

Malins Group

Via email only: Josh@malinsgroup.co.uk

7th January 2022

Our Ref.: 19380/ADD/LR

Dear Josh

Re: North Street Arcade, PO9 1PX

Soils Limited have undertaken the following investigations at the site previously in relation to both environmental and geotechnical matters regarding redevelopment of this site:

- Soils Limited Ref: 18184/PIR Dated February 2020
- Soils Limited Ref: 19380/MIR Dated June 2021
- Soils Limited Ref: 19537/MIR Dated August 2021

Following on from submission of the above data to the local authority planning department, we understand that the contaminated land officer has raised a concern regarding an existing boiler on site to the south that was considered an off-site source during previous investigations. They have expressed concerns regarding the potential for oil-based contamination associated with this activity and location to flow towards identified vulnerable receptors (drainage and a historically diverted stream) underlying North Street off-site to the west.

Soils Limited understand that the boiler is to be retained on site and proposed a day of intrusive investigation to comprise 5No. shallow windowless samples following demolition at the site to obtain additional soil samples for testing within the vicinity of the boiler as per an agreed location plan, determined following consideration of the source and likely pathway to the identified receptor in line with current guidance. We understand that the proposal was forwarded to the regulator for agreement or comment, but at the time of this reporting no response had been received by Soils Limited.

Intrusive Investigation

The intrusive investigation undertaken on 15th December 2021 comprised:

- 1 day of windowless sampling (5no. locations WS201-WS205)
- Contamination Analysis

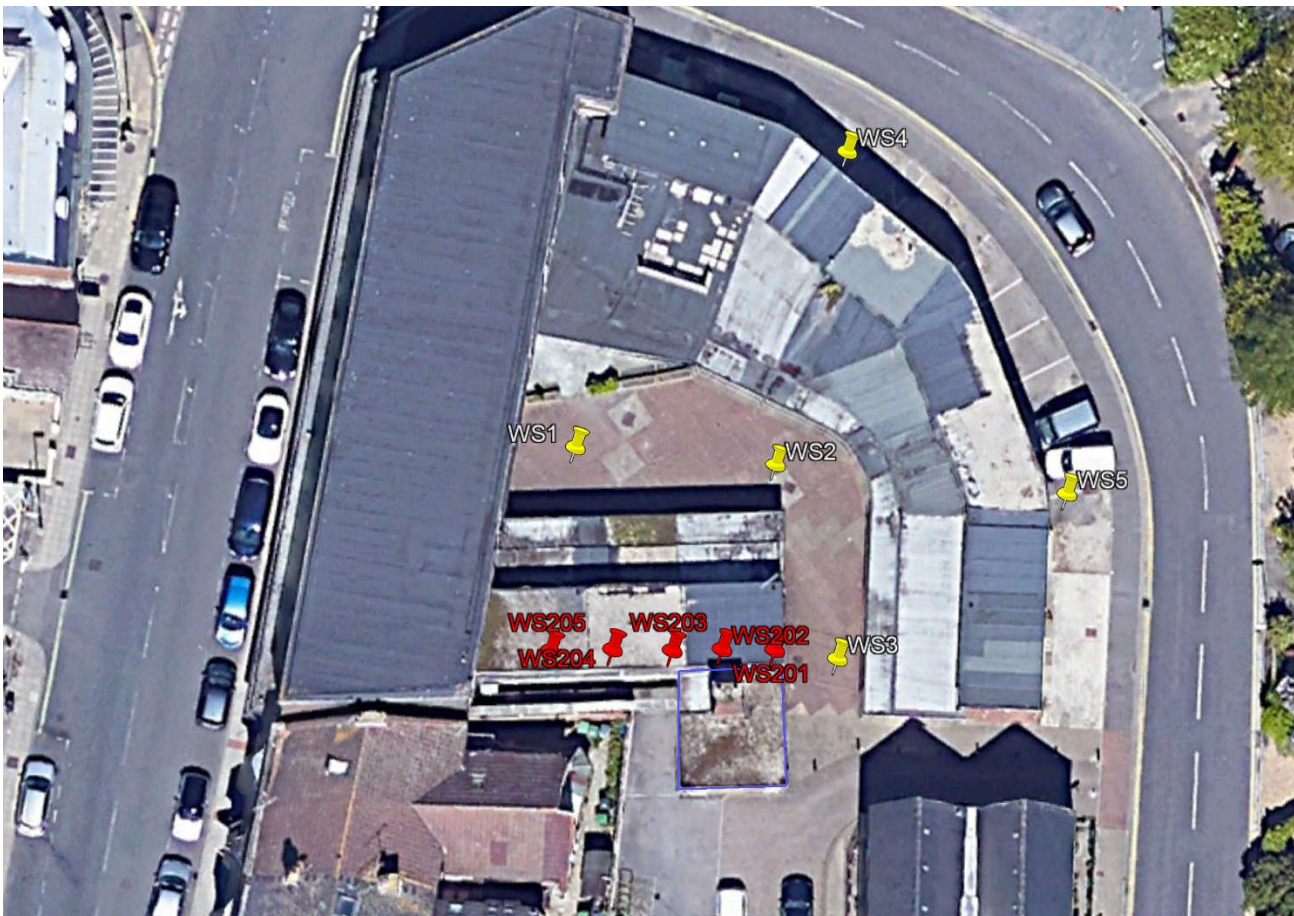


Soils Limited is a limited company registered in England and Wales number 1612073. VAT number 318273558

Registered Office: Newton House, Cross Road, Tadworth, Surrey KT20 5SR

The former electrical circuit noted adjacent and east of the boiler by Client records had been pot-ended just north of the boiler as part of the demolition works and therefore this circuit would not be detectable to a Cable Avoidance Tool (which requires a flowing current) but would remain live, thereby posing a hazard to the proposed investigation methodology. In view of the above and in light of the presumed flow from the potential source (westwards towards North Street) and presumed presence of possible pathways (former services and granular strata) the locations were modified as below (Figure 1 WS201-205 Red Pins). The original locations (WS1-5 Yellow Pins) and the boiler house (Purple Square) are also included for reference in Figure 1. Logs are included as Appendix 1.

Figure 1 – Trial Hole Locations



Intrusive Summary

All locations were ended in “natural” underlying ground (sandy gravelly CLAY) at approximately 0.45-0.80m below ground level. At two locations (WS203 and WS205) water was encountered at 0.80m but did not rise. A PID reading was taken (No. 69878 Calibration due 3.2.22) from each open hole on completion and prior to backfilling as a screen reading. The on-site findings are summarised in Table 1. Photographs of each location and/or excavation are included in Appendix 2 for reference.

Table 1 – Summary of On-site Findings

Location	Made Ground Depth (m)	Final Depth (m)	Water Depth (m)	Oily Sheen on Water	PID (Max Value in PPM)	Oily odour
WS201	0.80	1.00	None	None	1.0	None
WS202	0.45	1.00	None	None	0.2	None
WS203	0.85	1.00	0.80	None	0.1	None
WS204	0.45	1.00	None	None	< 0.1	None
WS205	0.80	1.00	0.80	None	0.6	None

Logging

The sealed sampling tubes from the site works were returned to Soils Limited's Winchester office where they were sub-sampled for analysis so as to comply with laboratory sample requirements for the analytes requested. Additional notes on the logs (Appendix 1) with reference to hydrocarbon odours (WS201 and WS202) reference those noted during logging and in part determined the sample depth chosen for analysis, which was to be the worst case i.e. the most odorous or visibly oily material for each location, if such was noted.

Contamination Analysis

Whilst previous investigations had been undertaken using a more generic screening analysis (as no specific contaminants of concern had been identified or confirmed), on this occasion and in light of the only identified contaminants of concern being liquid hydrocarbon-based oils and fuels, analysis was limited to hydrocarbons (as CWG aliphatic / aromatic banded split), pH and Organic Matter to allow appropriate risk assessment in line with current guidance. Samples were provided to DETS UKAS accredited laboratories and despite the intervening Christmas and New Year period generated no non-conformances on reporting. As such the results are considered valid and of good quality.

Contamination Results

Results of analysis are enclosed as Appendix 3 and confirm the presence of oily materials in locations WS201 (501mg/kg) and WS202 (1337mg/kg), these being the two closest to the boiler area and as noted during logging but not indicated during the on-site works. The remainder of the locations (WS203-205) which are presumed to lie on the pathway between the source and the identified vulnerable receptors, do not indicate the presence of any oily hydrocarbons more than the appropriate detection limits for the method.

A minor, but not significant, elevation for Toluene (20ug/kg) is noted in WS201 at 0.90m, but all other results indicate VOC's are less than their respective detection limits. This finding would explain and confirm the peak 1.0ppm PID reading noted on-site at this location.

The hydrocarbon bands and ratios noted in the elevated results lie mainly within the C12-C21 bands with a bias towards aromatic fractions, which would be expected from a historically weathered heating oil source, especially when combined with the lack of VOC's and no evidence of MTBE. On this basis Soils Limited consider that the localised presence of historical oil contamination related directly to the boiler storage has now been confirmed.

Significance of Results

None of the results are significant in regard to the intended use of the site as noted in the summary following the results in Appendix 3 where all results are one factor below the generic guidance S4UL guidance value, confirming the findings of the initial environmental investigation (Soils Limited Report ref: 19380 MIR dated June 2021) and therefore no changes to the conceptual model or findings of that report are considered necessary.

On the basis of the findings of the various investigations to date, the following comments can be made specifically in relation to the identified potential risk to North Street potentially vulnerable receptors from this now identified and "discovered" source and consideration of the possible pathways between them, in line with current guidance.

Significance of Discovered Source

- Oily material is located closely adjacent (within 3m) of the boiler house location at depth in the underlying "natural" ground as relict material from presumed historical leakage from the boiler house.
- The amount (< 2000mg/kg), nature (semi-solid, aliphatic biased, mainly C16+, thixotropic), location (within underlying "natural" strata) and form (historical, weathered) also strongly indicates that this is relict rather than more recent material.

- Such oily relict materials will be largely insoluble and not significantly leachable in this type of environment (see WAC results for WS5 from previous environmental investigation Soils Limited Report ref.19380/MIR dated June 2021 for additional confirmation).
- This material is not in a form or location (nor is it likely to be sufficiently soluble, leachable or mobile) to move any significant horizontal distance from the source but will instead sink vertically to a natural level in the underlying ground where it will be essentially trapped by surface tension.
- None of the proposed development works are liable to increase the mobility or availability of this relict material “trapped” at depth to create either an additional source or pathway.
- The worst-case material as located and analysed does not present a risk to any of the on-site vulnerable receptors identified in the initial conceptual model nor in relation to the additional external receptors identified underlying North Street to the west using commercial generic guidance and an assumed organic content of 1%.

Pathways from Discovered Source

- No direct pathways for materials from the discovered boiler source to reach the internal and external identified receptors have been either identified or confirmed during this investigation. The initial CSM linkages are therefore still considered valid and appropriate.
- However, indirect pathways postulating groundwater through Made Ground and underlying granular materials (occasionally present in underlying strata as noted on the logs) are potentially still viable if unlikely for the reasons noted for the source.
- Pathways through groundwater media are contradicted by the findings of these investigations which suggest ephemeral or perched waters lying on top of largely impermeable clay bands and fractions.
- Those waters encountered during this investigation (WS203 and WS205) showed no evidence of oil sheen, odours or especially elevated PID levels (all < 1ppm and no associated soil VOC results).
- No evidence of transport and/or redeposition in either the logging or on-site observations was noted. This has been further confirmed by the results of the down-gradient soil samples from WS203 to WS205, which show no levels in excess of the detection limits of the method.
- Whilst a single potential pathway has been identified using a water medium, it is not considered viable on the basis of the evidence from this and the previous investigations.

Receptor Vulnerability to Discovered Source

- On the basis of the confirmed nature of the discovered source and no confirmation that no viable pathway is present as outlined above, risk to the North Street receptors defaults to negligible by default, as both elements must be present and potentially significant in some way to present any risk to identified receptors.

Conclusions

In conclusion, the findings of this investigation would indicate that a potential oily source from the use of heating oils is present adjacent (and related to) historical use of the boiler house but very limited in both depth and extent, as would be anticipated given the nature of the oily material.

In context the potential risk identified cannot be considered significant to any potential identified receptor. As such the risk to the identified North Street receptors is considered negligible in light of the findings and conclusions of this and the previous investigations for reasons including the lack of any significant mobile, leachable or soluble source being identified and no significant additional pathways being determined or confirmed.

Recommendations

Oily materials are present on site from the boiler house area and have now been “discovered” and confirmed in terms of nature, location, extent, form and potential risk. If such materials were to remain undisturbed on site it is unlikely that (in context) they could present other than a negligible risk.

On this basis, operation of the discovery strategy as previously proposed should be maintained and a view formed as to the potential disposal or retention of any such materials encountered during the remaining works.

This could be by site specific determination of an agreed TPH "remediation or waste" level, which for an insoluble heating oil in context and for this type of strata would usually be of the order of 10,000 mg/kg as TPH. However, on exposure or excavation of soils, most such oily material is both visible and odorous at concentrations of about 300mg/kg.

In most cases it is anticipated that any such deleterious material encountered will probably be removed automatically from site as part of groundworks, foundation works (including piling) and/or service emplacement due to the hard covered nature of the final development precluding most opportunities for re-use of material on site. An agreed procedure or policy to remove from possible re-use on site any such identified materials and their replacement with "clean" certified materials should be sufficient to further reduce any possible risks.

If you have any additional comments or concerns, please contact us.

Yours sincerely



C Swainston BSc, PGCE, CGeol, FGS, CLAIre QP, MIAH
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Principal Environmental Engineer
For and on behalf of Soils Limited

Appendix 1: Site Logs (WS201-WS205)

Appendix 2: Site Photographs

Appendix 3: Analytical Results and Summary

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:											
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)												
Chiselling					Installation															
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)												
Water Strikes <table> <tr> <th>Strike (m)</th> <th>Casing (m)</th> <th>Sealed (m)</th> <th>Time (mins)</th> <th>Rose to (m)</th> <th>Remarks</th> </tr> <tr> <td></td> <td></td> <td></td> <td>0</td> <td>0.00</td> <td>None Encountered</td> </tr> </table>									Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks				0	0.00	None Encountered
Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks															
			0	0.00	None Encountered															
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.																				

				Contract Name: North Street Arcade				Client: Malins Group				Hole ID: WS202				
				Contract Number: 19380		Start and End Date: 15/12/21		Logged By: DW		Checked By: CS		Status: FINAL		Hole Type: WS		
				Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 06/01/2022		Scale: 1:50		
				Weather:				Termination:				Sheet 1 of 1				
Samples & In Situ Testing					Strata Details										Groundwater	
Depth	Type	Results		Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/ Installation		
0.70	ES				0.10		Firm greyish brown mottled light brown and white, slightly sandy gravelly CLAY. Gravel is angular to sub-angular, fine to coarse brick, flint, chalk and concrete. MADE GROUND. Firm greyish brown becoming brown with depth, slightly sandy gravelly CLAY. Gravel is angular to sub-angular, fine to coarse flint, and rare chalk. Rare fine charcoal and coarse sand sized brick. Reworked material. Faint hydrocarbon odour at base. MADE GROUND. Firm to stiff greyish brown mottled grey and yellowish brown with depth, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular weak calcic material. Strong hydrocarbon odour. <i>Orangish brown slightly gravelly band with sub-angular fine to coarse flint.</i>						1			
					(0.45)											
					0.55											
					(0.45)											
					1.00											
							End of Borehole at 1.00m									
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:							
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)								
Chiselling					Installation				Water Strikes							
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks		
												0	0.00	None Encountered		
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.																

Observations		Borehole Diameter		Casing Diameter		Remarks:				
Sinking (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)					
		Installation				Water Strikes				
Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.80			20	0.80	
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.										



Contract Name: North Street Arcade			Client: Malins Group			Hole ID: WS204					
Contract Number: 19380		Start and End Date: 15/12/21		Logged By: DW		Checked By: CS		Status: FINAL		Hole Type: WS	
Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 06/01/2022		Scale: 1:50	

Weather:				Termination:				Sheet 1 of 1			
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Samples & In Situ Testing			Strata Details					Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/ Installation
0.30	WAC			0.10		Firm greyish brown mottled multicoloured, slightly sandy very gravelly CLAY. Gravel is sub-angular, fine to coarse brick, clinker, flint, chalk and concrete. MADE GROUND.				
				(0.35)						
0.60	ES			0.45		Firm greyish brown slightly sandy silty CLAY. Occasional angular to sub-angular, fine to coarse flint, and rare chalk, brick and charcoal gravel (<5%). MADE GROUND.				
				(0.30)						
0.90	ES			0.75		Firm greyish brown slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse flint. Very rare fine charcoal and coarse sand sized brick.				
				1.00						
						Soft greyish brown slightly sandy, gravelly CLAY. Gravel is angular to sub-angular, fine to coarse flint. Very rare coarse sand sized brick.			1	
						End of Borehole at 1.00m				
									2	
									3	
									4	
									5	
									6	
									7	
									8	
									9	
									10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)		
									Water Strikes	
									None Encountered	
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.	

				Contract Name: North Street Arcade				Client: Malins Group				Hole ID: WS205			
				Contract Number: 19380		Start and End Date: 15/12/21		Logged By: DW		Checked By: CS		Status: FINAL		Hole Type: WS	
				Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 06/01/2022		Scale: 1:50	
Weather:				Termination:						Sheet 1 of 1					
Samples & In Situ Testing				Strata Details										Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation		
0.20	ES			0.25		Soft greyish brown slightly sandy gravelly CLAY. Gravel is angular to sub-angular, fine to coarse flint, brick, clinker, chalk and concrete. Rare steel nail. MADE GROUND. Soft greyish brown slightly sandy very gravelly CLAY. Gravel is angular to sub-angular, fine to coarse glass, flint and brick. MADE GROUND. Soft greyish brown slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to coarse flint. Rare fine brick and clinker gravel. MADE GROUND? Soft greyish brown slightly sandy, gravelly CLAY. Gravel is angular to sub-angular, fine to coarse flint. Very rare coarse sand sized brick. End of Borehole at 1.00m									
0.40	WAC		(0.30)												
0.60	ES		0.55												
0.90	ES		0.80												
				1.00											
												1			
												2			
												3			
												4			
												5			
												6			
												7			
												8			
												9			
												10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)							
									Water Strikes						
Chiselling					Installation										
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
									0.80			20	0.80		
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.															

Appendix 2 Site Photographs



Photo 1:

Location of WS201 - note Electrical Pot End excavation top left at building corner restricting potential locations



Photo 2:

WS202 Location



Photo 3:

WS203 Location



Photo 4:

WS204 Location



Photo 5:

WS205 Location



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

DETS Report No: 21-14950

Site Reference: North Street Arcade

Project / Job Ref: 19380

Order No: 19380

Sample Receipt Date: 22/12/2021

Sample Scheduled Date: 22/12/2021

Report Issue Number: 1

Reporting Date: 05/01/2022

Authorised by:

Dave Ashworth
Technical 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
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Soil Analysis Certificate						
DETS Report No: 21-14950	Date Sampled	15/12/21	15/12/21	15/12/21	15/12/21	15/12/21
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: North Street Arcade	TP / BH No	WS201	WS202	WS203	WS204	WS205
Project / Job Ref: 19380	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 19380	Depth (m)	0.90	0.70	0.40	0.60	0.90
Reporting Date: 05/01/2022	DETS Sample No	580641	580642	580643	580644	580645

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.1	8.8	8.3	7.2	7.8
Organic Matter (SOM)	%	< 0.1	MCERTS	0.7	0.8	1.8	1.4	1.3

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 21-14950	Date Sampled	15/12/21	15/12/21	15/12/21	15/12/21	15/12/21
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: North Street Arcade	TP / BH No	WS201	WS202	WS203	WS204	WS205
Project / Job Ref: 19380	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 19380	Depth (m)	0.90	0.70	0.40	0.60	0.90
Reporting Date: 05/01/2022	DETS Sample No	580641	580642	580643	580644	580645

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	8	34	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	31	99	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	126	363	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	110	320	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	21	71	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	295	887	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	7	16	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	85	197	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	94	207	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	21	30	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	207	451	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	501	1337	< 42	< 42	< 42



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-14950	Date Sampled	15/12/21	15/12/21	15/12/21	15/12/21	15/12/21
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: North Street Arcade	TP / BH No	WS201	WS202	WS203	WS204	WS205
Project / Job Ref: 19380	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 19380	Depth (m)	0.90	0.70	0.40	0.60	0.90
Reporting Date: 05/01/2022	DETS Sample No	580641	580642	580643	580644	580645

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	20	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 21-14950	
Soils Ltd	
Site Reference: North Street Arcade	
Project / Job Ref: 19380	
Order No: 19380	
Reporting Date: 05/01/2022	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
580641	WS201	None Supplied	0.90	16.9	Brown clay
580642	WS202	None Supplied	0.70	17.2	Brown clay
580643	WS203	None Supplied	0.40	10.7	Brown sandy clay with stones
580644	WS204	None Supplied	0.60	15.7	Brown sandy clay with stones
580645	WS205	None Supplied	0.90	10.7	Brown gravelly sand with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{u/s}

Unsuitable Sample ^{u/s}



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Unit 1, Rose Lane Industrial Estate
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Tel : 01622 850410



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-14950

Soils Ltd

Site Reference: North Street Arcade

Project / Job Ref: 19380

Order No: 19380

Reporting Date: 05/01/2022

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	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 hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	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 hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

