

PHASE 2 ENVIRONMENTAL INVESTIGATION
of a site at
LAND TO REAR OF EAST HOUSE, HIGH ROAD,
GREAT FINBOROUGH
for
MACNAMARA DEVELOPMENTS LTD



**Contaminated
Land
Solutions**

4 De Frene Road, London, SE26 4AB

Project No 2407
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1 EXECUTIVE SUMMARY

The phase 1 report indicates potential for contamination to be present from vegetated mounds located along the southern boundary of the site.

The proposed site usage is a residential development with private gardens.

In this investigation all samples tested were found to be well below the assessment criteria for residential with plant uptake.

There are no potential risks to on-site and off-site receptors from onsite contamination, and therefore no remediation is required.

It is recommended that this report is referenced in the site Health and Safety Plan and that normal good hygiene practice is observed during the works and subsequent building and grounds maintenance.

If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported.

Risk Summary

Very Low	Low	Moderate / Low	Moderate	High
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		Receptors					
		Site Users	Ground Workers	Neighbours	Proposed Building	Aquifer	Watercourse
Sources	Naturally Occurring Contaminants (On-Site)						

2 BRIEF

The purpose of this report is to investigate the potential sources of contamination identified in the phase 1 desktop study. In the light of the investigation results to update the site-specific conceptual model and risk assessment and where source-pathway-receptor linkages are identified advise on potential remedial options.

This report should be read in conjunction with the following reports:

Phase 1 Land Contamination Risk Assessment ref. 3044D P1 Ruffell – Suffolk dated September 2020 by Castledine.

Phase 2 Scope of Works ref. 2407-P2E-1-Scope dated February 2023 by GO Contaminated Land Solutions Ltd.

3 INVESTIGATION STRATEGY

The Phase 1 Land Contamination Risk Assessment shows potential for contamination to be present from vegetated mounds which are located over areas of proposed soft landscaping.

The principles of the strategy are to:

Identify the nature and extent of any contamination in the made ground across the site.

Location Reference	Rationale for Location	Depth (mbgl)	Sampling, Testing & Monitoring
S1	Boreholes were located to cover the raised vegetated mound(s) along the southern boundary of the site.	0.2 – 0.6	Tested for asbestos, metals, hydrocarbons & PAHs
S1A		0.2 – 0.4	
S2		0.05 – 0.25	
S3		0.1 -0.3	
S4		0.1 -0.4	
S5		0.1 -0.4	

4 SITE DESCRIPTION

Site description as of September 2020 as described in Castledine Phase 1 Report:

2407-P2E-1: Rear of East House, High Road, Great Finborough
McNamara Developments Ltd

The site is an irregular rectangle in shape orientated east to west and connected to the nearby High Road via an access spur. The site is directly bounded by field to the north, east and south with dwellings located to the west. The surrounding areas are predominantly agricultural with the village of Great Finborough located approximately 280m north of site.

The site interior comprises a large, open field in part use as a garden for the associated dwelling, which is located west of the main site area.

A gravelled site access track leads east off High road and bypasses the associated dwelling. The gravelled access track then terminates at the side of the dwelling, giving way to the main grassed site area. The grassed area was seen to contain scattered, miscellaneous garden furniture and toys and a vegetated spoil mound and pile. The pile is small and located adjacent to the eastern boundary of site. The vegetated mound is located on the southern boundary of site and extends west from the south eastern corner of site to approximately two-thirds of the site length.

Topographically the site is level with a small ditch noted forming or just outside of the eastern boundary of site. The vegetated rubble located along the southern boundary of site is a potential source of contamination.

Site Works – February 2023

The site was unchanged from the description above during the site works on 22 February 2023.

5 SITE WORKS

5.1 Programme

The site works were undertaken on 22 February 2023.

5.2 Boreholes

A total of 6no. boreholes were hand augered to depths of between 0.40 and 0.75m below ground level.

6 GROUND CONDITIONS

6.1 Geological Survey

Reference to the geological survey of Great Britain indicates that beneath made ground, the area generally is underlain by superficial deposits comprising the Lowestoft Group which is described as Diamicton.

The Lowestoft Group Diamicton is described by the BGS as an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays.

The superficial deposits are underlain by bedrock comprising Crag Group described as Sands, gravels, silts and clays.

During the site works, below topsoil or made ground the ground conditions mainly comprised of relatively stiff clay with gravels.

6.2 Hydrogeology & Hydrology

The Environment Agency maps show the site to be located over an Undifferentiated Aquifer in the superficial or drift deposits, in the bedrock they show the site to be over a Principal Aquifer .

Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Principal Aquifers comprise layers of rock or drift deposits that have either high intergranular or fracture permeability, meaning they usually provide a high level of water storage. They may support either water supply or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary Undifferentiated Aquifer has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

The site is located in a Type 3 Total Catchment Source Protection Zone (SPZ).

The Environment Agency define a zone according to how the groundwater behaves in that area. From this a model of the groundwater environment is developed on which to define the zones.

Groundwater source catchments are divided into three zones:

SPZ1 – Inner protection zone

Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.

SPZ2 – Outer protection zone

Defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

SPZ3 – Source catchment protection zone

Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75 .

An unnamed, surface level watercourse is located 158m north of site in the Groundsure mapping.

It is not considered that there is potential for the watercourse to be impacted by the site.

6.3 Fieldwork Summary

The ground conditions encountered are summarised in the following table. Full records are contained in appendix D.

Depth from (mbgl)	Depth to (mbgl)	Description
0.00	0.10/0.60	Topsoil (S1, S1A, S3 & S4)
0.00/0.60	0.25/0.75	MADE GROUND –CLAY/Silty CLAY containing gravels and occasional brick fragments
0.25/0.60	0.4/0.7++	CLAY/Silty CLAY containing gravels (S2 – S5)

7 PROPOSED DEVELOPMENT

Plan details for the proposed redevelopment of the site are shown on the Ken Judge and Associates drawing contained in appendix C.

The drawing shows a residential development comprising 4 detached dwellings including parking facilities, communal soft landscaping and private gardens. Access to the development is gained via a dedicated entrance from High Road.

8 CONTAMINATION SAMPLING and TESTING

8.1 Laboratory Testing

All samples were placed immediately in cool boxes with ice packs and collected by courier for transport to the laboratory.

The chemical testing was carried out in accordance with standard industry methods in a UKAS approved laboratory which is also currently accredited in accordance with MCERTS for the majority of its testing. Further information regarding this accreditation is available on request together with a full list of test methods if required.

All samples were tested for a range of commonly occurring contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA). These include, heavy metals, aromatic and aliphatic hydrocarbons, in accordance with Environment Agency guidelines, and speciated PolyAromatic Hydrocarbon (PAH) only.

All samples were analysed for the presence of asbestos.

8.2 Test Results

All the results have been compared to the Atkins ATRISKsoil SSVs for residential use with, for 1% or 6% as appropriate, where available. These guideline values have been derived using the updated CLEA v1.071 model, previously published Category 4 Screening Levels (C4SLs) by DEFRA and information in the Environment Agency guidance SR2. Where ATRISKsoil SSVs have not been derived, the Category 4 Screening Levels have been used, and for determinands which do not have either of the above, the LQM/CIEH Suitable 4 Use Levels (S4ULs) assessment criteria have been used.

No exceedances were identified in any samples for the residential with plant uptake criteria.

All samples were screened in the laboratory for the presence of asbestos fibres. No asbestos was identified in any of the samples.

With reference to the TPH results in appendix F, these were carried out at a sub-contract laboratory. The Elab sample number corresponds to the customer sample ref in the ALS results.

See table below for reference.

Sample Ref.	Elab Sample Number/ ALS Customer Ref
S1	313447
S1A	313448
S2	313449
S3	313450
S4	313451
S5	313452

The full contamination test results can be found in appendix F.

9 DISCUSSION

In this investigation samples were tested for a range of commonly occurring

contaminants and indicators of contamination including those given by the Contaminated Land Exposure Assessment (CLEA).

Two samples (S1 and S1A) were taken from a much larger mound in the southwest corner of the site. The larger mound was approximately 700 -800mm higher in elevation than the general elevation of the vegetated mound. The remainder of the vegetated mound along the southern boundary was relatively consistent in elevation being approximately 100 -200mm higher in elevation relative to the general ground level of the site. Samples were spread evenly along the extent of the vegetated mound.

The composition of the mound material was found to mainly be comprised of topsoil and clay or silty clay. Apart from occasional brick fragments, no significant construction rubble or debris was noted within the ground.

Sample S5 was located in a free-standing vegetated mound in the east of the site and just north of the mound running along the south boundary.

All samples tested were found to be well below the assessment criteria for residential with plant uptake.

No olfactory evidence of contamination (such as vapours) was identified during sampling. No visual evidence of contaminants, such as oils, were noted.

All samples were screened in the laboratory for the presence of asbestos fibres. No asbestos was identified in any of the samples.

No significant organic containing material was identified within the ground and it is therefore not considered necessary to undertake any monitoring of potential ground gases.

If any spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported. It is critical that the WAC results are representative of the material to be disposed of and therefore care must be taken to ensure that different materials are not mixed. Guidance can be obtained from Environment Agency document Waste Sampling and Testing for Disposal to Landfill.

10 REVISED CONCEPTUAL MODEL

The legislative framework for the regulation of contaminated land is embodied in Part IIA of the Environmental Protection Act 1990, implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The approach adopted by UK contaminated land policy is that of “suitability for use” which implies that the land should be suitable for its current use and made suitable for any proposed future use.

In this revised contamination assessment the site has been modelled using the Source-Pathway-Receptor approach to produce a site specific conceptual model.

Source - substances or potential contaminants which may cause harm

Pathway - a linkage or route between a source and receptor

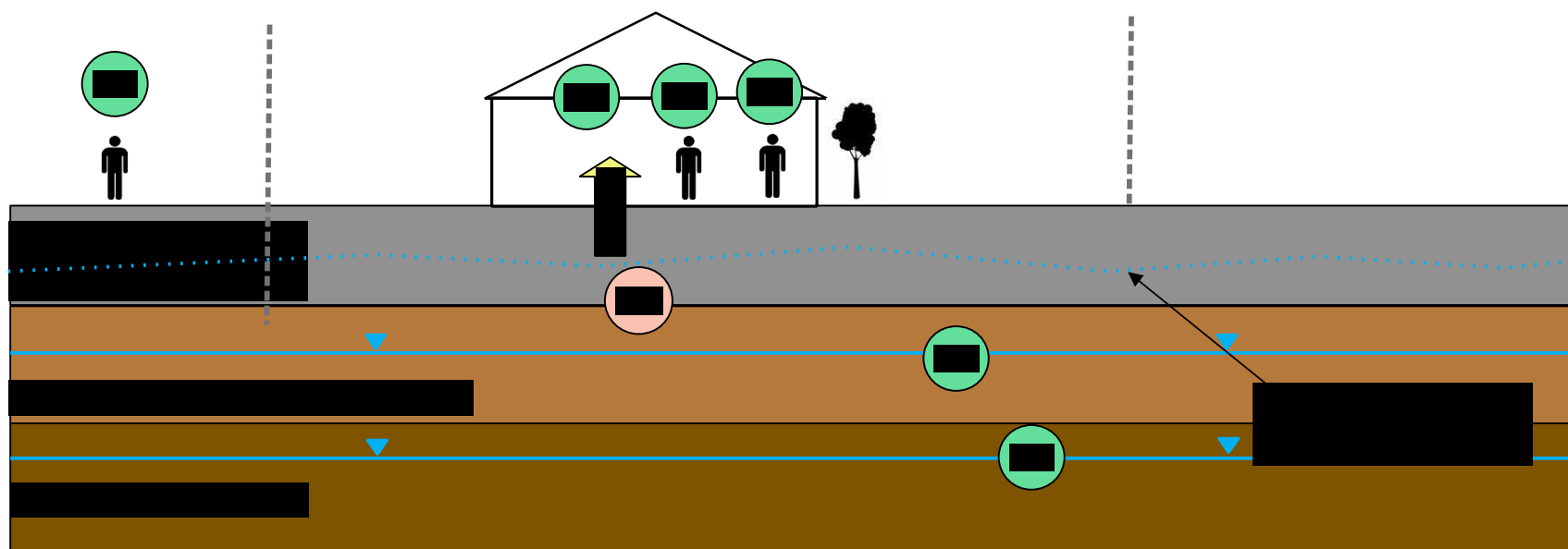
Receptor - humans, plant life, groundwater etc., which could be harmed by a contaminant


Geological records indicate that the site is underlain by an aquifer in the superficial stratum. However, the ground conditions were found to consist of relatively impermeable clay which would likely act as an aquiclude to the aquifer. Therefore, it is not considered that there is significant potential for the migration of contaminants to or from the site.

From the information available at present a revised conceptual model has been considered.

		POTENTIAL PATHWAYS											COMMENTS ON DISCOUNTED PATHWAYS		
		Inhalation of contaminated vapour	Inhalation of contaminated dust	Direct Soil Ingestion	Direct dermal contact	Inhalation of asbestos	Drinking contaminated water supply	Direct contact of soil with building materials	Surface water run-off	Surface water percolation to groundwater	Migration via groundwater	Build-up of ground gas – CH4 and CO2			
RECEPTORS	Site Users	N	N	N	N	N	N						N	No samples exceeded the screening criteria No asbestos identified	No significant source of ground gas identified
	Ground Workers	N	N	N	N	N							N		
	Neighbours	N	N			N			N		N	N	N		
	Proposed Building							Y					N	Geotechnical investigation should be undertaken	
	Watercourse								N		N			No major watercourse identified nearby.	
	Aquifer									N					

Schematic Conceptual Model



Sources	Pathways	Receptors
<p>1 Naturally Occurring Contaminants (On Site)</p>	<p> Direct contact of soil with building materials</p>	<ul style="list-style-type: none"> i Site Users ii Ground Workers iii Neighbours iv Proposed Building v Secondary Undifferentiated Aquifer v Principal Aquifer

11 REVISED RISK ASSESSMENT

The level of information provided by the phase 1 desktop study report together with the other information within this report is considered suitable to provide the data for a satisfactory risk assessment for the site. While there will always be uncertainties due to known or unknown gaps in information it is considered that sufficient information is available to reduce those uncertainties to within acceptable limits for the nature of the site under review.

There is a potential risk to the sub-structure of new buildings should any alkaline ground conditions, or elevated sulphate levels be present on the site, however this was beyond the brief of this report. As the protection of concrete is normally resolved in the building design process, the designer of the foundations should undertake appropriate geotechnical investigation and take into account the existing ground conditions.

Only contaminants identified to exceed the environmental screening level have been included in the Risk Assessment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk/ Significance	Comment & control measures
Naturally occurring contaminants	Sulphates pH	Proposed Building	Direct contact of soil with building materials	Mild	Likely	Moderate/Low Risk	As the protection of concrete is normally resolved in the building design process, the designer of the foundations should determine the appropriate foundation design.

Any visual or olfactory evidence of contamination noted during works should be investigated by a suitably qualified person and their recommendations implemented.

12 SITE WORKS and UNEXPECTED CONDITIONS

The sample locations were positioned to cover the site. However, there are areas where investigations were not carried out, and although unlikely given the size of the site, it should be considered possible that other areas may potentially be contaminated. Construction operatives should remain vigilant for any unexpected contamination encountered during development (eg discoloured soil or odours or buried waste). Any unexpected conditions should be investigated by a suitably qualified person and their recommendations implemented.

It is recommended that construction operatives use appropriate PPE, normal good hygiene measures, and appropriate dust control measures if necessary. The risks to construction operatives identified, should be addressed under a Construction (Design and Management) (CDM) Plan. The CDM Regulations place legal duties on those involved in construction work. All construction projects require a plan to ensure that health and safety issues are properly considered during a project's development so that the risk of harm to workers is reduced.

13 CONCLUSIONS

In this investigation all samples tested were found to be well below the assessment criteria for residential with plant uptake.

There are no potential risks to on-site and off-site receptors from onsite contamination, and therefore no remediation is required.

The sample locations were positioned to provide a general spread across the vegetated mound(s) along the southern boundary of the site.

Given there are no buildings or surfaced areas, it is very unlikely that asbestos could be present in other areas of the site, however construction operatives should ensure that appropriate PPE and good hygiene measures are used, and dust control measures during construction where necessary.

It is recommended that this report is referenced in the site Health and Safety Plan and that normal good hygiene practice is observed during the works and subsequent building and grounds maintenance.

It is recommended that appropriate dust control measures are implemented during construction. To assist in establishing what would be appropriate reference should be made to the Institute of Air Quality Management report entitled: Guidance on the assessment of dust from demolition and construction, version 1.1.

If any spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported.

14 REFERENCES

- Atkins. (2006, July 13). Retrieved from ATRISKsoil: <http://www.atrisksoil.co.uk/>
BS 5930, British Standard. Code of practice for ground investigations. British Standards Institution.
- BS10175, British Standard. (2001). Investigation of potentially contaminated sites - Code of Practice. London: British Standards Institution.
- Building Research Establishment. (2004). Cover Systems for Land Regeneration: Thickness of Cover Systems for Contaminated Land (BR 465). IHS BRE Press.
- Card, G. B., Wilson, S., & Mortimer, S. (2012). A Pragmatic Approach to Ground Gas Risk Assessment. London, UK: Contaminated Land: Applications in Real Environments.
- Contaminated Land: Applications in Real Environment (CL:AIRE). (2009). Soil Generic Assessment Criteria for Human Health Risk Assessment. London: CL:AIRE.
- Contaminated Land: Applications in Real Environment (CL:AIRE). (2014). Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination.
- Environment Agency. Land Contamination Risk Management (LCRM).
- Environment Agency. (2013). Groundwater protection: principles and practice (GP3). Bristol: Environment Agency.
- Environment Agency. (2013). Waste Sampling and Testing for Disposal to Landfill. Bristol, UK: EA.
- Health and Safety Executive. (2012). The Control of Asbestos Regulations 2012.
- Health and Safety Executive. (2015). Construction (Design and Management) Regulations 2015.
- Nathanial, C. P., McCaffrey, C., Gillet, A. G., Ogden, R. C., & Nathanial, J. F. (2015). The LQM/CIEH S4ULs for Human Health Risk Assessment. Nottingham: Land Quality Press.
- UK Water Industry Research Ltd. (2010). Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. UKWIR.
- Wilson, S., Oliver, S., Mallet, H., Hutchings, H., & Card, G. (2007). CIRIA Report C665. Assessing risks posed by hazardous gases to buildings. London, UK: Construction Industry Research and Information Association.

This document has been prepared for the titled project and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and the prior written authority of GO Contaminated Land Solutions Ltd being obtained. No responsibility or liability is accepted for the consequences of this document being used for a purpose other than that for which it was commissioned. Any person using or relying on this document for such other purpose will by such use or reliance be taken to confirm his agreement to indemnify GO Contaminated Land Solutions Ltd for all loss or damage resulting therefrom. GO Contaminated Land Solutions Ltd accepts no responsibility or liability for this document to any party other than MacNamara Developments by whom it was commissioned.

The recommendations made and the opinions expressed in this report are based on the borehole records, examination of samples and the results of site and laboratory tests.

The report is issued on the condition that GO Contaminated Land Solutions Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the boreholes or trial pits which have not been shown by the boreholes, trial pits or other tests carried out during the investigation.

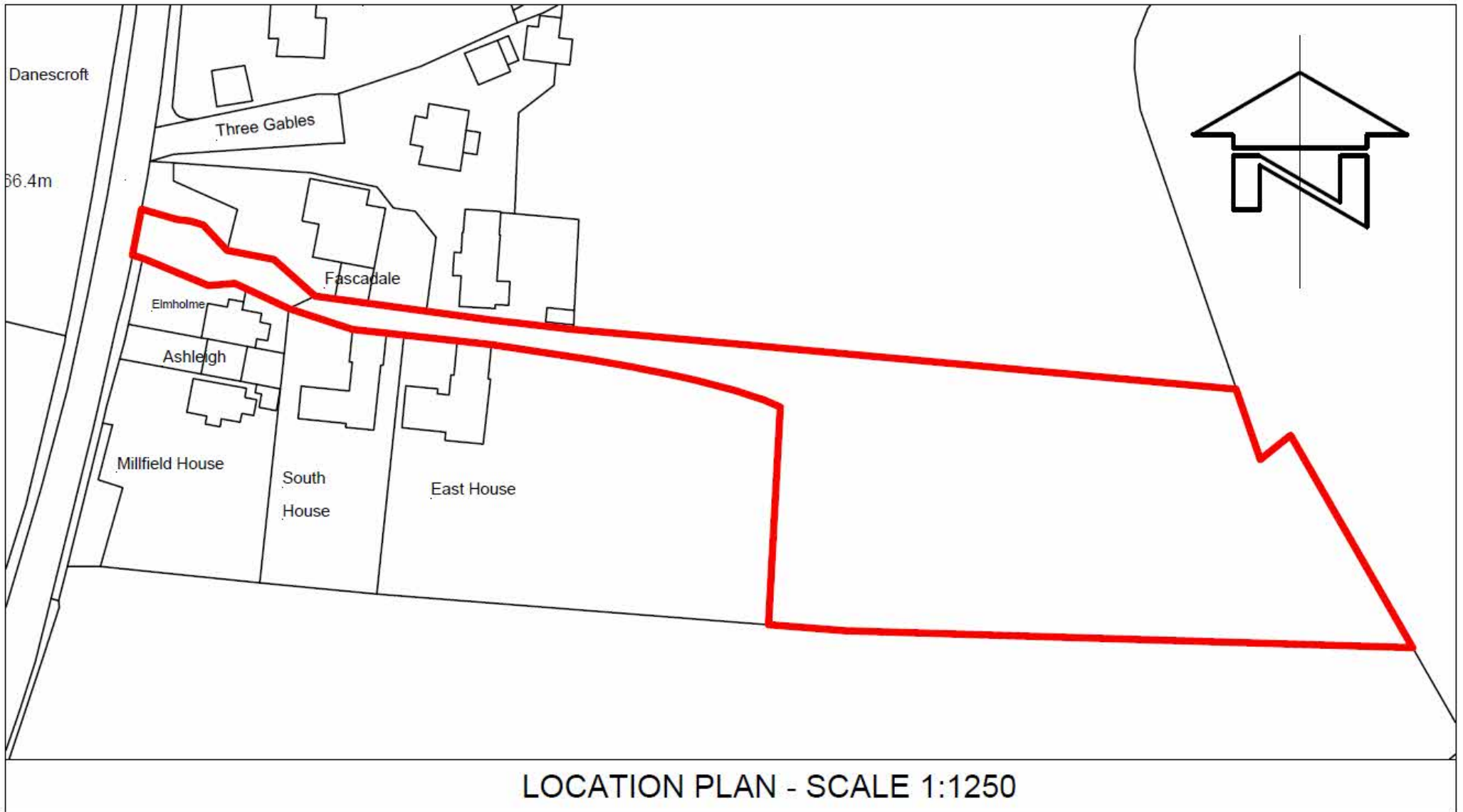
In addition, GO Contaminated Land Solutions Ltd will not be liable for any loss whatsoever arising directly or indirectly from any opinion given on the possible configuration of strata either between the borehole positions or below the maximum depth of the investigation. Such opinions, where given, are for guidance only.

Groundwater levels may also vary with time from those reported during our site investigation due to factors such as tidal conditions, heavy pumping from nearby wells or seasonal changes.

All soil samples will be kept for a period of 28 days after the date of the invoice for this project unless otherwise notified to GO Contaminated Land Solutions Ltd in writing. Should samples be required to be stored for longer than 28 days then a storage charge will be levied.



Appendix A – Site Location Plan



LOCATION PLAN - SCALE 1:1250

2407-P2E-1: Rear of East House, High Road, Great Finborough
McNamara Developments Ltd



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Appendix B – Site Works Plan

KEY:

Standard contamination suite: metals, total petroleum hydrocarbons, polyaromatic hydrocarbons, asbestos

Indicative location of vegetated mounds



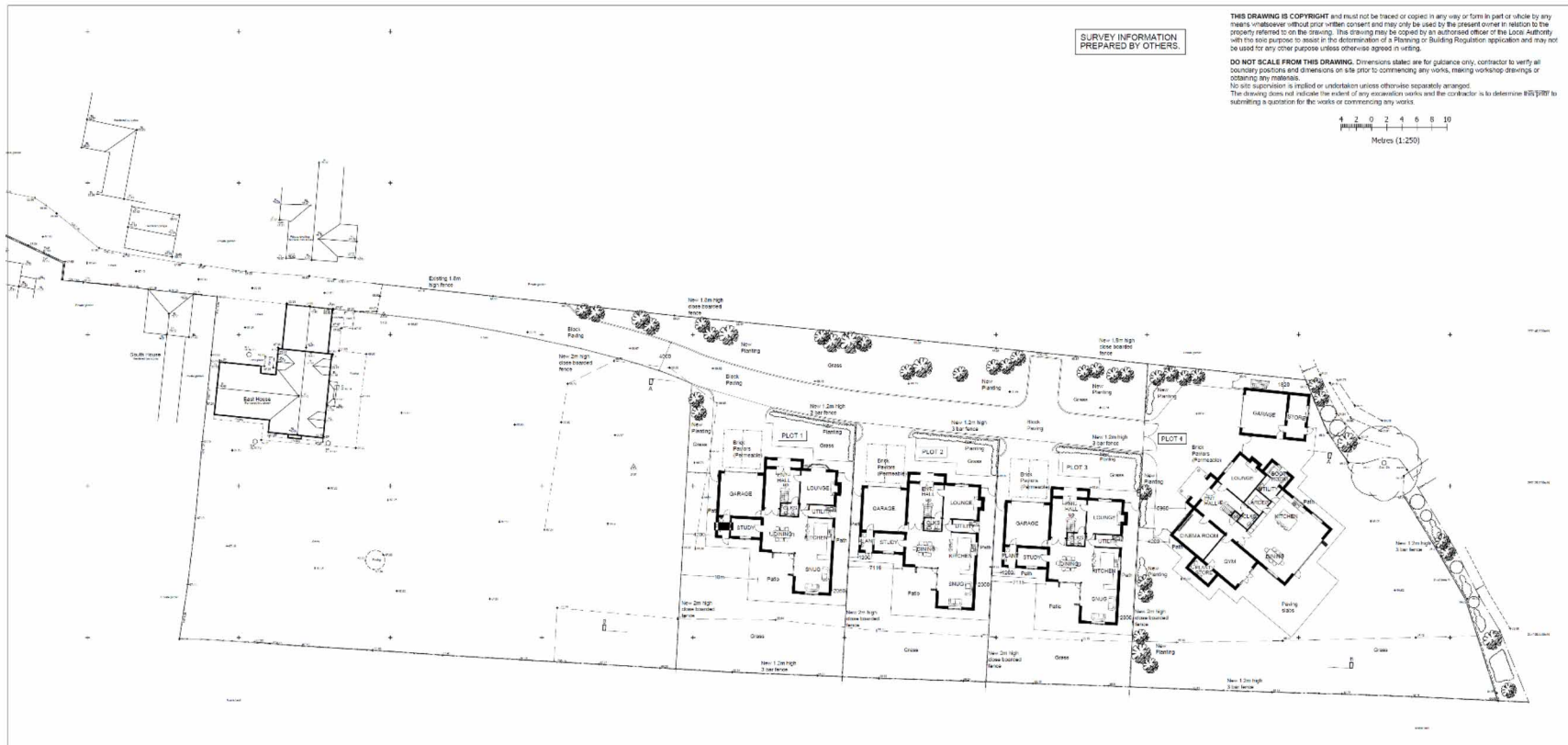
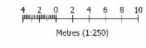


Appendix C – Proposed Site Plan

**SURVEY INFORMATION
PREPARED BY OTHERS.**

THIS DRAWING IS COPYRIGHT and must not be traced or copied in any way or form in part or whole by any means whatsoever without prior written consent and may only be used by the present owner in relation to the property referred to on the drawing. This drawing may be copied by an authorised officer of the Local Authority with this sole purpose to assist in the determination of a Planning or Building Regulation application and may not be used for any other purpose unless otherwise agreed in writing.

DO NOT SCALE FROM THIS DRAWING. Dimensions stated are for guidance only, contractor to verify all boundary positions and dimensions on site prior to commencing any works, making working drawings or obtaining any materials.
No site supervision is provided or undertaken unless otherwise separately arranged.
The drawing does not indicate the extent of any excavation works and the contractor is to determine this prior to submitting a quotation for the works or commencing any works.



PROPOSED SITE PLAN



PROPOSED BLOCK PLAN - SCALE 1:500

REV. 1	SCHEMATIC PRELIMINARY REVISED	25.08.2022
REV. 2	GENERAL REVISED ADDED	30.08.2022
REV. 3	GENERAL REVISED ADDED	29.07.2022
NO.	REVISION	DATE

CONTRACT
LAND REAR OF EAST HOUSE, GREAT
FINBOROUGH, SUFFOLK, IP14 3AQ.

DRAWING TITLE
PROPOSED SITE PLAN
PLANNING

SCALE: 1:250(A1) DATE: AUG 22 DRAWN BY: HH DWG NO: 2637/2 REV: C

KEN JUDGE & ASSOCIATES LTD.



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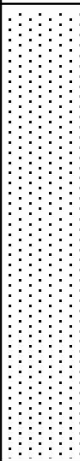

Appendix D – Borehole Logs



GO Contaminated Land Solutions
4 De Frene Rd
London, SE26 4AB

Web: www.gosolve.co.uk

BOREHOLE/TRIAL PIT LOG

Project		Rear of East House, Great Finborough			Project No		2407	
Client					Survey date		22 February 2023	
Log ID		S1			Hole type: BH			
Water Strikes	Samples		Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)	
	Type	depth (m)						
	C	0.2 - 0.6				TOPSOIL containing gravels and brick fragments	-0.10 -0.20 -0.30 -0.40 -0.50 -0.60	
				0.60		MADE GROUND - CLAY containing gravels and occasional brick fragments	-0.60 -0.70	
				0.75		Borehole terminated	-0.80 -0.90 -1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70	
<input checked="" type="checkbox"/> Water strike								
Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.								
Key: C - Contamination sample W - Water sample P - PID test								



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BOREHOLE/TRIAL PIT LOG


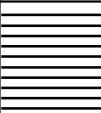
Project		Rear of East House, Great Finborough			Project No. 2407		
Client					Survey date: 22 February 2023		
Log ID		S1A			Hole type: BH		
Water Strikes	Samples		Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
	Type	depth (m)					
	C	0.2 - 0.4		0.20		Organic rich TOPSOIL containing occasional gravels	-0.10
						MADE GROUND - Silty CLAY containing gravels and occasional brick fragments	-0.20
							-0.30
							-0.40
							-0.50
							-0.60
							-0.70
				0.75		Borehole terminated	-0.80
							-0.90
							-1.00
							-1.10
							-1.20
							-1.30
							-1.40
							-1.50
							-1.60
							-1.70
<input checked="" type="checkbox"/> Water strike							
Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.							
Key: C - Contamination sample W - Water sample P - PID test							



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BOREHOLE/TRIAL PIT LOG

Project		Rear of East House, Great Finborough			Project No. 2407		
Client					Survey date: 22 February 2023		
Log ID		S2			Hole type: BH		
Water Strikes	Samples		Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
	Type	depth (m)					
	C	0.05 - 0.25		0.25		MADE GROUND - CLAY containing occasional gravels	-0.10 -0.20
				0.40		CLAY containing occasional gravels	-0.30
						Borehole terminated	-0.40 -0.50 -0.60 -0.70 -0.80 -0.90 -1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70
<input checked="" type="checkbox"/> Water strike							
Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.							
Key: C - Contamination sample W - Water sample P - PID test							



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BOREHOLE/TRIAL PIT LOG

Project Rear of East House, Great Finborough		Project No 2407				
Client		Survey date 22 February 2023				
Log ID S3		Hole type: BH				
Water Strikes	Samples Type	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
	C	0.1 -0.3	0.10		TOPSOIL	-0.10
			0.40		MADE GROUND Silty CLAY containing occasional gravles	-0.20 -0.30
			0.50		Silty CLAY containing gravels	-0.40
					Borehole terminated	-0.50 -0.60 -0.70 -0.80 -0.90 -1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70
Water strike						
Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.						
Key: C - Contamination sample W - Water sample P - PID test						



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BOREHOLE/TRIAL PIT LOG

Project		Rear of East House, Great Finborough			Project No. 2407		
Client					Survey date: 22 February 2023		
Log ID		S4			Hole type: BH		
Water Strikes	Samples		Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
	Type	depth (m)					
	C	0.1 - 0.4		0.10		TOPSOIL	-0.10
				0.50		MADE GROUND Silty CLAY containing occasional gravels, pieces of charcoal and brick fragments	-0.20 -0.30 -0.40 -0.50
				0.60		CLAY containing gravels	-0.60
						Borehole terminated	-0.70 -0.80 -0.90 -1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70
<input checked="" type="checkbox"/> Water strike							
Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.							
Key: C - Contamination sample W - Water sample P - PID test							



GO Contaminated Land Solutions
4 De Frene Rd
London, SE26 4AB

Web: www.gosolve.co.uk

BOREHOLE/TRIAL PIT LOG

Project		Rear of East House, Great Finborough			Project No. 2407		
Client					Survey date: 22 February 2023		
Log ID		S5			Hole type: BH		
Water Strikes	Samples		Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
	Type	depth (m)					
	C	0.1 - 0.4			[Hatched Pattern]	MADE GROUND Silty CLAY containing occasional gravels, pieces of charcoal and brick fragments	-0.10 -0.20 -0.30 -0.40 -0.50 -0.60
				0.60	[Horizontal Lines Pattern]	Silty Gravelly CLAY	-0.60
				0.70	[Horizontal Lines Pattern]	Borehole terminated	-0.70 -0.80 -0.90 -1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70
<input checked="" type="checkbox"/> Water strike							
Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.							
Key: C - Contamination sample W - Water sample P - PID test							



Appendix E– Borehole Photographs

S1



S1A



S2





S4



S5





Appendix F – Contamination Test Results

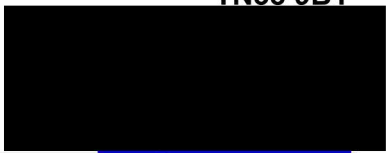
TPH testing was carried out by ALS and result are in a separate sheet. The LOD and units given are in ug/kg. These have been converted to mg/kg in the summary sheet below .

RESIDENTIAL WITH HOMEGROWN PRODUCE (R_{WH}P) - SOM 1%

Determinand	Unit	GAC	Source	Concentration						Number of Tests	Number of Exceedences
				S1	S1A	S2	S3	S4	S5		
Metals											
Arsenic	mg/kg	37.0	DEFRA C4SL	15.4	18.2	17.0	17.8	14.8	12.3	6	0
Cadmium	mg/kg	22.1	DEFRA C4SL	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6	0
Chromium (III)	mg/kg	14300.0	ATRISK SSV	30.5	34.5	33.3	32.8	27.4	26.3	6	0
Copper	mg/kg	4730.0	ATRISK SSV	29.9	28.5	26.4	28.7	22.4	17.7	6	0
Lead	mg/kg	200.0	DEFRA C4SL	62.8	55.4	53.8	69.8	41.8	34.9	6	0
Mercury (Inorganic)	mg/kg	180.0	ATRISK SSV	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6	0
Nickel	mg/kg	136.0	ATRISK SSV	29.1	35.8	32.3	34.7	29.6	20.4	6	0
Selenium	mg/kg	375.0	ATRISK SSV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6	0
Zinc	mg/kg	20000.0	ATRISK SSV	103.0	100.0	94.8	99.2	77.5	71.7	6	0
Inorganics											
Free Cyanide	mg/kg	34.0	ATRISK SSV	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	6	0
Hexavalent Chromium	mg/kg	20.5	DEFRA C4SL	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	6	0
Miscellaneous											
Moisture Content	%	-	-	20.7	18.6	17.8	17.0	16.4	16.1	6	-
pH	pH units	-	-	7.7	7.6	8.4	8.4	8.3	8.3	6	-
Soil Organic Matter	%	-	-	5.4	2.9	2.0	2.1	2.3	1.8	6	-
Stones Content	%	-	-	8.6	5.9	4.4	4.6	5.1	3.9	6	-
Phenols											
Total Monohydric Phenols	mg/kg	280.0	LQMCIEH	<5	<5	<5	<5	<5	<5	6	0
Polyaromatic hydrocarbons											
Naphthalene	mg/kg	0.83	ATRISK SSV	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Acenaphthylene	mg/kg	170.0	LQMCIEH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Acenaphthene	mg/kg	608.0	ATRISK SSV	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Fluorene	mg/kg	735.0	ATRISK SSV	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Phenanthrene	mg/kg	95.0	LQMCIEH	0.06	0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Anthracene	mg/kg	10200.0	ATRISK SSV	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Fluoranthene	mg/kg	983.0	ATRISK SSV	0.15	0.06	< 0.02	< 0.02	< 0.02	0.02	6	0
Pyrene	mg/kg	668.0	ATRISK SSV	0.13	0.05	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Benzo(a)anthracene	mg/kg	7.2	LQMCIEH	0.10	0.04	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Chrysene	mg/kg	15	LQMCIEH	0.08	0.03	< 0.03	< 0.03	< 0.03	< 0.03	6	0
Benzo(b)fluoranthene	mg/kg	2.6	LQMCIEH	0.13	0.05	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Benzo(k)fluoranthene	mg/kg	77	LQMCIEH	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	6	0
Benzo(a)pyrene	mg/kg	4.95	DEFRA C4SL	0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Indeno (1,2,3-cd) pyrene	mg/kg	27	LQMCIEH	0.08	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Dibenzo(a,h)anthracene	mg/kg	0.24	LQMCIEH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
Benzo(g,h,i)perylene	mg/kg	320	LQMCIEH	0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	6	0
TPH CWG											
>C ₅ -C ₆ Aliphatic	mg/kg	42.7	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6	0
>C ₆ -C ₈ Aliphatic	mg/kg	99.3	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6	0
>C ₈ -C ₁₀ Aliphatic	mg/kg	13.9	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6	0
>C ₁₀ -C ₁₂ Aliphatic	mg/kg	81.7	ATRISK SSV	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₁₂ -C ₁₆ Aliphatic	mg/kg	385.0	ATRISK SSV	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₁₆ -C ₃₅ Aliphatic	mg/kg	210000.0	ATRISK SSV	17.9	11.9	<1.0	<1.0	1.7	<1.0	6	0
>C ₃₅ -C ₄₀ Aliphatic	mg/kg	65000.0	LQMCIEH	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₅ -C ₇ Aromatic (benzene)	mg/kg	0.14	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6	0
>C ₇ -C ₈ Aromatic (toluene)	mg/kg	113.0	ATRISK SSV	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6	0
>C ₈ -C ₁₀ Aromatic	mg/kg	20.5	ATRISK SSV	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₁₀ -C ₁₂ Aromatic	mg/kg	70.0	ATRISK SSV	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₁₂ -C ₁₆ Aromatic	mg/kg	165.0	ATRISK SSV	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₁₆ -C ₂₁ Aromatic	mg/kg	319.0	ATRISK SSV	5.1	1.0	<1.0	<1.0	<1.0	<1.0	6	0
>C ₂₁ -C ₃₅ Aromatic	mg/kg	1120.0	ATRISK SSV	33.7	17.3	<1.0	2.6	3.7	1.9	6	0
>C ₃₅ -C ₄₄ Aromatic	mg/kg	1100.0	LQMCIEH	5.3	1.3	<1.0	<1.0	<1.0	<1.0	6	0



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY



THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 23-46922

Issue: 1

Date of Issue: 07/03/2023

Contact: Peter George

Customer Details: GO Contaminated Land Solutions Ltd
4 De Frene Road
Sydenham
London
SE26 4AB

Quotation No: Q22-03448

Order No: Not Supplied

Customer Reference: 2407

Date Received: 23/02/2023

Date Approved: 07/03/2023

Details: Rear of East House, Great Finborough

Approved by: 

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 23-46922, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
313447	S1 0.20 - 0.60	22/02/2023	23/02/2023	Silty loam	
313448	S1A 0.20 - 0.40	22/02/2023	23/02/2023	Silty clayey loam	
313449	S2 0.05 - 0.25	22/02/2023	23/02/2023	Silty loam	
313450	S3 0.10 - 0.30	22/02/2023	23/02/2023	Silty loam	
313451	S4 0.10 - 0.40	22/02/2023	23/02/2023	Silty clayey loam	
313452	5 0.10 - 0.40	22/02/2023	23/02/2023	Silty clayey loam	



Results Summary

Report No.: 23-46922, issue number 1

ELAB Reference	313447	313448	313449	313450	313451	313452
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	S1	S1A	S2	S3	S4	5
Sample Depth (m)	0.20 - 0.60	0.20 - 0.40	0.05 - 0.25	0.10 - 0.30	0.10 - 0.40	0.10 - 0.40
Sampling Date	22/02/2023	22/02/2023	22/02/2023	22/02/2023	22/02/2023	22/02/2023

Determinand	Codes	Units	LOD						
Soil sample preparation parameters									
Moisture Content	N	%	0.1	20.7	18.6	17.8	17.0	16.4	16.1
Stones Content	N	%	0.1	8.6	5.9	4.4	4.6	5.1	3.9
Material removed	N	%	0.1	8.6	5.9	4.4	4.6	5.1	3.9
Description of Inert material removed	N		0	Stones/Wood	Stones/Wood	Stones	Stones	Stones	Stones
Metals									
Arsenic	M	mg/kg	1	15.4	18.2	17.0	17.8	14.8	12.3
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	30.5	34.5	33.3	32.8	27.4	26.3
Copper	M	mg/kg	5	29.9	28.5	26.4	28.7	22.4	17.7
Lead	M	mg/kg	5	62.8	55.4	53.8	69.8	41.8	34.9
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	29.1	35.8	32.3	34.7	29.6	20.4
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	103	100	94.8	99.2	77.5	71.7
Inorganics									
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
pH	M	pH units	0.1	7.7	7.6	8.4	8.4	8.3	8.3
Soil Organic Matter	U	%	0.1	5.4	2.9	2.0	2.1	2.3	1.8

Results Summary

Report No.: 23-46922, issue number 1

ELAB Reference	313447	313448	313449	313450	313451	313452
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	S1	S1A	S2	S3	S4	5
Sample Depth (m)	0.20 - 0.60	0.20 - 0.40	0.05 - 0.25	0.10 - 0.30	0.10 - 0.40	0.10 - 0.40
Sampling Date	22/02/2023	22/02/2023	22/02/2023	22/02/2023	22/02/2023	22/02/2023

Determinand	Codes	Units	LOD						
Phenols									
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5	< 5	< 5
Polyaromatic hydrocarbons									
Naphthalene	SM	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Acenaphthylene	SM	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Acenaphthene	SM	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Fluorene	S	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Phenanthrene	SM	mg/kg	0.02	0.06	0.02	< 0.02	< 0.02	< 0.02	< 0.02
Anthracene	S	mg/kg	0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Fluoranthene	SM	mg/kg	0.02	0.15	0.06	< 0.02	< 0.02	< 0.02	0.02
Pyrene	SM	mg/kg	0.02	0.13	0.05	< 0.02	< 0.02	< 0.02	< 0.02
Benzo(a)anthracene	S	mg/kg	0.02	0.10	0.04	< 0.02	< 0.02	< 0.02	< 0.02
Chrysene	SM	mg/kg	0.02	0.08	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	SM	mg/kg	0.02	0.13	0.05	< 0.02	< 0.02	< 0.02	< 0.02
Benzo(k)fluoranthene	SM	mg/kg	0.03	0.05	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	S	mg/kg	0.02	0.10	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-cd)pyrene	SM	mg/kg	0.02	0.08	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Dibenzo(a,h)anthracene	SM	mg/kg	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Benzo[g,h,i]perylene	SM	mg/kg	0.02	0.07	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Total PAH(16)	NS	mg/kg	0.34	0.95	0.37	< 0.34	< 0.34	< 0.34	< 0.34



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

Report No.: 23-46922, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
313447	0.20 - 0.60	S1	Brown Sandy Soil, Stones, Wood	No asbestos detected	n/t	n/t	n/t	n/t
313448	0.20 - 0.40	S1A	Brown Soil, Organic	No asbestos detected	n/t	n/t	n/t	n/t
313449	0.05 - 0.25	S2	Brown Soil, Stones	No asbestos detected	n/t	n/t	n/t	n/t
313450	0.10 - 0.30	S3	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
313451	0.10 - 0.40	S4	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t
313452	0.10 - 0.40	5	Brown Soil	No asbestos detected	n/t	n/t	n/t	n/t



Method Summary

Report No.: 23-46922, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Free cyanide	N	As submitted sample	27/02/2023	107	Colorimetry
Hexavalent chromium	N	As submitted sample	27/02/2023	110	Colorimetry
pH	M	Air dried sample	01/03/2023	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	28/02/2023	300	ICPMS
Phenols in solids	N	As submitted sample	27/02/2023	121	HPLC
Low range Aliphatic hydrocarbons soil	N	As submitted sample	28/02/2023	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	28/02/2023	181	GC-MS
Asbestos identification	U	Air dried sample	02/03/2023	281	Microscopy
Soil organic matter	U	Air dried sample	01/03/2023	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

Report No.: 23-46922, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	<p>LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.</p> <p>Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.</p> <p>ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received.</p> <p>PCB congener results may include any coeluting PCBs</p> <p>Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.</p>

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry



The Environmental Laboratory Ltd
Unit A2, Windmill Road
Ponswood Industrial Estate
St. Leonards on Sea
East Sussex
TN38 9BY

Attention: Customer Services

CERTIFICATE OF ANALYSIS

Date of report Generation:	07 March 2023
Customer:	The Environmental Laboratory Ltd
Sample Delivery Group (SDG):	230228-82
Your Reference:	23-46922
Location:	Not Specified
Report No:	681031
Order Number:	11033

We received 6 samples on Tuesday February 28, 2023 and 6 of these samples were scheduled for analysis which was completed on Monday March 06, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Sonia McWhan
Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 230228-82
Client Ref.: 23-46922

Report Number: 681031
Location: Not Specified

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27617536	313447			22/02/2023
27617537	313448			22/02/2023
27617538	313449			22/02/2023
27617539	313450			22/02/2023
27617541	313451			22/02/2023
27617542	313452			22/02/2023

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 230228-82
Client Ref.: 23-46922

Report Number: 681031
Location: Not Specified

Superseded Report:

Results Legend

- X Test
- N No Determination Possible

Sample Types -

- S - Soil/Solid
- UNS - Unspecified Solid
- GW - Ground Water
- SW - Surface Water
- LE - Land Leachate
- PL - Prepared Leachate
- PR - Process Water
- SA - Saline Water
- TE - Trade Effluent
- TS - Treated Sewage
- US - Untreated Sewage
- RE - Recreational Water
- DW - Drinking Water Non-regulatory
- UNL - Unspecified Liquid
- SL - Sludge
- G - Gas
- OTH - Other

Lab Sample No(s)	27617536	27617537	27617538	27617539	27617541	27617542
Customer Sample Reference	313447	313448	313449	313450	313451	313452
AGS Reference						
Depth (m)						
Container	120g Amber Jar (ALE217)	120g Amber Jar (ALE217)	120g Amber Jar (ALE217)	120g Amber Jar (ALE217)	120g Amber Jar (ALE217)	120g Amber Jar (ALE217)
Sample Type	S	S	S	S	S	S

EPH CWG GC (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
TPH CWG GC (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
VOC MS (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 230228-82
Client Ref.: 23-46922

Report Number: 681031
Location: Not Specified

Superseded Report:

Sample Descriptions

Grain Sizes

<i>very fine</i>	< 0.063mm	<i>fine</i>	0.063mm - 0.1mm	<i>medium</i>	0.1mm - 2mm	<i>coarse</i>	2mm - 10mm	<i>very coarse</i>	> 10mm
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<i>Lab Sample No(s)</i>	<i>Customer Sample Ref.</i>	<i>Depth (m)</i>	<i>Colour</i>	<i>Description</i>	<i>Inclusions</i>	<i>Inclusions 2</i>
27617536	313447		Dark Brown	Sandy Loam	Vegetation	None
27617537	313448		Dark Brown	Clay Loam	Vegetation	None
27617538	313449		Light Brown	Clay	Stones	Vegetation
27617539	313450		Dark Brown	Clay	Stones	Vegetation
27617541	313451		Dark Brown	Clay	Vegetation	None
27617542	313452		Dark Brown	Clay	Vegetation	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



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Location: Not Specified

Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample Ref.							
# ISO17025 accredited.			313447	313448	313449	313450	313451	313452		
M mCERTS accredited.										
AQ Aqueous / settled sample.										
DIS.DISS Dissolved / filtered sample.										
TOT.UFIL Total / unfiltered sample.										
* Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery. (P) Trigger breach confirmed 1-4 # Sample deviation (see appendix)										
Component	LOD/Units	Method	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)	AGS Reference
GRO Surrogate % recovery**	%	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617536	
								230228-82	27617537	
								230228-82	27617538	
								230228-82	27617539	
								230228-82	27617541	
								230228-82	27617542	
Aliphatics >C5-C6 (HS_1D_AL)	<10 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617536	
Aliphatics >C6-C8 (HS_1D_AL)	<10 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617537	
Aliphatics >C8-C10 (HS_1D_AL)	<10 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617538	
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617539	
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617541	
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617542	
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617536	
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617537	
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617538	
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617539	
Aromatics >EC5-EC7 (HS_1D_AR)	<10 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617541	
Aromatics >EC7-EC8 (HS_1D_AR)	<10 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617542	
Aromatics >EC8-EC10 (HS_1D_AR)	<10 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617536	
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617537	
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617538	
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617539	
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617541	
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617542	
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617536	
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617537	
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10000 µg/kg	TM414		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617538	
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<50 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617539	
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<50 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617541	
GRO >C5-C10 (HS_1D_TOTAL)	<20 µg/kg	TM089		Soil/Solid (S)	22/02/2023		28/02/2023	230228-82	27617542	



CERTIFICATE OF ANALYSIS

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Location: Not Specified

Superseded Report:

VOC MS (S)

Results Legend			Customer Sample Ref.											
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. dis.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery. (P) Trigger breach confirmed 1-4 # Sample deviation (see appendix)			313447	313448	313449	313450	313451	313452						
Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference			Soil/Solid (S) 22/02/2023	Soil/Solid (S) 22/02/2023	Soil/Solid (S) 22/02/2023	Soil/Solid (S) 22/02/2023	Soil/Solid (S) 22/02/2023	Soil/Solid (S) 22/02/2023						
			28/02/2023 230228-82 27617536	28/02/2023 230228-82 27617537	28/02/2023 230228-82 27617538	28/02/2023 230228-82 27617539	28/02/2023 230228-82 27617541	28/02/2023 230228-82 27617542						
Component	LOD/Units	Method	313447		313448		313449		313450		313451		313452	
Dibromofluoromethane**	%	TM116	112	2	111	2	109	2	112	2	114	2	108	2
Toluene-d8**	%	TM116	97.7	2	98.4	2	96.4	2	99.4	2	98.7	2	97.8	2
4-Bromofluorobenzene**	%	TM116	77.8	2	82	2	71.9	2	87	2	101	2	75.7	2
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<100	2 M	<100	2 M	<10	2 M	<100	2 M	<100	2 M	<10	2 M
Benzene	<9 µg/kg	TM116	<90	2 M	<90	2 M	<9	2 M	<90	2 M	<90	2 M	<9	2 M
Toluene	<7 µg/kg	TM116	<70	2 M	<70	2 M	<7	2 M	<70	2 M	<70	2 M	<7	2 M
Ethylbenzene	<4 µg/kg	TM116	<40	2 M	<40	2 M	41.1	2 M	<40	2 M	<40	2 M	32.9	2 M
p/m-Xylene	<10 µg/kg	TM116	<100	2 #	<100	2 #	21.6	2 #	<100	2 #	<100	2 #	30.8	2 #
o-Xylene	<10 µg/kg	TM116	<100	2 M	<100	2 M	13.7	2 M	<100	2 M	<100	2 M	12.6	2 M
Sum of Detected Xylenes	<0.02 mg/kg	TM116	<0.2	2	<0.2	2	0.0353	2	<0.2	2	<0.2	2	0.0434	2
Sum of BTEX	<40 µg/kg	TM116	<400	2	<400	2	76.4	2	<400	2	<400	2	76.3	2



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Report Number: 681031
Location: Not Specified

Superseded Report:

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM089	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM414	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



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Test Completion Dates

Lab Sample No(s)	27617536	27617537	27617538	27617539	27617541	27617542
Customer Sample Ref.	313447	313448	313449	313450	313451	313452
AGS Ref.						
Depth						
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
EPH CWG GC (S)	03-Mar-2023	03-Mar-2023	03-Mar-2023	03-Mar-2023	03-Mar-2023	03-Mar-2023
GRO by GC-FID (S)	02-Mar-2023	06-Mar-2023	02-Mar-2023	02-Mar-2023	02-Mar-2023	02-Mar-2023
Sample description	01-Mar-2023	01-Mar-2023	01-Mar-2023	01-Mar-2023	01-Mar-2023	01-Mar-2023
TPH CWG GC (S)	03-Mar-2023	06-Mar-2023	03-Mar-2023	03-Mar-2023	03-Mar-2023	03-Mar-2023
VOC MS (S)	03-Mar-2023	03-Mar-2023	03-Mar-2023	03-Mar-2023	06-Mar-2023	03-Mar-2023



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Superseded Report:

Appendix

- Results are expressed on a dry weight basis (dried at 35°C) for all soil analysis for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NI BRE method, VOC TICs and SVOC TICs.
- If sufficient sample is received a sub sample will be retained free of charge for after analysis is completed (e-mailed) for all sample types unless the sample is on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be discarded one month after the date of receipt unless we are instructed to the contrary. Once the period has expired, a storage charge will be applied for each month or part thereof client cancels the request for sample storage. ALS reserve the right to charge for received and stored but not analysed.
- With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to variables beyond our control.
- We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinations are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with track record will be utilised.
- If no separate volatile sample is supplied by the client, or if a headspace or sample is present in the volatile sample, the integrity of the data may be compromised. Flagged up as an invalid VOC on the test schedule and the result marked as discarded on the test certificate.
- NDP - No determination possible due to insufficient/unsuitable sample.
- Results relate only to the items tested.
- LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not for moisture content.
- Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.
- Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
- In certain circumstances the method detection limit may be elevated due to things being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would method detection limit to be raised.
- For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.
- For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.
- For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.
- Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.
- We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
- Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

days

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are of supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sample which has been examined to determine the presence of asbestos using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accreditation. **Trace - Where** only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions interpretations and all other information contained in the report are outside the scope of UKAS accreditation.