

Our ref: CRS/L21056/Capping Validation

Ms B. Lohlun
Inland Homes
Burnham Yard
London End
Beaconsfield
HP9 2JH

02 July 2021

Dear Bronwen

CAPPING VALIDATION VINE STREET, UXBRIDGE

Further to your recent instruction Patrick Parsons have undertaken validation of the capping layer at the above site. The remedial strategy for the site was set in the following report:

- 'Former Randalls Site, Vine Street, Uxbridge – Remediation Strategy', Fairhurst, Report Ref 113780 R1.4, dated 18/02/2019.

The above report concluded that due to elevated levels of lead and various PAH compounds that a 500mm capping layer was required in soft landscaped areas and that the validation should comprise verification pits on an approximate 25m grid and testing of the imported capping material at a rate of one sample per 250m³.

An engineer from Patrick Parson visited the site on the 03 July 2021 to excavate hand dug trial pits in the soft landscaped areas. A plan of the hole locations is attached for reference, the number of pits is in line with the requirements set out in the above report. In all locations the capping layer was found to be the required 500mm and compromised a combination of subsoil and topsoil, this is shown on the enclosed photographs.

To ensure the imported soils were suitable for use three samples of subsoil and three samples of topsoil were collected and subject to chemical analysis for a general range of contaminants. As six samples have been tested then in accordance with the RMS this is sufficient to validate a total soil import of 1500m³ which is far more than has actually been imported and used to form the capping layer.

The results of the chemical validation analysis are enclosed for reference, the results have been compared against the Patrick Parsons Generic Assessment Criteria for residential end use without plant uptake (enclosed for reference). All the results for metals, inorganics, PAH and hydrocarbons were below their respective GAC and asbestos was not recorded in any of the samples as such the soils do not pose a risk to human health and are suitable for use.



The validation works completed have shown the capping layer in the soft landscaped areas is the required thickness and is made up of soils that do not pose a risk to human health as such it is considered that remediation works have been successfully completed in accordance with the Remediation Method Statement and the residual risk to human health is negligible.

We trust that this report is suitable for your current requirements. Should you have any queries, please do not hesitate to contact us.

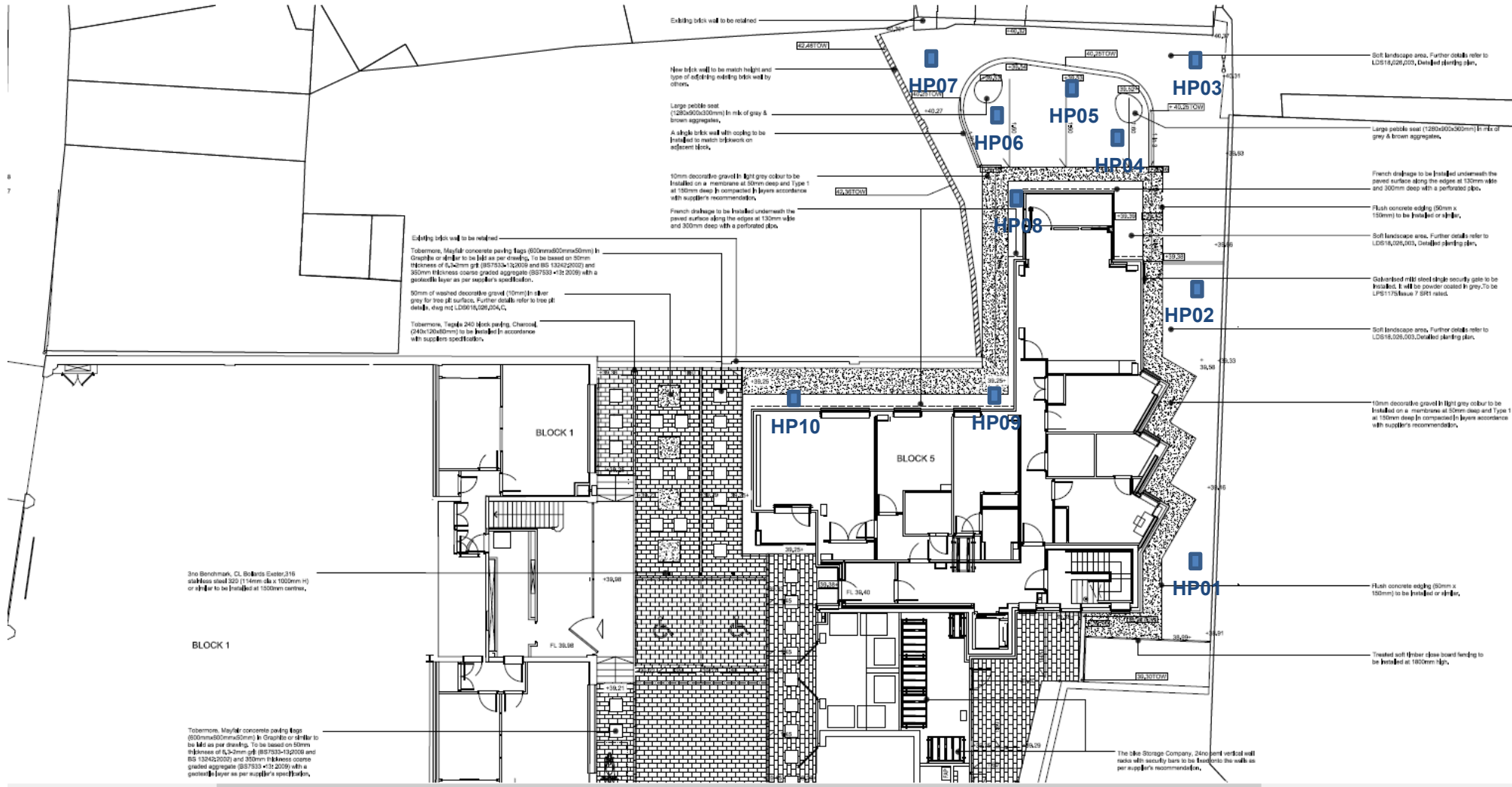
Yours sincerely



Chris Storey

Director of Geo-Environmental Services

Enc. L21056 Capping Validation Location Plan
L21056 Capping Validation Photographs
L21056 Topsoil and Subsoil Chemical Analysis Results (i2 Report 21-79744)





HP1



HP2



HP3



HP4



HP5



HP6



HP7



HP8



HP9



HP10



General



General

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Analytical Report Number : 21-79744

Project / Site name:	Vine street, Uxbridge	Samples received on:	04/06/2021
Your job number:	L21056	Samples instructed on/ Analysis started on:	08/06/2021
Your order number:	PP186	Analysis completed by:	15/06/2021
Report Issue Number:	1	Report issued on:	15/06/2021
Samples Analysed:	6 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
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

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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: 21-79744
Project / Site name: Vine street, Uxbridge
Your Order No: PP186

Lab Sample Number				1895689	1895690	1895691	1895692	1895693
Sample Reference				HP01	HP04	HP06	HP07	HP09
Sample Number				Topsoil	Subsoil	Topsoil	Subsoil	Topsoil
Depth (m)				0.20	0.35	0.10	0.30	0.10
Date Sampled				03/06/2021	03/06/2021	03/06/2021	03/06/2021	03/06/2021
Time Taken				None Supplied	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	< 0.1
Moisture Content	%	0.01	NONE	20	11	14	9.0	12
Total mass of sample received	kg	0.001	NONE	0.60	0.90	0.70	0.90	0.70

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0	9.9	8.3	11.6	8.4
Total Sulphate as SO ₄	%	0.005	MCERTS	0.109	0.102	0.100	1.19	0.125
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	470	430	440	47	350
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.23	0.22	0.22	0.023	0.18
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	234	216	218	23.3	177
Total Organic Carbon (TOC)	%	0.1	MCERTS	5.5	0.9	4.1	1.0	4.4

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 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	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.96	0.41	0.81	< 0.05	0.44
Anthracene	mg/kg	0.05	MCERTS	0.25	< 0.05	0.30	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.9	1.5	1.9	0.33	1.1
Pyrene	mg/kg	0.05	MCERTS	1.7	1.4	1.6	0.31	0.91
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.85	0.91	1.1	0.20	0.59
Chrysene	mg/kg	0.05	MCERTS	0.82	0.72	0.82	0.24	0.59
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.0	0.86	1.2	0.22	0.73
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.45	0.41	0.46	0.23	0.36
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.82	0.60	0.92	0.21	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.71	0.58	0.86	0.21	0.63
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.86	0.74	0.90	0.26	0.67

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	10.3	8.11	10.9	2.21	6.56
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Analytical Report Number: 21-79744
Project / Site name: Vine street, Uxbridge
Your Order No: PP186

Lab Sample Number				1895689	1895690	1895691	1895692	1895693
Sample Reference				HP01	HP04	HP06	HP07	HP09
Sample Number				Topsoil	Subsoil	Topsoil	Subsoil	Topsoil
Depth (m)				0.20	0.35	0.10	0.30	0.10
Date Sampled				03/06/2021	03/06/2021	03/06/2021	03/06/2021	03/06/2021
Time Taken				None Supplied	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	15	16	14	15	10
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	1.0	0.8	0.9	0.7
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	24	22	45	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	46	28	45	31	37
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	230	110	290	90
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	17	14	24	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	150	260	120	180	110

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	2.1	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	46	< 8.0	33
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	56	< 10	41

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	13	< 10	11	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	39	22	35	16	32
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	52	30	46	22	42

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-79744
Project / Site name: Vine street, Uxbridge
Your Order No: PP186

Lab Sample Number				1895694
Sample Reference				HP10
Sample Number				Subsoil
Depth (m)				0.40
Date Sampled				03/06/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	9.8
Total mass of sample received	kg	0.001	NONE	1.0

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	10.8
Total Sulphate as SO ₄	%	0.005	MCERTS	0.489
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	840
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.42
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	421
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.44
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.94
Pyrene	mg/kg	0.05	MCERTS	0.86
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.56
Chrysene	mg/kg	0.05	MCERTS	0.54
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.76
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.35
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.54
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.64
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.79

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.42
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Analytical Report Number: 21-79744
Project / Site name: Vine street, Uxbridge
Your Order No: PP186

Lab Sample Number				1895694
Sample Reference				HP10
Sample Number				Subsoil
Depth (m)				0.40
Date Sampled				03/06/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Heavy Metals / Metalloids				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	4.2
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	11
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	40
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	54

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	30
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	36

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-79744

Project / Site name: Vine street, Uxbridge

* 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 *
1895689	HP01	Topsoil	0.2	Brown loam and sand with vegetation and gravel.
1895690	HP04	Subsoil	0.35	Brown clay and sand with gravel.
1895691	HP06	Topsoil	0.1	Brown loam and sand with gravel and vegetation.
1895692	HP07	Subsoil	0.3	Brown clay and sand with rubble and vegetation.
1895693	HP09	Topsoil	0.1	Brown loam and sand with vegetation and gravel.
1895694	HP10	Subsoil	0.4	Light brown sand with gravel.

Analytical Report Number : 21-79744
Project / Site name: Vine street, Uxbridge

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
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
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
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
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 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
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil	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

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' 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.