Mugen Geo Ltd.

VALIDATION REPORT

for

LAND
AT
HEADLANDS ROAD
LIVERSEDGE
WF15 7NT

Document Status: FINAL Revision: v2	For **Mr S Finlay** **35 Headlands Road** **Liversedge** **WF15 7NT**

Prepared for & on behalf of Mugen Geo Ltd
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Job No 2306 2308 WF15 7NT Date: February 2024

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Note: This report has been formatted to be read as a PDF

1 INTRODUCTION

Mugen Geo Ltd were commissioned by Mr S Finley to provide a validation report of 'Land at Headlands Road Liversedge WF15 7NT' (the site).

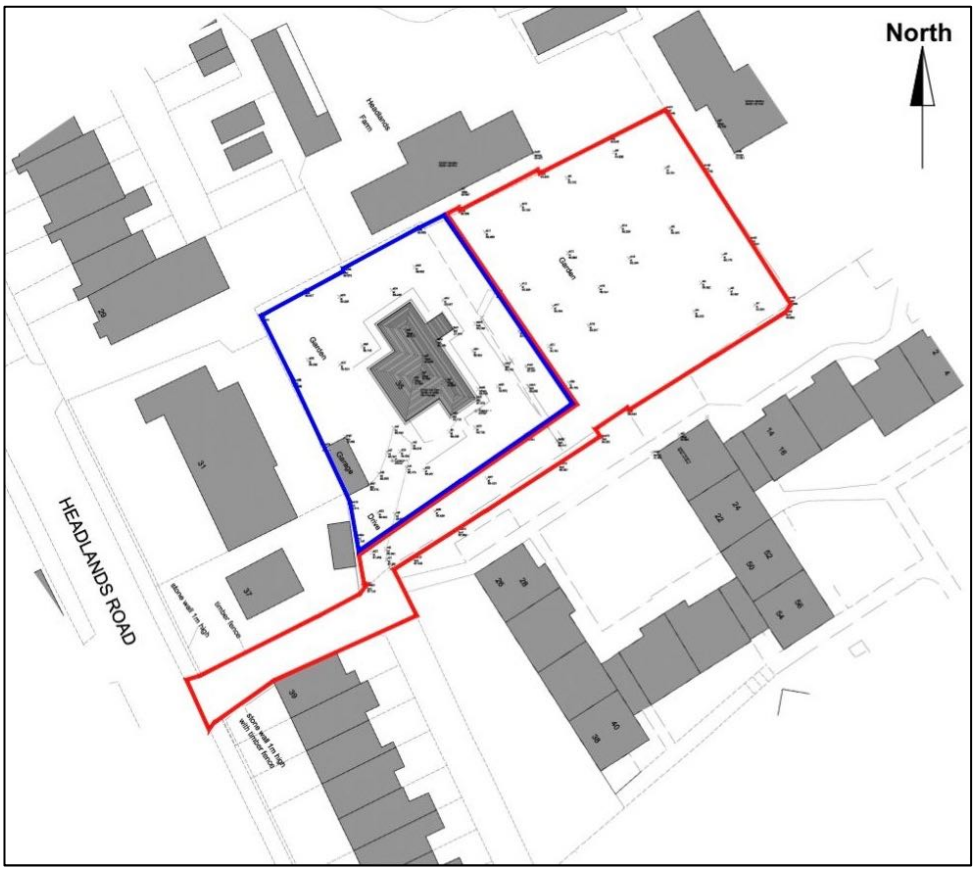

Figure 1 – Site Development Plan

This report has been developed in accordance with the YALPAG Technical Guidance for Developers Landowners & Consultants Version 10.3 – April 2019 (Ref 12), CLR11 (Ref. 1), and other best practice guidance cited at the end of this report.

The study has not included checks on services on or adjacent to the site, and no structural, ecological or asbestos surveys have been carried out.

1.1 Previous Reports

A Phase 1 investigation was prepared to provide supporting information relating to geo-environmental aspects for development of the site for residential use.

- Phase I Phase 1: Desk Top Study and Coal Mining Risk Assessment Report - Arc Environmental Limited, January 2022, Ref. 21-1036

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A Phase 2 investigation was prepared to provide supporting information relating to geo-environmental aspects for development of the site for residential use.

- Phase 2: Ground Investigation Report - Proposed Dwelling – Land Adjacent to 35 Headlands Road, Liversedge WF15 7NT, May 2022 Ref. 21-1036.01L

A Phase 3 report was prepared to provide supporting information relating to geo-environmental and geotechnical aspects for development of the site for residential use.

- Phase 3 Remediation Statement and Validation Proposals Sheet Land Adjacent to 35 Headlands Road, Liversedge WF15 7NT, August 2022 Ref. 21-1036.01

This report has been prepared with reference to this summary and the relevant protocols.

1.2 Limitations

This report has been prepared for the sole use and reliance of the Client named above and cannot be relied upon by any other parties without the express written authorisation of Mugen Geo Ltd. Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care.

Draft versions of this report cannot be relied upon and Mugen Geo Ltd accept no liability for decisions made based upon any draft versions circulated as part of project development. Please refer to the FINAL report only for decision making purposes.

The report should be read in its entirety, including all associated drawings and appendices. Mugen Geo Ltd cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. The report presents observations and factual data obtained during our site investigation, and provides an assessment of geo-environmental issues with respect to information provided by the Client and specific to the proposed development. Further advice should be sought from Mugen Geo Ltd prior to significant revision of the development proposals.

The geo-environmental investigation was undertaken on behalf of The Client (referenced above). The investigation was designed based upon information supplied by the client & on the assumption that the site is to be developed for residential use with private gardens.

The findings and opinions based upon the assessment conveyed in this report is based on information obtained from sources which Mugen Geo Ltd believe are reliable. All reasonable endeavours have been made to source the information from reputable organisations, however, Mugen Geo Ltd accepts no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

No attempt has been made to independently verify any data collected by others or from other sources.

Whilst the prepared report may express an opinion on the possible configuration of strata, contaminants or gases between or beyond exploratory hole positions or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only, and no liability can be accepted for its accuracy.

The comments on groundwater and ground gas conditions are based on observations made at the time of the investigation. It should be noted, however, that groundwater and ground gas levels may vary from those reported due to seasonal or other effects.

Consideration should be given to the possibility that exploratory holes excavated as part of this investigation, and indeed any previous ground work by others, may be encountered beneath or within the influence of the proposed development. Mugen Geo Ltd cannot be held responsible for failure of excavations or structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Existing manhole covers were not lifted and drainage runs not be inspected during the course of this ground investigation.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

Mugen Geo Ltd reserves the right to amend their conclusions and recommendations in the light of further information that may become available.

2 Site Description

The development site was land at Headlands Road in Liversedge as shown in figures 1 to 3 below and site photos included in appendix A.

Site details are summarised in Table 1 below:

Detail	Remarks
Location	35 Headlands Road, Liversedge, Kirklees, WF15 7NT
NGR	420276E 423467N
Area	Estimated to be 0.1ha
Known services	Underground sewers, drainage and gas, electric and telecoms assumed.

Table 1 – site summary

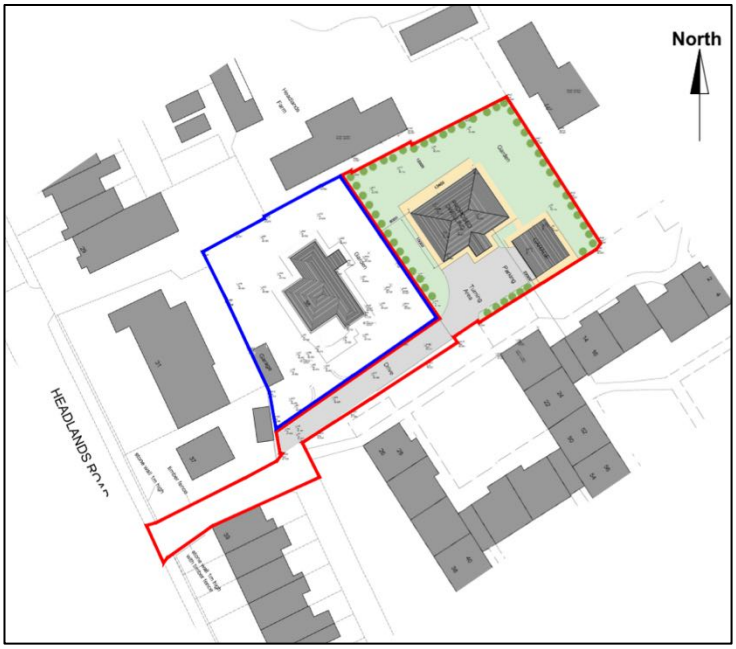


Figure 2 – Extract Image of submitted Site Development Plan

2.1 Verification of Works

Mugen Geo Ltd were requested to provide a remediation statement and validation report for the development.

A site visit was undertaken on the 19th October 2023 during the completion of the development works and soil sampling was undertaken within the garden prior to turfing.

A summary photo record is included in appendix B to highlight the site condition and development and demonstrate works were undertaken in an appropriately. Details of the works verified and the purpose are summarised in the following sections.

3 Remedial Measures

In order to mitigate potential risks posed by the identified minor contamination present at the site, and where made ground was identified, the following mitigation measures have been undertaken and these are outlined in the following sections.

3.1 Development and Future Maintenance Workers

As part of the site development mitigation measures were recommended where site workers or site maintenance workers work with the ground.

At this site no abnormal risks were identified that required additional measures beyond those expected at a modern construction site. Site workers involved in groundworks are required to use appropriate PPE, i.e. overalls and gloves and where appropriate masks to protect against the inhalation of hazardous gases. Appropriate health and safety measures, e.g. washing hands prior to eating or drinking, were also advised. During the site inspections it was seen that this work had been followed.

3.2 Landscaping and Garden Areas

The developed site comprised a single plot with private garden. Open space landscaping was as shown in the development plan in appendix A and site photos in appendix B.

It is noted as there were no trees or Tree Preservation Orders at the site no membrane was considered necessary to protect tree root systems and clean cover levels were maintained at 600mm

The topsoil samples were tested for a standard suite of contaminants as detailed in section 4. Two hand pits were excavated within the rear garden and were considered to provide suitable coverage for the site.

At each hand dug pit samples were recovered and photos of the hand pits taken, included as part of appendix B.

All works were considered to have been undertaken to a good standard of workmanship when inspected.

3.2.1 Landscaping

The majority of the remaining developed site was soft landscaping and is understood will be planted with low maintenance shrubs and hedging.

3.3 Landfill Gases

Based upon the results of the gas monitoring completed as part of the phase 2 investigation no gas protection measures were required.

3.4 Drinking Water Supply Pipes

Yorkshire Water are understood to have been contacted and indicated that no special requirements with regards pipelines.

3.5 Unexpected Contamination

No suspicious or unusual odours, colours, liquids or soils were identified within the development area for the two plots.

3.6 Waste Management

Limited material was removed from site with limited excavations to form development platforms.

4 Validation

The materials imported onto the site and present in the gardens of the properties were tested.

Environmental Laboratory testing was scheduled on samples of imported soils taken from the prepared stockpile and hand pits. I2 Analytical undertook the testing to a schedule drawn up by Mugen Geo Ltd. Selected samples were scheduled for a basic suite of determinants detailed in the analytical results for soil samples are provided within appendix C.

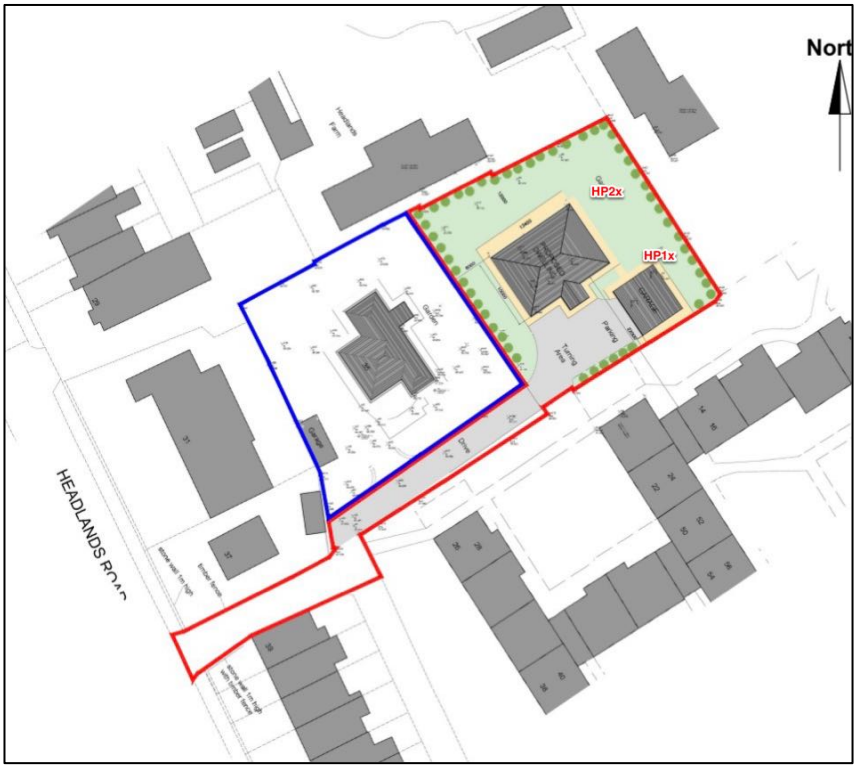


Figure 3 – plan showing approximate location of sampling positions for the hand pits.

4.1.1 Results of Chemical Analysis - Soils

Four samples of imported soils were analysed by i2 Analytical. The test results are provided in appendix C. The results have been screened in relation to Tier 1 contaminated land risk assessment criteria which are currently in use by the industry. The results of the screening are summarised in the following tables.

In March 2014 DEFRA released 'C4SLs' for six contaminants to be used as generic screening values for the assessment of chronic risks to human health from soils for six

land uses including residential. Where contaminant concentrations fall below the C4SL values the land would be classified as a Category 4 site.

Although the C4SL values have been primarily developed for use within a Part 2A context, they are considered to be both pragmatic and still strongly conservative. In September 2014 DEFRA issued a letter to all local authorities confirming that the values could be used for both Part 2A assessments and for planning purposes and therefore the derived value has been used as part of this assessment.

Determinand	Units	Screening criteria	Assessment Criteria	No of Samples tested	Min	Max	No. of Exceedences
Arsenic	mg/kg	37	LQM/CIEH S4ULs (2015)	4	4.8	5.1	0
Cadmium	mg/kg	11	SGV	4	0.3	0.4	0
Chromium	mg/kg	910	LQM/CIEH S4ULs (2015)	4	9.3	11	0
Lead	mg/kg	200	C4SL	4	31	35	0
Mercury	mg/kg	40	LQM/CIEH S4ULs (2015)	4	<0.3	<0.3	0
Nickel	mg/kg	180	LQM/CIEH S4ULs (2015)	4	8.8	9.3	0
Copper	mg/kg	2400	LQM/CIEH S4ULs (2015)	4	22	92	0
Zinc	mg/kg	3750	LQM/CIEH S4ULs (2015)	4	89	100	0
Selenium	mg/kg	250	LQM/CIEH S4ULs (2015)	4	<1	<1	0

Table 2.1 laboratory Analysis Results – metals & metalloids

Determinand	Units	Screening criteria	Assessment Criteria	No of Samples tested	Min	Max	No. of Exceedences
Acenaphthene	mg/kg	210	LQM/CIEH S4ULs (2015)	4	<0.05	0.09	0
Acenaphthylene	mg/kg	170	LQM/CIEH S4ULs (2015)	4	<0.05	<0.05	0

Determinand	Units	Screening criteria	Assessment Criteria	No of Samples tested	Min	Max	No. of Exceedences
Anthracene	mg/kg	2400	LQM/CIEH S4ULs (2015)	4	<0.05	0.2	0
Benzo(a) anthracene	mg/kg	7.2	LQM/CIEH S4ULs (2015)	4	0.17	0.49	0
Benzo(a)pyrene	mg/kg	5	SGV	4	0.18	0.46	0
Benzo(b) fluoranthene	mg/kg	2.6	LQM/CIEH S4ULs (2015)	4	0.21	0.51	0
Benzo(ghi) perylene	mg/kg	320	LQM/CIEH S4ULs (2015)	4	0.12	0.25	0
Benzo(k) fluoranthene	mg/kg	77	LQM/CIEH S4ULs (2015)	4	0.1	0.26	0
Chrysene	mg/kg	15	LQM/CIEH S4ULs (2015)	4	0.18	0.42	0
Dibenz(ah) anthracene	mg/kg	0.24	LQM/CIEH S4ULs (2015)	4	<0.05	0.06	0
Fluoranthene	mg/kg	280	LQM/CIEH S4ULs (2015)	4	0.3	1.1	0
Fluorene	mg/kg	170	LQM/CIEH S4ULs (2015)	4	<0.05	0.12	0
Indeno (123cd) pyrene	mg/kg	27	LQM/CIEH S4ULs (2015)	4	0.12	0.22	0
Naphthalene	mg/kg	2.3	LQM/CIEH S4ULs (2015)	4	<0.05	<0.05	0
Phenanthrene	mg/kg	95	LQM/CIEH S4ULs (2015)	4	<0.05	0.36	0
Pyrene	mg/kg	620	LQM/CIEH S4ULs (2015)	4	0.2	0.93	0

Table 2.2 Soil laboratory Analysis Results – hydrocarbons

Concentrations of heavy metals and hydrocarbons were all below their relevant screening values. Samples were screened and no asbestos was detected.

4.2 Verification Statement

Concentrations of heavy metals and hydrocarbons were all below their relevant screening values. Samples were screened and no asbestos was detected.

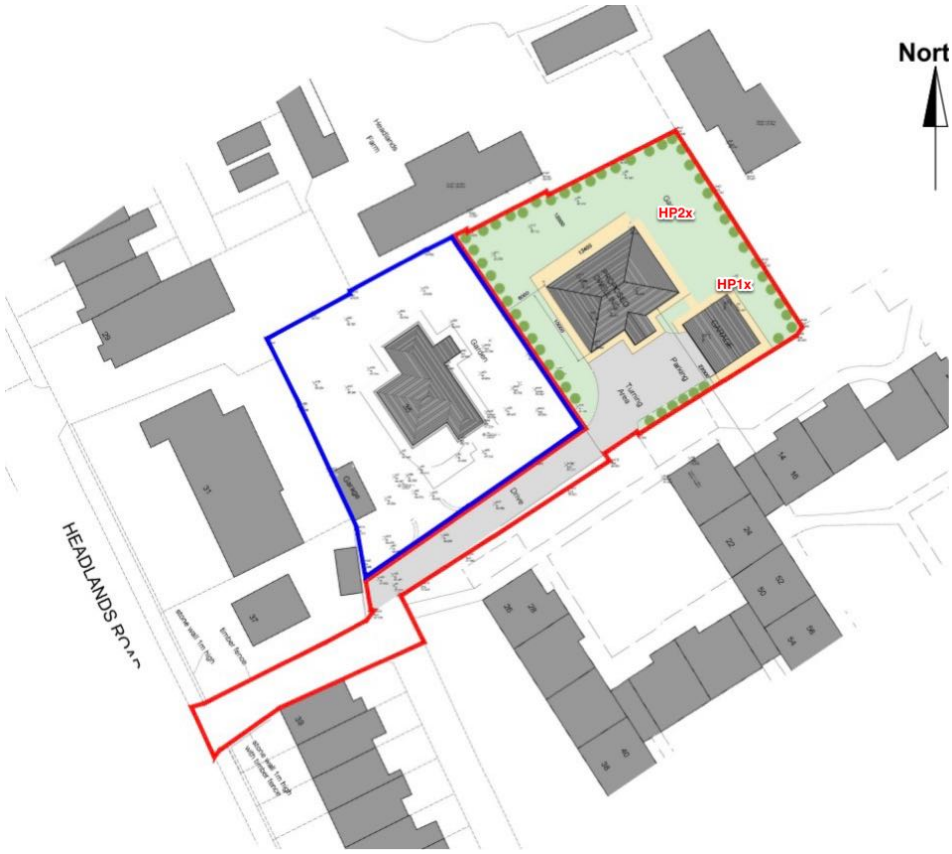
This report and the included site photo record has presented evidence with respect to development that are considered to demonstrate that the site has been developed appropriately.

5 References

1. Department of the Environment, Transport and the Regions and Environment Agency, Model Procedures for the Management of Land Contamination. Contaminated Land Report 11.
2. EA and NHBC 2000. Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66.
3. Department of the Environment, Transport and the Regions, Environment Agency and Institute of Environmental Health. Guidelines for Environmental Risk Assessment and Management. HMSO July 2000.
4. Construction Industry Research and Information Association (CIRIA). Contaminated Land Risk Assessment. A Guide to Good Practice. CIRIA C552 2001.
5. DoE, 1995 Industry Profiles.
6. EA, 2003b Consultation on Agency Policy: Building Development on or within 250m of a landfill site.
7. OPDM Planning Policy Statement 23: Planning and Pollution Control. Annex 2 Development on Land Affected by Contamination.
8. Approved Document C – Site Preparation and Resistance to Contaminants and Moisture (Relating to Building Regulations 2000 (SI 2000/2531).
9. BSI, 2011 Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175.
10. EA, 2001 Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination.
11. Environment Agency 2009: Updated technical background to the CLEA model Science report SC050021/SR3, Bristol, Environment Agency
12. Yorkshire & Humberside Pollution Advisory Council 2011. Development on Land Affected by Contamination - Technical Guidance for Developers Landowners & Consultants.
13. LQM 2007 Contaminated Land Management: Ready Reference 2007
14. Fookes, P.G., Baynes, F.J. & Hutchinson, J.M. 2000. Total geological history: a model approach to the anticipation, observation and understanding of ground conditions. GeoEng 2000, Melbourne, 1, 370-460.
15. Hencher, S. 2011. Practical Engineering Geology, Applied Geotechnics.
16. Structural Foundations Manual for Low-Rise Buildings. Atkinson, M.F. 2003
17. Leeds City Council Desk Study Report (Stage 1) Halton: Brooksbank, Scheme No: 994564 dated October 2010 (revision).
18. ICE Manual of Geotechnical Engineering Vol. 1&2. Burland, J. 2012.
19. The Geology of the Country around Huddersfield and Halifax Memoirs Of The Geological Survey England & Wales Explanation Of Sheet 77dated 1930.
20. Leeds City Council Yellow Leaflet June 2013

APPENDIX A

SITE LOCATION PLANS

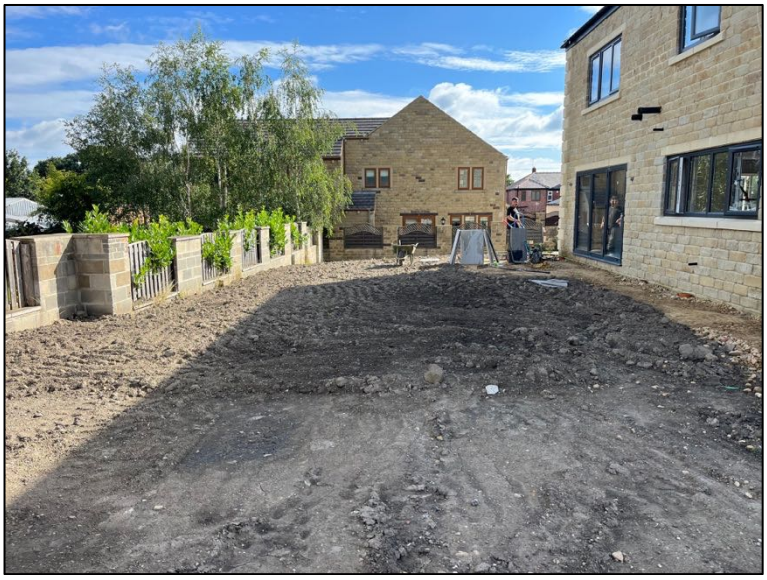


SAMPLING LOCATION PLAN
[Not to scale]

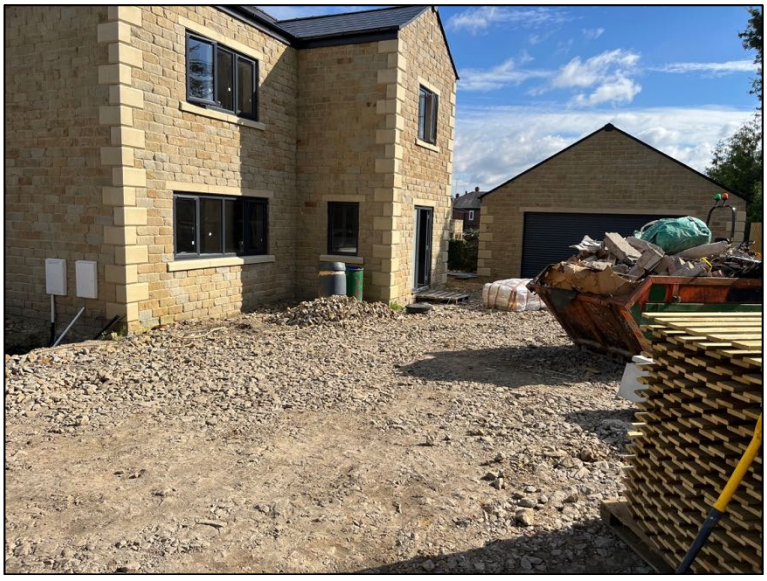
← **North**

APPENDIX B

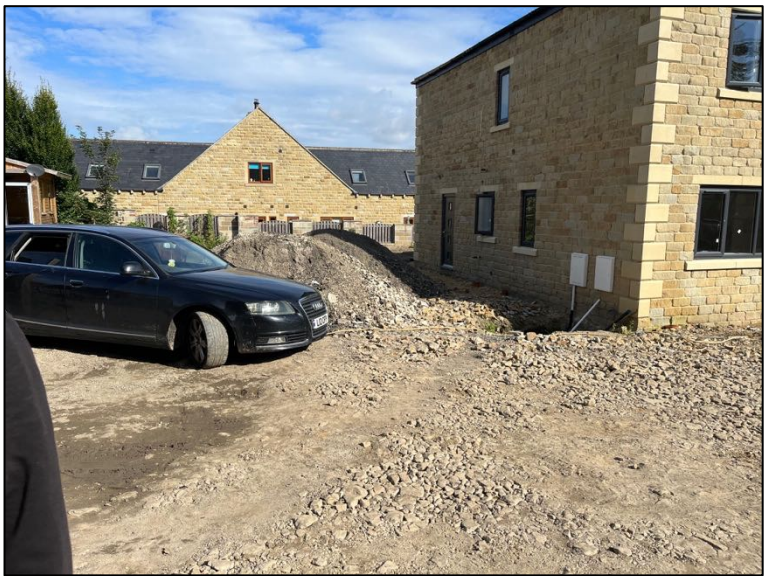
SITE PHOTOS



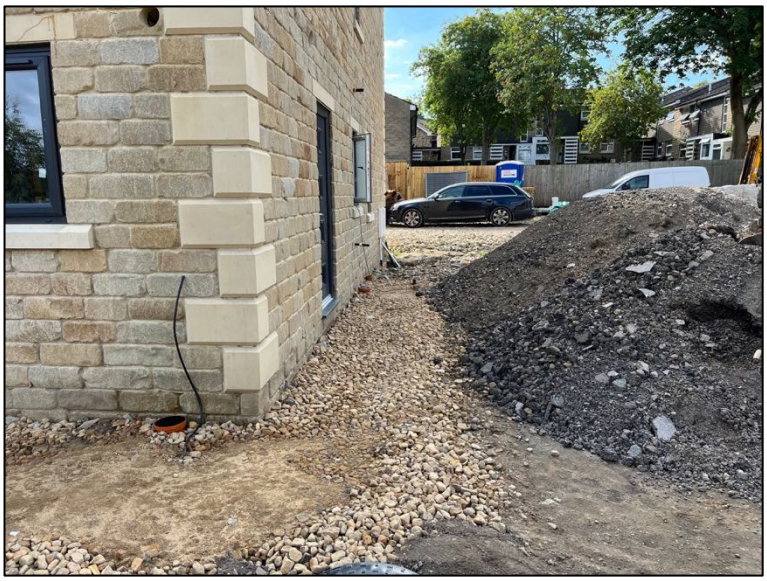
General view to the east across rear garden prior to turfing



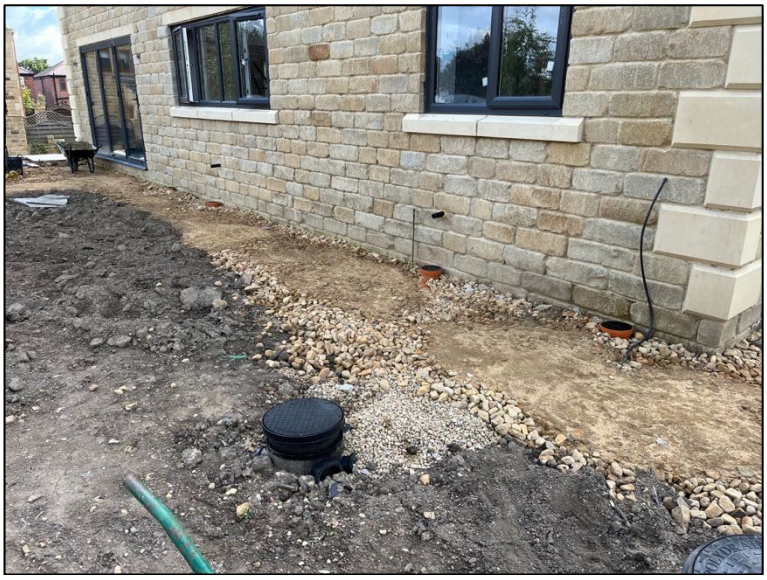
View of front area with clean granular file placed as capillary break layer exposed



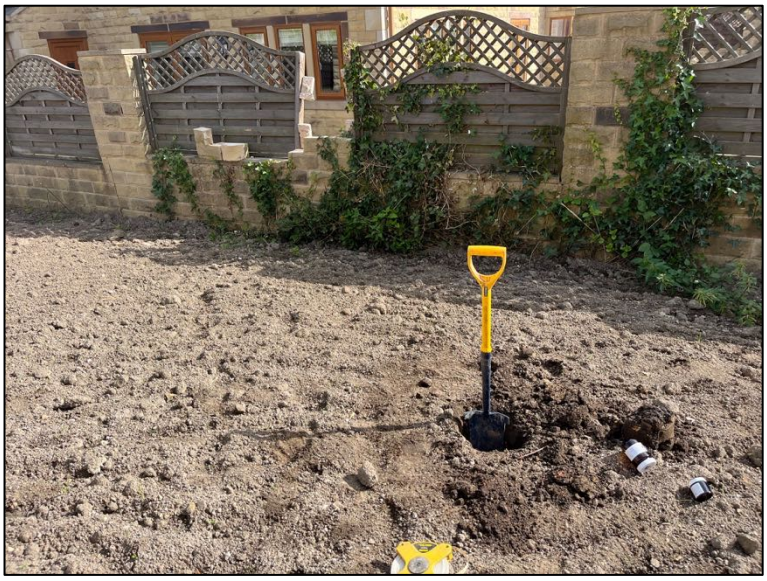
View to north of open amenity space at front of property



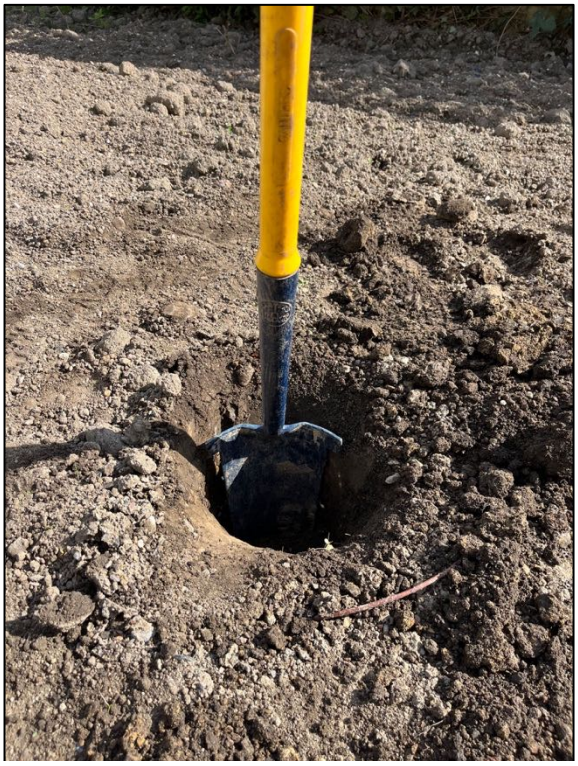
View to south of clean granular fill along west elevation of new property with stockpile of scalpings on right for planned surface course



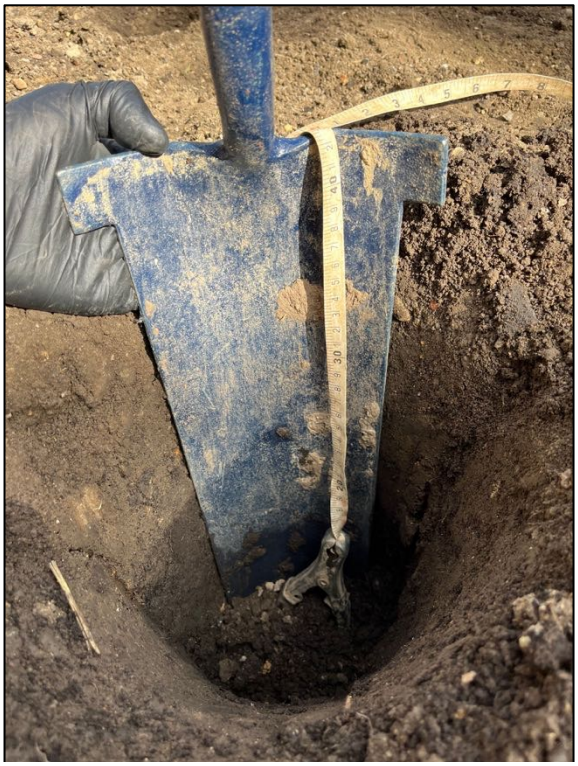
View to south of clean granular fill along north elevation of new property with topsoil to north



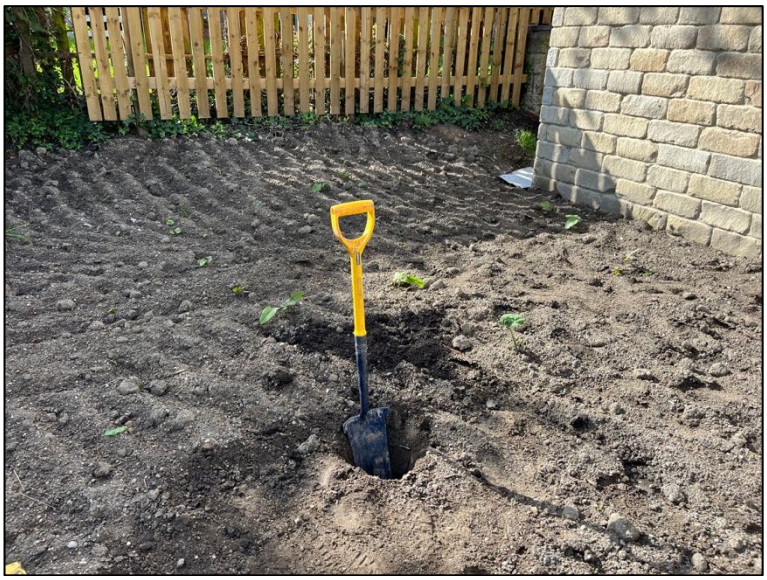
View of HP1 within garden prior to placement of turf



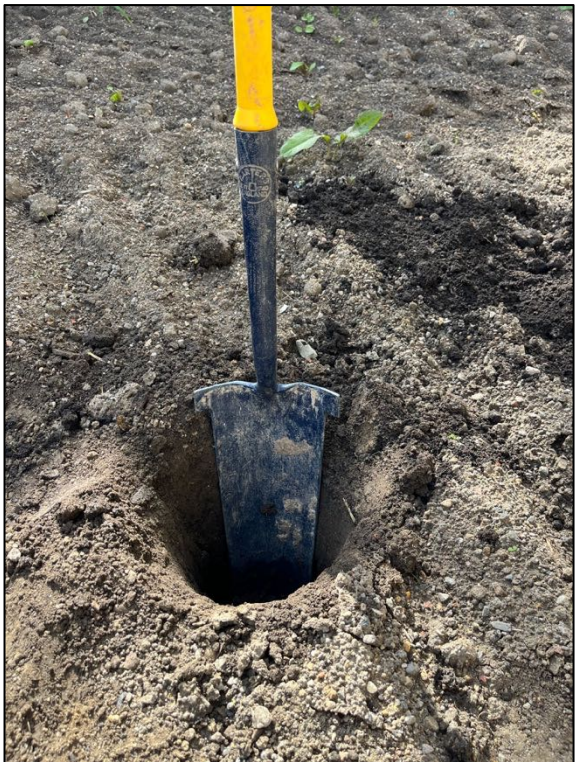
HP1 hand pit



HP1 hand pit with tape showing pit excavated to approximately 400mm bgl



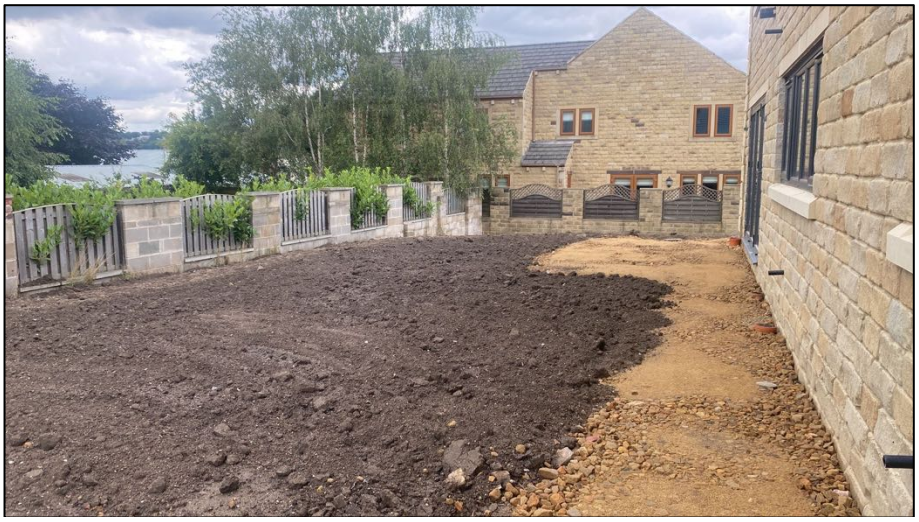
HP2 hand pit



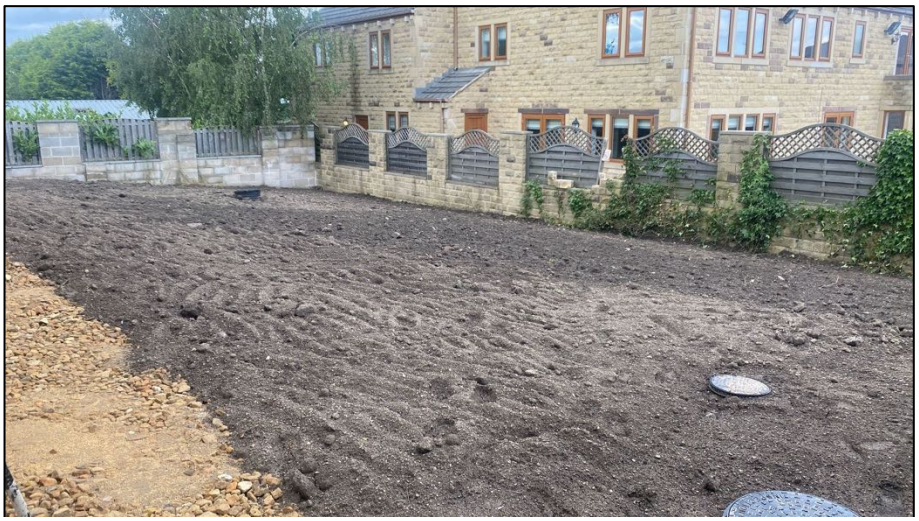
HP2 hand pit

Plot 7 garden

Client supplied photos July 2023:



View north east showing clean stone placed beneath planned pathway and recently laid topsoil



View south west showing clean stone placed beneath planned pathway and recently laid topsoil

APPENDIX C

CHEMICAL ANALYTICAL DATA

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t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 23-64522

Project / Site name:	Land at Headlands Road Liversedge WF15 7NT	**Samples received on:**	20/10/2023
Your job number:	2310 WF15 7NT	**Samples instructed on/ Analysis started on:**	24/10/2023
Your order number:		**Analysis completed by:**	02/11/2023
Report Issue Number:	1	**Report issued on:**	02/11/2023
Samples Analysed:	4 soil samples		

Redacted

Signed:

Izabela Wójcik
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-64522

Project / Site name: Land at Headlands Road Liversedge WF15 7NT

Lab Sample Number				2855396	2855397	2855398	2855399
Sample Reference				HP1	HP1	HP2	HP2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	0.10	0.40
Date Sampled				19/10/2023	19/10/2023	19/10/2023	19/10/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	30	24	24	21
Total mass of sample received	kg	0.001	NONE	0.4	0.3	0.4	0.3
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO	DSO
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.09	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.12	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.15	< 0.05	0.8	0.36
Anthracene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.2	0.1
Fluoranthene	mg/kg	0.05	MCERTS	0.3	0.2	1.1	0.77
Pyrene	mg/kg	0.05	MCERTS	0.29	0.2	0.93	0.65
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.18	0.17	0.49	0.36
Chrysene	mg/kg	0.05	MCERTS	0.18	0.18	0.42	0.33
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.22	0.31	0.51	0.39
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.12	0.1	0.26	0.19
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.18	0.24	0.46	0.36
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.12	0.15	0.22	0.19
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.06	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.12	0.18	0.25	0.19
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.94	1.73	5.93	3.89
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.8	5.2	5.1	5.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.4	0.4	0.4
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.3	10	9.5	11
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	23	92	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	31	35	34	35
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9	9.3	8.8	9.3
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	89	100	93	100

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-64522

Project / Site name: Land at Headlands Road Liversedge WF15 7NT

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2855396	HP1	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2855397	HP1	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
2855398	HP2	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2855399	HP2	None Supplied	0.4	Brown loam and clay with gravel and vegetation.

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Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

APPENDIX D

GENERAL TERMS AND CONDITIONS
&
STANDARD PROCEDURES

General Terms & Conditions Mugen Geo Phase II Investigations

This report describes a ground investigation to be undertaken on behalf of The Client and owner of the site) referenced above. The investigation proposed is been designed based upon information supplied by the client & on the assumption that the site is to be developed for residential use.

The objectives of the investigation are to obtain information relating to the ground conditions at the site in order to comply with a planning condition relating to the site. This report will be produced on behalf of The Client and no responsibility is accepted to any Third Party for all or any part.

The final report should not be relied upon or transferred to any other parties without the express written authorisation of Mugen Geo Ltd. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

Whilst the prepared report may express an opinion on the possible configuration of strata, contaminants or gases between or beyond exploratory hole positions or on the possible presence of features based on either visual, verbal or published evidence, this is for guidance only, and no liability can be accepted for its accuracy.

The comments on groundwater and ground gas conditions will be based on observations made at the time of the investigation. It should be noted, however, that groundwater and ground gas levels may vary from those reported due to seasonal or other effects.

Consideration should be given to the possibility that exploratory holes excavated as part of this investigation, and indeed any previous ground i work by others, may be encountered beneath or within the influence of individual foundations. Mugen Geo Ltd cannot be held responsible for failure of excavations or structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Existing manhole covers will not be lifted and drainage runs will not be inspected during the course of this ground investigation.

Standard Procedure Notes for Phase 2 Reports:

The desk study and ground investigation have been carried out in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001, and the terms of the client's brief.

It must be understood that any ground investigation only samples a small percentage of the ground. As a result changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. Unrecorded bell pits and shafts can also exist between exploratory points. The proposed ground investigation is designed to minimize such risks. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. Therefore, the actual ground conditions should be noted during construction and further advice sought if they differ significantly from those predicted.

Further investigation can be carried out to further reduce uncertainty and risk but ultimately these risks cannot be eliminated. In commissioning further research or investigation the costs, and the assumed benefit of doing so, must be considered.

Where buildings are present on a site, structural and asbestos surveys have not been carried out, unless specifically stated. An unexploded ordnance survey has not been carried out. In relevant situations it would be prudent to commission such surveys.

Where information has been obtained from Third Parties, no liability can be accepted for the accuracy or completeness of this information. Where anecdotal evidence or speculations are presented, they must be treated as such and cannot be relied upon.