



Contaminated Land Phase Two Intrusive Investigation for proposed residential development at 4 Thirsfield Drive, Manchester, M11 4BF.

Prepared for

Building Design Services
6 Stock Close
Rochdale
OL12 6BB

June 2024



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Introduction

Martin Environmental Solutions has been commissioned, to carry out a phase two intrusive investigation for a proposed residential development on land at 4 Thirsfield Drive, Manchester, M11 4BF. The Phase II Intrusive investigation follows a phase I desk study report which identified the presence of a former brick works on site.

The Site:

Site Address: 4 Thirsfield Drive, Manchester, M11 4BF.

Grid reference: 388119; 398902

An aerial photograph of the site is included in Figure 1.

Current Site use:

The site currently consists of an open piece of rectangular land which has now been cleared of vegetation and foundations had been dug at the time of the phase II investigation. Residential properties lie to the immediate north, east and south with Thirsfield Drive to the west and more residential properties beyond.

The phase I report identified the site as being located over a historic clay pit attached to a brick works on 1922 historic mapping. Subsequent maps in 1932 confirmed that the nearby brick works had been demolished and later in 1949 a dwelling house was erected over the site, along with a housing estate over the surrounding area. This too was demolished between 2001-03 and the site has formed a garden of the 4 Thirsfield Drive since.



Investigation

A site visit was conducted on the 31st May 2024 to undertake an intrusive investigation. Samples were taken from five locations across the site, identified in Figure 2.

The samples were sent to Chemtech environmental a UKAS and MCERTs laboratory and each analysed for heavy metals, Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH), and Asbestos.

Five trail pits were excavated across the site and samples taken for analysis. Shallow samples were taken at approx. 300mm bgl and further samples at approx. 600mm bgl at each location.

Trail pits were concentrated on the amenity areas of the proposed dwellings together with a further sample in the centre of the proposed dwelling.



Results

The full sampling results are presented in Appendix 1, the sampling locations in Figure 2. The results have been compared against the LQM/CIEH S4UL's for residential with homegrown produce scenario & the C4SL value for Lead. Soil organic matter ranged across the site ranged from 5.6-44.2%. Appropriate levels have been used within the analysis as the most conservative figure available.

Details of each trail pit, including photographs are shown in Appendix 2. No ground water was encountered in any of the trail pits.

Soil encountered in each trail pit was sandy loamy clay with gravel and stone, roots in the upper layer. Brick fragments were also identified in each trail pit.

The results of the samples identified no asbestos fibres within the site.

However, elevated levels of lead were identified in each sample with the exception of the deeper sample of TP4, along with elevated level of Arsenic in all but the shallow sample from TP1.

In addition, elevated levels of TPH (EPH Aromatic (>EC21-EC35)) were identified in the shallow sample of TP4 and elevated levels of PAH in TP2-5. These being:

Benzo(a)anthracene	TP 4 & 5
Chrysene	TP 4
Benzo(b)fluoranthene	TP 2, 4, & 5
Benzo(a)pyrene	TP 2-5
Indeno(123cd)pyrene	TP 4
Dibenz(ah)anthracene	TP 2-5
Benzo(ghi)perylene	TP 4

Heavy metal exceedances were identified across the site the principal risk from these would relate to the ingestion of the substances dermal contact poses some risk while the oral route is minimal.

The TPH exceedances were identified in the Aromatic range >CE21-EC35. The LQM/CIEH S4ULs for Human Health Risk Assessments confirms that compounds >EC16 are considered non-volatile, as a result any risk posed by these compounds relates to the oral ingestion of the compounds.



Of the elevated PAH's found on site each has a relatively high melting point and area solid at room temperature, indication vapours will not be a potential risk from ground contamination. Inhalation of fine particles, oral and dermal pathways do however pose a likely risk to future occupiers.

Potential for Ground Gas to be present on site

The development site lies over a historic clay pit for a nearby brickworks. The brickworks closed prior to 1932, with the area including brick works and clay pit being redeveloped into a housing estate by 1949, with the area shown as marked out in 1938.

No other landfill, waste or area of fill have been identified within 250m of the site. There is no evidence of the former clay pit having been filled with any biodegradable material likely to generate any ground gas and given the area was filled for the purpose of building a large housing estate, it is unlikely that any significant quantities of such material would have been deposited. No additional information has been identified suggesting any ground gas issues in the locality.

The ground on site has identified a shallow layer of made ground with sandy clay below. The sandy clay helping to restrict the passage of ground gas.

It has also been >70 years and nearer 80 years since the fill would have occurred. Gas production generally ceases after ~50 years and as such it is highly unlikely that any degradable material present within the former clay pit would still be producing gas at this stage. However, in accordance with the Desk Study Report as a precautionary measure only a gas protection system has been recommended. An effective gas protection system requires at least two protective measures, these generally consist of a membrane and a sub-floor ventilation system.

The proposed dwelling is to be constructed from standard strip foundations with a suspended floor over a ventilated void space. In accordance with BS8485:2015+A1:2019, for a type A building (private domestic property) to achieve a gas protection for a site characteristic gas situation of CS2 a minimum gas protection score of 3.5 is required (CS3 = 4.5).



The above will provide a score of 4.5;

Ventilation – passive void – 2.5

Gas protection membrane – 2.

Thus, a suitably installed gas protection membrane with subfloor ventilation void will provide sufficient protection to any unforeseen ground gas present.



Conclusions

Following the phase II investigation contamination likely to pose a potential significant risk of significant harm to the identified receptors has been found on site in the form of heavy metals (Lead and Arsenic), Total Petroleum Hydrocarbons (Aromatic EC>21-35), and Polycyclic Aromatic Hydrocarbons (Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(a)pyrene, Indeno(123cd)pyrene, Dibenz(ah)anthracene, Benzo(ghi)perylene).

An updated conceptual model has been provided below and remediation of the site is recommended to ensure any source-pathway-receptor pollutant linkages are removed.



Updated Conceptual Model

The table represents a basic conceptual model. It highlights the potential sources of pollutants identified from the gathered information, and potential pathways in which any contaminants could reach the identified receptors.

Pathway	Description	Identified sources	Receptor at risk	Likelihood
1	Run off and seepage into groundwater from any spillages	PAHs, TPH	Watercourse/ Environment	Low
2	Migration of gases into the building.	-	Future users	V. Low,
3	Inhalation of gases/ vapours outside	-	Construction workers/future users	V. Low
4	Inhalation of fine particles	Heavy metals, PAH TPH,	Construction workers/future users Construction workers	Medium Low
5	Direct ingestion of contaminated soil	Heavy Metals, PAHs TPH	Construction workers/future users Construction workers	Medium Low
6	In-direct ingestion of contaminated soil	Heavy Metals, PAHs	Future users	Medium
7	Absorption via direct dermal contact with contaminated soil	Heavy Metals, PAHs TPH	Construction workers/future users Construction workers	Medium Low



Recommendations

As a result of the desk study and intrusive investigations undertaken which confirms the presence of some elevated levels of contaminants present on site and the need for site remediation. Considering the size and restraints of the development site the following recommendations are proposed.

1. A clean cover system is provided across all landscaped areas. The clean cover system should be a minimum of 600mm deep, with a capillary and no dig break below. Imported material will need to be provided with suitable test certificates to provide evidence that it is clean, suitable and safe for the intended use within a domestic garden. Excavated material will need to be appropriately disposed of with waste transfer notes kept for evidence.
2. New services installed shall be installed in trenches which are backfilled with clean imported material.
3. All drinking water supply pipes and connections shall be of a MDPE barrier pipe design.
4. The construction of the building shall incorporate a clear void below the ground floor for passive ventilation of the space and a gas protection barrier. The barrier shall be formed using a suitable gas membrane with joints appropriately overlapped and sealed and all penetrations sealed.
5. All construction workers to be given suitable advice and training on the risks from contamination with adequate welfare facilities provided for handwashing etc.

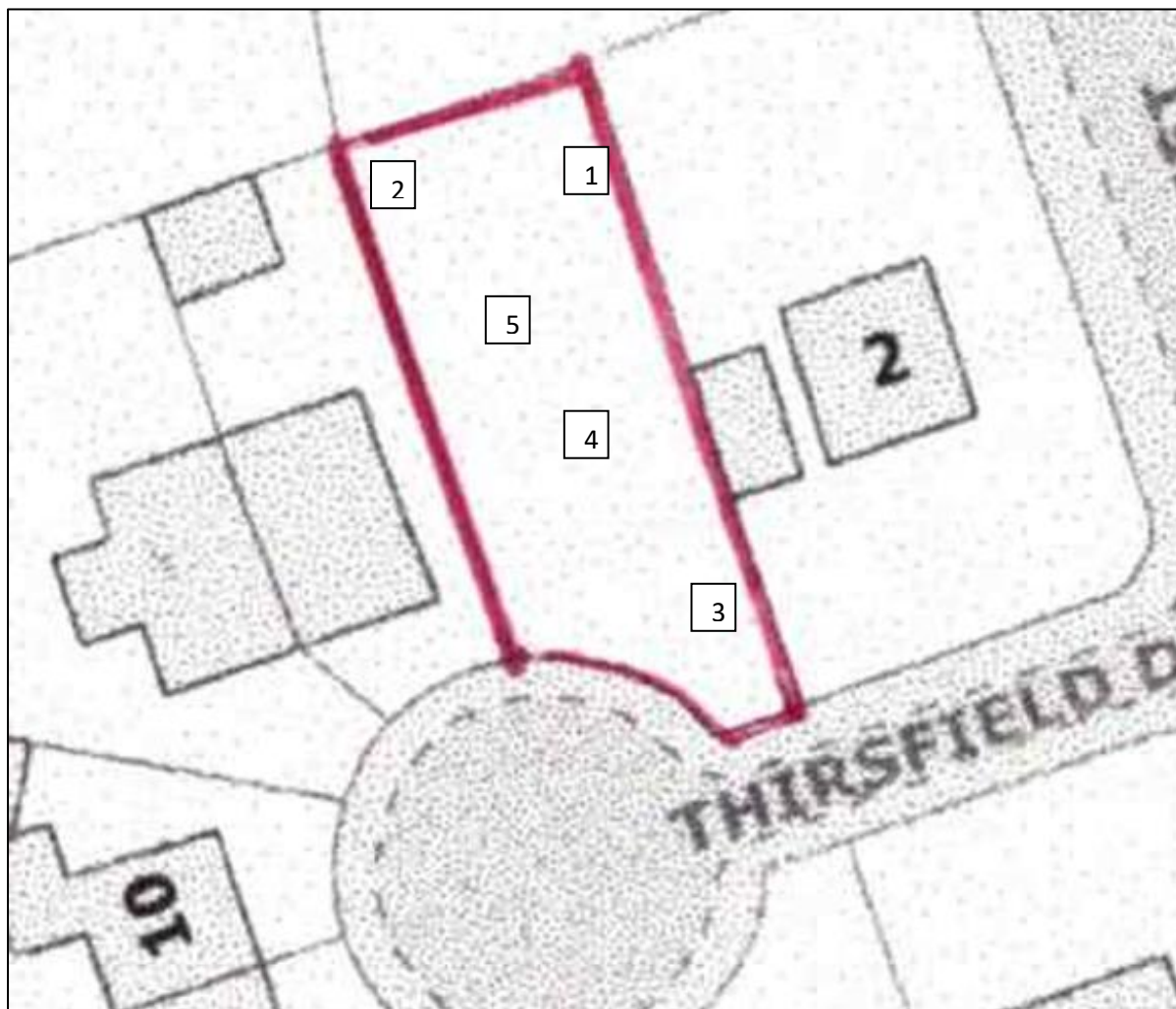
A verification report will be required on completion to demonstrate that the membrane has been installed correctly and a sufficient level of clean material has been provided in the landscaped areas.

The above measures will remove any contamination presence within the first 600mm of ground and break the source-pathway-receptor pollutant linkages. Ensuring that the site when complete will not preset any significant possibility of significant harm to the future residents and will be safe for the intended use.

Figure 1 – Aerial Photograph



Figure 2 – Sampling Locations





Appendix 1 – Soil Sample Results



ANALYTICAL TEST REPORT

Contract no: 133929

Contract name: Thirsfield Dr

Client reference: -

Clients name: Martin Environmental Solutions

Clients address: 14 Hermitage Way
Lytham
St Annes
FY8 4FX

Samples received: 04 June 2024

Analysis started: 04 June 2024

Analysis completed: 13 June 2024

Report issued: 13 June 2024

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

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SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
133929-1	TP1a	0.30	Sandy Loamy Clay with Gravel & Roots	-	-	22
133929-2	TP1b	0.60	Sandy Loamy Clay with Gravel & Roots	-	-	18.4
133929-3	TP2a	0.30	Sandy Loamy Clay with Gravel & Roots	-	-	21
133929-4	TP2b	0.60	Sandy Loamy Clay with Gravel & Roots	-	-	23.4
133929-5	TP3a	0.30	Sandy Loamy Clay with Gravel & Roots	-	-	18.5
133929-6	TP3b	0.60	Sandy Loamy Clay with Gravel & Roots	-	-	20.9
133929-7	TP4a	0.30	Sandy Loamy Clay with Gravel & Roots	-	-	18.6
133929-8	TP4b	0.60	Sandy Loamy Clay with Gravel & Roots	-	-	19.9
133929-9	TP5a	0.35	Sandy Loamy Clay with Gravel & Roots	-	-	19
133929-10	TP5b	0.60	Sandy Loamy Clay with Gravel & Roots	-	-	20.4

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SOILS

Lab number			133929-1	133929-2	133929-3	133929-4	133929-5	133929-6
Sample id			TP1a	TP1b	TP2a	TP2b	TP3a	TP3b
Depth (m)			0.30	0.60	0.30	0.60	0.30	0.60
Date sampled			31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024
Test	Method	Units						
Arsenic (total)	CE264 ^M	mg/kg As	27.2	57.5	53.1	59.4	52.9	75.2
Cadmium (total)	CE264 ^M	mg/kg Cd	6.3	2.9	4.4	8.4	5.4	5.6
Chromium (total)	CE264 ^U	mg/kg Cr	41.9	55.7	67.9	42.0	116.7	132.7
Copper (total)	CE264 ^M	mg/kg Cu	323.5	152.4	369.8	370.6	318.8	329.3
Lead (total)	CE264 ^U	mg/kg Pb	698.8	241.0	465.1	1374.6	628.3	576.3
Mercury (total)	CE264 ^U	mg/kg Hg	1.1	<0.7	0.7	<0.7	0.7	<0.7
Nickel (total)	CE264 ^M	mg/kg Ni	30.6	57.9	47.5	26.4	47.0	88.7
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3	<3
Zinc (total)	CE264 ^M	mg/kg Zn	1108.9	356.2	918.3	2301.7	1532.4	921.7
Total Organic Carbon (TOC)	CE197	% w/w C	13.7	3.3	7.4	14.0	9.3	11.7
Estimate of OMC (calculated from TOC)	CE197	% w/w	23.7	5.6	12.7	24.1	16.0	20.1
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	0.07	0.12	0.36	0.33	0.15
Acenaphthylene	CE087 ^M	mg/kg	<0.02	0.02	<0.02	0.02	0.08	0.03
Acenaphthene	CE087 ^M	mg/kg	0.04	0.09	0.32	0.09	1.23	0.19
Fluorene	CE087 ^U	mg/kg	0.03	0.06	0.19	0.04	0.73	0.11
Phenanthrene	CE087 ^M	mg/kg	0.33	0.77	3.45	0.50	8.99	1.70
Anthracene	CE087 ^U	mg/kg	0.09	0.21	0.88	0.19	2.29	0.45
Fluoranthene	CE087 ^M	mg/kg	0.65	1.18	6.48	0.82	12.50	3.48
Pyrene	CE087 ^M	mg/kg	0.60	1.19	5.55	0.88	11.34	3.19
Benzo(a)anthracene	CE087 ^U	mg/kg	0.36	0.68	2.80	0.48	5.31	1.59
Chrysene	CE087 ^M	mg/kg	0.39	0.73	3.04	0.39	5.40	1.46
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.45	0.83	3.40	0.78	5.81	1.94
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.20	0.30	1.34	0.28	2.30	0.69
Benzo(a)pyrene	CE087 ^U	mg/kg	0.37	0.73	3.21	0.76	5.18	1.82
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.34	0.63	2.52	1.13	4.33	1.26
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.06	0.12	0.43	0.26	0.77	0.27
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.26	0.53	1.77	1.28	3.13	1.20
PAH (total of USEPA 16)	CE087	mg/kg	4.18	8.15	35.5	8.27	69.7	19.5
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	2	3	13	7	3	6
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	6	9	175	111	12	14
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	13	37	218	769	60	116
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	63	146	2155	1267	242	1374
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	17	40	140	255	60	81
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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SOILS

Lab number			133929-1	133929-2	133929-3	133929-4	133929-5	133929-6
Sample id			TP1a	TP1b	TP2a	TP2b	TP3a	TP3b
Depth (m)			0.30	0.60	0.30	0.60	0.30	0.60
Date sampled			31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024
Test	Method	Units						
EPH Aliphatic (>C10-C12)		mg/kg	<1	<1	<2	<1	<1	1
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<0.5	<0.5	3	2	1	3
EPH Aliphatic (>C16-C35)	CE250	mg/kg	8	13	46	39	25	731
EPH Aliphatic (>C35-C44)	CE250	mg/kg	1	2	13	17	4	8
Subcontracted Analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			133929-7	133929-8	133929-9	133929-10
Sample id			TP4a	TP4b	TP5a	TP5b
Depth (m)			0.30	0.60	0.35	0.60
Date sampled			31/05/2024	31/05/2024	31/05/2024	31/05/2024
Test	Method	Units				
Arsenic (total)	CE264 ^H	mg/kg As	53.9	39.6	84.5	139.8
Cadmium (total)	CE264 ^H	mg/kg Cd	4.2	2.0	5.1	6.0
Chromium (total)	CE264 ^U	mg/kg Cr	75.3	67.2	186.5	111.8
Copper (total)	CE264 ^H	mg/kg Cu	185.4	128.2	577.2	721.4
Lead (total)	CE264 ^U	mg/kg Pb	264.3	169.2	2092.7	3435.6
Mercury (total)	CE264 ^U	mg/kg Hg	<0.7	<0.7	1.2	2.6
Nickel (total)	CE264 ^H	mg/kg Ni	67.5	61.3	76.7	104.8
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3
Zinc (total)	CE264 ^H	mg/kg Zn	758.9	300.3	1005.4	1028.4
Total Organic Carbon (TOC)	CE197	% w/w C	25.6	168.3	7.1	7.7
Estimate of OMC (calculated from TOC)	CE197	% w/w	44.2	290.2	12.3	13.3
PAH						
Naphthalene	CE087 ^M	mg/kg	0.16	0.33	0.31	0.10
Acenaphthylene	CE087 ^M	mg/kg	0.07	0.24	0.11	0.04
Acenaphthene	CE087 ^M	mg/kg	0.11	0.54	0.86	0.13
Fluorene	CE087 ^U	mg/kg	0.08	0.80	0.57	0.08
Phenanthrene	CE087 ^M	mg/kg	1.34	13.95	8.84	1.50
Anthracene	CE087 ^U	mg/kg	0.32	3.85	2.79	0.42
Fluoranthene	CE087 ^M	mg/kg	2.44	12.90	17.96	3.60
Pyrene	CE087 ^M	mg/kg	2.55	52.09	15.49	3.45
Benzo(a)anthracene	CE087 ^U	mg/kg	1.81	98.96	9.22	1.99
Chrysene	CE087 ^M	mg/kg	2.25	86.22	6.66	1.52
Benzo(b)fluoranthene	CE087 ^M	mg/kg	2.75	124.00	10.55	2.40
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.84	34.40	4.18	0.93
Benzo(a)pyrene	CE087 ^U	mg/kg	3.85	323.22	7.95	1.73
Indeno(123cd)pyrene	CE087 ^M	mg/kg	3.18	216.30	6.45	1.35
Dibenz(ah)anthracene	CE087 ^M	mg/kg	1.34	108.30	1.13	0.30
Benzo(ghi)perylene	CE087 ^M	mg/kg	6.34	408.34	5.29	1.23
PAH (total of USEPA 16)	CE087	mg/kg	29.4	1484	98.4	20.8
TPH						
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	158	25	7	6
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	325	91	29	16
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	320	221	162	43
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	4306	1350	491	174
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	1491	513	88	33
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1

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SOILS

Lab number			133929-7	133929-8	133929-9	133929-10
Sample id			TP4a	TP4b	TP5a	TP5b
Depth (m)			0.30	0.60	0.35	0.60
Date sampled			31/05/2024	31/05/2024	31/05/2024	31/05/2024
Test	Method	Units				
EPH Aliphatic (>C10-C12)	CE250	mg/kg	44	9	2	2
EPH Aliphatic (>C12-C16)	CE250	mg/kg	70	17	5	3
EPH Aliphatic (>C16-C35)	CE250	mg/kg	744	446	34	25
EPH Aliphatic (>C35-C44)	CE250	mg/kg	159	33	4	2
Subcontracted Analysis						
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE264	Arsenic (total)	Aqua Regia Extraction, ICPOES	Dry	M	1.8	mg/kg As
CE264	Cadmium (total)	Aqua Regia Extraction, ICPOES	Dry	M	1.6	mg/kg Cd
CE264	Chromium (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Cr
CE264	Copper (total)	Aqua Regia Extraction, ICPOES	Dry	M	1.6	mg/kg Cu
CE264	Lead (total)	Aqua Regia Extraction, ICPOES	Dry	U	2.3	mg/kg Pb
CE264	Mercury (total)	Aqua Regia Extraction, ICPOES	Dry	U	0.7	mg/kg Hg
CE264	Nickel (total)	Aqua Regia Extraction, ICPOES	Dry	M	2.1	mg/kg Ni
CE264	Selenium (total)	Aqua Regia Extraction, ICPOES	Dry	U	3	mg/kg Se
CE264	Zinc (total)	Aqua Regia Extraction, ICPOES	Dry	M	4	mg/kg Zn
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.016	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.015	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.013	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.013	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.014	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.017	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.017	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.016	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.012	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.028	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.025	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.019	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.019	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.017	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.019	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.028	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		0.6	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1.5	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		4.5	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		2	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		0.5	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		3	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		0.5	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-



Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
133929-1	TP1a	0.30	N	
133929-2	TP1b	0.60	N	
133929-3	TP2a	0.30	N	
133929-4	TP2b	0.60	N	
133929-5	TP3a	0.30	N	
133929-6	TP3b	0.60	N	
133929-7	TP4a	0.30	N	
133929-8	TP4b	0.60	N	
133929-9	TP5a	0.35	N	
133929-10	TP5b	0.60	N	



Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Soil/Solid samples will be disposed of 4 weeks from initial receipt unless otherwise agreed.

Waters and leachate samples will be disposed of 2 weeks from report issue unless otherwise agreed.

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132693/469907-0

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis



Lab number			133929-1	133929-2	133929-3	133929-4	133929-5	133929-6	133929-7	133929-8	133929-9	133929-10
Sample id			TP1a	TP1b	TP2a	TP2b	TP3a	TP3b	TP4a	TP4b	TP5a	TP5b
Depth (m)			0.30	0.60	0.30	0.60	0.30	0.60	0.30	0.60	0.35	0.60
Date sampled			31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024
Test	Method	Units										
Arsenic (total)	CE264M	mg/kg As	27.2	57.5	53.1	59.4	52.9	75.2	53.9	39.6	84.5	139.8
Cadmium (total)	CE264M	mg/kg Cd	6.3	2.9	4.4	8.4	5.4	5.6	4.2	2.0	5.1	6.0
Chromium (total)	CE264U	mg/kg Cr	41.9	55.7	67.9	42.0	116.7	132.7	75.3	67.2	186.5	111.8
Copper (total)	CE264M	mg/kg Cu	323.5	152.4	369.8	370.6	318.8	329.3	185.4	128.2	577.2	721.4
Lead (total)	CE264U	mg/kg Pb	698.8	241.0	465.1	1374.6	628.3	576.3	264.3	169.2	2092.7	3435.6
Mercury (total)	CE264U	mg/kg Hg	1.1	<0.7	0.7	<0.7	0.7	<0.7	<0.7	<0.7	1.2	2.6
Nickel (total)	CE264M	mg/kg Ni	30.6	57.9	47.5	26.4	47.0	88.7	67.5	61.3	76.7	104.8
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Zinc (total)	CE264M	mg/kg Zn	1108.9	356.2	918.3	2301.7	1532.4	921.7	758.9	300.3	1005.4	1028.4
Total Organic Carbon (TOC)	CE197	% w/w C	13.7	3.3	7.4	14.0	9.3	11.7	25.6	11.7	7.1	7.7
Estimate of OMC (calculated from TOC)	CE197	% w/w	23.7	5.6	12.7	24.1	16.0	20.1	44.2	290.2	12.3	13.3



PAH												
Naphthalene	CE087 M	mg/kg	<0.02	0.07	0.12	0.36	0.33	0.15	0.16	0.33	0.31	0.10
Acenaphthylene	CE087 M	mg/kg	<0.02	0.02	<0.02	0.02	0.08	0.03	0.07	0.24	0.11	0.04
Acenaphthene	CE087 M	mg/kg	0.04	0.09	0.32	0.09	1.23	0.19	0.11	0.54	0.86	0.13
Fluorene	CE087 U	mg/kg	0.03	0.06	0.19	0.04	0.73	0.11	0.08	0.80	0.57	0.08
Phenanthrene	CE087 M	mg/kg	0.33	0.77	3.45	0.50	8.99	1.70	1.34	13.95	8.84	1.50
Anthracene	CE087 U	mg/kg	0.09	0.21	0.88	0.19	2.29	0.45	0.32	3.85	2.79	0.42
Fluoranthene	CE087 M	mg/kg	0.65	1.18	6.48	0.82	12.50	3.48	2.44	12.90	17.96	3.60
Pyrene	CE087 M	mg/kg	0.60	1.19	5.55	0.88	11.34	3.19	2.55	52.09	15.49	3.45
Benzo(a)anthracene	CE087 U	mg/kg	0.36	0.68	2.80	0.48	5.31	1.59	1.81	98.96	9.22	1.99
Chrysene	CE087 M	mg/kg	0.39	0.73	3.04	0.39	5.40	1.46	2.25	86.22	6.66	1.52
Benzo(b)fluoranthene	CE087 M	mg/kg	0.45	0.83	3.40	0.78	5.81	1.94	2.75	124.00	10.55	2.40
Benzo(k)fluoranthene	CE087 M	mg/kg	0.20	0.30	1.34	0.28	2.30	0.69	0.84	34.40	4.18	0.93
Benzo(a)pyrene	CE087 U	mg/kg	0.37	0.73	3.21	0.76	5.18	1.82	3.85	323.22	7.95	1.73
Indeno(123cd)pyrene	CE087 M	mg/kg	0.34	0.63	2.52	1.13	4.33	1.26	3.18	216.30	6.45	1.35
Dibenz(ah)anthracene	CE087 M	mg/kg	0.06	0.12	0.43	0.26	0.77	0.27	1.34	108.30	1.13	0.30
Benzo(ghi)perylene	CE087 M	mg/kg	0.26	0.53	1.77	1.28	3.13	1.20	6.34	408.34	5.29	1.23
PAH (total of USEPA 16)	CE087	mg/kg	4.18	8.15	35.5	8.27	69.7	19.5	29.4	1484	98.4	20.8



TPH												
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	2	3	13	7	3	6	158	25	7	6
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	6	9	175	111	12	14	325	91	29	16
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	13	37	218	769	60	116	320	221	162	43
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	63	146	2155	1267	242	1374	4306	1350	491	174
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	17	40	140	255	60	81	1491	513	88	33
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<1	<1	<2	<1	<1	1	44	9	2	2
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<0.5	<0.5	3	2	1	3	70	17	5	3
EPH Aliphatic (>C16-C35)	CE250	mg/kg	8	13	46	39	25	731	744	446	34	25
EPH Aliphatic (>C35-C44)	CE250	mg/kg	1	2	13	17	4	8	159	33	4	2
Subcontracted Analysis												
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Form of Asbestos	\$	-										
Asbestos (quantitative)	\$	% w/w										

Appendix 2 – Trail pit logs

TP1 – Rear right side of site (proposed garden area)





Trail pit 1 – Rear right side of garden

0.00-0.15m	Topsoil, grass roots
0.15-0.30m	sandy loamy clay, gravel, some brick
0.30-0.60m	sandy loamy clay, gravel and brick, roots

TP2 – Rear left side of site (proposed garden area)





Trail Pit 2 – Rear left side of garden

0.00-0.00m	roots
0.00-0.30m	sandy loamy clay, gravel, some stone and brick
0.30-0.45m	sandy loamy clay, gravel, some stone and brick
0.45-0.65m	sandy loamy clay, gravel.

TP3 – Front right side of site (proposed garden area)





Trail Pit 3 – Front right side of garden

0.00-0.20m	grass and topsoil
0.20-0.30m	sandy loamy clay,
0.30-0.60m	sandy loamy clay, gravel, some stone and brick

TP4 – Centre of site and proposed building





Trail Pit 4 – Centre of Site

0.00-0.30m	sandy loamy clay, lots of stone, brick, some coal fragments
0.30-0.60m	sandy loamy clay, gravel, cleaner clay at base. some stone

TP5 – Rear of Proposed house foundations





Trail Pit 5 – Rear of proposed foundations

0.00-0.05m	grass and topsoil, roots
0.05-0.30m	sandy loamy clay, roots, gravel and brick
0.30-0.60m	sandy loamy clay, gravel,