

Project Name: Cobham Barn

Project No.
LP1436

Co-ords: -

Hole Type
HA

Location: Cobham, Kent, DA13 9BL

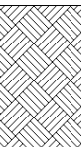
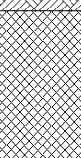
Level:

Scale
1:10

Client: Mr Nichols

Dates: 03/08/2017 - 03/08/2017

Logged By
ML

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.20	ES					TOPSOIL of brown gravelly sand. Gravel is fine to coarse flint, chalk and clinker, with rare brick.
		0.20 - 0.40	ES		0.20			MADE GROUND: Off-white and grey gravel of chalk.
					0.40			End of borehole at 0.40 m

1

2

Remarks

Borehole remained dry and stable. No further progress- flint obstruction.





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www.leapenvironmental.com

Borehole Log

Borehole No.

HA106

Sheet 1 of 1

Project Name: Cobham Barn

Project No.
LP1436

Co-ords: -

Hole Type
HA

Location: Cobham, Kent, DA13 9BL

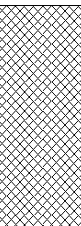
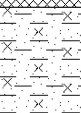
Level:

Scale
1:10

Client: Mr Nichols

Dates: 03/08/2017 - 03/08/2017

Logged By
ML

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.30	ES					MADE GROUND: Dark brown gravelly sand. Gravel is fine to coarse flint, chalk, brick and concrete with cobbles of brick and concrete.
		0.30 - 0.45	ES		0.30			Orange grey brown sandy silty CLAY with gravel of fine to coarse flint.
					0.45			End of borehole at 0.45 m

1

2

Remarks
Borehole remained dry and stable. No further progress- flint obstruction.



APPENDIX H – IMPORTED SOIL SPECIFICATION

Imported Soil
Specification

LEAP SPECIFICATION FOR PLACEMENT OF IMPORTED FILLS AND PROCUREMENT OF IMPORTED TOPSOIL AND SUBSOIL.

I FILLS

I.1 Filling Generally

Filling shall be carried out in accordance with the recommendations of BS 6031: 1981.

Fill shall be maintained and protected in a satisfactory condition at all times until final completion.

Any material rendered unsuitable or unsatisfactory after being placed in the works shall be repaired or replaced as appropriate so that all the completed filling is in accordance with the specification.

I.2 Dimensions

Fills shall be constructed to backfill the excavations made to remove unacceptable material in order to reinstate the ground to finished levels with an allowance for shrinkage and consolidation of the fill material subsequent to completion, and in order that the minimum clean cover as specified in the remediation method statement is achieved.

The excavated levels shall be recorded before the commencement of filling. The level of the filled areas shall be taken and recorded after filling.

2 Types of Fill

There are potentially two types of fill to be used. These are as follows:

- Topsoil
- Subsoil

The capping of landscaped areas will comprise a minimum of 150 mm of topsoil to finished garden level. Underlying subsoil thicknesses will be as required to achieve the overall finished levels and to provide the required cover layer thicknesses as detailed in the main body of this report.

2.1 Topsoil

It is recommended that imported topsoil complies with the requirements of BS 3882: 2015 for a Premium or General Purpose Grade material.

The topsoil shall be free from fragments of glass, bricks, concrete, wire or other potentially hazardous matter.

The topsoil will be subject to the additional limitations set out below.

2.2 Subsoil

Imported manufactured or modified subsoil shall comprise certified clean material which satisfies the conditions set out in BS8601:2013. Subsoil arising from site or from a certified direct transfer (e.g. under CL:AIRE Code of Practice) shall comprise clean natural arisings from construction activities which have been confirmed acceptable by the Engineer.

2.3 Sources of Materials

Imported materials may be obtained from any source unless otherwise stated in the Drawings or in the Specification.

It shall remain the responsibility of the Contractor to obtain only fill material complying with the Specification and Method Statement, notwithstanding any tests which may be accepted by the Engineer.

The Contractor shall demonstrate to the Validation Engineer's satisfaction that his fill materials from each source are uncontaminated by submitting to the Validation Engineer a chemical analysis of material or evidence of such other tests as the Validation Engineer may require for all proposed sources of fill, and if necessary sampling and analysing materials as they are delivered to stockpiles or the fill location on site.

Sampling rates shall be a minimum of one sample per 150 cubic metres of imported soil, unless otherwise agreed with the Engineer. Such tests for chemical composition as may be agreed by the Engineer shall be carried out on each sample and the results of tests shall be forwarded to the Engineer. Testing for contamination on samples taken shall be carried out at a testing laboratory approved by the Engineer and shall be to appropriate MCERTS standards. The Contractor shall maintain records of the location in the Works of fill from each source and the date of delivery to the site, and shall submit these records to the Engineer as requested. Chemical analysis on the imported fill material shall include testing for the contaminants listed in Tables B1 as a minimum. Contaminant concentrations shall be below those listed in Tables B1 and B2, which are attached, unless agreed otherwise by the Engineer. Additional analyses may be requested depending on the source and nature of the material.

In addition, the following shall be deemed as unacceptable for replacement fills:

- Peat, materials from swamps, marshes and bogs.
- Logs, stumps and perishable material.
- Materials in a frozen condition.

-
- Clay having a liquid limit determined in accordance with BS1377; Part 2, exceeding 90% or plasticity index determined in accordance with BS1377; Part 2, exceeding 65%.
 - Material susceptible to spontaneous combustion.

2.4 Practical Considerations

2.4.1 Formation Level / Subgrade Testing

Where made ground from previous site usage remains present at formation level then subgrade / formation level testing will be required to confirm the necessary thickness of sub soil and / or topsoil to be placed. This is assessed in accordance with BRE 2004: Cover systems for land regeneration. Sufficient time should be allowed in the programme for this testing to be completed prior to the requirement for clean cover to be laid. The standard turnaround for laboratory testing is 5 working days from the date of receipt at the laboratory.

2.4.2 Preparation of Subgrade

All pile mat, scaffold base and/or waste materials must be removed in their entirety from the surface of areas to become gardens or public open space / soft landscaping prior to the application of clean cover soils. This aspect of the works will be inspected and validated by the Engineer.

2.4.3 Out of Specification Materials

Should the Contractor proceed with stockpiling or spreading and fill prior to receiving approval from the Engineer of results of the above tests, and the results of such tests show that the fill is contaminated above acceptable levels, the Contractor shall remove all contaminated material and replace it with acceptable material at his own cost as part of the main contract.

2.4.4 Suitability of Materials in Gardens

Materials laid as clean cover in private gardens must not only meet the requirements to be protective against land contamination but they must also be suitable to garden in. Hence, topsoil should not contain more than the British Standard-specified percentage of clay as exceeding this value may result in poor drainage and the failure of turf to establish. Subsoil should contain sufficient nutrition and be of sufficient depth to allow for the establishment of larger shrubs and trees and hence, a subsoil exceeding the British Standard-specified percentage of sand (i.e. an as-dug sand) would be unsuitable.

TABLE B1: CHEMICAL ACCEPTABILITY CRITERIA FOR MATERIALS TO BE IMPORTED FOR USE AS TOPSOIL OR SUBSOIL IN PRIVATE GARDENS

Determinant	Assessment Criteria mg/kg
pH	6.5-9.5
Arsenic	37
Cadmium	11
Trivalent Chromium	910
Hexavalent Chromium	6.0
Copper	2400
Lead	200
Mercury	40 ¹
Nickel	180
Zinc	3700 ²
Selenium	250
Naphthalene	2.3
Acenaphthylene	170
Acenaphthene	210
Fluorene	170
Phenanthrene	95
Anthracene	2400
Fluoranthene	280
Pyrene	620
Benzo(a)Pyrene	2.2
Asbestos	Not detected

Notes to table

1. *Assessment criterion based on inorganic mercury.*
2. *Assessment criterion based on oral pathway only.*

TABLE B2: CHEMICAL ACCEPTABILITY CRITERIA FOR MATERIALS TO BE IMPORTED FOR USE AS TOPSOIL OR SUBSOIL IN PUBLIC OPEN SPACE (NEAR HOUSING)

Determinant	Assessment Criteria mg/kg
pH	6.5-9.5
Arsenic	79
Cadmium	120
Trivalent Chromium	1500
Hexavalent Chromium	7.7
Copper	12000
Lead	630
Mercury	120 ¹
Nickel	230
Zinc	81000 ²
Selenium	1100
Naphthalene	4900
Acenaphthylene	15000
Acenaphthene	15000
Fluorene	9900
Phenanthrene	3100
Anthracene	74000
Fluoranthene	3100
Pyrene	7400
Benzo(a)Pyrene	5.7

Asbestos	<0.001wt%
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Notes to table

1. *Assessment criterion based on inorganic mercury.*
2. *Assessment criterion based on oral pathway only.*