



OUR REF: A4755/23/LR/3 31st January 2024
YOUR REF:

31st January 2024

Paul Sinclair
Westchurch Homes Ltd
31 Stamford Street
Altrincham
Cheshire
WA14 1ES

By Email (paul.sinclair@westchurchhomes.co.uk)

Dear Paul,

Louisa Street, Openshaw
Soil & Groundwater Assessment Letter Report

Background and Terms of Reference

A GeoEnvironmental Site Investigation has been commissioned by Westchurch Homes Ltd (the Client) to further examine ground conditions particularly with reference the risk posed to controlled waters from soil.

Previous Reporting

This report should be read in conjunction with the following reports previously prepared by Earth Environmental & Geotechnical Ltd:

- Phase II GeoEnvironmental Site Investigation Report (Reference: A4755/22/SI, June 2022).
- Remediation Report (Reference: A4755/23/RMS/V3).

Reference

Earth Environmental and Geotechnical Ltd were commissioned to undertake an additional geo-environmental investigation of the site to retrieve further soil and groundwater samples for chemical analysis. The objectives of the investigation were as follows:

- To present the factual information on the work undertaken including sampling location plan, borehole logs and chemical testing.
- Tier 1 (semi-quantitative) risk assessment will be undertaken. This will compare the concentrations of soil leachate and groundwater contaminants identified against current and appropriate published guidelines, in relation to identified receptors, e.g., existing/ future end users and site neighbours.

**CONSULTING
ENGINEERS**
Geotechnical
Environmental
Ecology
Geology
Drainage
Mining

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Swallowfield
Reading
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Earth Environmental &
Geotechnical Ltd
Registered Office:
Mentor House, Ainsworth Street,
Blackburn, Lancashire, BB1 6AY

Proposed Development

It is understood that the client intends to construct two three-storey apartment blocks and twenty-nine dwellinghouses. A development plan has been provided as Figure 1, below.

Fieldwork

The site investigation was conducted on the 16th January 2024 by Earth Environmental & Geotechnical Ltd. This comprised:

- Four window sample boreholes (designated WS302 to WS305) were sunk to a maximum depth of 4.70m below ground level. Window sampler boring is carried out with a small, track-mounted rig, which uses a chain-driven trip hammer to drive sampling tubes or penetrometers into the ground. These tools are coupled to the anvil of the hammer by solid drill rods. Sampling tubes comprise “windowless samplers”, which are plain sampler tubes in which a continuous disturbed sample is recovered within a semi-rigid plastic liner. In order to reduce friction within the borehole, sampling tubes of progressively smaller diameter are used as the borehole depth increases. Sampler diameters generally range from between approximately 90mm to 50mm. Groundwater observations were noted where possible. These observations relate to the time of the investigation only, and do not necessarily reflect seasonal fluctuations. Exploratory hole logs are included in Appendix A.
- 50mm diameter standpipes were installed in both of the window sample boreholes to a maximum depth of 4.70m below ground level. Installation and backfill details are shown with the appropriate borehole log sheet.

An exploratory hole location plan for the additional and original sampling is provided as Figure 2, overleaf.

Figure 1: Proposed Development Plan



Figure 2: Exploratory Hole Location Plan



Chemical Testing

Chemical analyses were carried out on five leachate samples and submitted for the following suite of determinants:

Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, Cyanide, Phenol, Sulphate (SO₄), Sulphide, pH, Total Organic Carbon (TOC), Speciated Polycyclic Aromatic Hydrocarbons (PAH) and Speciated Total Petroleum Hydrocarbons.

A subsequent visit to conduct groundwater sampling was carried out on the 23rd January 2024. However, insufficient water was present, in all boreholes, to allow for groundwater sampling.

In the absence of specific UK guidelines regarding groundwater quality in the UK, soil leachate chemical results obtained by EEG have been compared with the following statutory and non-statutory standards:

- Environmental Quality Standards (EQS); and
- UK Drinking Water standards ⁽²⁰⁰⁰⁾.

Many of the EQS values lie just above the method detection limit for parameters and as such, are extremely conservative. In the absence of EQS values, Drinking Water Standards have been used for comparison of results. Again, these standards are highly conservative, especially in this site context.

A direct comparison was made between the leachate analyses results and the EQS and Drinking Water Standards, and the results are summarised in Table 1, below.

The results of the groundwater sampling from the original site investigation are also included in the report as Table 2, overleaf.

Table 1: Leachate Results Comparison with EQS/Drinking Water Quality Values

Determinand	EQS Value (1)	Drinking Water Quality (DWQ) Value (2)	WS302 0.20m	WS303 0.50m	WS304 0.20m	WS304 0.70m	WS305 0.30m	No. of Exceedances
Arsenic	50	10	0.4	0.8	1	3.6	2.6	0
Cadmium	0.9	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0
Chromium	50	-	0.3	< 0.2	< 0.2	1.6	0.4	0
Lead	1.2-14	10	< 0.2	0.2	0.3	< 0.2	0.4	0
Mercury	0.07	1.0	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0
Selenium	-	10	< 0.2	< 0.2	< 0.2	0.2	0.4	0
Nickel	50-200	20	0.5	0.4	0.4	1.1	1	0
Zinc	75	-	< 1	< 1	< 1	< 1	< 1	0
Cyanide	-	50	< 5	< 5	< 5	< 5	< 5	0
Phenol	7.7-46	-	< 10	< 10	< 10	< 10	< 10	0
Sulphate	250000	250000	30	14	15	42	33	0
pH	6 – 9	-	7.8	8	7.9	10.2	8.8	1 for (1)
Naphthalene	10	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Anthracene	0.1	-	< 0.01	< 0.01	< 0.01	0.03	< 0.01	0
Benzo(a)pyrene	0.27	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Benzo(b)fluoranthene	0.017	0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Benzo(k)fluoranthene	0.017	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Indeno(123cd)pyrene	-	0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0
Fluoranthene	0.12	-	< 0.01	0.02	< 0.01	0.05	0.04	0
Aliphatic >C5-C6	15000	-	< 10	< 10	< 10	< 10	< 10	0
Aliphatic >C6-C8	15000	-	< 10	< 10	< 10	< 10	< 10	0
Aliphatic >C8-C10	300	-	< 10	< 10	< 10	< 10	< 10	0
Aliphatic >C10-C12	300	-	< 10	< 10	< 10	< 10	< 10	0
Aliphatic >C12-C16	300	-	< 10	< 10	< 10	< 10	11	0
Aromatic >C5-C7	10	1	< 10	< 10	< 10	< 10	< 10	0
Aromatic >C7-C8	700	-	< 10	< 10	< 10	< 10	< 10	0
Aromatic >C8-C10	300	-	< 10	< 10	< 10	< 10	< 10	0
Aromatic >C10-C12	90	-	< 10	< 10	< 10	< 10	< 10	0
Aromatic >C12-C16	90	-	< 10	< 10	< 10	< 10	< 10	0
Aromatic >C16-C21	90	-	< 10	< 10	< 10	< 10	24	0
Aromatic >C21-C35	90	-	< 10	< 10	< 10	< 10	< 10	0
Benzene	10-50	1	< 1	< 1	< 1	< 1	< 1	0
Toluene	50-380	-	< 5	< 5	< 5	< 5	< 5	0
Ethylbenzene	20-200	-	< 5	< 5	< 5	< 5	< 5	0
Xylenes	30	0.10	< 5	< 5	< 5	< 5	< 5	0

Notes for Table 1

All units in ug/l.

Concentrations in **red** above assessment criteria.

Table 2: Groundwater Results Comparison with EQS/Drinking Water Quality Values

Determinand	EQS Value (1)	Drinking Water Quality (DWQ) Value (2)	WS1	WS4	No. of Exceedances
Arsenic	50	10	< 5	< 5	0
Cadmium	0.9	5	< 0.4	< 0.4	0
Chromium	50	-	< 5	< 5	0
Copper	10	2000	< 5	< 5	0
Lead	1.2 - 14	10	< 5	< 5	0
Mercury	0.07	1.0	< 0.05	< 0.05	0
Selenium	-	10	< 5	< 5	0
Nickel	50 - 200	20	7	< 5	0
Zinc	75	-	8	< 2	0
Cyanide	-	50	< 5	< 5	0
Phenol	7.7 - 46	-	< 10	< 10	0
Sulphate	400000	250000	112	24	0
pH	6 - 9	-	7.0	6.8	0
Naphthalene	10	-	0.03	0.02	0
Anthracene	0.1	-	< 0.01	< 0.01	0
Benzo(a)pyrene	0.27	0.01	< 0.01	< 0.01	0
Benzo(b)fluoranthene	0.017	0.10	< 0.01	< 0.01	0
Benzo(k)fluoranthene	0.017	-	< 0.01	< 0.01	0
Indeno(123cd) pyrene	-	0.10	< 0.01	< 0.01	0
Fluoranthene	0.12	-	0.03	0.02	0
Benzene	10 - 50	1	< 1	< 1	0
Toluene	50 - 380	-	< 5	< 5	0
Ethylbenzene	20 - 200	300 (WHO)	< 5	< 5	0
Xylenes	30	-	< 25	< 25	0
Total Petroleum Hydrocarbons Aro C6-C8	-	10	< 10	< 10	0
Total Petroleum Hydrocarbons Aro C8-C10	-	700	< 10	< 10	0
Total Petroleum Hydrocarbons Aro C10-C12	-	300	< 10	< 10	0
Total Petroleum Hydrocarbons Aro C12-C16	-	90	< 10	< 10	0
Total Petroleum Hydrocarbons Aro C16-C21	-	90	< 10	< 10	0
Total Petroleum Hydrocarbons Aro C21-C35	-	90	< 10	< 10	0
Total Petroleum Hydrocarbons Ali C6-C8	-	15000	< 10	< 10	0
Total Petroleum Hydrocarbons Ali C8-C10	-	15000	< 10	< 10	0
Total Petroleum Hydrocarbons Ali C10-C12	-	300	< 10	< 10	0
Total Petroleum Hydrocarbons Ali C12-C16	-	300	< 10	< 10	0

Notes for Table 2

All units in ug/l.

Concentrations in **red** above assessment criteria.

Based on the above tables, only one exceedance was identified. This is for an elevated pH value from the additional leachate testing at WS304 (0.70m).

This elevated pH value is thought to have been caused by the presence of concrete in the soil sample prior to leachate sample preparation. This is therefore considered not to be a risk to groundwater quality.

Given the environmental setting of the site, and lack of significant exceedances, the risk to groundwater from contamination is considered low.

Conclusions & Recommendations

No significant elevated chemical contaminants of concern have been identified in the samples tested during the additional soil leachate or original groundwater analysis. There is therefore considered to be no impact to controlled waters beneath the site.

Should you have any queries regarding the contents of this report, please feel free to contact me.

Yours Sincerely,



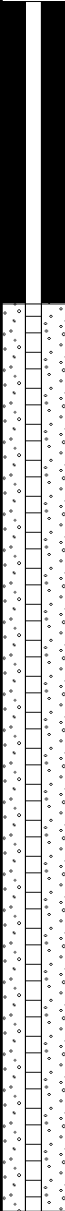
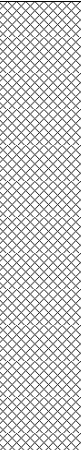
Luke Glover
Principal Geo-Environmental Consultant
For and on behalf of Earth Environmental & Geotechnical Ltd

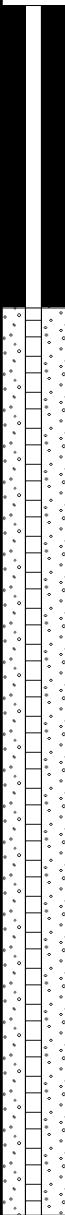
APPENDIX A

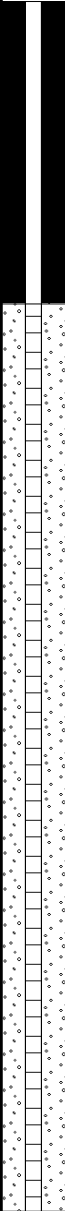
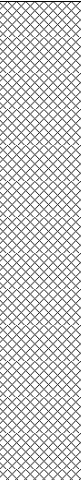
EXPLORATORY HOLE LOGS

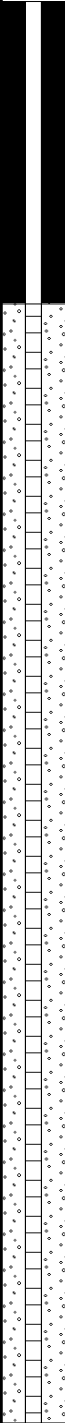
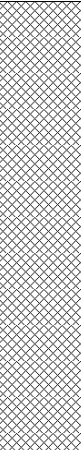
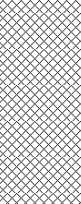
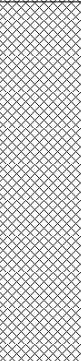
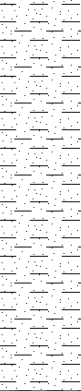
APPENDIX B

CHEMICAL TESTING RESULTS

 Earth Environmental & Geotechnical Ltd Houldsworth Mill Business & Arts Centre Houldsworth Street Stockport SK5 6DA					Borehole Log			Borehole No. WS302 Sheet 1 of 1			
Project Name: Louisa Street, Openshaw					Project No. A4755		Co-ords: 388630.60 - 397609.68		Hole Type WS		
Location: Openshaw, Greater Manchester					Level:			Scale 1:25			
Client: Westchurch Homes					Dates: 16/01/2024 - 16/01/2024			Logged By TO			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20	ES					Dark grey to black sandy very gravelly CLAY. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, sandstone and limestone (MADE GROUND).		1	
	0.50	ES									
	1.20		N=4 (1,1/1,1,1,1)	1.50							
	2.00		N=9 (1,2/2,2,2,3)				Loose becoming medium dense orange brown medium to coarse SAND.		2		
	3.00		N=28 (3,4/4,6,8,10)						3		
4.00		N=50 (4,5/50 for 275mm)	4.00		End of borehole at 4.00 m		4				
											5
Remarks Location scanned with CAT prior to excavation. Hand dug pit excavated to 1.20m. Monitoring installation; 1m plain pipe, 3m slotted pipe.											

 Earth Environmental & Geotechnical Ltd Houldsworth Mill Business & Arts Centre Houldsworth Street Stockport SK5 6DA					Borehole Log			Borehole No. WS303 Sheet 1 of 1		
Project Name: Louisa Street, Openshaw					Project No. A4755		Co-ords: 388569.20 - 397639.10		Hole Type WS	
Location: Openshaw, Greater Manchester					Level:			Scale 1:25		
Client: Westchurch Homes					Dates: 16/01/2024 - 16/01/2024			Logged By TO		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.15	ES		0.50		Dark grey to black sandy very gravelly CLAY. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, sandstone and limestone (MADE GROUND).	1		
		0.50	ES				Dark grey to black very sandy GRAVEL. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, sandstone, limestone (MADE GROUND).			
		1.20		N=18 (2,3/4,5,4,5)	2.50			2		
		2.00		N=8 (2,2/3,1,2,2)						
		3.00		N=25 (3,4/5,6,7,7)					3	
	4.00		N=50 (5,6/50 for 275mm)	4.00		End of borehole at 4.00 m	4			
								5		
Remarks Location scanned with CAT prior to excavation. Hand dug pit excavated to 1.20m. Monitoring installation; 1m plain pipe, 3m slotted pipe.										

 Earth Environmental & Geotechnical Ltd Houldsworth Mill Business & Arts Centre Houldsworth Street Stockport SK5 6DA					Borehole Log			Borehole No. WS304 Sheet 1 of 1			
Project Name: Louisa Street, Openshaw					Project No. A4755		Co-ords: 388597.20 - 397638.28		Hole Type WS		
Location: Openshaw, Greater Manchester					Level:			Scale 1:25			
Client: Westchurch Homes					Dates: 16/01/2024 - 16/01/2024			Logged By TO			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20	ES		1.60			Dark grey to black very sandy GRAVEL. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, plastic, sandstone, limestone (MADE GROUND).		1	
		0.70	ES								
		1.20		N=7 (3,3/1,2,2,2)							
		2.00		N=26 (2,4/5,5,7,9)					Medium dense orange brown medium to coarse SAND.		2
		3.00		N=25 (4,4/4,6,6,9)						3	
		4.00		N=50 (4,7/50 for 235mm)	4.00			End of borehole at 4.00 m		4	
											5
Remarks Location scanned with CAT prior to excavation. Hand dug pit excavated to 1.20m. Monitoring installation; 1m plain pipe, 3m slotted pipe.											 Earth Environmental & Geotechnical Ltd

 Earth Environmental & Geotechnical Ltd Houldsworth Mill Business & Arts Centre Houldsworth Street Stockport SK5 6DA					Borehole Log			Borehole No. WS305 Sheet 1 of 1		
Project Name: Louisa Street, Openshaw					Project No. A4755		Co-ords: 388584.86 - 397610.60		Hole Type WS	
Location: Openshaw, Greater Manchester					Level:			Scale 1:25		
Client: Westchurch Homes					Dates: 16/01/2024 - 16/01/2024			Logged By TO		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.30	ES					Dark grey to black sandy very gravelly CLAY. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, sandstone and limestone (MADE GROUND).	1	
		0.60	ES							
		1.20		N=5 (1,2/2,1,1,1)	1.50			Dark grey to black very sandy GRAVEL. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, sandstone and limestone (MADE GROUND).	2	
		2.00		N=12 (3,3/3,2,3,4)	2.20					
		3.00		N=9 (2,2/2,3,2,2)	3.40			Dark grey to black sandy very gravelly CLAY. Sand is medium. Gravel is fine to medium angular brick, concrete, ash, glass, sandstone and limestone (MADE GROUND).	3	
	4.00		N=22 (3,3/4,5,6,7)							
	4.70		N=50 (13,12/50 for 260mm)	4.70			Firm to stiff brown sandy CLAY.	4		
End of borehole at 4.70 m									5	
Remarks Location scanned with CAT prior to excavation. Hand dug pit excavated to 1.20m. Monitoring installation; 1m plain pipe, 3.70m slotted pipe.										



Tomasz Opara
Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Reddish
Stockport
Cheshire
SK5 6DA

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-00558

Site Reference: Luisa Street, Openshaw

Project / Job Ref: A4755

Order No: A4755/TO/23

Sample Receipt Date: 22/01/2024

Sample Scheduled Date: 22/01/2024

Report Issue Number: 1

Reporting Date: 26/01/2024

Authorised by:

Steve Knight
Customer Support Manager

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

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



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



4480

Leachate Analysis Certificate						
DETS Report No: 24-00558	Date Sampled	16/01/24	16/01/24	16/01/24	16/01/24	16/01/24
Earth Environmental & Geotechnical Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Luisa Street, Openshaw	TP / BH No	WS302	WS303	WS304	WS304	WS305
Project / Job Ref: A4755	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: A4755/TO/23	Depth (m)	0.20	0.50	0.20	0.70	0.30
Reporting Date: 26/01/2024	DETS Sample No	694988	694989	694990	694991	694992

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	7.8	8.0	7.9	10.2	8.8
Total Cyanide	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Complex Cyanide	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Free Cyanide	ug/l	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Sulphate as SO ₄	mg/l	< 1	ISO17025	30	14	15	42	33
Sulphide	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Organic Carbon (TOC)	mg/l	< 1	ISO17025	7.4	7.7	17	6.5	21.3
Arsenic	ug/l	< 0.2	ISO17025	0.4	0.8	1.0	3.6	2.6
Barium	ug/l	< 0.2	ISO17025	14.9	10.6	6.9	8.8	5.8
Beryllium	ug/l	< 0.2	ISO17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Boron	ug/l	< 1	ISO17025	15	5	19	6	13
Cadmium	ug/l	< 0.2	ISO17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	ug/l	< 0.2	ISO17025	0.3	< 0.2	< 0.2	1.6	0.4
Chromium (hexavalent)	ug/l	< 20	NONE	< 20	< 20	< 20	< 20	< 20
Lead	ug/l	< 0.2	ISO17025	< 0.2	0.2	0.3	< 0.2	0.4
Mercury	ug/l	< 0.04	ISO17025	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Nickel	ug/l	< 0.2	ISO17025	0.5	0.4	0.4	1.1	1.0
Selenium	ug/l	< 0.2	ISO17025	< 0.2	< 0.2	< 0.2	0.2	0.4
Vanadium	ug/l	< 0.2	ISO17025	0.3	0.5	0.5	13.9	1.5
Zinc	ug/l	< 1	ISO17025	< 1	< 1	< 1	< 1	< 1
Total Phenols (monohydric)	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
TPH (EPH EC10-EC40) : EH 1D Total	ug/l	< 10	NONE	11	44	< 10	31	253

Subcontracted analysis ⁽⁵⁾



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

Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 24-00558	Date Sampled	16/01/24	16/01/24	16/01/24	16/01/24	16/01/24
Earth Environmental & Geotechnical Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Luisa Street, Openshaw	TP / BH No	WS302	WS303	WS304	WS304	WS305
Project / Job Ref: A4755	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: A4755/TO/23	Depth (m)	0.20	0.50	0.20	0.70	0.30
Reporting Date: 26/01/2024	DETS Sample No	694988	694989	694990	694991	694992

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.10	< 0.01
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.04	< 0.01
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	0.03	< 0.01	0.10	0.09
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.03	< 0.01
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	0.02	< 0.01	0.05	0.04
Pyrene	ug/l	< 0.01	NONE	< 0.01	0.02	< 0.01	0.04	0.04
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.02	0.02
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.02	0.02
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Total EPA-16 PAHs	ug/l	< 0.16	NONE	< 0.16	< 0.16	< 0.16	0.40	0.21



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Leachate Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-00558	Date Sampled	16/01/24	16/01/24	16/01/24	16/01/24	16/01/24
Earth Environmental & Geotechnical Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Luisa Street, Openshaw	TP / BH No	WS302	WS303	WS304	WS304	WS305
Project / Job Ref: A4755	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: A4755/TO/23	Depth (m)	0.20	0.50	0.20	0.70	0.30
Reporting Date: 26/01/2024	DETS Sample No	694988	694989	694990	694991	694992

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C6 - C8 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C8 - C10 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C10 - C12 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic >C12 - C16 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	11
Aliphatic >C16 - C21 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	47
Aliphatic >C21 - C34 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	12
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	ug/l	< 70	NONE	< 70	< 70	< 70	< 70	70
Aromatic >C5 - C7 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C7 - C8 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C8 - C10 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C10 - C12 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C12 - C16 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic >C16 - C21 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	24
Aromatic >C21 - C35 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	ug/l	< 70	NONE	< 70	< 70	< 70	< 70	< 70
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	ug/l	< 140	NONE	< 140	< 140	< 140	< 140	< 140



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Leachate Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-00558	Date Sampled	16/01/24	16/01/24	16/01/24	16/01/24	16/01/24
Earth Environmental & Geotechnical Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Luisa Street, Openshaw	TP / BH No	WS302	WS303	WS304	WS304	WS305
Project / Job Ref: A4755	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: A4755/TO/23	Depth (m)	0.20	0.50	0.20	0.70	0.30
Reporting Date: 26/01/2024	DETS Sample No	694988	694989	694990	694991	694992

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/l	< 1	ISO17025	< 1	< 1	< 1	< 1	< 1
Toluene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
p & m-xylene : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10
o-xylene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
MTBE : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	< 10



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Water Analysis Certificate - Methodology & Miscellaneous Information	
DETS Report No: 24-00558	
Earth Environmental & Geotechnical Ltd	
Site Reference: Luisa Street, Openshaw	
Project / Job Ref: A4755	
Order No: A4755/TO/23	
Reporting Date: 26/01/2024	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazine followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered



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4480

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#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 eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH (EPH EC10-EC40) - EH_1D_Total
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Aromatic C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS