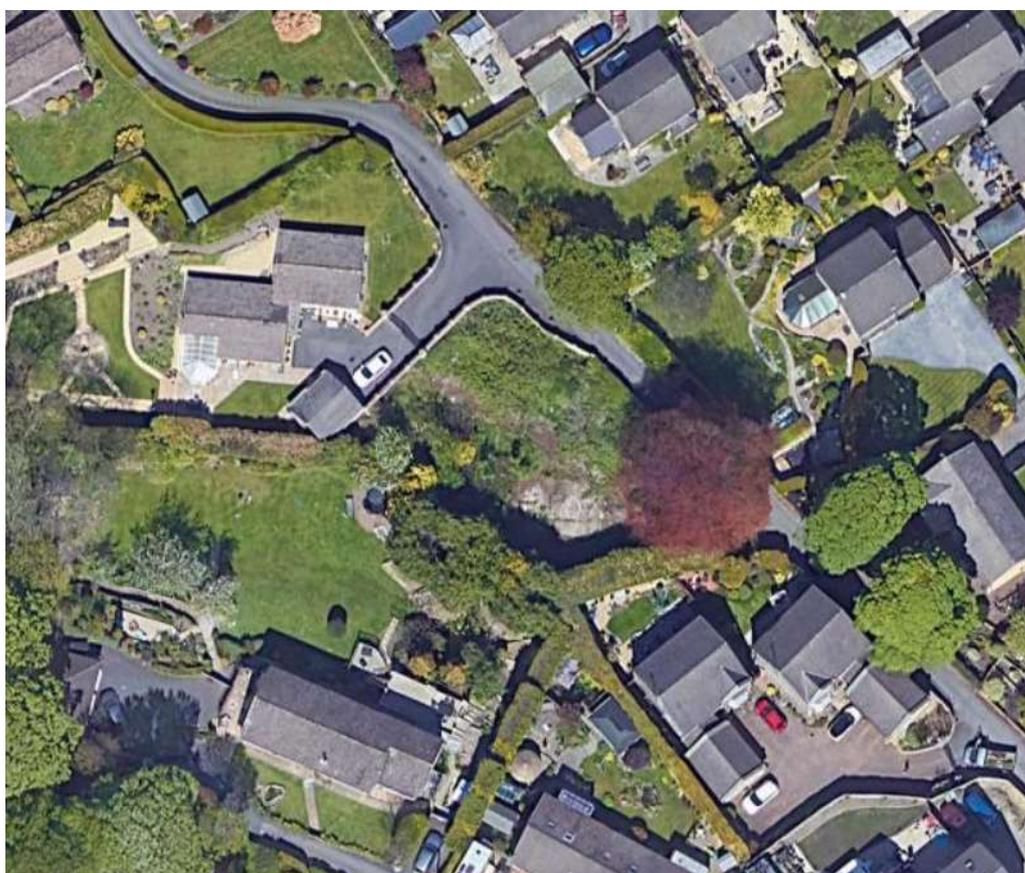


Validation Report Lower Lark Hill, Cleckheaton



Issue number: 1

Report status: FINAL

Date: JUNE 2024

Client: Knabbs Ash Barn

Contact: Emily Clay

This report has been prepared by Arcon with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client.

This report has been prepared for the sole use of Knabbs Ash. Any such party relies upon the report at their risk.

Unless stated the report assumes that the facility will continue to operate for its current purpose without significant change.

Unless otherwise stated, the information provided by any third parties has not been independently verified by Arcon. Arcon disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Lower Lark Hill

Validation Report

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EXECUTIVE SUMMARY

Overview	Arcon were retained by Knabbs Ash Barn to undertake a shallow soil sampling exercise, to achieve depth and chemical validation testing of an engineered cover system. The system was installed in all soft landscaping and garden areas across the site. A Site Layout is presented in Appendix I.
Site Setting	The Site currently comprises a residential property with garden areas. The site was previously a disused piece of land forming part of an adjacent property, but was later separated and allowed to become overgrown. The property and soft landscaping areas had been completed at the time of the validation investigation.
Field Observations	No significant visual or olfactory evidence of contamination was observed during the sampling activities. A minimum of 600mm of soils (including 150m topsoil and up to 450mm subsoil) was encountered in all hand pits, with the exception of TP103, which encountered sandstone bedrock at a depth of 550mm. See photographs in Appendix III.
Human Health Results	All samples taken have comeback acceptable
Recommendation	No further recommendations.

1. INTRODUCTION

1.1 Context and Objectives

Arcon was retained by Knabbs Ash Barn to validate an engineered cover system installed in all soft landscaping and garden areas at land adjacent to 15 Lower Lark Hill, Cleckheaton, BD19 6JJ in order to discharge planning condition No. 10, (Ref: 2022/70/93166/E) .

1.2 Background Information

An Options Appraisal and Remediation Strategy, produced by JNP Group in March 2022, recommended that any garden areas and soft landscaping would have an engineered cover system, comprising the installation of a minimum of 150mm of topsoil and 450mm of subsoils which are certified as chemically and physically clean and suitable for use.

The engineered cover system should be, in total, a minimum of 600mm thick to adequately mitigate risks to future site users.

1.3 Scope of works

The scope of the work comprised:

- The collection and analysis of soil samples for Metals, TPH, PAH and Asbestos from 3No. locations by a SES Engineer.
- The verification of the thickness of the installed engineered cover system.
- Validation that soils in the landscaped areas are chemically and physically suitable for use.
- Report submission of site findings.

The scope of works was developed in accordance with the Environment Agency document, Land Contamination Risk Management (LCRM).

2. VALIDATION WORKS

2.1 Validation Objective

The objectives of this strategy are to:

1. Validate an engineered cover system, installed by other, to adequately mitigate risks to future site users.
2. Verify the thickness of the installed cover system.
3. Confirm the soils used in the engineered cover system are suitable for use.

The design has been formulated based on the Options Appraisal and Remediation Strategy produced by JNP Group in March 2022, ref. B21114-JNP-XX-XX-RP-G-1004.

2.2 Target Levels

The target levels for this report relate to the JNP Group Options Appraisal and Remediation Strategy regarding a Residential end use with plant uptake, chemical testing certificates are presented in Appendix II.

2.3 Summary of Field Work

Site works were carried out on 31st May 2024. 3No. hand dug pits were excavated in areas of soft landscaping to ensure that the thickness of the engineered cover system met the requirements of the Remedial Strategy and Method Statement (minimum of 600mm thick). 2No. soil samples were recovered from each hand pit, to determine that the materials used within the engineered cover system were suitable for use. Recovered samples were tested for metals, TPH, PAH (USEPA 16) and Asbestos to confirm suitability for a residential end use.

Soil samples were sent to a UKAS Accredited laboratory; *THE ENVIRONMENTAL LABORATORY LTD, East Sussex*

2.4 Operations Summary

All 3No. hand pits were excavated to a minimum depth of 600mm (unless bedrock was encountered) to verify the thickness of the engineered cover system.

The soils exposed comprised 450mm of subsoils, described as brown sandy soils with occasional subangular to subrounded fine gravel of sandstone and red brick. This was overlain by 150mm of slightly clayey brown topsoil separated by a geotextile fabric.

A total of 5No. soils samples were recovered for chemical testing to ensure that the imported materials were suitable for use in the works. 2No. soil samples were retrieved from each of the 3No. trial pits, 1No. from the topsoil and 1No. from the subsoils.

3. ANALYTICAL RESULTS

3.1 Soil Sampling Results

Results of laboratory testing can be found in Appendix II.. No Asbestos was detected in any of the samples recovered from the site.

Chemical Analysis results are presented in Appendix II.

ELAB



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Certificate of Analysis

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 24-54315

Issue: 1

Date of Issue: 19/06/2024

Contact: Emily Clay

Customer Details: Quarters Construction Limited
Knabbs Ash
Skipton Road
Harrogate
HG3 2LT

Quotation No: Q24-04678

Order No: Not Supplied

Customer Reference: Not Supplied

Date Received: 12/06/2024

Date Approved: 19/06/2024

Details: Meadowcroft, 13 Lower Lark Hill

Approved by:



Tim Reeve, Technical Coordinator



Sample Summary

Report No.: 24-54315, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
363944	101 2	30/05/2024	12/06/2024	Sandy silty loam	
363945	102 2.5	30/05/2024	12/06/2024	Sandy silty loam	
363946	103 2	30/05/2024	12/06/2024	Sandy silty loam	



Results Summary

Report No.: 24-54315, issue number 1

ELAB Reference	363944	363945	363946
Customer Reference	2	2.5	2
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	101	102	103
Sample Depth (m)			
Sampling Date	30/05/2024	30/05/2024	30/05/2024

Determinand	Codes	Units	LOD			
Soil sample preparation parameters						
Moisture Content	N	%	0.1	33.7	35.7	34.6
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1
Description of Inert material removed	N		0	None	None	None
Metals						
Arsenic	M	mg/kg	0.5	4.7	4.7	5.6
Cadmium	M	mg/kg	0.2	0.3	0.3	0.4
Chromium	M	mg/kg	1	10.3	9.0	11.6
Copper	M	mg/kg	4	33.0	35.7	42.3
Lead	M	mg/kg	1	60.2	59.9	70.5
Mercury	M	mg/kg	0.1	< 0.1	0.1	0.1
Nickel	M	mg/kg	1	11.4	9.3	11.2
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	4.5	111	117	130
Polyaromatic hydrocarbons						
Naphthalene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Acenaphthene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Fluorene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Anthracene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	N	mg/kg	0.5	0.6	0.8	0.7
Pyrene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Benzo(a)anthracene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Chrysene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Benzo(b)fluoranthene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Dibenzo(a,h)anthracene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Benzo[g,h,i]perylene	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5
Total PAH(16)	N	mg/kg	2	< 2	< 2	< 2



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.: 24-54315, 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.

In accordance with procedures, a 1kg soil sample should be analysed. For amounts less than this caution should be used when analysing the data as sample size is smaller than the recommended amount, therefore samples could be deemed as not being representative of the materials present on site.

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 (%)	F/mm2 (l)
363944		101 2	Black Soil, Stones, Organics	No asbestos detected	n/t	n/t	n/t	n/t	n/t
363945		102 2.5	Black Soil, Stones, Organics	No asbestos detected	n/t	n/t	n/t	n/t	n/t
363946		103 2	Black Soil, Stones, Organics	No asbestos detected	n/t	n/t	n/t	n/t	n/t



Method Summary

Report No.: 24-54315, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
PAH (GC-FID)	N	As submitted sample	17/06/2024	133	GC-FID
Asbestos identification	U	Air dried sample	19/06/2024	281	Microscopy
Aqua regia extractable metals	M	Air dried sample	13/06/2024	300	ICPMS

Tests marked N are not UKAS accredited



Report Information

Report No.: 24-54315, 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

End of Report

ELAB



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TN38 9BY
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Certificate of Analysis

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 24-54298

Issue: 1

Date of Issue: 18/06/2024

Contact: Emily Clay

Customer Details: Quarters Construction Limited
Knabbs Ash
Skipton Road
Harrogate
HG3 2LT

Quotation No: Q24-04678

Order No: Not Supplied

Customer Reference: Not Supplied

Date Received: 11/06/2024

Date Approved: 18/06/2024

Details: Meadowcroft, 13 Lower Lark Hill

Approved by:



Tim Reeve, Technical Coordinator



Sample Summary

Report No.: 24-54298, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
363887	TP/BH 101 0.50	05/06/2024	11/06/2024	Silty loam	c
363888	TP/BH 102 0.60	05/06/2024	11/06/2024	Silty loam	c
363889	TP/BH 103 0.60	05/06/2024	11/06/2024	Silty loam	



Results Summary

Report No.: 24-54298, issue number 1

				ELAB Reference	363887	363888	363889
Customer Reference							
Sample ID							
Sample Type				SOIL	SOIL	SOIL	
Sample Location				TP/BH 101	TP/BH 102	TP/BH 103	
Sample Depth (m)				0.50	0.60	0.60	
Sampling Date				05/06/2024	05/06/2024	05/06/2024	
Determinand	Codes	Units	LOD				
Soil sample preparation parameters							
Moisture Content	N	%	0.1	18.5	20.3	20.7	
Material removed	N	%	0.1	< 0.1	< 0.1	< 0.1	
Description of Inert material removed	N		0	None	None	None	
Metals							
Arsenic	M	mg/kg	0.5	6.6	6.4	6.3	
Cadmium	M	mg/kg	0.2	0.3	0.3	0.3	
Chromium	M	mg/kg	1	13.6	13.2	11.1	
Copper	M	mg/kg	4	23.0	19.7	24.6	
Lead	M	mg/kg	1	61.5	50.5	52.8	
Mercury	M	mg/kg	0.1	0.1	0.2	0.1	
Nickel	M	mg/kg	1	9.8	8.2	9.8	
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	
Zinc	M	mg/kg	4.5	118	83.7	120	
Polyaromatic hydrocarbons							
Naphthalene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Acenaphthylene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Acenaphthene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Fluorene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Phenanthrene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Anthracene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Fluoranthene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Pyrene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Benzo(a)anthracene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Chrysene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Benzo(b)fluoranthene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Benzo(k)fluoranthene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
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Dibenzo(a,h)anthracene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Benzo[g,h,i]perylene	N	mg/kg	0.5	c < 0.5	c < 0.5	< 0.5	
Total PAH(16)	N	mg/kg	2	c < 2	c < 2	c < 2	

Results Summary

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Asbestos Results

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363887	0.50	TP/BH 101	Brown Soil, Stones, Clinker, Organics	No asbestos detected	n/t	n/t	n/t	n/t	n/t
363888	0.60	TP/BH 102	Brown Soil, Stones, Clinker, Organics	No asbestos detected	n/t	n/t	n/t	n/t	n/t
363889	0.60	TP/BH 103	Brown Soil, Stones, Clinker, Organics	No asbestos detected	n/t	n/t	n/t	n/t	n/t



Method Summary

Report No.: 24-54298, issue number 1

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Soil					
PAH (GC-FID)	N	As submitted sample	17/06/2024	133	GC-FID
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I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
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LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
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g	Sample age exceeds stability time (sampling to analysis)

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

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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

End of Report

4. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Further to the photographic records, the excavations at the validation positions and the chemical testing, it is considered that garden and soft landscaping areas at the site have been filled with in excess of 0.4m of topsoil suitable for the site use. Moreover, as no made ground was present no membrane or capillary break was encountered in accordance with the remediation statement. As a consequence, it is apparent that 0.6m of clean cover has been placed within the garden and soft landscaped areas around the properties at the site. Therefore, it is assumed that any contaminated made ground present to site has been wholly removed, or was possibly absent in this area. As a consequence, it is considered that the risk to garden plants, end-users from dermal contact with the soil and end-users and neighbours from the inhalation of dust, ingestion of soil or dust and the ingestion of contaminated fruit and vegetables is mitigated and may be considered as low.

On the basis of the information provided above it is concluded that a sufficient thickness of clean cover has been placed within the soft landscaped areas. It is considered that the end users will be protected from ingestion or dermal contact with contaminated soil. No further action is required.

APPENDIX I SITE LAYOUT PLAN



APPENDIX II LABORATORY CHEMICAL ANALYSIS

HAND PIT TP101

Developer: Knabbs Ash Barn

Date: 31/05/24

Pit Location: Engineered Cover System

Capping Observed	Total Depth
Topsoil	250 mm bgl
Subsoil	350 mm bgl
TOTAL DEPTH	600mm bgl

Validation Photograph	Locational Photograph
	

HAND PIT VALIDATION: PASS

HAND PIT TP102

Developer: Knabbs Ash Barn

Date: 31/05/24

Pit Location: Engineered Cover System

Capping Observed	Total Depth
Topsoil	300 mm bgl
Subsoil	300 mm bgl
TOTAL DEPTH	600mm bgl



HAND PIT VALIDATION: PASS

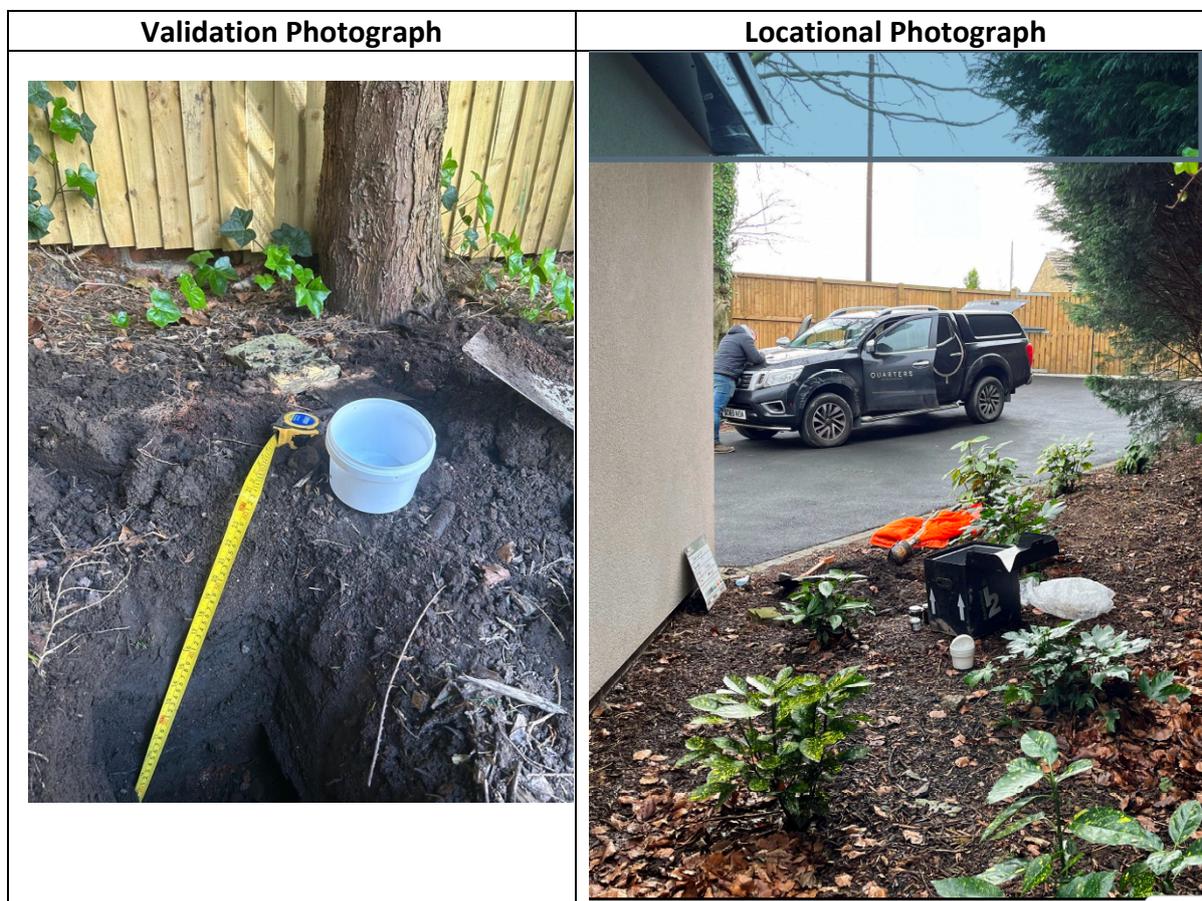
HAND PIT TP103

Developer: Knabbs Ash Barn

Date: 31/05/24

Pit Location: Engineered Cover System

Capping Observed	Total Depth
Topsoil	150 mm bgl
Subsoil	400 mm bgl
TOTAL DEPTH	550mm bgl



HAND PIT VALIDATION: PASS