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# Remediation Verification Report

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At: Branch Hill Allotments,  
Branch Hill, London, NW3  
7LS

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For: London Borough of  
Camden

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Report Reference: LP2167/Verification

Report Date: 08 July 2022

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## EXECUTIVE SUMMARY

Leap Environmental Ltd (**LEAP**) was appointed by the London Borough of Camden to undertake remediation verification works at a site referred to as Branch Hill Allotments, Branch Hill, London, NW3 7LS.



The site comprised part of the gardens of Branch Hill House prior to becoming allotment gardens. The site will remain as allotment gardens post remediation. The site has been subject to a number of previous investigations by Leap Environmental Ltd and others.

The intrusive investigations undertaken across the wider site identified elevated concentrations of lead, benzo[a]pyrene and asbestos in the shallow soils.

Remediation measures comprised the application of clean cover soils across the full area of all 28 no. plots which will be enclosed within gabion walls. A deter to dig membrane and 500mm of clean cover was required.

This report presents a detailed summary of the remediation and verification works carried out at the site.

It is considered that this report demonstrates that the remediation has been undertaken in accordance with the RMS and that no unacceptable risks remain to the identified receptors.

Signed:	 Harry Punter BSc MSc MCSM Project Engineer
Countersigned:	 Tim Thorpe MSci ARSM FGS
Date:	8 July 2022
Revision:	Issue 2 - FINAL

# A INTRODUCTION

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## 1 Authority

Leap Environmental Ltd (hereafter referred to as **LEAP**) was appointed by the London Borough of Camden (LB Camden) to provide independent verification of the remediation undertaken at Branch Hill Allotments, Branch Hill, London, NW3 7LS.

This document sets out the remediation completed onsite between December 2021 and March 2022 and presents the verification data in accordance with the Remediation Method Statement (RMS):

- Remediation Method Statement. **LEAP** Environmental Ltd. Ref: LP2167/RMS Issue 1, dated 11<sup>th</sup> November 2021.

## 2 Objective

The objective of this report is to summarise the actions taken to complete the required remediation works at the site. This report outlines the background and overall requirement for remediation in addition to the methodologies employed on site, the results and conclusions. The report serves to enable the discharge of LB Camden Planning Condition 3 of planning permission ref: 2021/4073/P.

## 3 Background

It is understood that suspected asbestos on a single plot (#28 in the west of the site) was highlighted to the council in the summer of 2018. A survey was subsequently undertaken by Manestream who reported seven instances of ACMs which comprised pieces of cemented panels on the surface of the soil. This material was subsequently removed by a specialist. It is further understood that the council then took the decision to investigate the remainder of the site in light of the asbestos being found. This led to the first of three intrusive investigations which identified potential risks from three contaminants namely: lead, benzo[a]pyrene and asbestos. In light of the information obtained, the council sought further advice from Public Health England (PHE - now referred to as the UK Health Security Agency) and took the decision not to close the site but instead issued advice and guidance to the plot holders via both letter and poster on the allotment site's notice board.

**LEAP** undertook a review of the previous site investigations in March 2020. A subsequent intrusive site investigation was then undertaken in July 2020. Following the additional site investigation, the decision was taken not to designate the land as contaminated as defined by Part 2A of the Environmental Protection Act (1990). Instead, the council decided to undertake

voluntary remediation. A Remediation Options Appraisal was produced in November 2020 and a Remediation Method Statement was produced in November 2021.

### 3.1 Previous Reports

- Ground Investigation Report. WSP. Project Ref: 70049152 v1, dated August 2018;
- Human Health Detailed Quantitative Risk Assessment. WSP. Project Ref: 70049152 v1, dated October 2018;
- Ground Investigation Report. Hydrock. Ref: BHA-HYD-XX-GI-GO-0001-P2, dated 4th June 2019;
- Letter Report: 'Review and discussion of previous investigative reports to determine the risk of 'SPOSH' and in turn the designation of contaminated land under Part 2A of the EPA 1990'. LEAP Environmental Ltd. Report Ref: PA/20/LP2167/v3, dated 9th March 2020;
- Supplementary Phase II Site Investigation Report. Report. LEAP Environmental Ltd. Ref: LP2167/Further SI, dated 28th July 2020; and
- Remediation Options Appraisal. LEAP Environmental Ltd. Ref: LP2167/ROA/Final, dated 3rd November 2020.

## 4 Proposed Land Use

The site will continue to be used as allotment gardens.

## 5 Environmental Setting and Site History

This Section provides a brief introduction to the site. Further information is provided within the RMS and the other reports referenced in Section 3.1 of this report.

### 5.1 Site Location and Description

The approximately 0.2 ha site is located on Branch Hill, in the LB Camden in northwest London (postcode NW3 7LS). The main entrance is located on Frognaal Rise opposite the junction with Lower Terrace. A second entrance is located off (private) Spedan Close where the site is accessed via a flight of stairs. The site is bowl shaped with the central regions at the lowest point and the site rising substantially in all directions towards the boundaries. Hence, substantial parts of the inner perimeters of the site are not suitable for plots and are vegetated with mature trees and associated undergrowth.

The allotments are located in a residential area and form 1 of 4 allotment sites in the LB of Camden which are run by allotment associations with the support of the council's parks team. At Branch Hill, prior to the remediation, there were 28 No. plots of varying size and shape along with a communal area, shed and pond.

## 5.2 Site History

The site is understood to have once comprised part of the gardens of Branch Hill House. There is anecdotal evidence of small buildings once being present in the western region of the site. Based on observations during the intrusive site investigation undertaken by LEAP in July 2020, evidence of foundations were occasionally encountered which may have been related to walls and hence a walled garden.

## 5.3 Contamination

Elevated concentrations of lead, benzo[a]pyrene and asbestos have been measured in soil at concentrations deemed unacceptable to site users (following detailed assessment and consideration). No risks were identified to controlled waters, ecological receptors or buildings / structures.

# 6 Limitations

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

This report is confidential to the Client and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Full details of the limitations are provided in Appendix A.

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## B REMEDIATION PHASE

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This section should be read in conjunction with the Remediation Strategy referenced in Section I. The remediation strategy was designed to mitigate the risks to human health (end users) that had been identified by the risk assessment. This would be achieved by breaking the source-pathway-receptor linkage, by removing the pathway by creating a physical barrier in the form of a clean cover system.

### 7 Remediation Strategy

The following remediation and verification measures were required at the site and agreed with the council:

- Application of a 500mm deep gabion-bordered clean cover system in all gardened areas of the site; and
- Independent verification of remediation measures namely:
  - Review of laboratory test data or sampling and testing of topsoil and subsoil proposed for import to site to act as clean cover;
  - Sampling and testing of clean cover soils post import;
  - Confirmation of the application of a deter-to-dig geotextile; and
  - Confirmation of the applied clean cover thickness.

### 8 Site Works

LB Camden engaged Ginkgo Gardens Ltd. (a specialist landscaping organisation) to undertake the remedial work. Work commenced in December 2021 with site clearance. The construction of the raised beds and Gabions commenced in January 2022 and was completed by April 2022. A total of 520T of subsoil and 980T of topsoil was imported from Bourne Amenity between 9<sup>th</sup> February and 30<sup>th</sup> March 2022. The subsoil comprised an 'as dug' product and the topsoil comprised a manufactured product.

### 9 Verification Works

#### 9.1 Review of pre-import lab data

Ginkgo provided the following reports on 7<sup>th</sup> December 2021:

- Subsoil analysis report: Westerham Subsoil. Produced by: Tim O'Hare Associates Ref: TOHA/21/7189/2/SS, dated 18<sup>th</sup> October 2021;
- Topsoil analysis report: Westerham TS6 Topsoil. Produced by: Tim O'Hare Associates Ref: TOHA/21/7189/2/SS, dated 18<sup>th</sup> October 2021.

Both reports provided a visual assessment, chemical analysis and assessment against the criteria presented in the relevant British Standard (BS8601:2013 for subsoil and BS3882:2015 for topsoil) for a single sample.

Tim O'Hare Associates (a specialist soil and landscape consultancy) concluded both materials to be suitable for use as general landscaping materials (the subsoil was outside of the specified particle size distribution range but this was concluded to be insignificant by the authors). The topsoil was fully compliant with BS:3882:2105.

LEAP reviewed the chemical analysis and concluded no exceedances of the assessment criteria presented in the RMS. Queries were raised regarding:

- the alkaline nature of the materials (particularly the topsoil);
- the fact that the assessment by the specialist had been made for general landscaping purposes (as opposed to allotments); and
- the high sand content of the subsoil.

Ginko forwarded the queries to Tim O'Hare Associates. A response was received by LEAP (via the client) on 20<sup>th</sup> January 2022. The email indicated that the elevated pH was as a result of potassium in the compost element of the topsoil. Potassium is highly leachable and hence the pH was anticipated to reduce in time (as the soils are wetted). The email raised no concerns re the sandy nature of the subsoil or the intended use of the soils in an allotment setting.

## 9.2 Site visits – clean cover geo-chemical testing and thickness

### 1) 15<sup>th</sup> February 2022

At the time of the visit the site had been cleared and 500mm high Gabions had been constructed around the majority of the perimeter area of the site. The deter to dig membrane had been placed in the western regions of the site. The membrane comprised Polyfelt produced by Tencate (a non-woven geotextile coloured yellow - similar to Terram). Subsoil had been applied and gently compacted to a depth of 200mm. Topsoil was being applied over a portion of the subsoil during the site visit. Four samples of subsoil were collected (two from insitu locations in the west of the site (confirming the thickness as 200mm) and two from material stockpiled on Polyfelt in the north of the site). Two samples of topsoil were taken from material stockpiled on Polyfelt inside the site entrance. Photographs are included as Appendix B.

The area to be filled was 1,900m<sup>2</sup> across the site. Ginko calculated a requirement for c. 540 tonnes of subsoil and c. 800 tonnes of topsoil. The RMS stipulated a subsoil testing frequency of one sample per 150m<sup>3</sup> with a minimum of three samples per source. Conservatively assuming that the materials have a density of 1 tonne per m<sup>3</sup> (the materials are in fact likely to be denser) then the four samples are sufficient for this material.



The RMS stipulated a topsoil testing frequency of one sample per 100m<sup>3</sup> with a minimum of three samples per source. Thus, further topsoil testing would be necessary during subsequent verification visits.

Both materials matched the descriptions provided in the Tim O'Hare Associates reports. As the materials were 'as dug' and manufactured materials, there was no need to test for pesticides (this would only have been undertaken for material(s) imported from a third party site). It was also deemed unnecessary to subject the topsoil to a BS3882 compliance test as this was undertaken by Tim O'Hare Associates previously.

All samples were placed in laboratory supplied containers and couriered in cool boxes to The Environmental Laboratory at their facility in East Sussex. All samples were subjected to heavy metals, polycyclic aromatic hydrocarbon, pH, total organic carbon and asbestos testing in accordance with Table B1 (RMS Appendix B). Where available, tests are MCERTS accredited.

## 2) 16<sup>th</sup> March 2022

At the time of the visit the site the rear (western region) was largely complete. Gabions had been constructed, the membrane and subsoil had been laid and topsoil was being delivered and applied in the central site region. Works had commenced on the access pathways which comprised compacted roadstone. Four samples of topsoil were collected (two from insitu locations in the central region of the site and two from material stockpiled adjacent to the site entrance. Photographs are included as Appendix B. The RMS stipulated a topsoil testing frequency of one sample per 100m<sup>3</sup> with a minimum of three samples per source. Thus, further topsoil testing would be necessary during subsequent verification visits.

The topsoil matched the descriptions provided in the Tim O'Hare Associates report. As the material was a manufactured product, there was no need to test for pesticides (this would only have been undertaken for material(s) imported from a third party site). It was also deemed unnecessary to subject the topsoil to a BS3882 compliance test as this was undertaken by Tim O'Hare Associates previously.

All samples were placed in laboratory supplied containers and couriered in cool boxes to The Environmental Laboratory at their facility in East Sussex. All samples were subjected to heavy metals, polycyclic aromatic hydrocarbon, pH, total organic carbon and asbestos testing in accordance with Table B1 (RMS Appendix B). Where available, tests are MCERTS accredited.

## 3) 5<sup>th</sup> April

Remediation was completed and the Contractor had demobilised from site. Subsoil and Topsoil had been placed in all locations apart from plot 1 which had been left at formation level for future works. Trial holes were dug across the site with at least 1 pit excavated per plot. Table 1 lists the findings of the inspection pits. Photographs of example inspection pits are included in Appendix C. The RMS stated that a thickness of topsoil >300mm and subsoil >200mm was required across the site.

**Table 1: Clean Cover Thicknesses**

<b>Plot</b>	<b>Topsoil Thickness (m)</b>	<b>Subsoil Thickness (m)</b>	<b>Depth of Membrane (m)</b>
2	0.41	0.19	0.60
3	0.36	0.12	0.48
4	0.35	0.15	0.50
6	0.46	0.14	0.60
7	0.50	0.07	0.57
8	0.40	0.17	0.57
9	0.47	0.16	0.63
10	0.40	0.20	0.60
11	0.35	0.20	0.55
12	0.37	0.24	0.61
13	0.40	0.20	0.60
14	0.40	0.22	0.62
15	0.45	0.20	0.65
16	0.40	0.23	0.63
17	0.42	0.28	0.70
18	0.42	0.31	0.73
18a	0.38	0.32	0.70
19	0.45	0.10	0.55
20	0.40	0.14	0.54
21	0.48	0.17	0.65
25	0.39	0.17	0.56
26	0.30	0.24	0.54
27	0.41	0.23	0.64
28	0.32	0.16	0.48
29	0.39	0.13	0.52
30	0.37	0.18	0.55
34	0.40	0.27	0.67
35	0.38	0.25	0.63

Four additional samples of topsoil were taken, bringing the total number of samples tested up to 10 No. as per requirements set out in the RMS.

The samples were placed in laboratory supplied containers and couriered in cool boxes to The Environmental Laboratory at their facility in East Sussex. All samples were subjected to heavy metals, polycyclic aromatic hydrocarbon, pH, total organic carbon and asbestos testing in accordance with Table B1 (RMS Appendix B). Where available, tests are MCERTS accredited.

### 9.3 Geo-chemical test results

All samples of subsoil and topsoil which were tested were found to meet the criteria set out in Table B1 of the RMS.

## 10 Conclusions

It is considered that this report has provided sufficient evidence to demonstrate that the remediation works comprising placement of a clean cover system has been completed in compliance with the approved remediation method statement and thus no unacceptable risks remain to the identified receptors.

## **APPENDIX A – LIMITATIONS**

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Limitations
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## LIMITATIONS

This report is confidential to the Client and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

## APPENDIX B – FIGURES

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Figures



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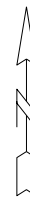


Client: London Borough of Camden  
Project: Branch Hill

Date: 01/06/2020  
Title: Site Location Plan

Project ID: LP2167  
Fig. No. 1

● Sample Locations



Basemap: Branch Hill Allotments Plan



Client:	London Borough of Camden	Date:	05/04/2022	Project ID:	LP2167
Project:	Branch Hill Allotments	Title:	Sample Location Plan	Fig. No.	



## **APPENDIX C – PHOTOGRAPHS**

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Photographs



Plate 1: VISIT 15/02/22 – View of the site looking east towards the entrance on Branch Hill



Plate 2: VISIT 15/02/22 – Gabion constructed around the communal area





Plate 3: VISIT 15/02/22 – Confirmation of Gabion height – 500mm



Plate 4: VISIT 15/02/22 – Subsoil stockpiled on membrane in north of site





Plate 5: VISIT 15/02/22 – Topsoil stockpiled on membrane adjacent to the site entrance



Plate 6: VISIT 15/02/22 – Laying of subsoil over membrane in the location of former plots 29 and 30 (northwest of site)





Plate 7: VISIT 15/02/22 – Laying of topsoil in the location of former plots 25-28 (west of site)



Plate 8: VISIT 15/02/22 – Thickness of subsoil in the location of former plots 25-28 (west of site)





Plate 9: VISIT 15/02/22 – Membrane specification



Plate 10: VISIT 16/03/22 – rear (west) of the site with placement of clean cover soils completed





Plate 11: VISIT 16/03/22 – central region of the site: membrane and subsoil placed, topsoil being placed (behind the excavator)



Plate 12: VISIT 16/03/22 – Commencement of construction of the communal paths between the plots





Plate 13: VISIT 05/04/2022 – View of the site looking northwest from the site entrance.



Plate 14: VISIT 05/04/2022 – View of the site looking southwest from the northern site boundary.





Plate 15: VISIT 05/04/2022 – View of plot 1 which was incomplete.



Plate 16: VISIT 05/04/2022 – Example down pit view of hand dug pit within allotment, showing geotextile membrane at base.



Plate 17: VISIT 05/04/2022 – Down pit view with arisings, consisting of brown slightly clayey sandy topsoil over orange fine to medium sand.

## **APPENDIX D – LABORATORY TEST CERTIFICATES**

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Laboratory Test  
Certificates



2683



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## THE ENVIRONMENTAL LABORATORY LTD

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**Analytical Report Number:** 22-38812

**Issue:** 1

**Date of Issue:** 25/02/2022

**Contact:** Paul Adams

**Customer Details:** Leap Environmental Ltd  
Book House  
Glebelands Centre  
Dorking  
Surrey RH4 3HW

**Quotation No:** Q14-00063


**Order No:** LPO-5218

**Customer Reference:** LP2167

**Date Received:** 17/02/2022

**Date Approved:** 25/02/2022

**Details:** Branch Hill Allotments

**Approved by:** 

Mike Varley, General Manager

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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.: 22-38812, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
268790	Subsoil Sample 1	15/02/2022	17/02/2022	Sand	
268791	Subsoil Sample 2	15/02/2022	17/02/2022	Sand	
268792	Subsoil Sample 3	15/02/2022	17/02/2022	Sand	
268793	Subsoil Sample 4	15/02/2022	17/02/2022	Sand	
268794	Topsoil Sample 1	15/02/2022	17/02/2022	Sandy silty loam	
268795	Topsoil Sample 2	15/02/2022	17/02/2022	Sandy silty loam	



## Results Summary

2683

Report No.: 22-38812, issue number 1

ELAB Reference	268790	268791	268792	268793	268794	268795
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	Subsoil Sample 1	Subsoil Sample 2	Subsoil Sample 3	Subsoil Sample 4	Topsoil Sample 1	Topsoil Sample 2
Sample Depth (m)						
Sampling Date	15/02/2022	15/02/2022	15/02/2022	15/02/2022	15/02/2022	15/02/2022

Determinand	Codes	Units	LOD						
<b>Soil sample preparation parameters</b>									
Moisture Content	N	%	0.1	11.4	10.2	7.6	7.7	13.1	12.8
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1	< 0.1	13.8	16.4
Description of Inert material removed	N		0	None	None	None	None	Wood/Glass	Stones/Wood
<b>Metals</b>									
Arsenic	M	mg/kg	1	27.0	20.8	24.7	25.9	13.0	13.7
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	62.0	45.8	64.4	70.0	24.2	23.3
Copper	M	mg/kg	5	11.0	6.3	11.9	12.8	20.6	27.0
Lead	M	mg/kg	5	11.0	5.9	< 5.0	< 5.0	22.0	23.9
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	34.1	26.6	34.0	37.1	17.8	18.0
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	43.0	31.5	42.0	45.3	52.7	57.8
<b>Inorganics</b>									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8



## Results Summary

2683

Report No.: 22-38812, issue number 1

ELAB Reference	268790	268791	268792	268793	268794	268795
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	Subsoil Sample 1	Subsoil Sample 2	Subsoil Sample 3	Subsoil Sample 4	Topsoil Sample 1	Topsoil Sample 2
Sample Depth (m)						
Sampling Date	15/02/2022	15/02/2022	15/02/2022	15/02/2022	15/02/2022	15/02/2022

Determinand	Codes	Units	LOD						
<b>Miscellaneous</b>									
pH	M	pH units	0.1	6.2	6.5	6.6	6.8	8.1	8.2
Total Organic Carbon	N	%	0.01	0.06	0.03	0.04	0.03	1.4	1.3
<b>Polycyclic aromatic hydrocarbons</b>									
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4





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Results Summary

Report No.: 22-38812, 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	Gravimetric Analysis Total	Gravimetric Analysis by ACM Type	Free Fibre Analysis	Total Asbestos
268790		Subsoil Sample 1	Loamy sand, stones	No asbestos detected	n/t	n/t	n/t	n/t
268791		Subsoil Sample 2	Loamy sand	No asbestos detected	n/t	n/t	n/t	n/t
268792		Subsoil Sample 3	Loamy sand	No asbestos detected	n/t	n/t	n/t	n/t
268793		Subsoil Sample 4	Loamy sand	No asbestos detected	n/t	n/t	n/t	n/t
268794		Topsoil Sample 1	Brown sandy soil, plant-material, stones, clinker	No asbestos detected	n/t	n/t	n/t	n/t
268795		Topsoil Sample 2	Brown sandy soil, plant-material, stones	No asbestos detected	n/t	n/t	n/t	n/t

## Method Summary

Report No.: 22-38812, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Soil</b>					
Hexavalent chromium	N	As submitted sample	21/02/2022	110	Colorimetry
pH	M	Air dried sample	23/02/2022	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	21/02/2022	118	ICPMS
PAH (GC-FID)	M	As submitted sample	21/02/2022	133	GC-FID
Total organic carbon/Total sulphur	N	Air dried sample	22/02/2022	210	IR
Asbestos identification	U	Air dried sample	25/02/2022	280	Microscopy

Tests marked N are not UKAS accredited



## Report Information

Report No.: 22-38812, 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 &lt; 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.</p> <p>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</p> <p>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



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[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

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## THE ENVIRONMENTAL LABORATORY LTD

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**Analytical Report Number:** 22-39404

**Issue:** 1

**Date of Issue:** 24/03/2022

**Contact:** Paul Adams

**Customer Details:** Leap Environmental Ltd  
Book House  
Glebelands Centre  
Dorking  
Surrey RH4 3HW

**Quotation No:** Q14-00063


**Order No:** LPO-5377

**Customer Reference:** LP2167

**Date Received:** 17/03/2022

**Date Approved:** 24/03/2022

**Details:** Branch Hill Allotments

**Approved by:** 

Mike Varley, General Manager

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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.: 22-39404, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
271593	Topsoil Sample 3	16/03/2022	17/03/2022	Sandy silty loam	
271594	Topsoil Sample 4	16/03/2022	17/03/2022	Sandy silty loam	
271595	Topsoil Sample 5	16/03/2022	17/03/2022	Sandy silty loam	
271596	Topsoil Sample 6	16/03/2022	17/03/2022	Sandy silty loam	



## Results Summary

2683

Report No.: 22-39404, issue number 1

ELAB Reference				271593	271594	271595	271596
Customer Reference							
Sample ID							
Sample Type				SOIL	SOIL	SOIL	SOIL
Sample Location				Topsoil Sample 3	Topsoil Sample 4	Topsoil Sample 5	Topsoil Sample 6
Sample Depth (m)							
Sampling Date				16/03/2022	16/03/2022	16/03/2022	16/03/2022
<b>Determinand</b>	<b>Codes</b>	<b>Units</b>	<b>LOD</b>				
<b>Soil sample preparation parameters</b>							
Moisture Content	N	%	0.1	13.4	14.1	15.3	14.9
Material removed	N	%	0.1	14.7	12.2	12.3	11.0
Description of Inert material removed	N		0	Stones/Wood	Stones/Wood	Stones/Wood	Stones/Wood
<b>Metals</b>							
Arsenic	M	mg/kg	1	24.1	73.8	22.7	22.0
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	34.4	31.7	33.9	29.5
Copper	M	mg/kg	5	38.7	32.1	39.1	36.9
Lead	M	mg/kg	5	38.7	33.5	39.7	34.3
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	31.1	26.1	33.0	25.8
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	100	96.8	97.3	89.8
<b>Inorganics</b>							
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8
<b>Miscellaneous</b>							
pH	M	pH units	0.1	7.7	7.7	7.9	7.7
Total Organic Carbon	N	%	0.01	1.6	1.6	1.4	1.6



## Results Summary

2683

Report No.: 22-39404, issue number 1

ELAB Reference				271593	271594	271595	271596
Customer Reference							
Sample ID							
Sample Type				SOIL	SOIL	SOIL	SOIL
Sample Location				Topsoil Sample 3	Topsoil Sample 4	Topsoil Sample 5	Topsoil Sample 6
Sample Depth (m)							
Sampling Date				16/03/2022	16/03/2022	16/03/2022	16/03/2022
Determinand	Codes	Units	LOD				
<b>Polyaromatic hydrocarbons</b>							
Naphthalene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Acenaphthylene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Acenaphthene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Fluorene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Phenanthrene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Anthracene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Fluoranthene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Pyrene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Chrysene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	n/t	< 0.1	n/t
Total PAH(16)	M	mg/kg	0.4	< 0.4	n/t	< 0.4	n/t
Naphthalene GCMS	N	mg/kg	0.01	n/t	< 0.01	n/t	0.01
Acenaphthylene GCMS	N	mg/kg	0.01	n/t	< 0.01	n/t	< 0.01
Acenaphthene GCMS	N	mg/kg	0.01	n/t	0.02	n/t	0.01
Fluorene GCMS	N	mg/kg	0.01	n/t	0.02	n/t	0.01
Phenanthrene GCMS	N	mg/kg	0.01	n/t	0.17	n/t	0.11
Anthracene GCMS	N	mg/kg	0.01	n/t	0.02	n/t	< 0.01
Fluoranthene GCMS	N	mg/kg	0.01	n/t	0.23	n/t	0.14
Pyrene GCMS	N	mg/kg	0.01	n/t	0.17	n/t	0.11
Benzo(a)anthracene GCMS	N	mg/kg	0.01	n/t	0.05	n/t	0.04
Chrysene GCMS	N	mg/kg	0.01	n/t	0.07	n/t	0.05
Benzo(b)fluoranthene GCMS	N	mg/kg	0.01	n/t	0.05	n/t	0.04
Benzo(k)fluoranthene GCMS	N	mg/kg	0.01	n/t	0.07	n/t	0.06
Benzo(a)pyrene GCMS	N	mg/kg	0.01	n/t	0.04	n/t	0.02
Indeno(1,2,3-cd)pyrene GCMS	N	mg/kg	0.01	n/t	0.03	n/t	0.02
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	n/t	0.01	n/t	< 0.01
Benzo(g,h,i)perylene GCMS	N	mg/kg	0.01	n/t	0.03	n/t	0.03
Total PAH(16) GCMS	N	mg/kg	0.04	n/t	0.99	n/t	0.67



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**Results Summary**  
**Report No.: 22-39404, 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 (%)
271593		Topsoil Sample 3	Brown sandy Soil, Twigs	No asbestos detected	n/t	n/t	n/t	n/t
271594		Topsoil Sample 4	Brown sandy Soil, Twigs	No asbestos detected	n/t	n/t	n/t	n/t
271595		Topsoil Sample 5	Brown sandy Soil, Twigs	No asbestos detected	n/t	n/t	n/t	n/t
271596		Topsoil Sample 6	Brown sandy Soil, Twigs	No asbestos detected	n/t	n/t	n/t	n/t

## Method Summary

Report No.: 22-39404, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Soil</b>					
PAH (GC-MS)	N	As submitted sample	24/03/2022		GC-MS
Hexavalent chromium	N	As submitted sample	21/03/2022	110	Colorimetry
pH	M	Air dried sample	24/03/2022	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	21/03/2022	118	ICPMS
PAH (GC-FID)	M	As submitted sample	21/03/2022	133	GC-FID
Total organic carbon/Total sulphur	N	Air dried sample	22/03/2022	210	IR
Asbestos identification	U	Air dried sample	23/03/2022	280	Microscopy

Tests marked N are not UKAS accredited

## Report Information

Report No.: 22-39404, 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 &lt; 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.</p> <p>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</p> <p>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





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## THE ENVIRONMENTAL LABORATORY LTD

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**Analytical Report Number:** 22-39828

**Issue:** 1

**Date of Issue:** 13/04/2022

**Contact:** James Sugden

**Customer Details:** Leap Environmental Ltd  
Book House  
Glebelands Centre  
Dorking  
Surrey RH4 3HW

**Quotation No:** Q22-02626


**Order No:** LPO-5510

**Customer Reference:** LP2167

**Date Received:** 06/04/2022

**Date Approved:** 13/04/2022

**Details:** Branch Hill Allotments

**Approved by:** 

Mike Varley, General Manager

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## Sample Summary

Report No.: 22-39828, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
274206	Plot 4 0.10	05/04/2022	06/04/2022	Sandy silty loam	
274207	Plot 10 0.10	05/04/2022	06/04/2022	Sandy silty loam	
274208	Plot 29 0.10	05/04/2022	06/04/2022	Sandy silty loam	
274209	Plot 35 0.10	05/04/2022	06/04/2022	Sandy silty loam	

## Results Summary

Report No.: 22-39828, issue number 1

ELAB Reference	274206	274207	274208	274209
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	Plot 4	Plot 10	Plot 29	Plot 35
Sample Depth (m)	0.10	0.10	0.10	0.10
Sampling Date	05/04/2022	05/04/2022	05/04/2022	05/04/2022

Determinand	Codes	Units	LOD				
<b>Soil sample preparation parameters</b>							
Moisture Content	N	%	0.1	9.0	10.4	13.0	9.5
Material removed	N	%	0.1	16.6	16.4	12.7	13.6
Description of Inert material removed	N		0	Stones/Wood	Stones/Wood	Stones/Wood	Stones/Wood
<b>Metals</b>							
Arsenic	M	mg/kg	1	22.7	19.2	13.8	15.5
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	M	mg/kg	5	31.5	32.6	26.5	27.8
Copper	M	mg/kg	5	27.9	30.9	26.2	30.3
Lead	M	mg/kg	5	36.6	33.8	28.1	25.5
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	26.2	24.0	17.5	20.3
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	83.3	92.2	63.9	70.0
<b>Inorganics</b>							
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8
<b>Miscellaneous</b>							
pH	M	pH units	0.1	9.0	9.0	8.6	8.8
Total Organic Carbon	N	%	0.01	1.0	1.7	1.1	1.4
<b>Polyaromatic hydrocarbons</b>							
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	0.3	< 0.1	0.2	0.5
Pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	0.5	< 0.4	0.4	0.7



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Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

## Results Summary

Report No.: 22-39828, 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 (%)
274206	0.10	Plot 4	Brown Sandy Soil, Stones, Organic	No asbestos detected	n/t	n/t	n/t	n/t
274207	0.10	Plot 10	Brown Sandy Soil, Stones, Organic	No asbestos detected	n/t	n/t	n/t	n/t
274208	0.10	Plot 29	Brown Sandy Soil, Stones, Organic	No asbestos detected	n/t	n/t	n/t	n/t
274209	0.10	Plot 35	Brown Sandy Soil, Stones, Organic	No asbestos detected	n/t	n/t	n/t	n/t



2683

## Method Summary

Report No.: 22-39828, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Soil</b>					
Hexavalent chromium	N	As submitted sample	08/04/2022	110	Colorimetry
pH	M	Air dried sample	13/04/2022	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	11/04/2022	118	ICPMS
PAH (GC-FID)	M	As submitted sample	08/04/2022	133	GC-FID
Total organic carbon/Total sulphur	N	Air dried sample	11/04/2022	210	IR
Asbestos identification	U	Air dried sample	13/04/2022	280	Microscopy

Tests marked N are not UKAS accredited

## Report Information

Report No.: 22-39828, issue number 1

### Key

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^	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 &lt; 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.</p> <p>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</p> <p>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

## **APPENDIX E – MATERIALS IMPORT DOCUMENTATION**

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Materials Import  
Documentation



TIM O'HARE ASSOCIATES  
SOIL & LANDSCAPE CONSULTANCY

Mr Drew Wetherell  
Bourne Amenity Ltd  
The Wharf  
Newenden  
Cranbrook  
Kent TN18 5QG

18<sup>th</sup> October 2021  
Our Ref: TOHA/21/7189/2/SS  
Your Ref: PO 77955

Dear Sirs

**Topsoil Analysis Report: Westerham TS6 Topsoil**

We have completed the analysis of the soil sample recently received, referenced *Westerham TS6 Topsoil*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

This report presents the results of analysis for the sample received, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the Bourne Amenity site.

**SAMPLE EXAMINATION**

The sample was described as a brown (Munsell Colour 10YR 4/3), dry, friable, slightly calcareous LOAMY SAND with a single grain structure\*. The sample was slightly stony and contained a moderate proportion of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

\*This appraisal of soil structure was made from examination of a disturbed sample. Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

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## **ANALYTICAL SCHEDULE**

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- detailed particle size analysis (5 sands, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- saturated hydraulic conductivity;
- pH and electrical conductivity values;
- calcium carbonate;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- visible contaminants (>2mm);
- heavy metals (Sb, As, B, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, Zn);
- total cyanide and total (mono) phenols;
- elemental sulphur, acid volatile sulphur and water soluble sulphate;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

## **RESULTS OF ANALYSIS**

### **Detailed Particle Size Analysis and Stone Content**

The sample fell into the *loamy sand* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

Further detailed particle size analysis revealed the sample to have a sufficiently narrow particle size distribution and a predominance of *medium sand* (0.25-0.50mm), followed by *coarse sand* (0.50-1.0mm). This is usually ideal for topsoil in general landscape applications as reasonable porosity levels are generally maintained in a consolidated state and the risk of particle interpacking is reduced. The sample should therefore provide adequate drainage and aeration properties for general landscape applications.

The stone content of the sample was low and, as such, stones should not restrict the use of the soil for general landscape purposes.

### **Saturated Hydraulic Conductivity**

The saturated hydraulic conductivity result (43mm/hr) recorded for the sample indicates that the material would demonstrate a moderately high drainage performance for a general landscape topsoil.

### **pH and Electrical Conductivity Values**

The sample was strongly alkaline in reaction (pH 8.3). This pH value would be considered suitable for general landscape purposes provided species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was moderate, which indicates that soluble salts should not be present at levels that would be harmful to plants.

The electrical conductivity value by CaSO<sub>4</sub> extract (BS3882 requirement) fell below the maximum specified value (3300 µS/cm) given in BS3882:2015 – Table 1.

### **Organic Matter and Fertility Status**

The sample was adequate to well supplied with organic matter and all major plant nutrients.

The C:N ratio of the sample was acceptable for general landscape purposes.

### **Potential Contaminants**

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a requirement to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

### **Phytotoxic Contaminants**

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

## **CONCLUSION**

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes. The analysis has also been undertaken to determine the sample's compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

From the soil examination and subsequent laboratory analysis, the sample was described as a strongly alkaline, non-saline, slightly calcareous loamy sand with a single grain structure and low stone content. The sample contained sufficient reserves of organic matter and plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs and amenity grass), provided species with a wide pH tolerance or those known to prefer alkaline soils are selected and the physical condition of the soil is satisfactory. This topsoil may not be ideal for plant species that specifically demand moisture retentive topsoil, unless additional moisture inputs are provided, especially in dry periods.

The topsoil was also fully compliant with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

## **RECOMMENDATIONS**

### **Soil Handling Recommendations**

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, resspreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015*.

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We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



**Tilly Kimble-Wilde**  
BSc MSc  
Graduate Soil Scientist



**Ceri Spears**  
BSc MSc MSc SoilSci  
Senior Associate

For & on behalf of Tim O'Hare Associates LLP





TIM O'HARE ASSOCIATES  
SOIL & LANDSCAPE CONSULTANCY

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18<sup>th</sup> October 2021  
Our Ref: TOHA/21/7189/2/SS  
Your Ref: PO 77955

Dear Sirs

**Subsoil Analysis Report: Westerham Subsoil**

We have completed the analysis of the soil sample recently submitted, referenced *Westerham Subsoil*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for use as subsoil in general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*), including analysis of potential contaminants.

This report presents the results of analysis for the sample submitted, and it should be considered 'indicative' of the subsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing, especially after the subsoil has left the Bourne Amenity Ltd site.

**SAMPLE EXAMINATION**

The sample was described as a strong brown (Munsell Colour 7.5YR 5/8), slightly moist, friable, non to slightly calcareous SAND with a single grain structure\*. The sample was virtually stone-free and no unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

\*This appraisal of soil structure was made from examination of a disturbed sample. Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

---

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## **ANALYTICAL SCHEDULE**

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- detailed particle size analysis (5 sands, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- saturated hydraulic conductivity;
- pH and electrical conductivity values;
- calcium carbonate;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- visible contaminants (>2mm);
- heavy metals (Sb, As, B, Ba, Be, Cd, Cr, Cr(VI), Cu, Pb, Hg, Ni, Se, V, Zn);
- total cyanide and total (mono) phenols;
- elemental sulphur, acid volatile sulphur and water soluble sulphate;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

## **RESULTS OF ANALYSIS**

### **Particle Size Analysis and Stone Content**

The sample fell into the *sand* texture class and would be described as light in texture. Further detailed particle size analysis revealed the sample to have a sufficiently narrow particle size distribution and a predominance of *medium sand* (0.25-0.50mm). This particle size distribution is usually considered suitable for subsoil materials in general landscape applications provided the soil's physical condition is maintained and compaction avoided.

The sample was virtually stone-free and, as such, stones should not restrict the use of the soil for use as subsoil in general landscape purposes.

### **Saturated Hydraulic Conductivity**

The saturated hydraulic conductivity result (223 mm/hr) recorded for the sample is high for a *general landscape* subsoil and is likely to offer a free-draining subsoil environment.

### **pH and Electrical Conductivity Values**

The sample was alkaline in reaction (pH 7.6). This pH value would be considered suitable as subsoil for general landscape purposes providing species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was very low, which indicates that soluble salts were not present at levels that would be harmful to plants.

### **Organic Matter Content**

The organic matter content was low (<0.5%) and compliant with *BS8601:2013 – Table 1*.

### **Potential Contaminants**

With reference to *BS8601:2013 – Section 4.2: Note 2*, there is a recommendation to confirm levels of potential contaminants in relation to the subsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations of selected potential contaminants that affect human health have been assessed for the concentrations that affect human health have been assessed for *residential* end-use against the Suitable For Use Levels (S4ULs) presented in the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) and the DEFRA SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document (2014).

Of the potential contaminants determined, none exceeded their respective guideline values.

### **Phytotoxic Contaminants**

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS8601:2013 – Table 1*.

### **CONCLUSION**

The purpose of the analysis was to determine the suitability of the sample for use as subsoil in general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*), including analysis of potential contaminants.

From the soil examination and subsequent laboratory analysis, the sample was described as an alkaline, non-saline, non-calcareous virtually stone-free sand. The organic matter content was low and consistent with subsoil. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the soil represented by this sample would be considered suitable for use as subsoil for general landscape purposes provided its 'free-draining' nature is acceptable, species with a wide pH tolerance or those known to prefer alkaline soils are selected, and the soil's physical condition is satisfactory.

The sample was largely compliant with the requirements of the British Standard for Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*) with the exception of its overall particle size distribution, which fell outside of the specified textural range given for *BS3882:2015 – Figure 1*. On this occasion, these non-compliances are considered minor and insignificant when reviewed in the context of all the other results, provided its 'free-draining' nature is acceptable for the recipient scheme.

### **Soil Handling Recommendations**

Reference should be made to Section 6.0 of *BS8601:2013* with regard to the handling and management of the subsoil:

"Soils generally lose strength and become less resistant to damage as they become wetter; therefore, it is essential that they are stripped, handled and trafficked only in the appropriate conditions of weather and soil moisture, and with suitable machinery. If sustained heavy rainfall (e.g. >10 mm in 24 h) occurs during soil stripping operations, work should be suspended and not restarted until the ground has had at least one dry day or until a suitable moisture content has been reached. A soil can be considered to have a suitable moisture content for stripping and handling if the whole thickness of the subsoil layer being stripped and/or handled is at a moisture content below the plastic limit as determined in accordance with BS 1377-2:1990 (incorporating Amendment No. 1).

Machinery should be selected and routed to minimise soil compaction."

Further guidance is provided in Clauses 6.1–6.5.

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We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



**Tilly Kimble-Wilde**  
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