

GARDEN VALIDATION – SILK STREET

Project Name: Silk Street, Newton Heath
Project Number: 16-698
Client: Rowlinson Construction Ltd
Date: 12-06-2023
Project Manager: R Horseman
E3P Engineer: T. Newall
Garden Validation Requirements: 600 mm cover system with break layer
Plots: 59-63

OVERVIEW

An E3P engineer attended the above site to validate the thickness of the cover system placed within the rear garden of plots 59-63 at the site located off Silk Street in Newton Heath.

In total 5 No. hand-excavated trial pits were advanced, with the resulting strata detailed at the rear of this letter.

All trial pits were completed to highlight the required cover system of 600 mm (600 mm topsoil) underlain by a suitable geotextile.

E3P can confirm that our independent validation demonstrates that all gardens have been installed with 600 mm of certified topsoil under the NHBC requirements for a site of this nature.

A list of plots requiring validation and their associated validation letters is presented in Table 1 for reference.



Geo-Environmental



Acoustics



Remediation and
Enabling Earthworks
Design



Arboriculture



Compliance
& Due Diligence



Ecology



Industrial Permitting



Geotechnical

TOPSOIL

E3P attended site on the 31st of March 2023 to obtain three samples of the imported topsoil deposits. Four additional samples were collected on the 31st July 2023. The topsoil was sourced from Baldwin's Landscape Supplies in Wigan. Chemical analysis confirmed that these topsoil deposits were chemically suitable for use within the proposed garden areas.

Analysis for topsoil undertaken by I2 Analytical Laboratory using UKAS accredited methods where applicable.

The chemical analysis suite comprises heavy metals, sulphates, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAHs), speciated and total Petroleum Hydrocarbons (TPH) and asbestos.

Sampling frequency following the agreed Remediation Strategy at 1 sample per 50 m³. Approximately 315 m³ of topsoil has been imported to date. Laboratory analysis certificates are attached to this validation certificate.

Chemical analysis results are included within lab reports 23-26300 and 23-48150 (attached to this letter).

CHEMICAL ANALYSIS

TOPSOIL/SUBSOIL	SOURCE	LAB REFERENCE	SAMPLE REFERENCE	PASS/FAIL
Topsoil	Baldwin's Landscape Supplies	23-26300	TS101-TS103	Pass
Topsoil	Baldwin's Landscape Supplies	23-48150	TS1001-TS1004	Pass

The cover system validation photographs are enclosed within this letter. For information, Table 1 includes references and validation dates of previously validated plots.

TABLE 1 – VALIDATION LETTER REFERENCE

PLOT NUMBER	DATE	REPORT NUMBER
1		
2		
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PLOT NUMBER	DATE	REPORT NUMBER
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24		
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31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

PLOT NUMBER	DATE	REPORT NUMBER
41		
42		
43		
44		
45		
46		
47		
48		
49	12 th April 2023	V1
50	12 th April 2023	V1
51	12 th April 2023	V1
52	12 th April 2023	V1
53	12 th April 2023	V1
54	12 th April 2023	V1
55	12 th April 2023	V1
56	12 th April 2023	V1
57	12 th April 2023	V1
58	12 th April 2023	V1
59	12 th June 2023	V2
60	12 th June 2023	V2
61	12 th June 2023	V2
62	12 th June 2023	V2
63	12 th June 2023	V2
64		
65	12 th April 2023	V1
66	12 th April 2023	V1
67	12 th April 2023	V1
68	12 th April 2023	V1
69	12 th April 2023	V1

Garden Cover System Validation

		Complete
Score	100%	
Site Name	Silk Street	
Location	Unison Business Park, Robson Ave Manchester England M41 7JQ United Kingdom (53.47003031980609, -2.3455507532661835)	
Project Number	16698	
Developer	Rowlinson	
Project Manager	R. Horseman	
Conducted By	Tobey Newall	
Date of visit	12 Jun 2023 3:15 PM BST	

Plot Validation 1 100%

Plot Number 59

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6 m

Depth of Topsoil (mm) 600

Depth of Subsoil (mm) 0

Depth of Cover System at Ground Level (Photo) ☒



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 7



Photo 8

Soil suitable Yes

Geotextile membrane present Yes

Plot Validation 2 100%

Plot Number 60

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6 m

Depth of Topsoil (mm) 600

Depth of Subsoil (mm) 0

Depth of Cover System at Ground Level (Photo) ☒



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 15



Photo 16

Soil suitable Yes

Geotextile membrane present Yes

Plot Validation 3 100%

Plot Number 61

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6 m

Depth of Topsoil (mm) 600

Depth of Subsoil (mm) 0

Depth of Cover System at Ground Level (Photo) ☒



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 24

Soil suitable Yes

Geotextile membrane present Yes

Plot Validation 4 100%

Plot Number 62

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6 m

Depth of Topsoil (mm) 600

Depth of Subsoil (mm) 0

Depth of Cover System at Ground Level (Photo) ☒



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒

Soil suitable Yes

Geotextile membrane present Yes

Plot Validation 5 100%

Plot Number 63

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6 m

Depth of Topsoil (mm) 600

Depth of Subsoil (mm) 0

Depth of Cover System at Ground Level (Photo) ☒



Photo 31



Photo 32



Photo 33



Photo 34



Photo 35



Photo 36

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 37

Soil suitable Yes

Geotextile membrane present Yes

Site Manager or Representative

Name Simon

Signature 12 Jun 2023 2:38 PM BST

Media summary



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30



Photo 31



Photo 32



Photo 33



Photo 34



Photo 35



Photo 36



Photo 37

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Analytical Report Number : 23-26300

Project / Site name:	Silk Street	Samples received on:	31/03/2023
Your job number:	16698	Samples instructed on/ Analysis started on:	31/03/2023
Your order number:	004536	Analysis completed by:	11/04/2023
Report Issue Number:	1	Report issued on:	11/04/2023
Samples Analysed:	3 soil samples		

Izabela Wójcik
Signed:

Izabela Wójcik
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-26300
Project / Site name: Silk Street
Your Order No: 004536

Lab Sample Number	2637174	2637175	2637176
Sample Reference	TS101	TS102	TS103
Sample Number	PLOT 49	PLOT 50	PLOT 51
Depth (m)	None Supplied	None Supplied	None Supplied
Date Sampled	31/03/2023	31/03/2023	31/03/2023
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status
Stone Content	%	0.1	NONE
Moisture Content	%	0.01	NONE
Total mass of sample received	kg	0.001	NONE

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KWB	KWB	KWB

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	7.8	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	410	410	420
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.055	0.023	0.045
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	110	46	89
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	55.4	23.2	44.6
Sulphide	mg/kg	1	MCERTS	11	7	11
Total Sulphur	mg/kg	50	MCERTS	620	660	760
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.4	3.7	5.6

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.1	0.13	0.43
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11
Fluoranthene	mg/kg	0.05	MCERTS	0.25	0.32	0.95
Pyrene	mg/kg	0.05	MCERTS	0.22	0.28	0.95
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.13	0.19	0.46
Chrysene	mg/kg	0.05	MCERTS	0.15	0.19	0.53
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.16	0.23	0.5
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.08	0.1	0.31
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.1	0.18	0.46
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.07	0.1	0.26
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.11	0.13	0.36

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.37	1.85	5.32
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Analytical Report Number: 23-26300
 Project / Site name: Silk Street
 Your Order No: 004536

Lab Sample Number				2637174	2637175	2637176
Sample Reference				TS101	TS102	TS103
Sample Number				PLOT 49	PLOT 50	PLOT 51
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				31/03/2023	31/03/2023	31/03/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	2.8	3.6	4.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	6	7.1	7.8
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	16	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	20	26	31
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	5.6	6.9	7.4
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	60	50	61

Petroleum Hydrocarbons

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	4.6	5.8	8.5
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	29	36	60
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	< 10	< 10	12
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	NONE	33	49	80

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-26300

Project / Site name: Silk Street

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2637174	TS101	PLOT 49	None Supplied	Brown loam and sand with vegetation.
2637175	TS102	PLOT 50	None Supplied	Brown loam and sand with vegetation.
2637176	TS103	PLOT 51	None Supplied	Brown loam and sand with vegetation.

Analytical Report Number : 23-26300

Project / Site name: Silk Street

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

Analytical Report Number : 23-26300
Project / Site name: Silk Street

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC. Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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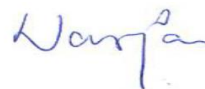
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Analytical Report Number : 23-48150

Project / Site name:	Silk Road	Samples received on:	31/07/2023
Your job number:	16-698	Samples instructed on/ Analysis started on:	31/07/2023
Your order number:	005640	Analysis completed by:	04/08/2023
Report Issue Number:	1	Report issued on:	04/08/2023
Samples Analysed:	4 soil samples		



Signed:

Dominika Warjan
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-48150
Project / Site name: Silk Road
Your Order No: 005640

Lab Sample Number				2766164	2766165	2766166	2766167
Sample Reference				TS001 - Plot 52	TS002 - Plot 50	TS003 - Plot 54	TS004 - Plot 57
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				31/07/2023	31/07/2023	31/07/2023	31/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	31	29	25	29
Total mass of sample received	kg	0.001	NONE	0.2	0.2	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM	WEM	WEM

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	8.1	8.3	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	480	410	240	360
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.022	0.026	0.024	0.037
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	43	51	48	73
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	21.6	25.6	24	36.5
Sulphide	mg/kg	1	MCERTS	1.2	1.3	1.3	1.9
Total Sulphur	mg/kg	50	MCERTS	920	980	580	820
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4	4.2	4.2	4.7

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.07	0.07	0.15	0.21
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.4	0.22	0.39	0.49
Pyrene	mg/kg	0.05	MCERTS	0.38	0.22	0.39	0.45
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.19	0.14	0.23	0.28
Chrysene	mg/kg	0.05	MCERTS	0.24	0.15	0.26	0.28
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.3	0.26	0.37	0.38
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.13	0.12	0.16	0.12
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.23	0.21	0.3	0.29
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.16	0.15	0.2	0.14
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.2	0.2	0.24	0.19

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.3	1.74	2.76	2.83
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Lab Sample Number	2766164	2766165	2766166	2766167
Sample Reference	TS001 - Plot 52	TS002 - Plot 50	TS003 - Plot 54	TS004 - Plot 57
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	31/07/2023	31/07/2023	31/07/2023	31/07/2023
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4	4.5	3.9	4.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.3	0.2	0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	U/S**	U/S**	U/S**	U/S**
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	8.3	9	8.2	7.5
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	30	24	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	34	41	27	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	7.5	8.5	7.3	7.3
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	64	72	57	55

Petroleum Hydrocarbons

TPH (C5 - C6) HS ID TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C6 - C8) HS ID TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS ID TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH CU ID TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH CU ID TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21) EH CU ID TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH (C21 - C35) EH CU ID TOTAL	mg/kg	10	MCERTS	50	30	53	42
TPH (C35 - C40) EH CU ID TOTAL	mg/kg	10	NONE	12	< 10	15	13
TPH Total C5 - C40 EH CU+HS ID TOTAL	mg/kg	10	NONE	65	39	79	61

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2766164	TS001 - Plot 52	None Supplied	None Supplied	Brown loam with gravel and vegetation.
2766165	TS002 - Plot 50	None Supplied	None Supplied	Brown loam with gravel and vegetation.
2766166	TS003 - Plot 54	None Supplied	None Supplied	Brown loam with gravel and vegetation.
2766167	TS004 - Plot 57	None Supplied	None Supplied	Brown loam with gravel and vegetation.

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Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 °C)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphénylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

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Project / Site name: Silk Road

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

**Analysis could not be completed due to sample matrix.