OAKSHIRE
ENVIRONMENTAL

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Soil Contamination Test

21 April 2023

La Rose Homes Limited
Land adjacent to Charnwood, 259 High Road, Whaplode, Spalding, PE12 6TG

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1. Introduction

The following document provides details of a Soil Contamination Test carried out by Oakshire Environmental, and includes a description of the site, proposed project, sampling methodology, testing methodology and an evaluation laboratory testing.

1.1 Project Overview

Soil contamination testing has been requested by the client, to assess the suitability of site-won soil for re-use, as part of a project involving the erection of a dwelling and detached garage. Oakshire Environmental will carry out Soil Contamination Testing including delivery and collection of a soil test kit, as described below.

1.2 Purpose of Investigation

The objectives of the Soil Contamination Test will be to:

- Identify contamination of sampled soil from Heavy Metals and Hydrocarbons.
- Assess the risk to human health and the environment.
- Determine the requirement for further investigations or remediation.

1.3 Scope of Work

- Brief introductory information will be noted to provide context to the report and will include an Introduction, Project Overview, Scope of Work and Limitations.
- In order to identify contamination of sampled soil, 3 x samples will be taken by the client from soil at the site and analysed for Metals (As,Be,Cd,Cu,Pb,Hg,Ni,Se,V,Zn), Chromium (III & VI), Phenols, PAHs, BTEX & MTBE, TPH CWG (Aliphatic/ Aromatic), pH and Organic Matter in a UKAS accredited laboratory.
- Results of laboratory testing will be assessed with reference to screening values, including LQM/CIEH Suitable 4 Use Levels (S4ULs), CL:AIRE Category 4 Screening Levels (C4SLs) and Generic Assessment Criteria (GAC), to assess the risk to human health and the environment.
- This information will be used to provide a clear, easy to understand and actionable summary of results, and determine the requirement for further investigations or remediation.
- Report to be carried out, by professional Environmental Consultants with BSc (Hons) in Environmental Science or above, in accordance with appropriate technical guidelines, which may include Environment Agency Land Contamination: Risk Management (LCRM) guidelines, WM3 Technical Guidance, British Standards Institute and Oakshire Environmental reporting guidelines.

1.4 Limitations

Quantum Intelligent Trading Ltd is previously and hereafter referred to as “Oakshire Environmental” or “the company”. Oakshire Environmental has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant when undertaking works of this nature. This report is only valid when used in its entirety and any information or advice contained within the report should not be relied upon until considered in the context of the whole report. Oakshire Environmental disclaims any responsibility to the client, as named on the front of this report (“the client”), and others in respect of any matters outside the scope of this work. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate. This report has been prepared solely for the benefit of the client and any other party using or placing reliance upon any information contained in this report does so at their own risk. Oakshire Environmental accepts no responsibility or liability for the contents of this report being used for any purpose or project for which it was not commissioned. Oakshire Environmental accepts no liability whatsoever for any loss or damage arising from the interpretation or use of this report and in no event shall the company be liable for any punitive, exemplary or other special damages, or for any indirect, incidental or consequential damages, including with respect to the performance or non-performance of any services, whether arising under breach of contract, tort or any other legal theory, and regardless of whether the company has been advised of, knew of, or should have known of the possibility of such damages. Furthermore, Oakshire Environmental does not accept any liability for the consequences of any legislative changes or the release of subsequent guidance documentation and following delivery of the report has no obligation to advise the client or any other party of such changes or their repercussions.

This report excludes consideration of potential hazards arising from any activities at the site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities. Oakshire Environmental does not warrant or guarantee that the site is free of hazardous or potentially hazardous materials or conditions. It should be noted that this report has been produced for environmental purposes only.

Oakshire Environmental cannot be held responsible for incorrect analysis of samples as the laboratory analysis presented in this report was carried out by Chemtech Environmental Ltd. The information and conclusions provided in this report are limited to, and representative of, the samples taken and cannot be extended to apply to the whole site, in addition, Oakshire Environmental cannot guarantee the accuracy of analysis for samples not taken at the source by the company or those which deviate due to exceedance of holding time or inappropriate sampling practises. The findings and/or recommendations of this report do not take into account any conditions that may be present but have hitherto not been encountered and as such further investigation and/or a reconsideration of the findings of this report should be undertaken if such conditions are subsequently encountered or an alternative development plan or land use is subsequently proposed.

2. Site

The following section describes the site and outlines the details of proposed project.

2.1 Site Description and Location

The site is located on land adjacent to Charnwood, 259 High Road, Whaplode, Spalding, PE12 6TG, and is comprised of an approximately 0.03ha soft landscaped area, formerly the private garden of the adjacent dwelling.

The site is bordered by residential dwellings and gardens to the east, south and west and High Road to the north. No Environmentally Sensitive Sites, Ecological Protection Zones, Ramsar Sites or Special Areas of Conservation were identified on or within 250m of the proposed development, in addition, no Conservation Areas, Listed Buildings or Scheduled Ancient Monuments were identified on or within 50m of the proposed development.

National Grid Reference: 532471, 324298

2.2 Proposed Project

The client's proposed project involves erection of a dwelling and detached garage with associated access, parking and landscaping.

3. Methodology

3.1 Sampling Methodology

Three samples were taken by the client, on 11th April 2023, from site-won soil and placed into sample containers. Sample containers used for analysis of volatile contaminants were filled as much as possible without air spaces as volatile compounds can be lost into these spaces.

3.2 Health & Safety

When collecting potentially contaminated soil samples it must be assumed that the soil is contaminated in order to protect the health of the assessor, Personal Protective Equipment (PPE) was used during the sampling process to mitigate this risk. Sample containers were packed with biodegradable fill for protection and placed in a sealed container for transportation to the laboratory.

3.3 Testing Methodology

UKAS accredited laboratory testing included a comprehensive suite of contaminants, including Metals (As,Be,Cd,Cu,Pb,Hg,Ni,Se,V,Zn), Chromium (III & VI), Phenols, PAHs, BTEX, TPH CWG (Aliphatic/ Aromatic), pH and Organic Matter.

4. Evaluation of Results

4.1 Screening Values

Results of laboratory testing of soil samples were analysed by comparing them to industry standard screening values used for risk assessments. These are specific to the proposed land use and depend on the pathways present at a particular site. Exposure pathways considered include direct soil and indoor dust ingestion, skin contact with soils and dust, inhalation of vapours in indoor airspace, ingestion of homegrown produce, permeation into and/or corrosion of water pipes and leaching of contaminants through soil. It should be noted that not all of these pathways will be relevant at the site and the most appropriate screening values available have been used to assess the results. Screening values take a conservative approach to assessing potential risk and concentrations below these values can be considered to represent 'uncontaminated conditions' which pose 'LOW' risk based on the land use.

It is important to note that exceedance of a relevant screening value does not necessarily constitute evidence of either a ‘significant possibility of significant harm’ or the need for remediation. Rather such exceedance should usually trigger a further detailed quantitative risk assessment, where site-specific parameters are used to derive site-specific assessment criteria. Common sense tells us, and a robust risk evaluation reveals, that a gross exceedance is a good indicator that an unacceptable risk is present.

4.2 Summary of Results

- Heavy metal concentrations were all below residential use screening values
- pH was alkaline in all samples
- Phenols (total) concentration was below the laboratory limit of detection
- Total Organic Carbon values were low in all samples, suggesting that the soil has a low organic matter content
    - Soils with low organic matter content will allow hydrocarbons to leach through the soil more easily as these organic contaminants would usually adsorb to organic matter particles
- PAH concentrations were all below residential use screening values
    - PAHs are often present in made ground deposits and coal related products such as coal tar used for the construction of roads and are also the by-products of exhaust emissions from vehicles and can, therefore, build up to high concentrations near roads
- BTEX and TPHs concentrations were all below the laboratory limit of detection
    - These substances are used in various oil and fuel products such as petrol, diesel and lubricant oils, in addition, these contaminants often impact soils near industrial sites where fuel and oils are stored such as garages and farms

4.3 Conclusions

Based on the results of laboratory testing, sampled site-won soil is considered to be uncontaminated, suggesting a low risk to human health and the environment and is, therefore, considered suitable for re-use at the site.

5. References

Environment Agency *Land contamination: risk management*. [online] Available at: <gov.uk/guidance/land-contamination-how-to-manage-the-risks>.

DEFRA. *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*.

Nathanail, C.P.; McCaffrey,C.; Gillett, A.G.; Ogden, R.C. & Nathanail, J.F. *The LQM/CIEH S4ULs for Human Health Risk Assessment*.

USEPA. *Regional Screening Levels (RSLs).* [online] Available at: <epa.gov/risk/regional-screening-levels-rsls>.

Oakshire Environmental Available at: <oakshireenvironmental.co.uk>

Lab number			121506-1	121506-2	121506-3
Sample id			S01	S02	S03
Depth (m)			0.21	0.26	0.25
Date sampled			11/04/2023	11/04/2023	11/04/2023
Test	**Method**	**Units**			
Chromium (III)	CE208	mg/kg CrIII	27.30	27.90	28.20
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1
Arsenic	M	mg/kg	13.00	13.30	13.50
Beryllium	M	mg/kg	0.60	0.90	0.70
Cadmium	M	mg/kg	0.20	< 0.2	< 0.2
Chromium	M	mg/kg	27.30	27.90	28.20
Copper	M	mg/kg	24.10	20.10	21.40
Lead	M	mg/kg	37.20	25.90	37.00
Mercury	M	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	M	mg/kg	16.10	21.70	18.60
Selenium	M	mg/kg	< 1.0	< 1.0	< 1.0
Vanadium	M	mg/kg	31.30	35.70	35.30
Zinc	M	mg/kg	50.60	60.80	51.50
pH	CE004 M	units	8.30	8.30	8.30
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	2.26	1.70	1.95
PAH					
Naphthalene	CE087 M	mg/kg	<0.02	<0.02	<0.02
Acenaphthylene	CE087 M	mg/kg	<0.02	<0.02	<0.02
Acenaphthene	CE087 M	mg/kg	<0.02	<0.02	0.02
Fluorene	CE087 U	mg/kg	<0.02	<0.02	<0.02
Phenanthrene	CE087 M	mg/kg	0.07	0.04	0.32
Anthracene	CE087 U	mg/kg	<0.02	<0.02	0.10
Fluoranthene	CE087 M	mg/kg	0.21	0.12	0.62
Pyrene	CE087 M	mg/kg	0.18	0.09	0.50
Benzo(a)anthracene	CE087 U	mg/kg	0.11	0.05	0.26
Chrysene	CE087 M	mg/kg	0.13	0.05	0.27
Benzo(b)fluoranthene	CE087 M	mg/kg	0.17	0.08	0.28
Benzo(k)fluoranthene	CE087 M	mg/kg	0.06	0.03	0.14
Benzo(a)pyrene	CE087 U	mg/kg	0.12	0.06	0.27
Indeno(123cd)pyrene	CE087 M	mg/kg	0.09	0.04	0.19
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	<0.02	0.04
Benzo(ghi)perylene	CE087 M	mg/kg	0.08	0.03	0.16
PAH (total of USEPA 16)	CE087	mg/kg	1.22	0.59	3.19
BTEX & TPH					
Benzene	CE192 U	mg/kg	<0.01	<0.01	<0.01

Toluene	CE192 U	mg/kg	<0.01	<0.01	<0.01
Ethylbenzene	CE192 U	mg/kg	<0.01	<0.01	<0.01
m & p-Xylene	CE192 U	mg/kg	<0.02	<0.02	<0.02
o-Xylene	CE192 U	mg/kg	<0.01	<0.01	<0.01
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<10	<10	<10
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<10	<10	<10
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15	<15	<15
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	<10	<10