



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

EDGEFOLD HOMES

Springside Road, Bury

Phase II Geo-Environmental Assessment Report

MAS/C6123/14192 Rev B

August 2025

EXECUTIVE SUMMARY	
Location and Brief Site Description	The site is located off Springside Road, Bury, BL9 5JQ, centred on National Grid Reference 380183, 413608, as shown on the Site Location Plan, Drawing No. C6123/01.
Ground Conditions	Generalised ground conditions from the ground investigation comprise (top down): • Made ground encountered from ground level to between 0.90m and 4.00m bgl. • Natural strata encountered from 0.30m bgl to between 2.60m and 5.45m bgl. • Solid geology was not encountered during site works. • Groundwater was not encountered during site works or monitoring to date.
Human Health - Soils Contamination	• Heavy metal exceedances were encountered within the made ground in TT01. • Chrysotile asbestos fibres have been identified in WS04 at trace levels (<0.001%). • No other exceedances were experienced.
Controlled Waters – Surface and Groundwater Contamination	• Though contaminants have been identified within soils, due to the low permeability clays underlying site and the distance to the nearest watercourse (River Irwell circa 1000m SW), the risk to controlled waters is limited.
Ground Gas	Based on the ground gas risk assessment, the site is classified as CS1 – No protection is required.
Outline Remedial Strategy	Subject to regulatory approval, the following outline remedial strategy is recommended: • Further delineation and removal of asbestos hotspot in WS04, and removal of hotspot associated with historic pond in the south-east. • Introduction of a clean cover system with 600mm of ‘clean’ validated topsoil/subsoil in gardens and 450mm in soft landscaping areas. • Treatment and removal of Japanese Knotweed encountered on site. • Verification of the above with validation reports produced.
Waste	TT01 exceeds Loss on Ignition (LOI) and Total Organic Carbon (TOC), and WS04 had trace levels of asbestos encountered. All tested made ground soils are classed as non-hazardous as part of the waste classification report.
Foundations and Floor Slabs	Shallow strip footings are considered most suitable, though alternate solutions may be locally required due to localised deeper made ground. At 0.90m bgl, an allowable bearing capacity not exceeding 115 kN/m ² may be assumed. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits. This increases to 150 kN/m ² at 1.50m bgl and 190 kN/m ² at 2.00m bgl. Suspended floor slabs may be adopted. Ground bearing floor slabs may also be adopted in certain areas and conditions.
Concrete Classification	DS1 AC-1s conditions prevail.
Highways Design	Made Ground CBR – 2% Superficial Strata CBR – cohesive/fine soils– 5% The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.
Site Drainage	Drainage to soakaways is not considered to be feasible due to the presence of low permeability cohesive strata underlying the site.
Further Work	The following further works will be required to progress to the construction phase: • Supplementary intrusive site investigations comprising: ◦ Delineation of asbestos hotspot. • Treatment and removal of Japanese Knotweed encountered onsite. • Tree survey by qualified arboriculturist. • Detailed foundation design by a structural engineer including foundation zonation plan and depth schedule. • Design of Remedial Strategy and confirmation with the Local Authority /EA / warranty provider. • Production of Materials Management Plan (MMP) under the CL:AIRE DoWCoP, if required. • Implementation of the Remedial Strategy and verification of the remedial works.

This executive summary should be read in conjunction with the full report, reference MAS/C6123/14192 Rev B and not as a standalone document. Report template version 4.5.

PROJECT QUALITY CONTROL DATA SHEET

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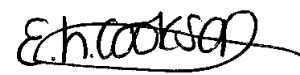
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DRAWINGS

Drawing Number	Rev	Title
J1192-SK103	-	Proposed Development Layout Plan
C6123/01	-	Site Location Plan
C6123/02	-	Exploratory Hole Location Plan
C6123/03	-	Site Remediation Plan

APPENDICES

Appendix	Title
Photographs	Site Works Photographs
Appendix A	BSL Methodology and Guidance
Appendix B	Exploratory Hole Logs
Appendix C	Geotechnical Testing Results
Appendix D	Chemical Testing Results
Appendix E	Monitoring Results
Appendix F	Waste Assessment Report

1.0 INTRODUCTION

1.1 Context

This report describes a Phase II Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for Edgefold Homes on a site off Springside Road, Walmersley, Bury and has been completed in general accordance with the following guidance:

-
- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
 - BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
 - BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
 - BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
 - BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.
 - NHBC Standards. Chapter 4.1: Land Quality - Managing Ground Conditions.
-

Definitions of terms and acronyms used within this report is presented in Section 11.0.

1.2 Proposed Development

The proposed development is for a residential end use, comprising the construction of 12 traditional two storey houses with associated private gardens, highways, and infrastructure, as shown on the proposed development schematic, drawing No. J1192-SK103 provided to BSL by the client.

1.3 Previous Reports

This report should be read in conjunction with the Desk Study Assessment Report undertaken by GEO Environmental Engineering (Report Ref: GEO2022-5262, issued May 2022).

1.4 Objectives and Scope

The objectives of this report are to determine the geo-environmental setting and ground conditions of the site, highlighting potential risks and areas of concern that may govern the development under the current planning regime.

The factual and interpretive Phase II sections of this report are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance. This assessment is also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Following the Phase I Geo-Environmental Assessment undertaken by GEO Environmental Engineering, an intrusive investigation was undertaken to confirm the findings of the preliminary CSM and risk assessment and meet any objectives that had not been satisfied. The exploratory investigation was undertaken using trial pitting, window sampling, trial trenching, ground gas and groundwater monitoring, laboratory chemical and geotechnical testing, with reporting on the findings.

A summary of previous investigations carried out at the site has also been undertaken.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology as outlined in Appendix A. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, Edgefold Homes. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care. This report may not be relied upon by the client or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

The investigation carried out on the site has been conducted to provide the best information on the ground conditions within site access and budgetary constraints. The inherent variation of ground conditions allows only for definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigation. Different ground conditions may exist that have not been identified within this investigation.

The recommendations in this report assume that ground levels will remain as existing, unless stated otherwise within the report. If there is to be any re-profiling (e.g. to create development platforms or flood defences) then the recommendations may not apply.

The groundwater results described are only representative of the dates on which they were recorded, and levels may vary seasonally (e.g. due to changes in weather).

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Where it has not been possible to reasonably use an EC7 compliant investigation technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

The chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required, unless otherwise stated.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues.

Asbestos in structures was not covered in this report. It should be noted that an asbestos demolition survey will be required prior to any demolition of structures. If asbestos is present in soils, these will need to be dealt with in accordance with the Control of Asbestos Regulations (CAR) 2012.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

2.0 THE SITE

2.1 Location

The site is located off Springside Road, Walmersley, Bury, BL9 5JQ, centred on National Grid Reference 380183, 413608, as shown on the Site Location Plan, Drawing No. C6123/01.

2.2 Site Description

A site reconnaissance survey was carried out at the site on 28th April 2025. The main site features and potential issues identified are detailed below.

A selection of photographs from the site walkover are presented to the rear of this report.

Feature	Description
Site Area	Approximately 0.50 hectares.
Site Access	Access to the site is gained off Springside Road to the southeast, via an electric gate.
Current Land Use and Site Features	The site comprises open fields covered with overgrown grasses and shrubs in the north, and grasses in the south. The site forms part of a farm, the access road for which bisects the middle of the site from southeast to northwest. The road is enclosed by barbed wire fencing and comprises a tarmac surface. Access to the northern half of site is via an unlocked gate found in the central-eastern site area, and access to the southern half of site is via an unlocked gate found offsite to the northwest, further along the access road towards the farm. There is a sectioned off area of overgrown vegetation in the northern area. This was marked out with rope and was noted to contain Japanese Knotweed. Overhead cables run parallel to the southern site boundary, circa 3m from the site boundary.
Potential Sources of Gross Contamination	No potential sources of gross contamination were identified.
Vegetation / Ecology	There is a hedge running along the southern edge of site, and sporadic mature trees along the site boundaries. The northern area of site was overgrown with grasses and shrubs and had a sectioned off area which was noted to contain Japanese Knotweed. The southern area of site was covered in grasses. Deer were noted during site works, crossing the northwestern area of site.
Topography	The site is circa 125m OD. There is a trench along the northern site boundary, circa 1m deep and 1m wide. There is a slight incline towards the southern boundary from the access road. There is also a slight depression in the southeastern site area, which is thought to be an infilled pond.
Site Boundaries	Wooden fencing encloses the site to the north, barbed wire fencing to the east, hedges and mature trees along the south, and the fields are open to the west.
Surrounding Area	The site is set within a largely residential and agricultural area, bordered by houses to the north and east, and fields to the south and west.

3.0 SUMMARY OF PREVIOUS REPORTS

A summary of the relevant points from the Phase I Geo-Environmental Assessment completed by GEO Environmental Engineering (reference Report Ref: GEO2022-5262 issued May 2022) is presented below:

- The site has had very minimal historical usage, mainly remaining undeveloped and used for agriculture, except for a small lodge onsite between 1850 and 1910. The surrounding area also remained largely agricultural, with residential developments to the north and east from the 1960's.
- The site is indicated to be underlain by Glacial Till (Secondary Aquifer Undifferentiated). The deeper solid geology is indicated to comprise Pennine Lower Coal Measures (Secondary (A) Aquifer).
- The nearest watercourse is the River Irwell circa 1000m to the south-west of the site.
- The risk from mining is considered to be low.
- The site is located in a Zone 1 floodplain.
- The overall risk to human health is considered to be low.
- The risk to controlled waters is low.
- The risk from ground gas is low and no radon protection measures are required.
- The site is located in the UXO low risk zone.
- Recommendations included:
 - Intrusive site investigations comprising windowless sampling and trial pits.
 - Geotechnical testing of soils.
 - Contamination analyses of soil.
- Assessment and recommendations based on the above, including requirements for further work, if necessary.

4.0 METHOD OF INVESTIGATION

4.1 Objectives

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation was undertaken.

The aim of the fieldwork was to:

- Investigate ground conditions on the site and the potential need for detailed investigation.
- Install standpipes to allow future monitoring.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.

4.2 Site Works

The following site works have been undertaken as part of the intrusive investigation between the dates of 28th and 29th April 2025.

Method	No.	Range Depths (m bgl)	Purpose
Trial pits – JCB 3CX	8	3.00 – 4.00	Establish general ground conditions and gain good coverage. Undertake hand shear vanes in cohesive strata to determine soil strengths for preliminary foundation design.
Trial trenches – JCB 3CX	2	2.30	Establish general ground conditions on site. Establish extent of historical pond and composition of infill material.
Window sample boreholes – Tracked WS rig	6	5.45	Establish general ground conditions on site. Allow Standard Penetration Tests (SPTs) to be carried out and obtain samples for contamination and geotechnical and testing. Determine soil strengths/densities for preliminary foundation design. Installation of ground gas and water monitoring wells.

The surveyed locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No C6123/02. The exploratory hole logs are presented in Appendix B. The area of Japanese Knotweed in the north of the site limited the extent of the ground investigation in this area, though the coverage still remains sufficient.

The exploratory holes were logged by an experienced geo-environmental engineer in general accordance with the following guidance:

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.
- BS EN 14688-1:2018 Geotechnical Investigation and Testing – Identification and classification of soil.

4.3 Sampling Strategy

Representative samples were taken from exploratory holes at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing. They were stored and transported in general accordance with BS 10175:2011+A2:2017.

The type of sample was dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance. The distribution of samples taken across the site is recorded on the exploratory logs.

Investigatory hole locations were determined by reference to the conditions identified in the preliminary risk assessment. Certain specific features such as a historical pond were targeted for specific investigation with trial trenches, but a reasonably even spacing was used for the remainder of the site. No specific sampling statistics or grid were utilised in this instance.

4.4 Laboratory Testing

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' and BS EN ISO 17892- Parts 1-12:2018 'Geotechnical investigation and testing. Laboratory testing of soil'.

The following tests were scheduled for geotechnical purposes:

Description	No of Samples
Plasticity Index Analysis.	4
Moisture Content	4
pH Value.	4
Water Soluble Sulphate Contents.	4

The Geotechnical Laboratory Testing Results are presented in Appendix C.

As part of the initial assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

Based on the potential contaminative processes on site identified, the following suite of determinands were analysed at a UKAS approved laboratory to screen for potential site impacts:

Determinand	No of Samples
BSL Default Soil Suite: Arsenic, Cadmium, Chromium (III), Chromium (VI), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), water soluble sulphate (2:1 Extract), soil organic matter (SOM) and pH.	4
Asbestos Screen and ID	4
Asbestos Quantitative Analysis.	1
Waste Acceptance Criteria (WAC).	2

The Chemical Laboratory Testing Results are presented in Appendix D.

4.5 Monitoring

Ground gas and ground water monitoring standpipes were installed in 3 boreholes as detailed in the table further below.

A total of 6 monitoring visits have been undertaken out of 6 proposed as part of the current scope, in line with the recommendations of BS8485.

All gas monitoring was undertaken using either a GA5000 or GFM436 infrared gas meter with integral electronic flow analyser and a Photo Ionisation Detector (PID).

Flow measurements on each standpipe (l/hr) were taken. Measurements of the percentage volume in air (%v/v) of oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane (Note: 100% LEL equates to 5% by volume), the atmospheric pressure (mb) and average temperature during the visit (°C). Total volatile organic compounds (TVOCs) were measured with a Photo Ionisation Detector (PID).

Standpipes were constructed in general accordance with the relevant guidance. A summary of the installation construction is presented in the table below:

Location	Internal Diameter Pipe	Response Zone (m bgl)	Targeted Strata	Purpose
WS01	35mm PVC	3.00 – 5.00	Sand	Ground Gas & Groundwater
WS04	35mm PVC	0.50 – 1.50	Made Ground	Ground Gas & Groundwater
WS05	35mm PVC	1.00 – 5.00	Clay	Ground Gas & Groundwater

The gas monitoring visits recorded peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.

Ground gas monitoring results are presented in Appendix E of this report.

5.0 GROUND CONDITIONS

5.1 Summary

A brief summary of the ground conditions encountered is presented in the table below:

Stratum	Range Depths - Top (m bgl)	Range Depths - Base (m bgl)	Range Thickness' (m)	Brief Description
Natural Topsoil	GL	0.30 – 0.50	0.30 – 0.50	Clay with minor constituents of sand and gravel
Made Ground Topsoil	GL	0.30 – 0.50	0.30 – 0.50	Clay with minor constituents of sand and gravel
Made Ground	GL– 1.50	0.90 – 4.00	0.30 – 3.50	Clay
	0.30 – 0.50	1.50 – 2.20	1.00 – 1.90	Sand and gravel
Natural Superficial Strata	0.30 – 2.20	2.60 – 5.45	1.70 – 4.95	Clay
	2.60 – 3.10	5.45	2.35 – 2.85	Gravelly sand

Details are provided in the logs in Appendix B and the individual strata are described in the sections below.

5.2 Made Ground

Made Ground – Topsoil

Made Ground Topsoil was encountered in 9 locations, all within the northern section of the site (with exception to the historic pond feature) from ground level to between 0.30m and 0.50m bgl, generally comprising brown clay with varying amounts of sand and gravel, rootlets, and anthropogenic inclusions of gravel and cobble sized brick, clinker, ceramic, concrete, coal, plastic, textile, metal, and timber.

Made Ground – General

Made ground was encountered within 8 exploratory holes all within the northern section of the site (with exception to the historic pond feature).

Cohesive made ground clay was encountered in 6 locations, generally comprising clay with varying amounts of sand and gravel, rootlets, and anthropogenic inclusions of gravel and cobble sized brick, clinker, ceramic, concrete, coal, plastic, textile, metal, and timber inclusions. The cohesive made ground was encountered from depths ranging between ground level and 1.50m bgl, down to depths ranging between 0.90m and 4.00m bgl. It ranged in thickness from 0.30m to 3.50m.

Granular made ground was encountered in 3 locations, comprising gravelly sand or sandy gravel, with anthropogenic inclusions of gravel and cobble sized brick, concrete, coal, glass, ceramic, plastic, and metal. Cobbles of brick, sandstone, concrete, ceramic, and metal were medium content within the deeper made ground encountered on site. Ash was also encountered within both of the trial trenches. The granular made ground was encountered from depths ranging between 0.30 and 0.50m bgl, down to depths ranging between 1.50m and 2.20m bgl. It ranged in thickness from 1.00m to 1.90m.

5.3 Natural Topsoil

Topsoil was encountered in 5 locations across the site, all in the south, from ground level to depths ranging between 0.30m and 0.50m bgl, generally comprising brown clay with rootlets and clay varying amounts of sand and gravel.

For the purpose of this assessment, topsoil is defined as the upper darker and more fertile layer of the soil profile which is a product of natural chemical, physical, biological and environmental processes. This does not imply compliance with BS 3882:2015.

5.4 Natural Superficial Strata

The natural strata underlying the site was generally soft to stiff clay with varying amounts of sand and gravel as minor constituents. This is interpreted to represent Glacial Till. This was encountered from depths ranging between 0.30m and 1.60m bgl, down to depths ranging between 2.60m and 5.45m bgl. It ranged in thickness from 1.70m to 4.95m bgl.

Gravelly sand was encountered in 2 locations across the site (WS01 and WS03) encountered from 2.60m and 3.10m bgl respectively, with both present down to the borehole base at 5.45m bgl. It ranged in thickness from 2.35m to 2.85m.

Shear vane readings in the cohesive soils indicate the clays ranged from low (soft) to high (very stiff) strength. The cohesive soils generally ranged from firm to stiff.

5.5 Solid Geology

The solid geology of the Pennine Lower Coal Measures was not encountered in this investigation.

5.6 Groundwater

Groundwater was not encountered during site works and post site works monitoring has revealed no groundwater to be present.

5.7 Observations

Contamination

During the works undertaken by BSL, observations for both visual and olfactory evidence of contamination were undertaken.

A slight hydrocarbon odour was noted in TP02 at 1.70m bgl. No further olfactory evidence was noted during site works.

With the exception of ash, clinker, and other anthropogenic inclusions observed as a minor constituents in the made ground soils, no other evidence of contamination was observed at the site.

Stability of Excavations/Boreholes

The sides of the trial pits were generally stable however collapsing of the made ground was observed in TT01 and TT01E.

The borehole sidewalls were generally stable, and window sampling progressed without the need to install casing within the cohesive strata. Casing was required to prevent collapse with the granular materials during drilling of the window sample boreholes.

The stiff nature of the clay across the site proved difficult to excavate at depth.

Obstructions

Numerous obstructions were encountered throughout the made ground on site. The obstructions identified are summarised in the table below:

Location	Depth (m bgl)	Comments
WS01	0.50 – 0.60	Non-reinforced concrete.
WS03	0.40 – 0.50	Non-reinforced concrete.
WS04	0.50 – 0.60	Non-reinforced concrete.
TP01	0.30 – 0.50	Sandstone and concrete boulders.

Location	Depth (m bgl)	Comments
TP02	1.00	Sandstone boulders.
	1.40	
	1.80	
TP04	0.20 – 0.30	Sandstone flagstone.

6.0 TEST RESULTS

6.1 Geotechnical Laboratory Testing

Plasticity Index Analysis

Plasticity index results ranged between 10% and 25%. Associated water contents ranged between 17.7% and 26.8%.

After modification of particle size in accordance with NHBC Chapter 4.2 the modified plasticity indices are in the range 10% to 24% indicating the cohesive soils to be of low to medium volume change potential.

6.2 Aggressive Ground Conditions – Geotechnical Chemical Testing

The test results for the assessment of aggressive ground conditions are presented in Appendix C. The results are summarised and assessed within Section 7.0 of this report.

6.3 In Situ Geotechnical Testing

In Situ Hand Shear Vane Tests

Hand shear vane tests were carried out on suitable cohesive soils where possible. Each shear vane result recorded represents the mean value of three tests undertaken at the specified depth.

The results and distribution of the hand shear vane tests are recorded in kPa on the Exploratory Hole Logs which are presented in Appendix B.

In Situ Standard Penetration Tests

Standard Penetration Tests (SPTs) were carried out within the window sample boreholes at regular 1.00m intervals. The results of the individual blows and the N-values are recorded on the Exploratory Hole Logs in Appendix B.

All SPT N values are uncorrected. Density and strength descriptors are reported in accordance with the guidelines stated in BS 5930:2015+A1:2020, incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

6.4 Geo-Environmental Testing

Chemical Laboratory Testing

The chemical test results for soils are presented in Appendix D. The results are summarised and assessed within Section 8.0 of this report.

Ground Gas Monitoring

Ground gas monitoring results are presented in Appendix E and are summarised and assessed within Section 8.6 of this report.

7.0 GEOTECHNICAL ASSESSMENT

7.1 Ground Model

The site is currently open fields with limited historical development.

The ground conditions can be summarised as below (top down):

-
- Made ground generally comprising sands and gravels or clays from ground level to between 0.90m and 4.00m bgl.
 - Natural superficial deposits comprising clays or sands proven to depths between 2.60m and 5.45m bgl.
 - Groundwater was not encountered during site works or monitoring.
-

A trench is present along the northern site boundary, circa 1.00m wide and deep. There are known services on site, including a private water main and electrical cables. There is also a former infilled pond in the southeastern area of site. These features will need to be taken into consideration for foundation design.

There were numerous concrete, brick, and sandstone obstructions encountered throughout the made ground that will need removal during enabling works, though these were all confined to the northern section of the site.

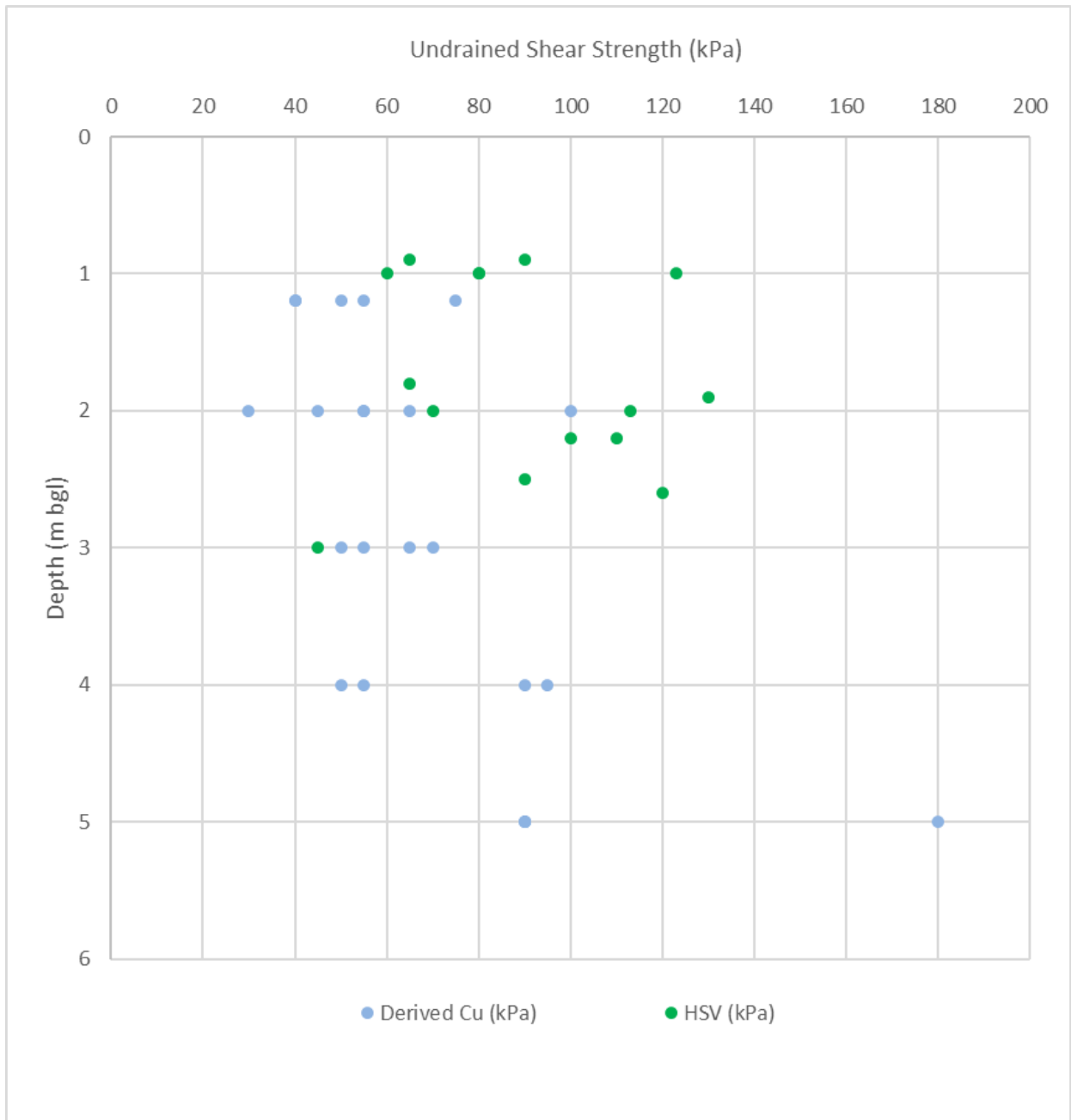
Japanese Knotweed has been identified on site and specialist advice should be sought.

7.2 Design Soil Parameters

The relevant test results from the prior section have been evaluated to derive geotechnical soil parameters for the site.

For cohesive (fine) soils, the equivalent approximate undrained shear strengths (C_u) have been calculated from the recorded SPT N values, adopting f_1 values based on the correlation of Stroud (1975) and the 'average' plasticity.

A depth (m bgl) vs derived shear strength (C_u) graph is provided below to provide a profile of the cohesive soils underlying the site.



The above graphs show a general increase in soils strengths as depth increases.

Characteristic Values

Characterisation of the geotechnical parameters above has been undertaken to obtain characteristic values, which are a cautious estimate of the values affecting the occurrence of the limit state, taking into consideration typical minimum foundation depths for cohesive and granular soils.

Characteristic values for made ground are not presented due to the heterogeneity of the deposits and that they are not typically considered to be a suitable bearing stratum without some form of ground improvement.

Based on the medium volume change of the cohesive soils, foundations should be placed at a minimum depth of 0.90m bgl, therefore characteristic values are presented for this approximate depth. However, in areas of the site, foundations will be required to be taken deeper due to the presence of made ground.

The characteristic value for undrained shear strength (C_u) as read from the depth vs C_u graph above in cohesive deposits at 0.90m bgl is interpreted to be 50kN/m², increasing to 60kN/m² at 1.50m bgl and 75kN/m² at 2.00m bgl. Note that the made ground is still present at circa 4.00m bgl in one isolated location, and the historic pond will also not be suitable for building on in its current state.

7.3 Foundations

The development will comprise 12 residential houses and is classed as Geotechnical Category 2 in accordance with Eurocode 7.

Preliminary design by calculation has been undertaken to determine the design resistance of the bearing strata in the following section.

Note that the made ground is not considered to be a suitable bearing stratum. Made ground was identified down to 2.20m bgl in the location of the historic pond in the south-east section of the site, adjacent to, but not underlying, plot 1. Shallow firm to stiff clays are therefore anticipated to underly the proposed footprint of plot 1, however, if site conditions are found to differ, or the proposed development plan changes, then advice should be sought from a suitable geotechnical consultant, such as BSL.

The deep made ground localised to TP02 in the north of the site is currently indicated to be in the garden area of plot 5. Based on other exploratory holes and the proposed development plan, it is likely that suitable shallow firm to stiff clays will be encountered beneath the footprint of the proposed plots in this area. However, advice should again be sought if conditions are found to differ.

No proposed structural loads were available at the time of writing, therefore the following recommendations are provisional and should be reviewed at the detailed design stage. However, for the purpose of this assessment a typical load of 50kN has been assumed per storey.

This assessment is based on the existing ground levels and does not take into consideration any cut/fill exercise, which should be considered at the detailed design stage.

Shallow Foundations – Strip

The most suitable foundations for the proposed residential homes are considered to be strip foundations.

Based on the medium volume change potential foundations should be placed at a minimum depth of 0.90m bgl into the natural cohesive deposits and deepened near trees and hedges in accordance with NHBC Chapter 4.2.

Whilst minimum founding depths are 0.90m bgl, foundations may need to be locally deepened to found in more competent strata due to made ground depths and low soil strengths in some areas (for example WS01, WS04 and WS06). Where footings are placed below the minimum founding depths, they should extend a minimum of 100mm into the specified bearing stratum.

At 0.90m bgl, an allowable bearing capacity not exceeding 115 kN/m² may be assumed. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits. This increases to 150 kN/m² at 1.50m bgl and 190 kN/m² at 2.00m bgl. Trees are noted within and close to the area of the site proposed for development. Depending on their size, type and maturity, the required depth of founding based on the recommendations of NHBC Chapter 4.2 may exceed 2.5m. Should this prove to be the case, then piled foundations should be considered as a potentially more economical solution, unless it can be proven that the soils are not desiccated.

Note where foundations require deepening to greater than 2.5m below ground level, they must be designed by an engineer, as specified in NHBC Technical Requirement R5.

General Advice for Shallow Foundations

The bearing stratum should be inspected for 'soft spots' within the natural clay strata, resulting for instance from localised groundwater perched within the overlying fill materials. If unsuitable soft soils are encountered, then foundations will need to be deepened to found on suitable strata or soft or loose zones should be excavated and replaced with well compacted suitable granular fill or lean mix concrete. The stratum should also be inspected for 'hard spots' which may require removal.

If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during construction, work should cease and BSL contacted for further advice.

During the construction phase supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

Ground improvement

Based on the depth of localised made ground, and subject to the final development layout, this may preclude the use of traditional foundations prior to improvement of the soils in certain plots.

As such, ground improvement by methods such as vibro stone columns (VSCs) should be considered for structures in this instance. This will create stiffened columns upon which to help spread the building loads and thus minimise differential settlement. The vibro stone columns would need to penetrate through the made ground and underlying any soft cohesive natural strata, down to a competent horizon.

On completion of the vibro treatment works, in-situ testing should be carried out to confirm the treatment meets the bearing capacity and deformation criteria for construction. Further guidance is provided in BRE 391 "Specifying vibro stone columns".

Following ground improvement, reinforced strip foundations could be used bearing onto the improved ground, usually at depths of circa 600mm depth. Typically, allowable bearing capacities of the order of $125\text{kN/m}^2 - 150\text{kN/m}^2$ can be achieved, keeping total and differential settlements within tolerable limits, although this should be discussed with specialist contractors.

Working Platform

Prior to the commencement of penetrative works (piling/vibro), a working platform will be required for tracked plant. This should be designed and installed in accordance with BR470 (BRE 2004) based on the plant requirements, data and rig loadings.

7.4 Building Near Trees

The clay soils on site are of medium volume change potential. Where foundation excavations (or piles if adopted) encounter cohesive strata in the vicinity of existing, proposed or recently removed trees, foundations should be adjusted in full accordance with NHBC Standards Chapter 4.2. All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings.

A survey of all trees and hedges on the site and within influencing distance of the site boundary should be undertaken to identify tree species and heights by a qualified arboriculturist in accordance with BS 5837:2012 and NHBC Standards. This information will be required in order to assess the effects of trees on the cohesive strata.

Where foundation depths due to trees already present or recently removed exceeds 1.50m, there is a possibility for heave to occur on removal of the tree and guidance states that compressible material or void former is required against the inside face of the foundation, unless it can be satisfied that the soil is not desiccated.

7.5 Floor Slabs

Given the thickness of made ground present (generally >600mm in the northern section of the site), suspended floor slabs should be adopted at the site in accordance with NHBC standards.

Where foundation depths due to trees already present in cohesive (shrinkable) strata exceeds 1.50m, there is a possibility for heave to occur on removal of the tree, unless it can be satisfied the soils are not desiccated. In this instance, NHBC Guidance states that either a precast concrete floor (i.e. beam and block), a suspended timber or a cast in-situ concrete floor must be used. We recommend the former, where the required void size for beneath floor slabs on this site is 250mm based on the medium volume change potential clays.

Ground bearing slabs may also be adopted, particularly in the southern section of the site, providing the following criteria are satisfied:

-
- Any other compressible or unsuitable materials (topsoil containing vegetation and organic matter, including tree roots, are excavated and either improved or removed and replaced with suitable materials.
 - The foundation depth (such as due to the influence of trees) is less than 1.5m.
 - It is demonstrated that desiccation in cohesive soils is not present.
 - Any fill beneath the slab is suitable, well-compacted granular material placed in an appropriate thickness in accordance with a suitable specification (e.g. NHBC Standards/SHW Series 600) designed and supervised by an appropriately qualified engineer, with the end performance validated.
 - The slab is adequately reinforced.
 - Regular construction joints and ties are provided to allow for differential settlement.
-

The final floor slab design should be of sufficient thickness and sufficiently reinforced to accept the envisaged applied loads, without unacceptable total or differential movement.

Vertical elements within the structure, such as columns and walls will need to be isolated from the ground bearing slab in order to allow for the slab to expand against them without resulting in cracking.

Prior to the placement of the founding materials and the construction of a ground bearing floor slab, the sub-formation and formation will need to be inspected and checked by a geotechnical engineer to ensure the ground conditions are as expected. If soft spots or hard spots are identified at the formation level, they should be reported to the Geotechnical Engineer immediately and remedial actions agreed.

Incorporation of geogrid reinforcement at formation level, before granular material is placed and compacted, will likely minimise required excavation depths and help provide a suitable foundation for the ground bearing slab.

Ground floor slabs should also be designed to incorporate any ground gas protections measures, where required.

7.6 Site Preparation and Construction

Topsoil and subsoil should be removed from beneath all proposed buildings and hardstanding areas.

There are a number of services crossing the site including a private water main and electrical cables in the southern site area. To allow remediation and construction, all services will need to be disconnected and any suspected dead services are confirmed as dead by testing.

Instability of excavations through natural soils is not anticipated provided they are not exposed to adverse weather conditions for any substantial period of time. Instability of the made ground should be allowed for. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'.

Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360° or similar) is recommended to maintain the build programme.

Japanese Knotweed has been identified on site and specialist advice should be sought.

The presence of substantial depths of made ground in areas of the site may result in settlement of newly installed drainage. This should be taken into consideration during the design of drainage, which may include flexible joints to allow for some differential settlement.

It should be noted that undertaking treatment locally or using deepened foundations (i.e. focusing only on the footprint of structures) means that the surrounding areas (roads, gardens and landscaping) are likely to settle relative to the structures if disturbed. This risk can be mitigated by undertaking more widespread ground improvement through techniques such as dynamic compaction, surcharging or excavation and re-compaction.

To protect against the effects of heave, new drainage in costive soils should be designed to take account of potential ground movement, including where pipes and services which pass through substructure walls or foundations. The volume change potential on this site is medium and the potential ground movements that need to be considered for design are 100mm.

Groundwater has not been encountered during monitoring visits and therefore are unlikely to be encountered within likely excavation depths.

Based on the exploratory holes logs and monitoring, it is considered that methods such as sump pumping are likely to be sufficient to deal with anticipated flows. Further guidance is provided in CIRIA C750 "Groundwater Control: Design and Practice". It should be noted that groundwater levels will vary seasonally and the timing of construction may influence requirements.

7.7 Concrete Classification

The soluble sulphate and pH test results have been assessed in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The Design Sulphate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in the table below.

For the purposes of this assessment, the groundwater has been classified as static given the site is underlain by low permeability deposits.

Stratum	No. Samples	Characteristic SO ₄ (g/l)	Characteristic pH	DS Class	ACEC Class
Made Ground	4	433	6.2	DS1	AC-1s
Natural Superficial Strata – Clay	4	50.4	5.2		

Based on the above, the results of laboratory pH and sulphate content, alongside the BRE full suite tests, indicate that sulphate class DS-1 and ACEC Class AC-1s conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005.

The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site-specific concrete requirements in terms of the durability and structural performance. These are assessed

in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

7.8 Highways

Based on Table 5.1 from DMRB IAN 73/06 Rev 1 equilibrium CBR values of 5% are likely to be achieved in undisturbed natural clays soils for pavement design purposes, unless proven otherwise by in-situ testing at formation level by a specialist geotechnical engineer. Equilibrium CBR values are likely to be 2% within the made ground, which will likely be at formation level in the northern section of the site.

Where the CBR is found to be less than 2%, the sub-grade is unlikely to be suitable for both the trafficking of site plant and as a permanent highway foundation without improvement of the soils.

To achieve the required design CBR value, improvement works should be carried out in accordance with DMRB IAN 73/06 Rev 1 Chapter 5 and may include proof rolling, excavation and re-engineering / replacement of weaker soils, the inclusion of a geogrid or use of stabilisation techniques such as the addition of hydraulic binders (e.g. cement/lime).

Based on the fines content of the soils, they are considered to be frost susceptible, therefore highway construction should be a minimum thickness of 450mm to mitigate against the risk.

Care should be taken to ensure the stratum at formation level is protected against inclement weather, as this is likely to lead to surface deterioration and a decrease in soils strengths.

7.9 Site Drainage

The use of sustainable drainage systems, such as traditional soakaways within the natural ground, is not considered to be feasible due to the presence of low permeability cohesive strata underlying the site.

8.0 GEO-ENVIRONMENTAL RISK ASSESSMENT

8.1 Introduction

The samples were tested to allow for an assessment of the chemical contamination that may pose a risk to human health. The results were examined with reference to a selection of guidance documents as detailed in Appendix A. In this case the LQM/CIEH S4ULs and DEFRA C4SLs for a residential end use with homegrown produce Tier 1 generic screening values.

Where samples record determinand concentrations that exceed the relevant screening values then these will be considered further.

A summary assessment sheet is presented in Appendix D alongside the chemical test results. Results are discussed in detail in the sections below.

8.2 Soils Test Results and Risk Assessment – Human Health

Metals

The following elevated metals were detected:

Exploratory Hole	Depth (m)	Stratum	Metal	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
TT01	0.50 – 1.50	Made Ground	Arsenic	68	37
			Lead	800	200
			Mercury	2	1.2

Asbestos

Chrysotile loose fibres have been detected in one sample from WS04 at 0.10 – 0.40m bgl. On quantification analysis the asbestos level was <0.001% mass and classified as being trace levels.

No visual evidence of asbestos contamination was noted during the investigation, which was undertaken by an engineer with asbestos awareness and>NNLW qualifications.

Poly Aromatic Hydrocarbons (PAHs)

No PAHs have been detected above the adopted screening criteria.

8.3 Summary – Human Health Risk Assessment

Based on the testing and assessment undertaken it would appear that there is localised contamination within the made ground in TT01 in the form of metals (Arsenic, Lead, and Mercury).

Chrysotile asbestos fibres have been detected in one sample to date at trace levels (<0.001%).

The above pose a risk to human health and will require further consideration.

8.4 Soil, Water and Leachate Test Results – Controlled Waters

Soils

Though contaminants have been identified within soils, due to the low permeability clays underlying site and the distance to the nearest watercourse, the risk to controlled waters is limited.

8.5 Controlled Waters Risk Assessment

Groundwater water testing has not been carried out based on the preliminary CSM risk assessment and the site is not considered to pose a significant risk to controlled water for the following reasons:

- There is no indication under present conditions of significant pollution of controlled waters and conditions following development of the site will not be any worse, indeed they may improve with increased hard cover and water retaining imported soft landscaping soils.
- The nearest watercourse is 162m away, which provides considerable distance for attenuation and contaminant degradation.
- The site is underlain by low permeability clays which will inhibit lateral and vertical contaminant migration.
- The site does not lie within an SPZ.
- There are no active groundwater abstractions within 1000m.
- The closest active surface water abstraction is recorded 684m southwest of site and is not considered to be at risk from the proposed development.

8.6 Permanent Ground Gas and Vapours Results

Six ground gas monitoring visits have been carried out between the 12th May and 4th June 2025. A further four visits are scheduled. Results from the monitoring undertaken so far are summarised in the table below:

	CH ₄ (%)		CO ₂ (%)		O ₂ (%)		CO (ppm)		H ₂ S (ppm)		TVOC (ppm)		Steady Flow (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Peak	0.1	0.1	0.1	9.5	7.8	21.2	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.3
Steady	0.1	0.1	0.1	3.5	16.3	20.9							0.1	0.1

Notes: CH₄ = Methane; CO₂ = Carbon dioxide; O₂ = Oxygen; CO = Carbon Monoxide; H₂S = Hydrogen Sulphide; TVOC (PID) = Total Volatile Organic Compounds (as measured with Photo Ionisation Detector); ppm = Parts Per Million.

The highest peak carbon dioxide concentrations were recorded in WS05 (9.5% v/v). Methane has not been identified over the limit of detection.

The atmospheric pressure ranged between 993mb and 1021mb over the monitoring period, of which visits were conducted over a range of falling and rising pressure trends.

No groundwater was detected in either of the monitoring visits.

All of the samples tested recorded PID results of 0.0ppm, indicating that no significant volatile vapour contamination was present.

8.7 Ground Gas Risk Assessment

Basis of Assessment

In order to assess the ground gas situation and the requirement for ground gas precautionary measures at the site, guidance was taken from BS8485:2015+A1:2019 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CL:AIRE Technical Bulletin TB17 'Ground Gas Monitoring and 'Worst-Case' Conditions'.

Rationale and Suitability of Dataset

As per the Phase I Geo-Environmental Assessment, in accordance with BS8485 and as set out in Appendix A of this report, the ground gas generation potential is considered to be **very low**. The sensitivity of the development is **high** on account of the proposed residential end use.

In line with current guidance, it is recommended gas monitoring should comprise 6 visits over a 3-month period. The required monitoring frequency has been met.

Assessment of Data

Derivation of a Gas Screening Values (GSV) has been undertaken based on the guidance with BS8485 using the following equation: (max gas concentration / 100) x maximum steady flow.

A maximum steady flow of 0.1l/hr has been used to derive the worst credible GSVs. The GSV's for the site are presented below:

Ground Gas	Adopted Typical Steady Flow Rate (l/hr)	Max Concentration (% v/v)	Worst Credible GSV (l/h)	Classification based on GSV	Typical Threshold Concentration Exceeded
Methane	0.1	0.1	<0.0001	CS1	No – CS1
Carbon Dioxide	0.1	9.5	<0.0095	CS1	Yes – CS2

The GSVs place the site the site into Characteristic Situation 1 (CS1), however due to concentrations of carbon dioxide greater than 5% v/v being recorded at the site then guidance states **consideration** should be given to increasing the site classification as part of assessment

Glacial Till is not generally considered to be a source of ground gases due to the very low concentrations of organic material typically present within such soils. It is likely the excess concentrations of gas are attributable to microbial respiration as opposed to any other obvious generation source.

In order to further increase confidence in this assessment and adopting a lines of evidence approach, reference has been made to the 2018 paper by Wilson et al (Ambience and EPG Ltd) "Using ternary plots for interpretation of ground gas monitoring results" and NHBC NF94 "Hazardous Ground Gas".

The paper states that carbon dioxide is widespread in the sub surface environment and is generated by microbial and geochemical processes. If there is any organic, carbonate or pyrite content in the soils or rocks then carbon dioxide could potentially be present at concentrations up to 21% v/v. Soils in the UK where carbon dioxide is present commonly include glacial Till and made ground.

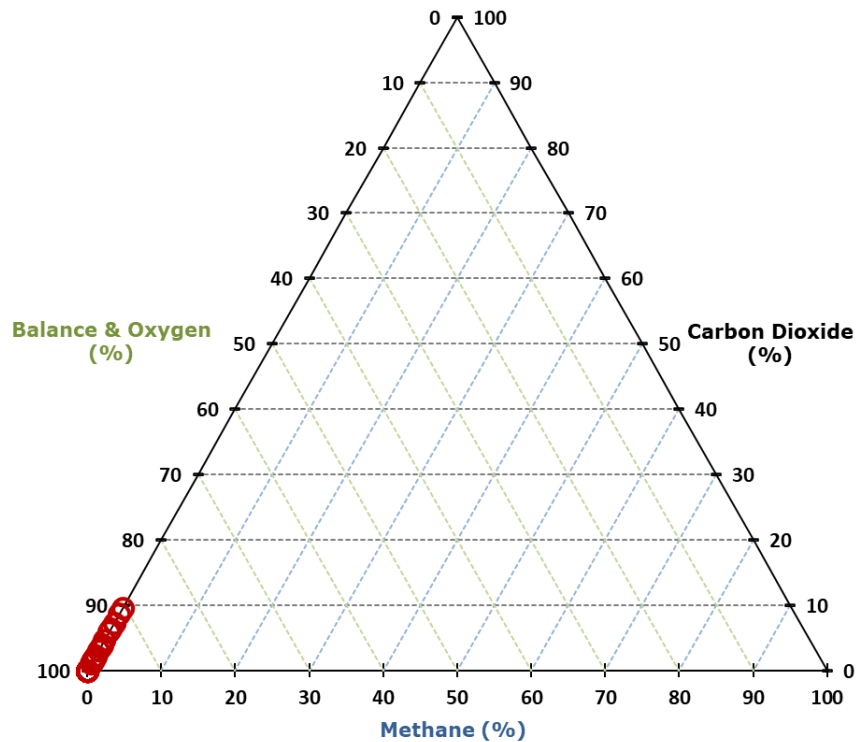
When monitoring wells are installed in these materials, the small volumes of organic material are exposed to oxygen. This can result in biological respiration or oxidation of the material resulting in the production of carbon dioxide.

Low volumes of organic material in made ground can also degrade aerobically to produce carbon dioxide or may locally be degrading anaerobically with the process being so slow that the methane completely oxidises to carbon dioxide before reaching the well headspace. In all these cases the carbon dioxide is generated so slowly that it will not be emitted from the ground surface in quantities or at a rate that is sufficient to pose a risk to overlying development.

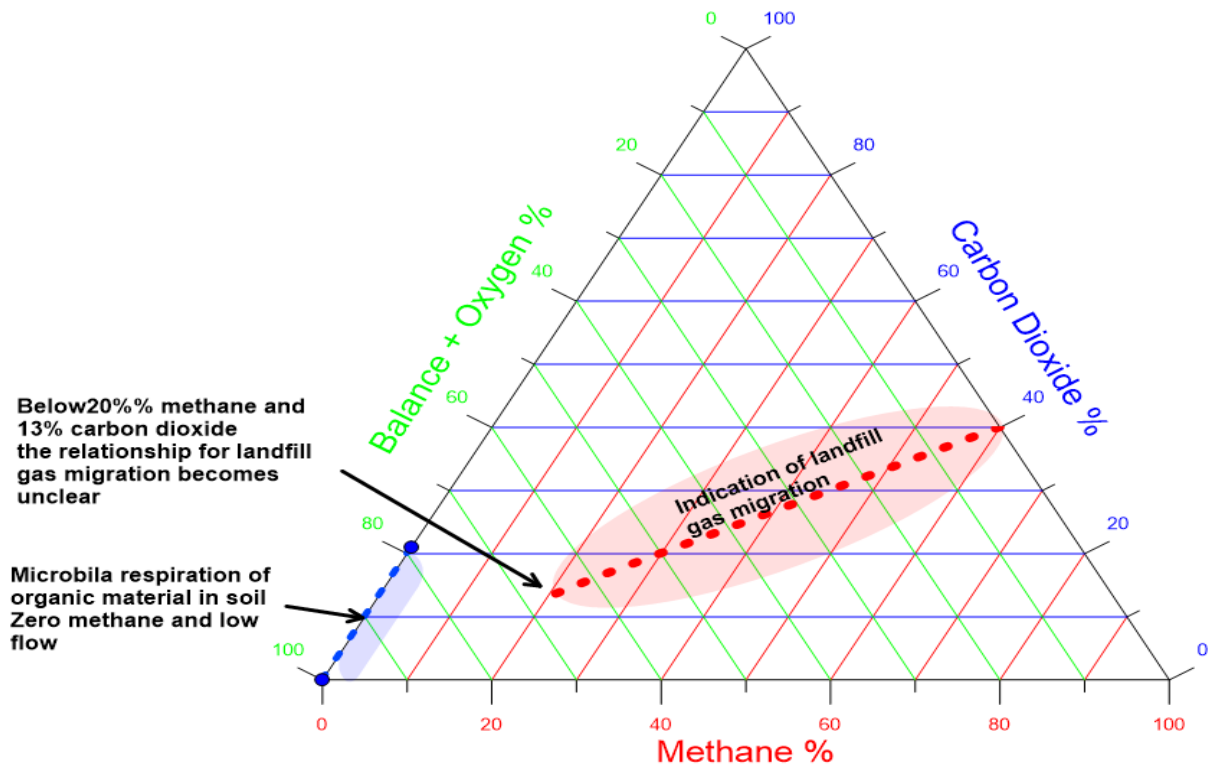
The screening approaches used in the UK for ground gas have a requirement to **consider** increasing the characterisation of a site identified as Characteristic Situation CS1 based on the Gas Screening Value, if carbon dioxide concentrations exceeding 5% have been recorded.

This increase in characterisation is **not** a mandatory requirement in any of the guidance documents. The distribution of elevated concentrations and the source of the gas should be considered before deciding whether the increase is appropriate. The paper goes on to state that in most cases there will not be any need to increase the classification if the carbon dioxide is caused by biological respiration of small quantities of organic material. Increasing the characteristic situation is only likely to be a requirement if the gas source is one of the high-risk sources (landfills, open mine workings, flow of acidic mine water through rocks).

Based on the methodology described in the paper, a ternary plot has been produced using the results from the continuous monitoring data and is presented below:



The distribution of the gas concentrations over the monitoring period fall within the area associated with microbial respiration of organic matter in soils in accordance with Wilson et. al.



Where gas monitoring results plot in the zone for microbial respiration, there is no requirement to increase the characteristic situation simply because the carbon dioxide concentration exceeds 5%. This, as the paper recommends, is supported by other data and lines of evidence such as the site conceptual model and continuous monitoring data.

Assessment Summary

In summary, based on a lines of evidence approach, we consider that the site should be placed within CS1 classification and ground gas protection measures are not required within structures at the development, subject to agreement with the Local Authority, based on the following rationale:

- Based on the GSVs alone, the site falls into CS1 classification.
- The typical threshold concentrations of 5% have been exceeded on a number of occasions within WS04 and WS05 within the spot monitoring data.
- The “worst case” data has been plotted on a ternary diagram, which indicates the carbon dioxide concentrations are likely due to microbial respiration, where there is no requirement to increase the characteristic situation simply because the carbon dioxide concentration exceeds 5%.
- CL:AIRE Research Bulletin RB17 states the minimum level of ventilation required to deal with condensation is capable of dealing with quite onerous ground gas regimes. In addition, the requirements of Part L of the building regulations relating to the air tightness of buildings also leads to the need for a well-sealed floor slab (NHBC Foundation, 2009).
- Therefore, the structures on the development will also have an inherent level of ground gas protection, thus adding an additional layer of mitigation to the already low assessed level of risk.

8.8 Qualitative Risk Assessment

The CSM has been revised based on the findings of the site investigation and laboratory testing results and these are presented overleaf.

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made Ground Metals, PAH's, asbestos	Root uptake, ingestion, direct contact, inhalation of dusts	End-users	Likely	Medium	Moderate	Made ground has been encountered across the site during SI, localised to the northern section and the historic pond in the south-east and up to 4.00m bgl, though typically less than 1.60m bgl. There were localised exceedances of heavy metals within TT01, and trace amounts of asbestos encountered in WS04. The made ground encountered in TT01 is likely associated with the infilling of the historical pond in the southeast corner of site, marked on 1891 records and no longer present in 1910 records. The residential development is considered high risk, and a pathway to end users exists due to the private gardens. The risk is considered moderate at this stage, and remediation of the contaminated soils will be needed prior to site redevelopment.
On site Made Ground Metals and organic contamination	Migration into/chemical attack of water supply pipelines	Water Pipelines / End users	Likely	Mild	Moderate / Low	Contaminants within the soil/groundwater could potentially attack the clean potable water supply pipe, contaminants should be assessed in accordance with the relevant guidance to determine the correct pipe material and level of precautions required.
On site Made Ground Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / property / structures	Unlikely	Medium	Low	As the southern section of the site remains undeveloped and the made ground from the historical pond and the northern section is of significant age, any ground gases will likely have degassed to the atmosphere. Elevated levels of carbon dioxide have been identified within WS04 and WS05, with a peak carbon dioxide level of 9.5% v/v. No significant elevations of methane or VOCs have been detected during gas monitoring to date, and maximum steady flow has been recorded as 0.1l/hr. The ground gas risk assessment has classed the site as CS1.
On Site Natural Geology Radon	Migration into confined spaces, inhalation	End-users	Unlikely	Medium	Low	BR 211 radon advice indicates no protection measures are required.

Controlled Waters						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
Made Ground PAH's, Metals	Overland flow, / migration through saturated zone	Walmersley Brook 162m away (Surface waters)	Unlikely	Medium	Low	It is considered contaminants associated with the made ground and other past industrial uses are unlikely to impact the Brook. This is due to the low permeability of the clays underlying the area, which will inhibit lateral migration, and the potential for contaminants to attenuate and degrade over this distance. Therefore a low risk is posed to the river from the made ground.
	Leaching through unsaturated zone	Secondary Aquifer (Undifferentiated)	Unlikely	Medium	Low	No significant contamination has been identified onsite that would adversely affect controlled waters. The site is currently open vegetated fields, and a new surface water drainage system will be installed during redevelopment. This will reduce the risk to controlled waters, and by virtue of the development taking place, this should contribute to an overall "betterment" of groundwater quality.
	Migration through saturated zone	Secondary A Aquifer (Ground-water)	Unlikely	Medium	Low	There are no groundwater abstraction licences or Source Protection Zones near the site. As stated above, no significant contamination has been identified onsite and a new surface water drainage system installed which will further reduce the risk to controlled waters

8.9 Outline Remedial Measures

Localised heavy metal exceedances within the made ground have been found in TT01 (Arsenic, Lead, and Mercury) and trace asbestos has been identified within WS04.

The made ground within TT01 is localised to the vicinity of the historic pond within the south-eastern corner of the site. The made ground here has been proven to be 21m in length and 6m in width, and of oval shape, reflecting the shape of the historic pond. The base of the made ground was proven to be 2.20m bgl. Therefore, the approximate volume of made ground is 550m³ (based on the likelihood of made ground thinning out). This is shown within the Site Remediation Plan, Drawing No. C6123/03. This feature should be treated as a hotspot and should be removed from site and reinstated with a suitable, clean imported material.

The asbestos found localised in WS04 should also be treated as a hotspot. Further delineation is recommended as a series of hand pits around the location of WS04. Following suitable delineation, the asbestos impacted made ground should be removed for offsite disposal.

Whilst the soils in the remainder of the site had no elevated determinands above a residential with homegrown produce end use, the soils in the northern section of the site were all encountered as made ground topsoil, containing anthropogenic inclusions of gravel and cobble sized brick, clinker, ceramic, concrete, coal, plastic, textile, metal, and timber. Therefore, these soils are not suitable for use in gardens or soft landscaping.

Where gardens or soft landscaping are present within the north of the site, a cover of “clean” subsoil and topsoil should be provided to break the pathway to site end users as described in CIRIA Special Publication 124 - Barriers, liners and cover systems for containment and control of land contamination. This should be 600mm thick in private garden areas and 450mm in soft landscaping areas (Public Open Space – POS). This will allow plants to be grown and prevent undesirable soils mixing or being brought to the surface.

Prior to import or re-use of clean cover soils, they should be tested to confirm chemical suitability. After installation of the clean cover, soil depths should be verified by a suitably qualified independent geo-environmental engineer, such as BSL.

The soils in the southern section of the site, with exception to the historic pond, are all natural, and are assumed to be inert and suitable for use as topsoil and subsoil within the proposed garden areas, however further chemical validation samples will be required to confirm this.

The Japanese Knotweed in the north of the site will also need treatment and removal by a specialist.

Utilities

The level of protection for the clean potable water supply pipes should be determined using the local water company risk assessment criteria in accordance with UKWIR.

As the site is brownfield, there is the assumption that barrier pipe would be utilised, although requirements should be confirmed by risk assessment and with the water supply company.

Ground Gas Protection Systems

Based on the ground gas monitoring results and the ground gas risk assessment, no mitigation measures are required, and no radon protection is required for new buildings at this location.

8.10 Health and Safety Issues

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground (heavy metals, PAHs)	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Likely	Mild	Moderate/low
Asbestos	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Low likelihood	Medium	Moderate/low
Ground gas	Inhalation in confined spaces/trenches	Construction Workers	Unlikely	Severe	Moderate/low

Trace levels of Chrysotile asbestos loose fibres have been identified in one sample to date and trace levels of asbestos are assumed within the northern section of the site. The risk from asbestos should be highlighted in the method statements and site induction. If further evidence of asbestos is encountered in the soils, work should cease until asbestos control measures have been agreed and put in place. Asbestos is further discussed in Section 8.11 below.

The risk from made ground will be mitigated by standard PPE including gloves. Welfare facilities should be made available to wash before hand to mouth activities.

General guidance on these matters is given in the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Redevelopment of Contaminated Land”. In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

8.11 Asbestos

The investigation of asbestos issues within structures was beyond the scope of this report. However, guidance from UK Government indicates that asbestos should be assumed to be present in buildings unless proven otherwise.

Any asbestos will require removal prior to re-development. This will need to be done by a suitably qualified experienced and licensed contractor, who ensures that adequate PPE is provided to operatives, and that all the relevant legislation is adhered to.

In addition, the presence of asbestos within the ground will require, a safe system of work to be set up on site to deal with the asbestos risk from the made ground. This may include but be not limited to:

-
- The use of qualified personnel where required.
 - Careful segregation of stockpiles on site.
 - Defining transport routes.
 - Cleaning down of machinery in designated areas.
 - Decontamination unit for ground workers.
 - Damping down of soils to prevent dust migration.
-

Asbestos fibres have been identified in one sample at the site with quantification analysis identifying this to be trace amounts. At these concentrations the liberation of fibres is considered to be unlikely and no specific precautionary measures with regards to asbestos are likely to be required at the site. The level of precautions required are at the discretion of the principal contactor on site however good site practices including minimising the generation of dusts should be adhered to and sufficient to mitigate against the risk from asbestos.

In addition, site personnel should have the risk communicated at the induction stage. It is recommended that the asbestos in construction materials assessment tool is used at the site to inform asbestos licensing and control measures.

Excavations in soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CARSOIL) and CAR 2012. All such works will need to be agreed with the regulatory bodies (HSE and/or LA).

Additional guidance is provided within the BSL methodology Guidance Note in Appendix A.

9.0 WASTE SOIL CLASSIFICATION & ASSESSMENT

9.1 Summary

BSL have undertaken a preliminary assessment of potential excavation waste to arise from the site during redevelopment to:

- Classify the excavation waste to arise as either hazardous or non-hazardous.
- Identify the most sustainable options for the wastes to arise in accordance with the waste hierarchy.
- Provide a written description of the waste required as part of the Duty of Care.
- Provide details of “hazardous properties” to complete hazardous waste consignment note (where applicable).
- Be able to provide a basic classification report to a landfill operator (where waste is destined for landfill disposal).

It should be noted that testing requirements for contaminated land risk assessment differ to those for waste classification purposes. Unless otherwise stated, the assessment in this section has been carried out to provide initial indications in respect to disposal of waste soils, however this may not be fully compliant with waste testing requirements or frequencies, with further testing potentially required.

9.2 Soils Waste Classification Procedure

As described in the ‘Waste Duty of Care Code of Practice (2016)’ any substance or object that the holder discards, intends to discard or is required to discard is a waste. It is the responsibility of the waste producer to classify this waste. The classification process is described in the ‘Guidance on the classification and assessment of waste’ WM3 and aims to determine whether the waste is Hazardous or Non-Hazardous to human health and the environment.

Waste classification should be based on soils analyses that are representative of the actual waste load. At the stage of ground investigation, the materials that will become waste have generally not been defined yet, however test data can provide a useful guide to the likely waste classification before it is generated.

Further guidance is provided in Appendix A.

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste, Decision 2003/33/EC and Landfill Regulations 2005) led to the establishment of a methodology for classifying wastes. Wastes first need to be classified based on their total concentrations and classified as either hazardous or non-hazardous waste. WAC testing is only required if the end disposal route is a landfill and WAC analysis must not be used for waste classification.

Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. A waste must comply with the WAC limits for the relevant landfill, otherwise the soil will need to be pre-treated. There are three different WAC criteria, these are:

- Inert waste.
- Stable Non-Reactive Hazardous Waste (SNRHW).
- Hazardous waste.

Details of how material should be classified for waste disposal are presented in the BSL Methodology and Guidance in Appendix A and are summarised in the table below:

Classification based on Total Concentrations ¹	PRIOR TO LEAVING SITE			
	Non-Hazardous Waste		Hazardous Waste	
	IF SOILS CANNOT BE RE-USED ELSEWHERE AND MUST GO TO LANDFILL			
WAC testing	Below inert WAC limit values	Above inert WAC limit values	Below hazardous WAC limit values ⁴	> WAC limit values
Landfill requirements	INERT landfill	NON-HAZARDOUS landfill ²	HAZARDOUS landfill	PRE-TREATMENT ³

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).

2 Individual sites may have certain limit values pre-determined in their licence.

3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.

4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Inert Waste

The possibility of automatic inert classification of the naturally occurring “clean” soils should be explored in accordance with Section 4.3 of the EA guidance document. See Appendix A for further guidance.

9.3 Waste Classification and Waste Acceptance Criteria (WAC)

We have reviewed the testing results and assessed them through a waste classification database (HazwasteOnline™) which allows users to code and classify waste as defined in the EWC (European Waste Catalogue) based on EC Regulation 1272/2008 on the Classification, Labelling and Packaging of Substances and Mixtures (CLP) and latest Environment Agency guidance (WM3 “Guidance on the classification and assessment of waste -Technical Guidance”).

The samples tested were screened against assessment criteria within WM3 using the HazWasteOnline tool to assess whether they contained any contaminants in the hazardous range.

The Waste Classification Report and WAC testing results are presented in Appendix F. Locations of hazardous soils are presented in the table below, alongside the WAC analysis test results.

Testing for total contaminant concentrations on natural soils was not undertaken and they are assumed to be non-hazardous.

Location	Depth (m)	Stratum	Waste Classification	WAC Analysis	Landfill	Comments
TP02	1.60 – 2.00	MADE GROUND	Non-hazardous	Below inert WAC limit values	Inert Waste Landfill	
TT01	0.50 – 1.50		Non-hazardous	Above inert WAC limit value	Non-Hazardous Landfill	Elevated Total Organic Carbon (TOC)
				Below hazardous WAC limit values	Hazardous Waste Landfill	Elevated Loss On Ignition (LOI)
WS03	0.50 – 1.20		Non-hazardous	-	Inert Waste Landfill	
WS04	0.10 – 0.40		Non-hazardous	-	Inert Waste Landfill	

Based on the waste classification database assessment, the majority of the made ground soils have been classified as **non-hazardous**.

The sample of made ground from TT01 marginally exceeds Total Organic Carbon (TOC). However, dependant on the receiving operators limits, it is possible that this could still be accepted as inert, provided

the Dissolved Organic Carbon value of 500mg/kg is achieved at L/S 10 l/kg, either at the soil's own pH or at a pH value between 7.5 and 8.0.

The LOI exceedance has triggered the hazardous waste threshold. However, coal fragments within the sample are the likely source of this exceedance. Coal fragments have a naturally high LOI value but are typically inert with regards to landfill classification. It is recommended that additional WAC testing is carried out on the actual arisings constituting the waste in order to satisfactorily categorise the soil for its suitability for disposal to landfill. A single sample in this instance may over-represent the organic rich coal component, especially given the presence of visually inert, construction derived materials that are often inert but with a high LOI, and do not therefore reflect an environmental hazard. Furthermore, the sample returned a non-hazardous classification from the WM3 hazwasteonline assessment.

Waste Containing Asbestos

Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWG 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	<0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

A summary of locations where asbestos was identified is presented in the table below:

Location	Depth (m)	ACM	Conc. by Weight (%)	Waste Disposal Route
WS04	0.10 – 0.40	Loose fibres	<0.001	Hazardous

A watching brief should be maintained for evidence of Asbestos Containing Materials (ACMs), any ACMs observed should be handpicked and disposed of in accordance with current asbestos disposal regulations.

General

Following the classification of waste materials, the options available for the waste can be considered in the context of the waste hierarchy as below:

-
- Onsite re-use (with or without prior treatment) under suitable exceptions/permits.
 - Offsite processing for recycling or recovery e.g. screening.
 - Offsite disposal (with or without prior treatment) i.e. landfill.
-

Where feasible, efforts should be made to retain soils for onsite re-use to minimise costs and maximise the sustainability of projects.

If any gross hydrocarbon contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

Where it is necessary to dispose material off site it is recommended that materials are segregated and sufficient time is allowed to further classify the actual soil arisings that constitute the waste, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is illegal to dilute and mix soils without a suitable permit.

Where possible, the option that the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route should be explored.

9.4 Re-use of Soils

By definition in law, any material excavated from the ground becomes waste at the moment of excavation. If that soil (now a “waste”) is then placed on another part of the development site (or used on another development site) without an appropriate materials management plan, permit or exemption being in place, by law this material is defined as “illegally deposited waste”.

In order to comply with UK legislation and avoid excessive costs, if the re-use of soils is proposed on site, this should be done in accordance with the relevant exemptions or permits in place.

Soils Re-use Under DoWCoP

One of the main industry mechanisms for allowing the re-use of soils in construction is the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE DoWCoP) also known as a Materials Management Plan (MMP). Further guidance is provided in the BSL Methodology and Guidance in Appendix A.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

-
- The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
 - The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
 - There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
 - Quantity (the quantity of materials used should be known).
-

Information on existing site levels, proposed levels, volumes generated (e.g. foundation / drainage excavation arisings) would need to be known in order to complete the MMP.

If the DoWCoP is the chosen route, the MMP should be in place and declared by a Qualified Persons (QP) before works commence, otherwise excavated soils could constitute an illegal deposit of waste and enforcement action could be taken by the EA and HMRC.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-compliant with the CoP can be referred to the EA for further investigation.

Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Re-use of soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CAR-SOIL™) and CAR 2012.

In terms of the re-use of brick/concrete crush materials, the DoWCoP does cover aggregates, but only on the site of origin, and the EA WRAP aggregate Quality Protocol might best apply to ensure quality standards, which are discussed further below.

Soils Re-use under Exemptions and Permits

Other potentially suitable re-use mechanisms may include U1 Exemptions, WRAP quality protocols (for aggregates) or Waste Framework Directive (WFD) Exclusions, amongst other mechanisms. Further details are provided in Appendix A.

10.0 CONCLUSIONS

10.1 Geo-Environmental

Geo-Environmental – Human Health – Soils

Chemical testing showed heavy metal exceedances in TT01 (0.50 – 1.50m bgl), in arsenic, lead, and mercury.

Chrysotile fibres (loose fibres) have been detected in one made ground samples (WS04). On quantification analysis the asbestos level within the sample was <0.001% mass and classified as being trace levels.

The above are considered to pose a risk to human health and remedial measures are required in the form of hotspot delineation, source removal and a cover system in soft landscaping areas to mitigate the risk.

Geo-Environmental – Ground Gases and Vapours

Ground gas monitoring has revealed a maximum peak carbon dioxide concentration of 9.5%v/v and methane concentrations of 0.1%v/v. Based on a lines of evidence approach, the ground gas risk assessment concludes the site should be placed within CS1 classification and ground gas protection measures are not required.

Geo-Environmental – Controlled Waters

The overall risk to controlled waters is considered to be low and no further action is required.

Waste

Waste classification for the made ground at the site has revealed the majority of the soils to be non-hazardous.

10.2 Geotechnical

Foundations

Shallow strip footings are considered most suitable, though alternate solutions may be locally required due to localised deeper made ground. At 0.90m bgl, an allowable bearing capacity not exceeding 115 kN/m² may be assumed. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits. This increases to 150 kN/m² at 1.50m bgl and 190 kN/m² at 2.00m bgl.

Floor slabs

Suspended floor or ground bearing slabs may be adopted.

Concrete classification

The soils are classified as DS-1 and AC-1s.

Highways

5% CBR values for cohesive deposits and 2% CBR values for made ground deposits.

Drainage (SuDS)

SuDS are not considered to be viable due to the underlying cohesive strata.

10.3 Further Work

The following further work is considered necessary to progress the site to construction phase:

-
- Supplementary intrusive site investigations comprising:
 - Delineation of asbestos hotspot
 - Treatment and removal of Japanese Knotweed encountered on site.
-

-
- Tree survey by qualified arboriculturist.
 - Detailed foundation design by a structural engineer including foundation zonation plan and depth schedule.
 - Design of Remedial Strategy and confirmation with the Local Authority /EA / warranty provider.
 - Production of Materials Management Plan (MMP) under the CL:AIRE DoWCoP, if required.
 - Implementation of the Remedial Strategy and verification of the remedial works.
-

11.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	Definition
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Geo-Environmental Assessment). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.
EHO	Environmental Health Officer.
EQS	Environmental Quality Standard.

GLOSSARY	
Term / Abbreviation	Definition
GAC	Generic Assessment Criteria.
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.

GLOSSARY	
Term / Abbreviation	Definition
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	Definition
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m ²)
kN/m ² /mm	Kilo Newton per metered squared per millimeter
kN/m ²	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m ²)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M ² /MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m ³	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

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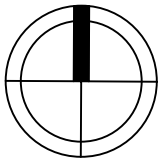
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Land At Springside Rd, Walmersley						
ACCOMMODATION SCHEDULE						
Type	Beds	Storeys	No. Units	GIFA (m ²)	Site Total(m ²)	
Lawson	3	2	1	96.27	96.27	8%
Lightshaw	3	2	2	109.03	218.06	17%
Newhall Bay	3	2	2	107.04	214.08	17%
Kenyon	4	2	4	127.35	509.4	33%
Audlum	4	2	1	134.64	134.64	8%
Pendleton	4	2	2	108.35	216.7	17%
			12		1389.15	100%
Gross Site Area	0.55 ha					1.35 acres
Undevelopable Area	0.16 ha					0.39 acres
Net Site Area	0.39 ha					0.96 acres
Net Density	30.77 Units/ha					12.50 Units/acre
Net Coverage	3561.92 m ² /ha					1447.03 m ² /acre



MANOR
ARCHITECTURE

Client
Edgefold Homes Ltd

Project Name
Land at Springside Rd, Walmersley

Drawing Name
Sketch Scheme 3

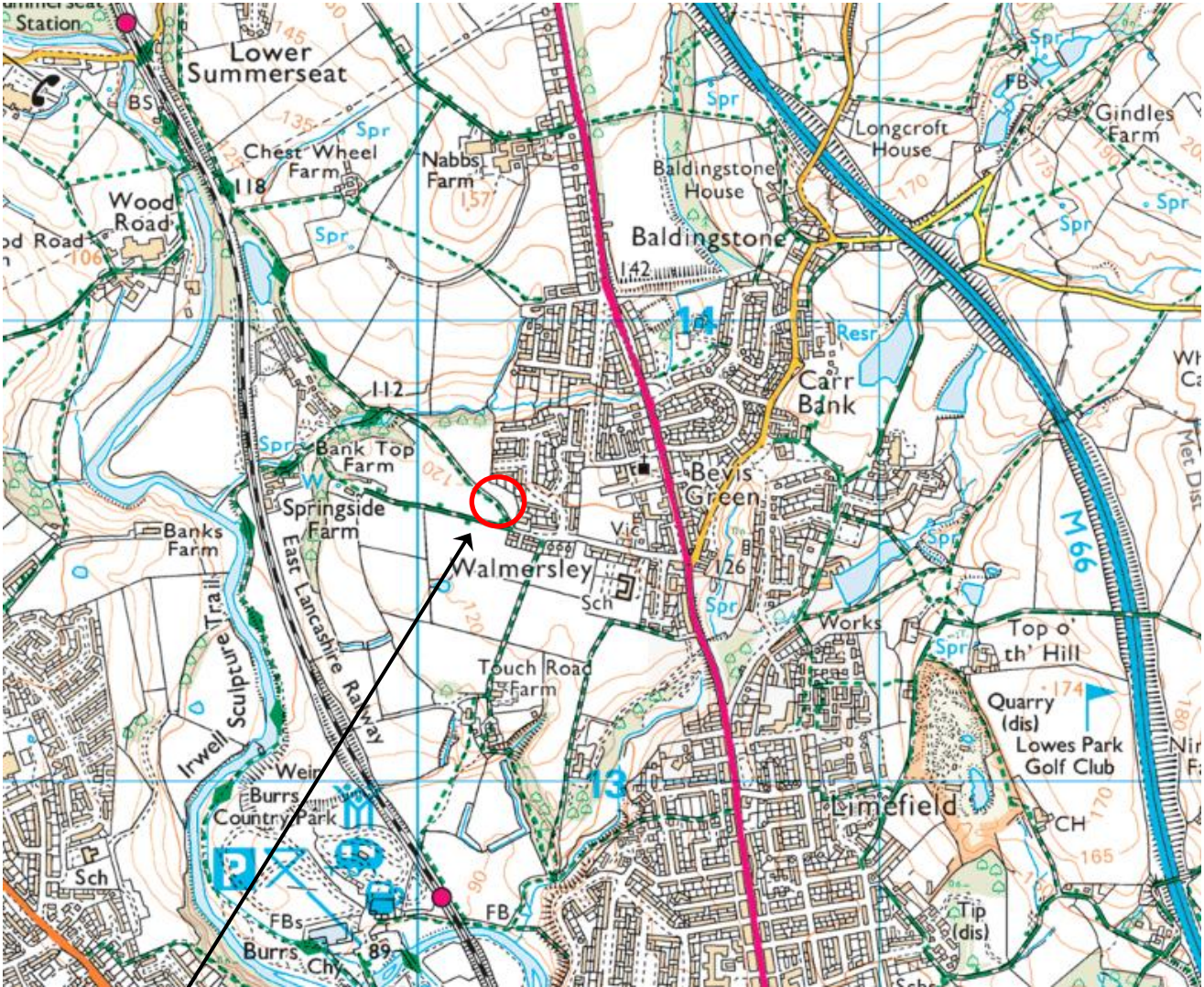
Drawing Number J1192-SK103	Revision -		
Date March 2025	Scale 1:500	Size A3	Status Information

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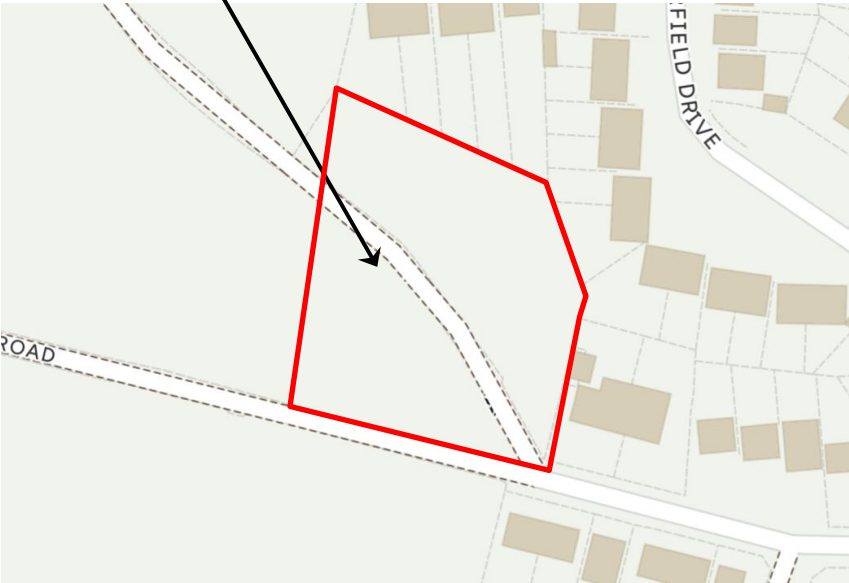
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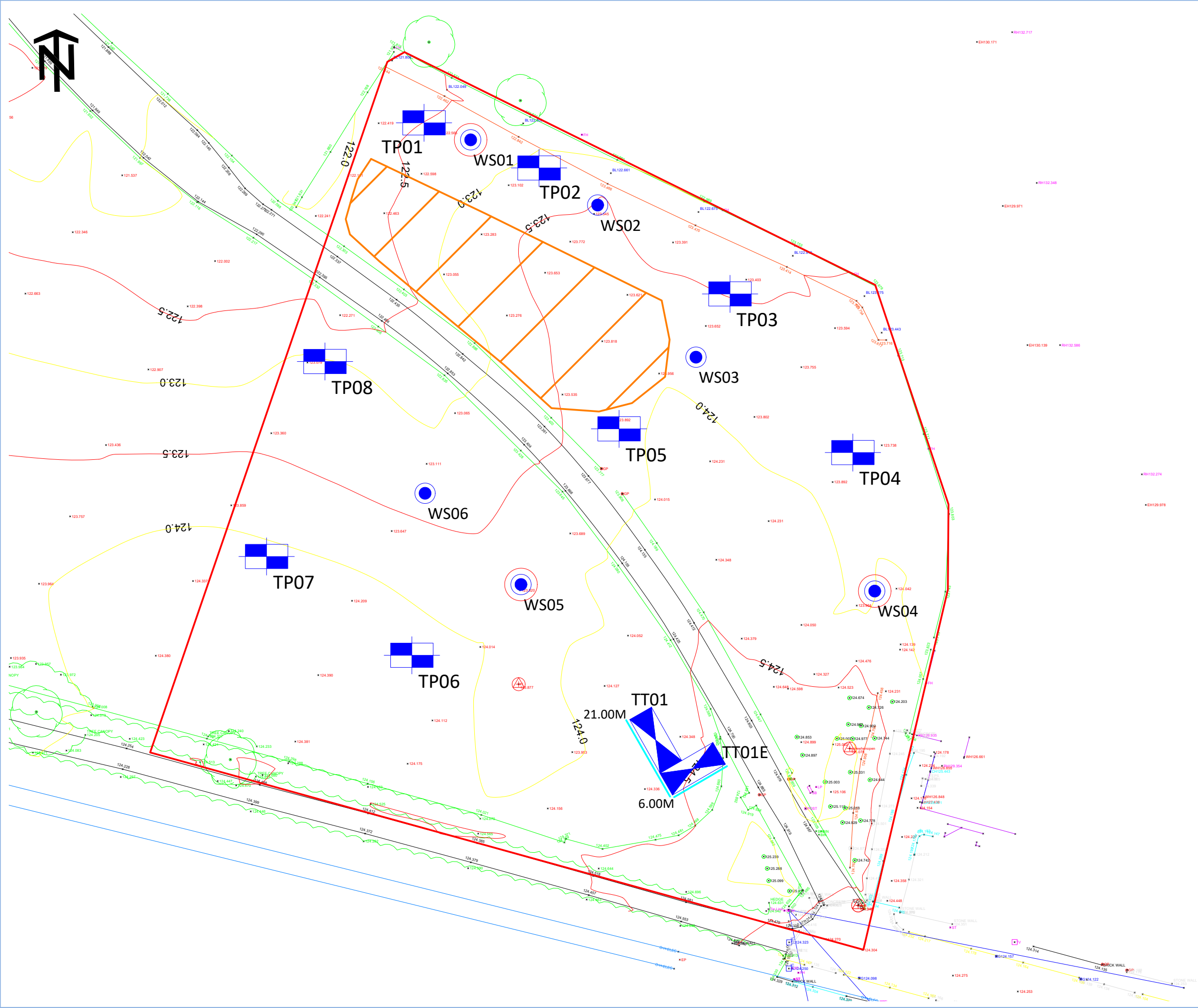
SITE LOCATION

NEAREST POSTCODE: BL9 5JB

SITE ENTRANCE. WHAT THREE WORDS /// SCANS.MISS.TAPS



REV	DATE	DESCRIPTION	BY	CKD
 BROWNFIELD SOLUTIONS LTD CEO ENVIRONMENTAL ENGINEERING EXCELLENCE				
CLIENT EDGEFOLD HOMES				
PROJECT TITLE SPRINGSIDE ROAD, BURY				
DRAWING TITLE SITE LOCATION PLAN				
DRAWING No. C6123/01	REVISION -	SCALE NTS	DATE 15/04/25	
DRAWN BY JM		CHECKED BY JM		



KEY	
	APPROXIMATE SITE BOUNDARY
	TRIAL PIT
	TRIAL TRENCH
	WINDOW SAMPLE BOREHOLE
	BOREHOLE INSTALLATION
	JAPANESE KNOTWEED

- NOTES
1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
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REV	DATE	DESCRIPTION	BY	CKD



CLIENT

EDGEFOLD HOMES

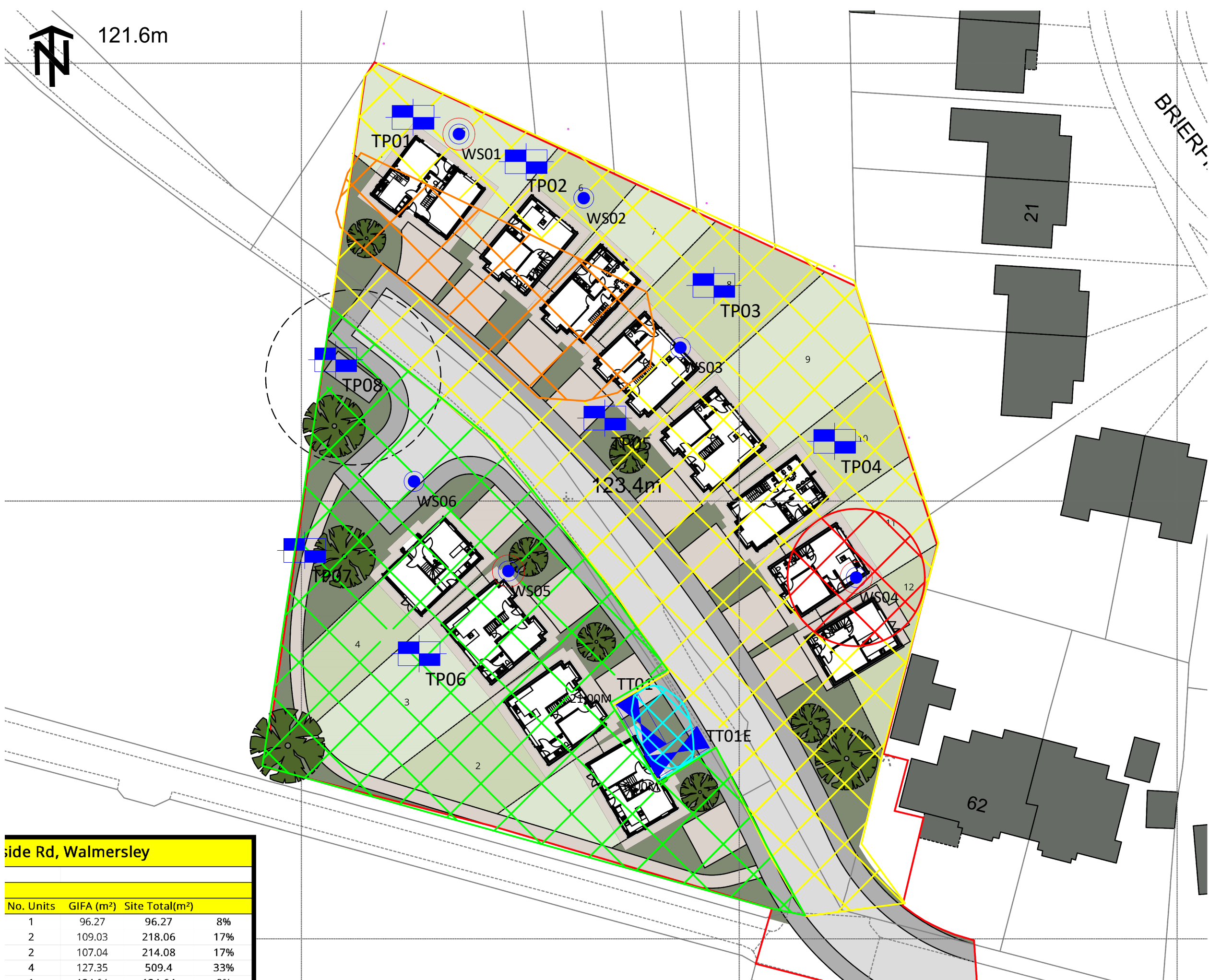
PROJECT TITLE

SPRINGSIDE ROAD, BURY

DRAWING TITLE

EXPLORATORY HOLE PLAN

DRAWING No.	REVISION	SCALE	DATE
C6123/02	-	NTS	14/05/2025
DRAWN BY		CHECKED BY	
MAS		JM	



KEY	
	APPROXIMATE SITE BOUNDARY
	AREA REQUIRING ASBESTOS DELINEATION
	HISTORIC POND AREA REQUIRING REMOVAL
	CLEAN COVER SYSTEM REQUIRED IN SOFT LANDSCAPING / GARDENS
	NO REMEDIATION REQUIRED
	JAPANESE KNOTWEED

- NOTES
1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
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REV	DATE	DESCRIPTION	BY	CKD



CLIENT
EDGEFOLD HOMES

PROJECT TITLE
SPRINGSIDE ROAD, BURY

DRAWING TITLE
SITE REMEDIATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C6123/03	-	NTS	14/05/2025

DRAWN BY	CHECKED BY
MAS	JM

side Rd, Walmersley			
No. Units	GIFA (m²)	Site Total(m²)	
1	96.27	96.27	8%
2	109.03	218.06	17%
2	107.04	214.08	17%
4	127.35	509.4	33%

PHOTOGRAPHS



Photograph 1: Site Entrance and road



Photograph 2: Gate entrance to northern site area



Photograph 3: Overgrown area in northern section



Photograph 4: Overgrown area in northern section



Photograph 5: Vegetation cover in northern section



Photograph 6: Japanese Knotweed identified in roped off area of northern section



Photograph 7: Southern site area overview



Photograph 8: Trial trench location in southeastern area

APPENDIX A

BSL Methodology and Guidance

BSL Phase I & II Geo-Environmental Assessment Reports - Methodology and Guidance

Background

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial **Conceptual Site Model (CSM)**. From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. In the case of the geotechnical hazard identification, this is referred to as the **Ground Model**.

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The Ground Investigation comprises field work and laboratory testing based on the findings of the Preliminary Risk Assessment, to reduce uncertainty in the geotechnical and geo-environmental hazard identification. This may include an exploratory, a detailed or/and supplementary Investigations as described in BS 10175:2011+A2:2017. Phase II Assessments are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance and are also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Contaminated Land - Legislative Background

Land contamination can be addressed in several ways, e.g. during planning, under Part 2A, following an incident, during an investigation into environmental damages, or during the application of an environmental permit, or its surrender.

For the planning process the key test is **as a minimum the site cannot be determined as contaminated land**, e.g. there is not significant harm, significant possibility of significant harm to human health or that there is not significant harm to, or the significant possibility that the pollution of controlled waters will occur.

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

-  The 1995 Environment Act.
-  The Contaminated Land Statutory Guidance, DEFRA – April 2012.
-  The Contaminated Land (England) Regulations 2006.
-  The Contaminated Land (England) Amendment Regulations 2012.
-  Water Resources Act.
-  Water Framework Directive.
-  Environmental Damage Regulations.
-  Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused.
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

Source - substances that are potential contaminants or pollutants that may cause harm.

Pathway - a potential route by which contaminants can move from the source to the receptor, and the impact of that migration on the source e.g. attenuation.

Receptor - a receptor that may be harmed, for example the water environment, humans and water, considering the sensitivity of the receptor.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused.



Where any one of the “pollution linkages” between the above is absent there is deemed to be no risk.

The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the S-P-R approach is ‘suitable for use’ criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below, however the list is not exhaustive:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.
- Groundwater Protection <https://www.gov.uk/government/collections/groundwater-protection>
- UK Technical Advisory Group (UKTAG) - Water Framework Directive
- Incidents and their classification: the Common Incident Classification Scheme (CICS) – Used by the Environment Agency to classify pollution incidents.

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
- The Environment Protection Act (1990).
- The Water Resources Act (1991).
- The Environment Act (1995).
- The Contaminated Land (England) Act (2000).
- The Pollution Prevention and Control (England and Wales) Regulations (2000).
- The Landfill Regulations (England and Wales) Regulations (2002).
- The Landfill (England and Wales) (Amendment) Regulations (2004).
- Contaminated Land (England) Regulations (2012).
- The Environmental Damage (Prevention and Remediation) Regulations (2009).
- Environmental Permitting Regulations (England and Wales) Regulations (2010).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017).
- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF) – latest version.

Contaminated Land Risk Assessment Approach

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:



LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative and Stage 3 Detailed Quantitative.

Further information can be found at the below site:

<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report if applied.

The likelihood of a given receptor being impacted is related to a number of factors, e.g. the geology which could inhibit contaminant migration. For example, a site with a significant thickness of clay between it and a receptor may reduce migration of contamination via the subsurface, which will reduce the likelihood of a given receptor being impacted. The geology or drainage for example could offer a preferential pathway e.g. mines shafts/faults increasing the likelihood and potential magnitude of an impact. The depth of contamination will also affect the exposure pathway, for example petroleum hydrocarbons at depth are unlikely to reach a receptor via dermal contact but could via vapour pathways which will influence the likelihood of an impact being felt e.g. if there are no buildings on site.

The terms and definitions used for the assessment of the likelihood are provided below:

High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.

Examples - Extensive areas with concentrations above saturation limits for mobile contamination e.g. petroleum hydrocarbons within the water table.

Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.

Examples – Localised areas of contaminants with concentrations above saturation limits for mobile contamination e.g. localised petroleum hydrocarbons within the water table; shallow contamination above relevant human health generic assessment criteria is present with little or no hardstanding,

Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.

Examples - A thickness/distance of low permeability deposits preventing contaminant migration to a receptor is present; a site is mostly covered hard standing preventing exposure to soil contamination.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

Examples – A site is underlain by a substantial thickness of low permeability clays, between the source and potential receptors which will inhibit significantly, but not completely rule out migration to sensitive receptors.

The severity is also classified using a system based on CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report, if applied. The terms and definitions are:

Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse.

Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve.

Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment.

Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.

Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low
	Negligible	Negligible Risk / No Linkage			

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required.

High: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term.

Moderate: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.

Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled 'negligible risk' and 'no linkage' in the summary table, which give rise to an overall **negligible** risk category and no further action is required.

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General

The purpose of using generic Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake remedial action based on the data to hand is cost effective.

Human Health

Current UK guidance on risks to human health is provided by DEFRA and the Environment Agency (EA). Under the land use planning system where the aim is to demonstrate 'suitability for use' the key will usually be to confidently determine that the level of contamination of the land is low relative to some appropriate measure of risk at a particular critical connection.

Publications forming part of the guidance include the CLEA Model and toxicological reports collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values or Generic Assessment Criteria (GACs) for soils contamination based on standard land uses and soil assumptions. The critical concentrations referred to above can be the relevant GAC.

CLEA guidance has gone through a number of revisions over time. Tier 1 generic S4UL values (or GACs) have been published using the CLEA 1.06 Model by CIEH/LQM. These are the third set of generic assessment criteria generated by CIEH and replace the previous two sets of GACs. The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

C4SL values for six determinands including lead were published by DEFRA/CL:AIRE in December 2014. Additional determinands were added in 2021. They represent a low risk as opposed to minimal risk, however they are still strongly precautionary. These screening values were published by DEFRA for Part 2A use, although DEFRA have also confirmed acceptability for use under planning. However, S4ULs remain the first reference point for BSL due to the broader range of end uses scenarios and the availability of a wide array of determinands with various soil organic contents.

As part of Tier 1 assessments, the following data sources are used in the order of preference given below, unless further justification is provided to adopt less conservative criteria:

-  CIEH S4UL values (derived by CIEH/LQM).
-  DEFRA/CL:AIRE C4SL's <https://www.claire.co.uk/projects-and-initiatives/category-4-screening-levels>
-  CL:AIRE GAC values.
-  Guidance from other European countries.
-  Guidance from the outside Europe.

Dependent on requirements, test results may be divided into representative data sets for assessment against the above referenced screening criteria, based on the conceptual model and taking into account such characteristics as variation in soil properties, historical, existing or proposed land uses. The soils in these areas are considered likely to form the ground cover in critical receptor areas (e.g. gardens, soft landscaping etc)

where pathways may exist. The critical part of the soil column is typically taken as the upper metre in terms of contact with end users of a development site for the purposes of initial assessment.

The screening criteria adopted by BSL are presented overleaf.

Further Assessment

When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and assessment to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway. In some cases, dependant on the Conceptual Site Model (CSM), no action may be required.

PAHs and B(a)P as a Surrogate Marker for Adoption of C4SLs

As stated above, S4ULs remain the first reference point as screening levels unless further justification is provided. In order to determine if the C4SL can be adopted, benzo(a)pyrene (B(a)P), the following guidance within SP1010 Appendix E for B(a)P and Public Health England (PHE) may be adopted with our assessments where appropriate.

Guidance states that benzo(a)pyrene is considered to be one of the most potent PAHs, and it would be appropriate to assume the cancer risk in a mixture is proportional to the concentration of a surrogate marker PAH (benzo(a)pyrene) in the mixture. The ratio of PAHs within the mixture can be assessed to ensure that the profile is similar to that seen for the test material (coal tar mixtures) in the toxicological study by Culp et al. The International Programme on Chemical Safety (IPCS) considered that the PAH profile of the soil sample may deviate from the average profile by about an order of magnitude (up or down).

A more recent study by Bull et al (2013) which analysed PAH concentrations in soil samples from 274 sites, showed that the levels of PAH relative to B(a)P showed little variability and were similar to that recorded for the coal tar mix used in the Culp et al study. Given this, it was concluded that benzo(a)pyrene is a suitable surrogate marker to represent mixtures of PAH in soil.

In order to risk assess the PAH mixture for site specific soil samples using human health guideline values, notably the C4SLs, as detailed in SP10101 the ratio of the seven genotoxic PAHs as shown below, relative to B(a)P, should be calculated to ensure it is similar to the test material used in the Culp study (PHE 2010). To be considered sufficiently similar, the ratio relative to B(a)P should fit within the upper and lower limits (representing an order of magnitude above and below the mean ratio to B(a)P of test material used in the Culp et al study). In such cases B(a)P is considered an adequate surrogate marker and the Low Level of Toxicological concern (LLTC) for B(a)P (i.e., the C4SL) may be used in the risk assessment.

Statistical Analysis on Soils

Guidance on the use of statistics is taken from the CL:AIRE publication “Comparing Soil Contamination Data with a Critical Concentration” 2020, the basis of which in statistics is termed Central Limit Theorem (CLT), which says “*The distribution of sample means converges to a normal distribution as the sample size increases*”.

If the critical concentrations have been exceeded, as part of a further assessment, statistical analysis may be undertaken on a dataset to demonstrate that the mean concentration on the site (or a particular area) is actually below the critical concentration. The true mean concentration of a contaminant is never known because all the site soil has not been tested. An estimation of the true mean can be obtained from the samples tested during the investigation. The greater the number of samples tested, the closer the mean of these values is to the true mean.

As discussed above, test results are typically divided into representative data sets for assessment and may be referred to as ‘averaging areas’ to which statistics can be applied, although several statements need to be satisfied before applying the guidance:

-  Averaging areas have been defined based on the CSM.
-  Sample locations – random/grid sampling adopted as opposed to targeted investigation.
-  Samples are evenly spread and not clustered.

- Analysis do not suggest a hotspot/outlier or cluster established by histogram or other means.
- Samples are of same/similar depth and taken from one population (e.g. just topsoil).
- Analyses do not show a spatial trend or other spatial pattern across that zone.
- The number of samples has been shown to be sufficient for statistical analysis.

Once the above have been satisfied, when undertaking statistical analysis, the question “*are mean soil concentrations within the averaging area equal to, or greater than, the GAC?*” is being asked. Typically, outliers or “hotspots” are treated as separate zones or averaging areas. The sampling strategy and assessment should also take into account uncertainty (for example, spatial heterogeneity) in contaminant concentrations. There is the assumption that sampling was random or stratified and systematic (e.g. on a grid) and not targeted at specific sources; data from such targeted areas should be omitted from the statistical analysis. Data should be from one population (i.e. the same materials).

The statistical test that is carried out is used to demonstrate that there is a certain probability that the true mean falls below the critical concentration (typically the GAC in a screening exercise). The main tool used to draw conclusions based on the 2020 guidance is a comparison of a 2-way confidence interval with the critical concentration. A confidence interval consists of two sets of numbers; an interval i.e. a range of values plus a pre-determined level of confidence e.g. 80%. A common interpretation of a confidence interval of say 80% is that “*there is an 80% chance that the true mean concentration level of the contaminant in a sampling zone lies between X concentration and Y concentration*”.

The current guidance for planning says that the site has to be “safe” which suggests we should use a large confidence interval such as 95% or higher to make a decision. This means that there is a 95% chance of the true mean concentration lying in this interval, there is also a 5% chance it lies outside this interval. One could then conclude that the requirements of planning have been met if the 95% confidence interval lies below the critical concentration.

The guidance recommends that at least two confidence levels are used such as 90% and 99% or 80% and 95%. By using two differing confidence intervals, we can use the smaller confidence interval (e.g. 80% confidence interval) to say “*we think the mean is most likely to be inside this range*” and the larger confidence interval (e.g. 95% confidence interval) to say “*we think the mean is most unlikely to be outside this range*”.

If the confidence interval extends to above the critical concentration, then further action may be required.

Controlled Waters

The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards (Water Quality Targets – WQTs) for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 and The Private Water Supplies (England) Regulations 2016. SI 2016 / 618). In Scotland, the Public Water Supplies (Scotland) Regulations 2014 apply. The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impact of contamination on controlled waters are Environmental Quality Standards (EQS). These cover a large number of compounds. EQS are available for inland surface waters (freshwater) and other surface waters (transitional and marine).

Several EQS are based on bioavailable metal proportions (i.e. copper, lead, manganese, nickel and zinc). A software tool (M-BAT) is available from the Water Framework Directive - UK TAG website for calculating the bioavailable fraction. Where this tool has been used, the bioavailability has been taken into account by calculating site-specific $PNEC_{dissolved}$ (Predicted No Effect Concentration) values. These enable the dissolved concentration data to be compared with the PNEC as if it were an EQS.

UK Drinking Water Standards (DWS) apply to waters abstracted for human consumption. Where no UK or EU drinking water standard exists, reference is made to the World Health Organisation criteria (2011).

The DWS apply to groundwater or to surface water used for abstraction and the EQS apply to surface water where the aquatic ecosystem is the receptor. Where the most appropriate water quality target cannot be determined with certainty, the lowest one is adopted in line with the precautionary principle.

In some instances, the laboratory detection limits (LODs) may be greater than the water quality target it is being screened against, but it should be noted that these comparisons are an initial screening assessment. It may be the case that lower LODs could be obtained using a more specialised technique, but it would be disproportionately expensive to adopt the more costly specialist technique for initial screening exercises.

The preference of BSL is to have testing carried out on actual samples of ground/surface water rather than theoretical values obtained from leachate testing, which is considered to often be highly conservative. Data from water samples obtained or from leachate analysis is then compared against the screening criteria adopted by BSL, which are presented overleaf.

When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and detailed quantitative risk assessment (DQRA) to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway.

Ground Gas Risk Assessment

BS8485:2015+A1:2019, BS 8576:2013, CL:AIRE RB17, and NHBC 'Hazardous Ground Gas - An essential guide for housebuilders' 2023, are the current guidance which gives up-to-date advice on all aspects of permanent ground gas risk. BS8576 alongside CIRIA C682 also provides guidance on assessment of hydrocarbon vapour intrusion.

The CL:AIRE publication 'Good Practice for Coal Mine Gas Emissions' 2021 provides guidance on the assessment of risks from mine gas sources.

The above all outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination. The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework

BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land*.

Generation Potential of Sources

BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	- Natural carbonate soil and strata, e.g. chalk and limestone. - Natural soil strata with a low degradable organic content, e.g. alluvium, peat. - In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. - Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). - Mine workings shallow or shaft (where there is clear evidence that they are flooded). - Inert landfill sites (and pre -1945 landfills).
Low	- Natural soil strata with a high degradable organic content (DOC). - Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). - Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). - Landfill 1945 to mid 1960s (see also Moderate below).
Moderate	- Sewage sludge. - Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). - Landfill 1945 to mid 1960s (this could also be “low” or, if disturbed, “high”).
High	- Landfill mid 1960s to early 1990s. - Mine workings – unflooded – less than 50 years since last worked.
Very High	- Municipal landfill sites. - Landfill early 1990s onward.

Frequency and Duration of Monitoring

BS8576 notes to determine where and how to monitor ground gases requires consideration of credible pathways of possible exposure of the receptors, taking into account what is known about the geology and hydrogeology, building construction and services layout, foreseeable events such as flooding, changes in groundwater level, climate change, extreme weather conditions, the closure of mines, and possible changes to the gas regime caused by future development.

The monitoring period for a specific site should cover the “worst case” scenario. A “worst case” scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with ground gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 “Ground Gas Monitoring and ‘Worst-Case’ Conditions” provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Notes

- 1 Generation potential of sources based on descriptions within BS 8576:2013.
- 2 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

Gas Risk Assessment

Within BS8485:2015+A1:2019 a semi-quantitative method is set out for the assessment of risk.

This method (Modified Wilson and Card) uses the concept of Gas Screening Values (GSVs) and typical threshold concentrations of carbon dioxide and methane to identify levels of risk. Sites are then classified into a 'Characteristic Situation' or 'CS' from CS1 where no mitigation is required and CS2 increasing up to CS6 where protection measures are required.

The NHBC guide 'Hazardous Ground Gas - An essential guide for housebuilders' 2023 provides further assessment tools for ground gas monitoring data, including the use of ternary plots to determine ground gas sources.

A separate approach to assessment without monitoring data is discussed under the RB17 header further below.

CIRIA C682 and BS 8576:2013 provide guidance on assessment of VOC intrusion risk.

Ground Gas Mitigation

Where a risk is determined to be present by assessment, BS8485:2015+A1:2019 provides guidance for the design of protection systems based on a points scoring system depending on the characteristic situation, structure type, structural barrier types, ventilation and a gas resistant membrane. Source removal can also be considered.

The design requires the structures to be categorised into one of four building types: Type A, Type B, Type C or Type D, related to the construction and end use of the building, together with the control of future structural changes and maintenance.

CIRIA C748 provides advice on the use of membranes as VOC vapour barriers.

CIRIA C735 sets out the approach for verification of installed mitigation measures. Note that if a membrane is installed it must be verified in accordance with CIRIA C735 or it will score zero points and assumed to not afford any protection.

RB17 Approach

CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

Radon

Advice on radon protection in England is provided by the UK Health Security Agency, <https://www.ukradon.org/information/ukmaps> and by the BRE (BR 211 (Scivyer 2023)).

Areas of the country can be categorised according to the percentage of existing homes where radon is present above the Action Level:

-  0-1% lower probability.
-  1-3% and 3-10% intermediate probability.
-  >10% higher probability.

Basic radon protection measures are required in new buildings and extensions in areas of England and Wales where 3-10% of properties exceed the Action Level and full radon protection measures where >10% exceed the Action Level.

Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

Geotechnical Guidance

A preliminary risk assessment of geotechnical hazards is carried out at the desk study stage and confirmed (or amended) at the ground investigation stage.

The CD 622 'Managing Geotechnical Risk' guidance document defines the technical approval and certification procedures to be used to ensure that the risk associated with the geotechnical activities are appropriately managed.

The desk-based stage may also include the requirements for a Coal Mining Risk Assessment (CMRA) which specifically assesses the risks from mining induced instability and related issues in high risk development areas: <https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments>.

In order to establish the requirements of a project, the Geotechnical Category which is based on a consideration of project complexity, proposed geotechnical activities, presence of geo-hazards and severity of geotechnical risks, shall also be considered. These range from Category 1 (small/simple structures) to Category 3 (very large, unusual or complex activities/structures, such as tunnels). It is envisaged most projects typically fall into Category 2, including conventional types of geotechnical structures, earthworks and activities.

In the case of the geotechnical hazard identification at the intrusive investigation stage, this is referred to as the **ground model**.

The geotechnical sections of the report contain the factual information on the geology and relevant site data, including both in situ and laboratory testing, with a geotechnical evaluation of the information stating the assumptions made in the interpretation of the data.

Derived values of geotechnical parameters are obtained from test results by theory (book values), correlation or empiricism in general accordance with BS EN 1997-2:2007 (EC7).

Where derived geotechnical parameters are to be used in designs in accordance with EC7, the selection of characteristic values for geotechnical parameters using the derived values is carried out by well-established experience.

The characteristic value is a cautious estimate of the value affecting the occurrence of the limit state. For any particular material type there may be more than one characteristic value for each parameter because there may be more than one limit state.

The second stage is the selection of design values. The design values are either derived from the characteristic value by applying the relevant partial factors or assessed directly. Similarly, there can be several design values for the same material type.

In the event that geotechnical designs are included in this report, selection of the characteristic and design values is included. Otherwise, it is the duty of the geotechnical designer to determine these within a separate design report (a GDR).

Where it has not been possible to reasonably use an EC7 compliant technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

In addition to the above:

-  Assessments for highways designs are based on CD 622 Managing Geotechnical Risk.
-  The assessment of sustainable drainage is based on BRE365 and CIRIA C753 'The SuDS Manual'.
-  Earthworks Assessments are based on SHW Series 600 and BS6031.
-  Risks from mining (both at the desk based and intrusive stages) are assessed adopting guidance from CIRIA C758.

Re-Use of Waste Soils Guidance

Definition of Waste

The Environment Agency considers waste to be “...any material that is discarded, or intended to be discarded...” this includes any soil from drainage trenches, foundation arisings, site strips etc. It is no longer required in its original location, therefore it is considered to be waste. Without an appropriate materials management plan, permit or exemption in place, by law this material is defined as “illegally deposited waste”.

Landfill tax rules allow HM Revenue & Customs (HMRC) to recover landfill tax on illegally deposited waste on construction sites. This could lead to excessive costs without the correct documentation in place. In addition, a

person who makes, knowingly causes or knowingly facilitates a disposal to be made at an unauthorised site is also liable to pay Landfill Tax.

CL:AIRE: Code of Practice

Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. This can be implemented under the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE DoWCoP), also commonly referred to as a “Materials Management Plan”.

<https://www.claire.co.uk/projects-and-initiatives/dow-cop>

Developers and contractors are advised to complete all works under the DoWCoP where applicable.

To implement the DoWCoP (for Route A), there is a requirement to notify the Environment Agency and Local Authority of the intention to use the code of practice in principle, after which there is a 21-day notice period for their response.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

-  The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
-  The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
-  There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
-  Quantity (the quantity of materials used should be known).

Potential scenarios where soils may be able to be re-used:

-  Material capable of being used in another place on the same site without treatment.
-  Material capable of being used in another place on the same site following ex-situ treatment on site.
-  Material capable of being used in another development site without treatment (Direct Transfer).
-  Material capable of being used in another development site following ex-situ treatment on another site e.g. Hub site.

In order to satisfy these requirements, the following are required:

- i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
- ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
- iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
- iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
- v) Volume calculations.
- vi) Planning permission for the development.
- vii) Contractual details to be clear, regarding who steps in if a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (e.g. bioremediation, stabilisation etc) may require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties are not generally regarded as waste treatment operations and do not require a permit.

Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.

Any declared MMP should be amended as new import sources are added.

Regardless of implementing re-use under the code of practice or not, all sites should have some form of materials tracking in place in compliance with current legislation. Any re-use scheme should also be designed to minimise disposal costs. Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-complaint with the CoP can be referred to the EA for further investigation.

Soils Re-use under Exemptions and Permits

Other potential options to allow the re-use and/or import of soils and aggregates on site are provided in the table below. Applies to England/Wales only – Scotland differs.

Re-use Mechanism	Description
U1 Exemption	Can be applied to re-use/import of soils and stones, but only up to 1000 tonnes or for brick and concrete up to 5000 tonnes. This is usually an efficient way to re-use small volumes of waste materials. However, only one U1 can be filled in per site in any 3-year period. Quick and free via online registration.
WRAP Quality Protocols	Describes how processed demolition arisings can be removed from regulatory waste regime. Requires a demonstration of appropriateness by: • Factory Production Control Manual. • Facility Permit (or Exemption). • Grading Analysis.
Waste Framework Directive (WFD) exclusion	In regard to “clean” naturally occurring soils only that are to be re-used on their site of origin, these are covered by a Waste Framework Directive (WFD) exclusion which is an EA regulatory position statement. So long as the project can prove the four criteria listed above for the DoWCoP, then permits or the DoWCoP are not required. However, many projects still use the CoP to ensure compliance.
T5 Screening and blending of waste	The T5 exemption allows you to temporarily treat waste on a small scale to produce aggregate or soil at a particular location, such as a construction or demolition site. The limit is 5,000 tonnes. This applies to: • Screening soil on a demolition site to remove wood and rubble. • Blending soil and compost that has been produced under an exemption on a construction site to produce better soil for landscaping on that site (e.g. peaty deposits). • Crushing waste (except bricks, tiles and concrete) before screening or blending • Grading waste concrete after it has been crushed to produce a certain type of aggregate.
T7 Exemption	The T7 allows treatment of waste bricks, tiles and concrete by crushing, grinding or reducing in size. This needs to be registered with the Local Authority.
Other Permitting Routes	Other options include use under an Environmental Permit (Standard or Bespoke Rules), however these may be a time consuming and costly route, where use of the other above options (if applicable) are likely to be more feasible in construction.

There are also potential non-enforcement positions for re-use e.g. a site has a large volume waste illegally deposited on it (not by landowner). The new owner is keen to re-use waste where possible to reprofile the site (planning condition granted). The DoWCoP could not be used as materials already excavated and deposited as a waste (illegally). The EA may agree that although the DoWCoP not applicable, they would take a non-enforcement position if the works were completed in accordance with the DoWCoP – this would need to be agreed in advance.

Waste Classification and Disposal Guidance for Soils

Introduction

As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. Waste producers have a duty of care to classify the waste they are producing:

-  Before it is collected, disposed of or recovered.
-  To identify the controls that apply to the movement of the waste.
-  To complete waste documents and records.
-  To identify suitably authorised waste management options.
-  To prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site will also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal

The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points:

-  Not all waste can be landfilled.
-  Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
-  Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
-  Most wastes must be treated before you can send them to landfill.
-  There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification

Wastes are listed in the European Waste Catalogue and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not i.e. the hazard assessment. The most common EWC waste codes related to soil are:

17 05	Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (e.g. asbestos, oil,) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on specific "hazardous properties" which include hazards such as carcinogenicity, flammability and toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations** and classified as either hazardous or non-hazardous waste. WAC analysis must not be used for waste classification.

Waste Definitions

Inert	- Will not undergo any significant physical, chemical or biological transformations. - Will not dissolve. - Will not burn. - Will not physically or chemically react. - Will not biodegrade. - Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. - Has insignificant total leachability and pollutant content. - Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above). Is not hazardous (see below).
Hazardous	Soil has hazardous properties as defined in WM3 (Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance).
Stable Non-reactive hazardous waste#	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents either: in the waste alone (for example, by biodegradation), under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints) or by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that is stable and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. If the waste has any disposal route other than a landfill site (e.g. recycling facility, incineration etc) then WAC is not relevant. Furthermore, the WAC limits **cannot** be used to make an assessment of whether a waste is hazardous. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.

Classification based on Total Concentrations ¹	Non-Hazardous Waste		Hazardous Waste	
	Below inert WAC limit values:	Above inert WAC limit values:	Below hazardous WAC limit values	> WAC limit values
WAC testing				

Landfill requirements	INERT landfill	NON-HAZARDOUS landfill ²	HAZARDOUS landfill	PRE-TREATMENT ³
-----------------------	----------------	-------------------------------------	--------------------	----------------------------

- 1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
- 2 Individual sites may have certain limit values pre-determined in their licence.
- 3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
- 4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Waste classified as non-hazardous can be accepted into a non-hazardous landfill without having to pass any numerical WAC.

Soils above hazardous WAC limit values require pre-treatment prior to disposal. The effective pre-treatment, typically involving separation, sorting and screening, can offer cost savings through reducing the hazardous nature and volumes of soil. Costs for disposal of non-hazardous/hazardous soils are significant compared to the disposal of inert material.

Greenfield Sites and Inert Waste

The possibility of automatic inert classification naturally occurring “clean” soils should be explored in accordance with the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005). This is the case if:

- They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source); and
- There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other classes of landfill (e.g. the waste producer can characterise the waste based on visual assessment and written description with supporting evidence such as a desk study, subject to agreement by the landfill operator).

Hydrocarbons in Soils

WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However, hydrocarbons in soils are a mixture rather than a pure product and are therefore not absolute entries.

Known Oils

The simplest scenario is where the identity of the contaminating oil is known or can be identified. If the oil is known the manufacturer’s or supplier’s REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation of the chromatograph to determine if it is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils

Where hydrocarbons are contaminating soils, it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

For contaminated land specific consideration must be given to the following before proceeding:

- The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in WM3 example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
- The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of marker compounds is optional; however, it is recommended that where possible the marker compounds should be used. WM3 states:

If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:

- The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
- This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D of WM3, and
- The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

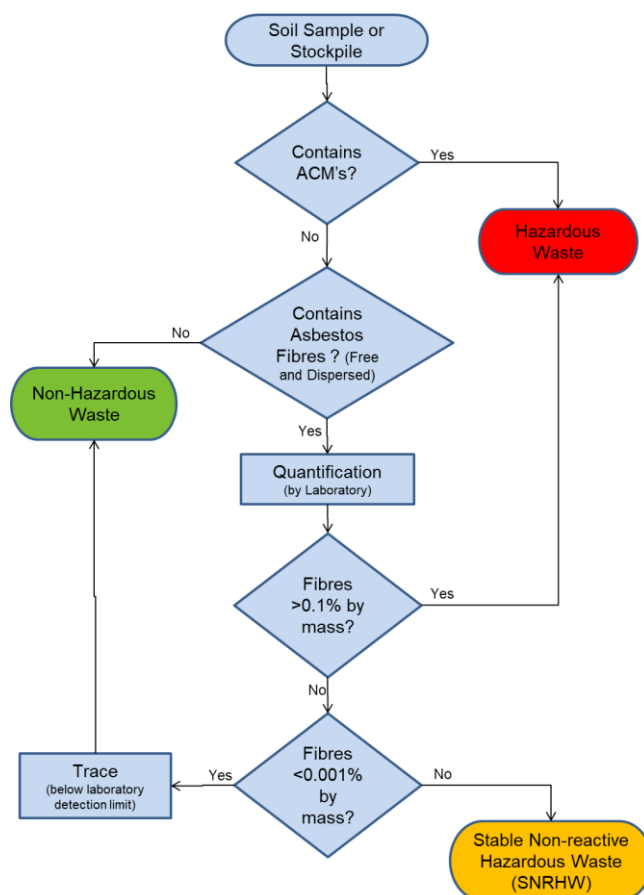
1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the subsequent Council Decisions.
2. Environment Agency Environmental Permitting Regulations: "Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land" 2009.
3. Environment Agency "Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria" Nov 2010.
4. Environment Agency "Guidance on the classification and assessment of waste (Technical Guidance WM3)".
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).
6. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
7. 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament.
8. Environmental Permitting Guidance The Landfill Directive For the Environmental Permitting (England and Wales) Regulations 2010 Updated March 2010 Version 3.1.
9. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).

Waste Containing Asbestos

The assessment of asbestos containing waste is dependent on whether the asbestos is present as:

- Fibres that are free and dispersed, or
- Identifiable pieces of asbestos containing materials (ACM's).

Identifiable pieces of asbestos are any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye. The result is that commonly soils with visible ACM's are sorted and the ACM's removed by hand picking and separate disposal.



Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWG 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.

Waste	Conc. by Weight (%)	EW C 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

Asbestos concentrations below 0.001% by mass are below standard laboratory detection limits and are not currently regarded as containing asbestos for the purposes of disposal and may be disposed of to an inert landfill site¹. These levels are often termed “trace” by laboratories.

Asbestos concentrations between 0.001% and 0.1% are stable non-reactive hazardous waste (SNRHW)¹. Waste transfer stations where soil recycling takes place may be able to take SNRHW, but are unlikely to take soils containing asbestos above trace concentrations.

The following codes should be assigned to the asbestos waste as appropriate:

17 06	Insulation materials and asbestos-containing construction materials
17 06 01	Insulation materials containing asbestos
17 06 03	Other insulation materials consisting of or containing hazardous substances
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05	Construction material containing asbestos

WM3 indicates that 17 06 05 would normally be used in preference to 17 06 01 for the asbestos in asbestos contaminated soil and stones.

Construction materials containing asbestos and “*other suitable materials*” may be landfilled at landfills for non-hazardous waste in accordance with the Landfill Directive without testing.

This means that wastes that are only hazardous because of their asbestos content can be disposed of at landfills for non-hazardous waste in separate landfill cells that only accept asbestos wastes and other suitable materials. The Landfill Directive requires that stable non-reactive hazardous waste shall not be deposited with biodegradable waste (for example organic material, household waste, paper etc..) and must meet the waste acceptance criteria set out in accordance with Annex II.

Construction

Health and Safety Executive (HSE) guidance on asbestos is not directly related to soil and much of the guidance focuses on the removal of asbestos from buildings. The overarching legislation is the Control of Asbestos Regulation (CAR 2012). However, where work involves (or is likely to involve) contact with asbestos then CAR 2012 requires a risk assessment including whether the work is licensed or notifiable non-licensed work and may require an Asbestos Management Plan. Work becomes notifiable if it is considered that the control limit could be exceeded.

Brownfield sites frequently have soils that contain asbestos and the presence of asbestos needs to be considered within the context of construction, particularly in relation to groundworks. The exposure of soils and the use of excavators and plant to move soil around increases the possibility of fibres becoming airborne. However, it is good site practice to not generate dusts and to employ dust suppression on all sites regardless of the presence of asbestos.

The legal control limit for asbestos is 0.1f/ml over a continuous four-hour period. The control limit is not a 'safe' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Clearly the higher the concentrations in the soil the greater potential there is for fibres to be released, however IOM publication TM/88/14 "the release of dispersed asbestos fibres from soil" 1988 concludes that:

-  Mixtures of asbestos in dry soils with asbestos content as low as 0.001% can produce airborne respirable asbestos concentrations greater than 0.1f/ml in dust clouds where the respirable dust concentrations are less than 5mg/m³.
-  An action limit is recommended of no higher than 0.001% asbestos in soils above which steps should be taken to minimise exposure to airborne fibres (e.g. by wetting).
-  The addition of relatively small quantities (10%) of water can reduce the airborne fibre concentrations by an order of magnitude.

Where asbestos has been identified at concentrations above 0.001% as free and dispersed fibres in the soil precautions need to be adopted. Concentrations below this are considered to be normal background, although good site practice dictates that the generation of dusts should be avoided and therefore any fugitive fibre release from minor concentrations should be kept to a practical minimum.

End Use

The use of materials containing asbestos and material containing asbestos is prohibited under EU legislation.

Asbestos containing materials can remain in situ under a suitable cover system which may be hard surfacing or soft landscaping (with or without hard dig layers and markers).

There is a risk that future maintenance may compromise such systems and details of the presence of asbestos should be kept in the Health and Safety File.

Publications from the JIWG provide guides for decision making in relation to construction.

The re-use of waste soils should be undertaken in accordance with the CL:AIRE Code of Practice and is subject to suitable risk assessments demonstrating low risk. There is nothing that specifically excludes the re-use of soils containing asbestos as fill to raise levels. However, the movement of materials increases the risk of fibres becoming airborne and suitable precautions will be required. Re-use of soils containing asbestos should be as per CARSOILS.

The re-use of soils containing asbestos at concentrations above hazardous waste levels may be met with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be feasible where there is a long program for implementation.

Asbestos in Soil as Free Fibres

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
Not detected	✓	✓			No precautions necessary, however on a brownfield site asbestos not previously identified may be found during works and a statement within the contractor's method statement for how they will deal with this unforeseen asbestos would be good practice to ensure compliance with CAR2012.	Yes.	None.
Trace (<0.001%)		✓ ²			Precautions are unlikely to be required, however a detailed method statement may be required to ensure compliance with CAR2012. Basic asbestos management good practice will be required. Typically precautions would include: - Ensuring soils do not dry out to become dusty. - Site personnel have the risk communicated at induction stage.	Yes Soils can be re-used under CL:AIRE CoP with the correct precautions in place.	Generally clean cover or hardstanding cover required.
0.001% – 0.099%			✓		Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: - Site personnel have the risk communicated at induction stage. - Ensuring personnel have suitable training. - Task monitoring to inform PPE requirements. - Ensuring soils do not dry out to become dusty and that misting is available during groundworks. - Separate stockpiling. - Clean haulage routes.	Possibly. Soils may be able to be re-used under CL:AIRE CoP, subject to a satisfactory Risk Assessment and regulatory agreement with the correct precautions in place.	Clean cover with hard dig/demarcation layer or hardstanding cover required.
0.1+%				✓	Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: - Site personnel have the risk communicated at induction stage. - Ensuring personnel have suitable training. - Task monitoring to inform PPE requirements. - Site wide and or perimeter monitoring. - Ensuring soils do not dry out to become dusty and that misting is available during groundworks. - Separate stockpiling.	Unlikely ³ Re-use of soils containing asbestos within an earthworks scheme will involve significant engineering and the risk for generating dusts will be significantly	Clean cover and a hard dig / demarcation layer. A plan should be in place for future excavations as part of the Health and Safety File.

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
					- Clean haulage routes. - Decontamination unit	increased with repeated handling and compaction.	

1. The standard laboratory detection limit is normally 0.001%. Below 0.001% is trace and currently regarded as not containing asbestos for the purposes of disposal off site. However the waste producer has a duty to fully classify the waste and the presence of trace asbestos should be declared. Consequently it is unlikely that a waste treatment site will take this soil and an inert landfill may make a commercial decision to only take it under some circumstances.
2. The re-use of soils containing asbestos at concentrations above hazardous waste is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be warranted where there a long program for implementation.

APPENDIX B

Exploratory Hole Logs



No.

TP01

Sheet 1 of 1

PROJECT NO: C6123

CO-ORDS: 380161E, 413643N

Hole Type

Hole Type

PROJECT NAME: SPRINGSIDE ROAD, BURY

LEVEL: 122.86m OD

Scale

1:25

CLIENT: EDGEFOLD HOMES

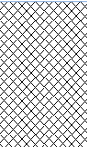
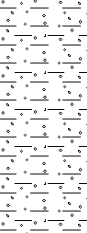
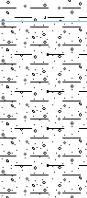
DATES: 29/04/25

Logged

Checked

MA⁹

IM

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10-0.40	ES	123kPa	0.50	122.36		MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay with frequent rootlets and low cobble content. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, ceramic, sandstone, mudstone, concrete, and coal. Cobbles are sub-angular of brick up to 230mm in diameter. <i>Sandstone boulder encountered at 0.30m bgl. Large boulder is sub-angular up to 700mm in diameter.</i> <i>Concrete boulder encountered at 0.40m bgl. Boulder is sub-angular up to 400mm in diameter.</i>	1.0 - 2.0
	0.60-1.00	ES						
	1.00	HSV			Stiff reddish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.			
	1.60-2.00	D			Stiff greyish brown slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.			
	2.40-3.00	D			Stiff yellowish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.			
				3.00	119.86		End of Trial Pit at 3.00m	3.0 - 5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny.
2. No groundwater encountered.
3. Excavation sides stable.
4. Trial pit terminated at 3.00m bgl due to reaching target depth.
5. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



No.

TP02

Sheet 1 of 1

CO-ORDS: 380174E, 413638N

LEVEL: 123.45m OD

DATES: 29/04/25

Logged

Checked

MAS

JM

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10-0.40	ES		0.40	123.05		MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay with frequent rootlets. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of brick, sandstone, mudstone, and concrete.	1.0
	0.60-1.00	ES		0.50	122.95		MADE GROUND: Cobbles with some gravel. Gravel is angular to sub-rounded fine to coarse of brick, sandstone, and concrete. Cobbles are angular to sub-rounded of brick, sandstone, and concrete up to 230mm in diameter. MADE GROUND: Light brown gravelly sand. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, sandstone, coal, mudstone, and concrete. <i>Sandstone boulder encountered at 1.00m bgl. Boulder is sub-angular up to 600mm in diameter.</i>	
	1.60-2.00	ES		1.50	121.95		<i>Sandstone boulder encountered at 1.40m bgl. Boulder is sub-angular up to 600mm in diameter.</i> MADE GROUND: Greyish brown slightly gravelly slightly sandy clay with medium cobble content. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, sandstone, and coal. <i>Slight hydrocarbon odour at 1.70m bgl.</i> <i>Sandstone boulder encountered at 1.80m bgl. Boulder is sub-angular up to 600mm in diameter.</i>	2.0
	3.50-4.00	D		4.00	119.45			End of Trial Pit at 4.00m
								5.0

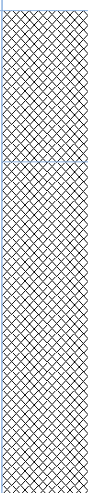
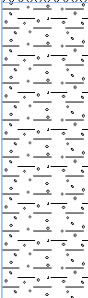
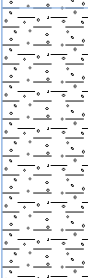
1. Service clearance undertaken by a BSL engineer using CAT & Genny.
2. No groundwater encountered.
3. Excavation sides stable.
4. Trial pit terminated at 4.00m bgl due to reaching target depth.
5. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



No.	
TP03	
Sheet 1 of 1	
Hole Type	
TP	
Scale	
1:25	
Prepared	Checked
JS	JM

DATES: 29/04/25

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10-0.40	ES	65kPa	0.50	123.22		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly sandy clay with frequent rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, plastic, textile, coal, concrete, timber, metal, and sandstone. <i>Timber beam encountered at 0.20m bgl, up to 1500mm in diameter.</i> <i>Cobbles and boulders of brick, sandstone, and concrete encountered at 0.30m bgl up to 400mm in diameter.</i>	1.0
	0.50-1.50	ES					MADE GROUND: Brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, coal, metal, and concrete.	
	1.70-2.50	D		2.60	122.12		Firm grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone and sandstone.	2.0
	1.80	HSV						
	2.70-3.40	D		3.50	121.12		Firm grey slightly gravelly CLAY with pockets of orangish brown SAND. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and sandstone.	3.0
	3.00	HSV					45kPa	
				3.50	120.22		End of Trial Pit at 3.50m	4.0
								5.0

- ES = Environmental Sample
- D = Disturbed Sample
- B = Bulk Sample
- LB = Large Bulk Sample
- U = Undisturbed Sample
- UT = Undisturbed Thin Wall Sample
- SPT = Standard Penetration Test
- PID = Photoionization Detector (ppm)
- PPM = Part Per Million
- HSV = Hand Shear Vane



No.

TP04

Sheet 1 of 1

PROJECT NO: C6123

CO-ORDS: 380199E, 413617N

Hole Type

Hole Type

PROJECT NAME: SPRINGSIDE ROAD, BURY

LEVEL: 123.77m OD

Scale

1:25

CLIENT: EDGEFOLD HOMES

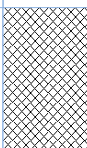
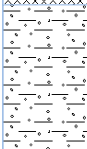
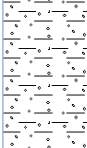
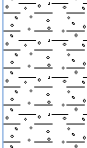
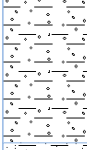
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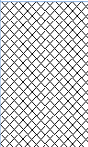
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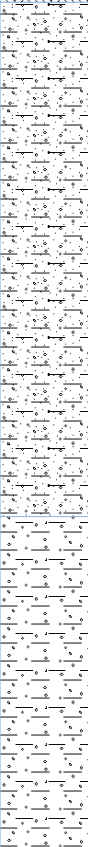
JM

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10-0.40	ES	60kPa	0.50	123.27		MADE GROUND TOPSOIL: Brown slightly gravelly sandy clay with frequent rootlets and low cobble content. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, concrete, metal, plastic, sandstone, mudstone, coal, and timber. Cobbles are sub-angular of brick and sandstone up to 230mm in diameter. <i>Sandstone flagstone encountered at 0.20m bgl.</i> Firm orangish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.	1.0
	0.60-1.20	ES						
	1.00	HSV						
	2.00	HSV	113kPa	2.50	121.27		Becomes stiff from 2.00m bgl.	2.0
	2.50-3.50	D						
				3.50	120.27		End of Trial Pit at 3.50m	4.0
								5.0

1. Service clearance undertaken by a BSL engineer using CAT & Genny.
2. No groundwater encountered.
3. Excavation sides stable.
4. Trial pit terminated at 3.50m bgl due to reaching target depth.
5. Backfilled with arisings upon completion.

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LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.		
								TP05		
								Sheet 1 of 1		
PROJECT NO: C6123						CO-ORDS: 380183E, 413608N		Hole Type		
								TP		
PROJECT NAME: SPRINGSIDE ROAD, BURY						LEVEL: 124.04m OD		Scale		
								1:25		
CLIENT: EDGEFOLD HOMES						DATES: 29/04/25		Logged	Checked	
								MAS	JM	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description			
	Depth (m)	Type	Results							
	0.10-0.40	ES	65kPa	0.50	123.54		MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay with frequent rootlets and low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, coal, and mudstone. Cobbles are sub-angular of brick and sandstone up to 230mm in diameter.		1.0	
	0.50-1.50	ES					Firm grey and orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal and sandstone.			
	0.90	HSV								
	1.60-2.20	D	70kPa	1.60	122.44		Firm reddish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of coal.			2.0
	2.00	HSV								
	2.50-3.00 2.50	D HSV					90kPa	2.20		
Becomes stiff from 2.50m bgl.										
End of Trial Pit at 3.30m		3.0								
			3.30	120.74			4.0			
								5.0		

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.	
								TP06	
PROJECT NO: C6123						CO-ORDS: 380160E, 413582N		Sheet 1 of 1	
PROJECT NAME: SPRINGSIDE ROAD, BURY						LEVEL: 124.41m OD		Hole Type	
CLIENT: EDGEFOLD HOMES						DATES: 29/04/25		TP	
								Scale	
								1:25	
								Logged	Checked
								MAS	JM
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
	0.10-0.30	ES		0.30	124.11		TOPSOIL: Grass over brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.		1.0
	0.40-1.50	D					Stiff orangish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal, sandstone, and mudstone.		
	0.90	HSV	90kPa	2.00	122.41				2.0
	2.20-3.10 2.20	D HSV	110kPa				Stiff grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.		
				3.10	121.31		End of Trial Pit at 3.10m		3.0
									4.0
									5.0
Remarks 1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. No groundwater encountered. 3. Excavation sides stable. 4. Trial pit terminated at 3.10m bgl due to reaching target depth. 5. Backfilled with arisings upon completion. ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane									



No.

TP07

Sheet 1 of 1

PROJECT NO: C6123

CO-ORDS: 380139E, 413595N

Hole Type

Hole Type

PROJECT NAME: SPRINGSIDE ROAD, BURY

LEVEL: 124.27m OD

Scale

1:25

CLIENT: EDGEFOLD HOMES

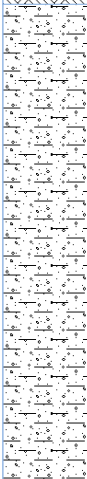
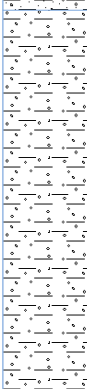
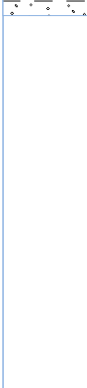
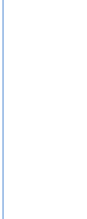
DATES: 29/04/25

Logged

Checked

MAS

JM

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10-0.30	ES		0.30	123.97		TOPSOIL: Grass over brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, mudstone, and sandstone. <i>Metal pole encountered at 0.30m bgl.</i>	1.0
	0.50-1.50	D					Stiff orangish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal, sandstone, and mudstone.	
	1.00	HSV	80kPa	1.90	122.37		Stiff grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal.	2.0
	1.90-2.50	D						
	2.20	HSV	100kPa				End of Trial Pit at 3.20m	3.0
					4.0			
								5.0

Remarks

1. Service clearance undertaken by a BSL engineer using CAT & Genny.
2. No groundwater encountered.
3. Excavation sides stable.
4. Trial pit terminated at 3.20m bgl due to reaching target depth.
5. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

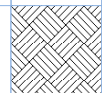
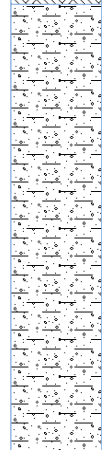
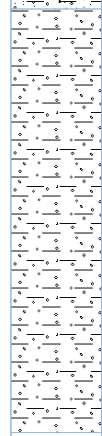


No.	
TP08	
Sheet 1 of 1	
Hole Type	
TP	
Scale	
1:25	
Red	Checked
S	JM

CO-ORDS: 380150E, 413616N

LEVEL: 123.14m OD

DATES: 29/04/25

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10-0.30	ES		0.30	122.84		TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and sandstone.	1.0
	0.40-1.00	ES					Stiff orangish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal, sandstone, and mudstone.	
	1.00	HSV	80kPa	1.80	121.34		Stiff grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.	2.0
	1.90	HSV	130kPa					
	2.50-3.20	D	120kPa			3.20	119.94	
2.60	HSV							4.0
								5.0

1. Service clearance undertaken by a BSL engineer using CAT & Genny.
2. No groundwater encountered.
3. Excavation sides stable.
4. Trial pit terminated at 3.20m bgl due to reaching target depth.
5. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



No.

TT01

Sheet 1 of 1

CO-ORDS: 380176E, 413583N

LEVEL: 123.94m OD

DATES: 29/04/25

Logged

Checked

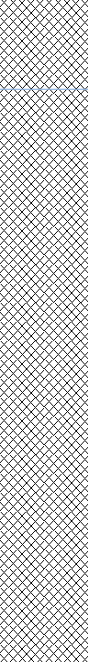
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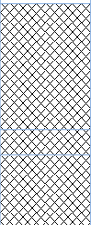
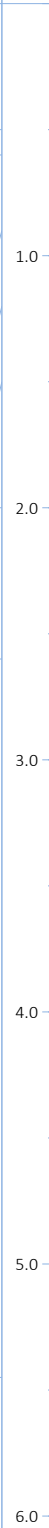
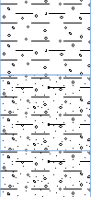
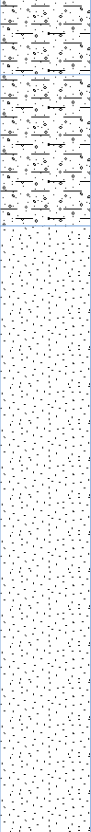
JM

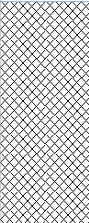
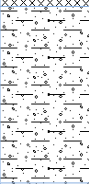
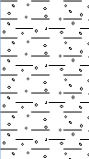
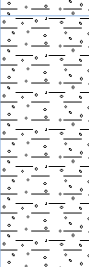
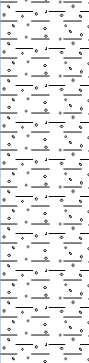
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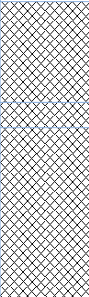
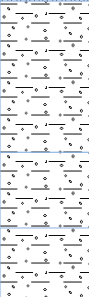
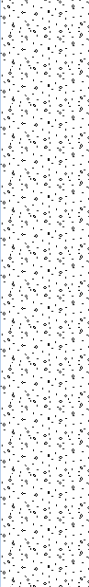
1. Service clearance undertaken by a BSL engineer using CAT & Genny.
2. No groundwater encountered.
3. Excavation sides unstable from 1.50m bgl..
4. Trial pit terminated at 2.20m bgl due to collapse.
5. Backfilled with arisings upon completion.

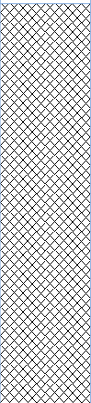
ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

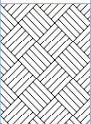
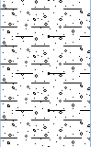
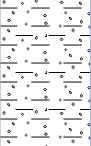
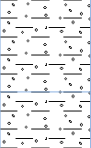
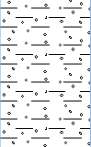
 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TT01E Sheet 1 of 1 Hole Type TP Scale 1:25 Logged MAS Checked JM	
PROJECT NO: C6123						CO-ORDS: 380189E, 413570N			
PROJECT NAME: SPRINGSIDE ROAD, BURY						LEVEL: 124.52m OD			
CLIENT: EDGEFOLD HOMES						DATES: 29/04/25			
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
	0.50-1.50	ES		0.30	124.22		MADE GROUND TOPSOIL: Grass over brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.		
							MADE GROUND: Dark brown ashy sandy gravel with medium cobble content and rare boulders. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, sandstone, coal, and ceramic. Cobbles are sub-angular of sandstone, ceramic, brick, and metal up to 230mm in diameter. Boulders are angular to sub-angular of anthropogenic origins.	1.0	
				2.20	122.32		Firm grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.	2.0	
				2.30	122.22		End of Trial Pit at 2.30m	3.0	
								4.0	
								5.0	
Remarks 1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. No groundwater encountered. 3. Excavation sides unstable from 1.50m bgl.. 4. Trial pit terminated at 2.20m bgl due to collapse. 5. Backfilled with arisings upon completion. ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane									

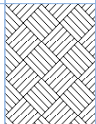
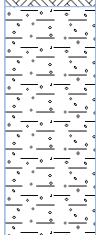
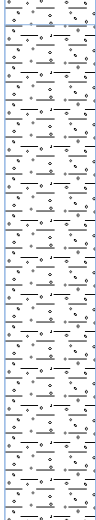
BROWNFIELD SOLUTIONS LTD							Borehole Log		Window Sampler No.
									WS01
									Sheet 1 of 1
PROJECT NO: C6123							CO-ORDS: 380166E, 413641N		Hole Type
									WS
PROJECT NAME: SPRINGSIDE ROAD, BURY							LEVEL: 122.71m OD		Scale
									1:30
CLIENT: EDGEFOLD HOMES							DATES: 28/04/25		Logged
									Checked
									MAS JM
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10-0.40	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal.	
		0.60-0.80	ES		0.50 0.60	122.21 122.11		MADE GROUND: Non-reinforced concrete.	
		0.90-1.20	D		0.90	121.81		MADE GROUND: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of coal, sandstone, and quartz. <i>Possible sandstone cobble recovered at 0.80m bgl as sub-angular gravel sized fragment of sandstone and some sandy GRAVEL.</i>	
		1.20	SPT	N=8 (1,1/2,2,2,2)	1.20	121.51		Soft reddish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal, sandstone and mudstone.	
					1.50	121.21		Soft to firm reddish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, mudstone and sandstone.	
		2.00	SPT	N=20 (3,4/4,4,6,6)	2.00	120.71		Stiff reddish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone.	
								Stiff reddish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and sandstone, with rare coal pockets.	
		2.60-3.50	D		2.60	120.11		Medium dense brown slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of coal, sandstone and mudstone.	
		3.00	SPT	N=18 (3,3/4,4,5,5)					
		4.00	SPT	N=16 (4,4/4,4,4,4)					
		5.00	SPT	N=36 (6,7/9,9,9,9)				Becomes dense from 5.00m bgl.	
					5.45	117.26	End of Borehole at 5.45m		
Remarks		1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Window sample completed at 5.45m bgl. 5. Installation to 5.00m bgl: 3.00m plain 35mm PVC, 2.00m slotted PVC upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD							Borehole Log		Window Sampler No.	
									WS02	
									Sheet 1 of 1	
PROJECT NO: C6123							CO-ORDS: 380178E, 413635N		Hole Type	
									WS	
PROJECT NAME: SPRINGSIDE ROAD, BURY							LEVEL: 123.40m OD		Scale	
									1:30	
CLIENT: EDGEFOLD HOMES							DATES: 28/04/25		Logged	Checked
									MAS	JM
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10-0.90	ES					MADE GROUND: Grass over dark brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, sandstone, mudstone, plastic, coal and clinker.		
		0.90-1.60	ES		0.90	122.50		Stiff greyish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, sandstone and mudstone.	1.0	
		1.20	SPT	N=15 (1,1/2,2,5,6)						
		1.60-2.00	D		1.60	121.80		Firm grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub rounded fine to coarse of mudstone and coal.		
		2.00-2.30	D		2.00	121.40		Firm reddish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and sandstone.	2.0	
		2.00	SPT	N=11 (3,3/2,3,3,3)						
					2.30	121.10		Firm slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.		
		3.00	SPT	N=14 (3,3/3,3,4,4)	3.00	120.40		Firm grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone, coal and sandstone.	3.0	
		4.00	SPT	N=19 (3,4/4,5,5,5)				Becomes stiff from 4.00m bgl.	4.0	
		5.00	SPT	N=36 (6,8/8,9,9,10)				Becomes very stiff from 5.00m bgl.	5.0	
					5.45	117.95		End of Borehole at 5.45m	6.0	
Remarks		1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Window sample completed at 5.45m bgl. 5. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane		

 BROWNFIELD SOLUTIONS LTD							Borehole Log		Window Sampler No.	
									WS03	
									Sheet 1 of 1	
PROJECT NO: C6123							CO-ORDS: 380192E, 413616N		Hole Type	
									WS	
PROJECT NAME: SPRINGSIDE ROAD, BURY							LEVEL: 123.78m OD		Scale	
									1:30	
CLIENT: EDGEFOLD HOMES							DATES: 28/04/25		Logged	Checked
									MAS	JM
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10-0.40	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly slightly sandy clay with rare rootlets. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, plastic, sandstone, shale, clinker and quartz.	1.0	
		0.30	HSV	53kPa	0.40	123.38		MADE GROUND: Non-reinforced concrete.		
		0.50-1.20	ES		0.50	123.28		MADE GROUND: Grey and reddish brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, coal, quartz and sandstone.		
		1.20-1.80	ES		1.20	122.58		Firm reddish brown and grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and sandstone.	2.0	
		1.20	SPT	N=10 (1,1/2,2,3,3)				Firm reddish brown and grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.		
		1.80-2.10	D		1.80	121.98		Firm grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.		
		2.00	SPT	N=13 (2,2/3,3,4)	2.10	121.68		Stiff yellowish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, mudstone and sandstone.		
					2.40	121.38				
		3.00	SPT	N=16 (3,3/3,3,4,6)	3.10	120.68		Medium dense yellowish brown gravelly SAND. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone, sandstone and shale.		
		3.10-4.00	D						3.0	
		4.00	SPT	N=18 (3,3/4,4,5,5)						
		5.00	SPT	N=20 (7,7/7,5,4,4)						
						5.45	118.33		End of Borehole at 5.45m	4.0
										6.0
Remarks		1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Window sample completed at 5.45m bgl. 5. Backfilled with arisings upon completion.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

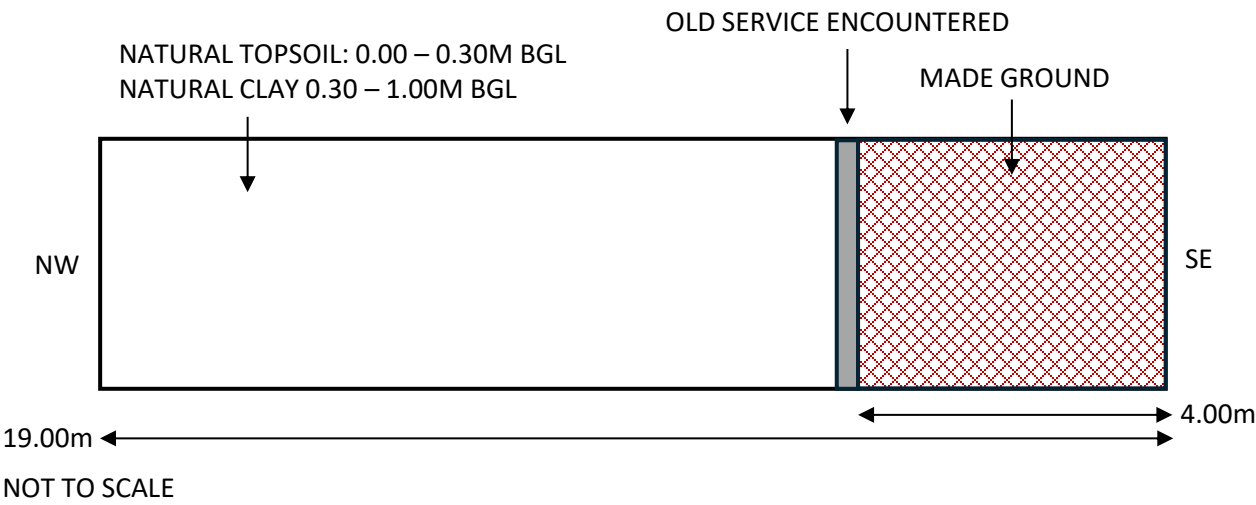
 BROWNFIELD SOLUTIONS LTD						Borehole Log		Window Sampler No.	
PROJECT NO: C6123						CO-ORDS: 380207E, 413613N		WS04	
								Sheet 1 of 1	
								Hole Type WS	
PROJECT NAME: SPRINGSIDE ROAD, BURY						LEVEL: 123.92m OD		Scale 1:30	
CLIENT: EDGEFOLD HOMES						DATES: 28/04/25		Logged	Checked
								MAS	JM
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10-0.40	ES					MADE GROUND: Grass over brown slightly gravelly slightly sandy clay with rare rootlets. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, plastic, sandstone, shale, clinker and quartz. Non-reinforced concrete obstruction encountered between 0.50-0.60m bgl. Rare gravels encountered between 0.60-1.20m bgl. Gravels are sub-angular of brick and sandstone up to 50mm in diameter.	
		0.30	HSV	50kPa					
		1.20	SPT	N=4 (1,0/1,1,1,1)					
		1.60-2.00	ES		1.60	122.32		Soft greyish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone and coal.	
		2.00-2.50	D		2.00	121.92		Firm grey and mottled orangish brown slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of sandstone and coal.	
		2.00	SPT	N=9 (2,3/2,2,3)				Firm grey slightly gravelly CLAY. Gravel is sub-angular to rounded fine to coarse of mudstone. Rare quartz gravels encountered between 2.50-3.20m bgl.	
		3.00	SPT	N=11 (2,3/3,2,3,3)				Coal gravels encountered between 3.20-4.00m bgl.	
		3.20-3.80	D						
		4.00	SPT	N=11 (3,2/3,3,2,3)				Becomes stiff from 5.00m bgl.	
		5.00	SPT	N=18 (3,3/4,4,5,5)					
				5.45	118.47	End of Borehole at 5.45m			
Remarks		1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Window sample completed at 5.45m bgl. 5. Installation to 1.50m bgl: 0.50m plain 35mm PVC, 1.00m slotted PVC upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD						Borehole Log		Window Sampler No.		
								WS05		
								Sheet 1 of 1		
PROJECT NO: C6123						CO-ORDS: 380170E, 413592N		Hole Type		
								WS		
PROJECT NAME: SPRINGSIDE ROAD, BURY						LEVEL: 123.88m OD		Scale		
								1:30		
CLIENT: EDGEFOLD HOMES						DATES: 28/04/25		Logged		
								Checked		
								MAS		
								JM		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10-0.50	ES					TOPSOIL: Grass over brown slightly gravelly slightly sandy clay with frequent rootlets. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal and sandstone.		
		0.50-1.30	ES		0.50	123.38		Firm light brown and orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	1.0	
		1.20	SPT	N=11 (1,1/2,3,3,3)	1.30	122.58		Firm grey CLAY with rare gravel. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.		
		1.30-2.00	D							
		2.00	SPT	N=11 (3,2/3,3,2,3)					2.0	
		3.00-3.50	D		3.00	120.88		Stiff grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal.	3.0	
		3.00	SPT	N=13 (3,4/3,3,4,3)						
		4.00	SPT	N=18 (3,3/5,4,4,5)	4.00	119.88		Stiff grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.	4.0	
		5.00	SPT	N=18 (4,5/5,4,4,5)					5.0	
					5.45	118.43				
End of Borehole at 5.45m									6.0	
Remarks		1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. Hand dug inspection pit to 1.20m bgl. 3. No groundwater encountered. 4. Window sample completed at 5.45m bgl. 5. Installation to 5.00m bgl: 1.00m plain 35mm PVC, 4.00m slotted PVC upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane		

 BROWNFIELD SOLUTIONS LTD						Borehole Log		Window Sampler No.	
								WS06	
								Sheet 1 of 1	
PROJECT NO: C6123						CO-ORDS: 380161E, 413601N		Hole Type	
								WS	
PROJECT NAME: SPRINGSIDE ROAD, BURY						LEVEL: 123.48m OD		Scale	
								1:30	
CLIENT: EDGEFOLD HOMES						DATES: 28/04/25		Logged	Checked
								MAS	JM
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10-0.50	ES		0.50	122.98		TOPSOIL: Grass over brown slightly gravelly slightly sandy claywith frequent rootlets. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone, mudstone, and coal.	
		0.50-1.20	ES					Soft orangish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.	
		1.20	SPT	N=8 (1,2/2,2,2,2)	1.50	121.98		 <i>Becomes firm from 1.20m bgl.</i>	
		1.50-2.00	D					Firm grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.	
		2.00	SPT	N=6 (2,1/1,2,1,2)	3.50	119.98			
		3.00	SPT	N=10 (2,2/2,3,2,3)					
		3.50-4.00	D		5.45	118.04		Firm grey CLAY with rare gravel. Gravel is sub-angular to sub-rounded fine to coarse mudstone.	
		4.00	SPT	N=10 (2,2/2,2,3,3)					
		5.00	SPT	N=18 (5,3/4,4,5,5)				 <i>Becomes stiff from 5.00m bgl.</i>	
								End of Borehole at 5.45m	

 BROWNFIELD SOLUTIONS LTD				Trial Pit Log				No. TT01	
PROJECT NO: C6123				CO-ORDS: 380176E, 413583N				Sheet 1 of 1	
PROJECT NAME: SPRINGSIDE ROAD, BURY				LEVEL: 123.94m OD				Hole Type	
CLIENT: EDGEFOLD HOMES				DATES: 29/04/25				TP	
								Scale	
								1:25	
								Logged	
								Checked	
								MAS	
								JM	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
	0.50-1.50	ES		0.30	123.64		MADE GROUND TOPSOIL: Grass over brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.		
							MADE GROUND: Greyish brown ashy gravelly sand with medium cobble content. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, glass, sandstone, coal, metal, ceramic, and plastic. Cobbles are sub-angular of sandstone, brick, and metal up to 230mm in diameter.		
				2.20	121.74		Firm grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.		
				2.30	121.64		End of Trial Pit at 2.30m		
Remarks									
1. Service clearance undertaken by a BSL engineer using CAT & Genny.							ES = Environmental Sample		
2. No groundwater encountered.							D = Disturbed Sample		
3. Excavation sides unstable from 1.50m bgl.							B = Bulk Sample		
4. Trial pit terminated at 2.20m bgl due to collapse.							LB = Large Bulk Sample		
5. Back-filled with arisings upon completion.							U = Undisturbed Sample		
							UT = Undisturbed Thin Wall Sample		
							SPT = Standard Penetration Test		
							PD = Photoluminescence Detector (ppm)		
							PPM = Parts Per Million		
							HGV = Hand Shear Vane		

TT01 - PLAN VIEW

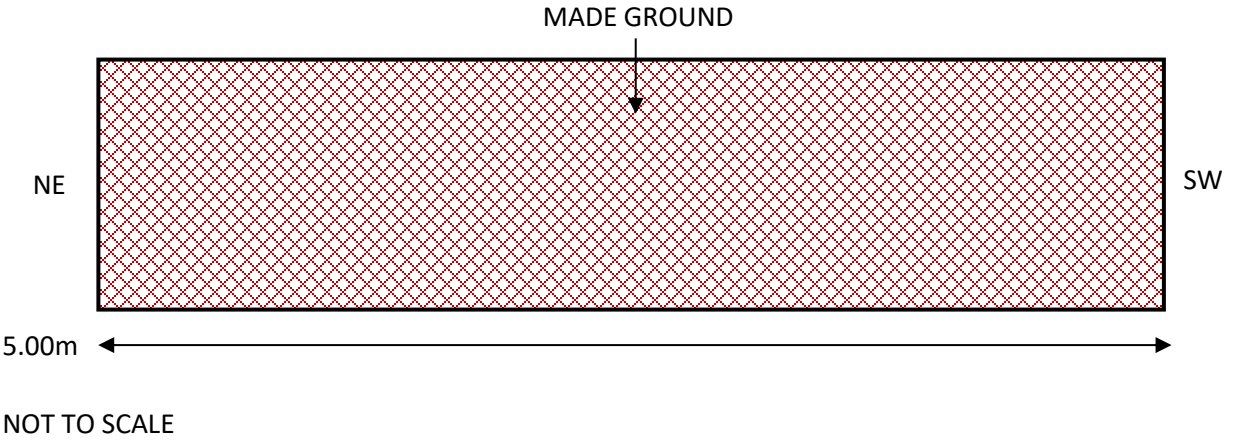


PHOTOGRAPHS



 BROWNFIELD SOLUTIONS LTD				Trial Pit Log		No. TT01E Sheet 1 of 1 Hole Type TP Scale 1:25 Logged Checked MASJIM	
PROJECT NO: C6123				CO-ORDS: 380189E, 413570N			
PROJECT NAME: SPRINGSIDE ROAD, BURY				LEVEL: 124.52m OD			
CLIENT: EDGEFOLD HOMES				DATES: 29/04/25			
Water Strikes	Sample and in Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50-1.50	ES		0.30	124.22		MADE GROUND TOPSOIL: Grass over brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
							MADE GROUND: Dark brown ashy sandy gravel with medium cobble content and rare boulders. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, sandstone, coal, and ceramic. Cobbles are sub-angular of sandstone, ceramic, brick, and metal up to 230mm in diameter. Boulders are angular to sub-angular of anthropogenic origins.
				2.20	122.32		Firm grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.
				2.30	122.22		End of Trial Pit at 2.30m
Remarks							
1. Service clearance undertaken by a BSL engineer using CAT & Genny. 2. No groundwater encountered. 3. Excavation sides unstable from 1.50m bgl. 4. Trial pit terminated at 2.20m bgl due to collapse. 5. Backfilled with screenings upon completion.							
ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LG = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSE = Hand Shear Vane							

TT01E - PLAN VIEW



PHOTOGRAPHS



APPENDIX C

Geotechnical Testing Results



TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022,
cl 5.3, 6

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Brownfield Solutions Ltd
Client Address: William Smith House, 173 - 183 Witton Street,
Northwich, Cheshire,
CW9 5LP

Contact: Maeve Sutterby
Site Address: Springside Road, Bury

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6123
Job Number: 25-023170-1
Date Sampled: 29/04/2025
Date Received: 07/05/2025
Date Tested: 13/05/2025
Sampled By: Client - MAS

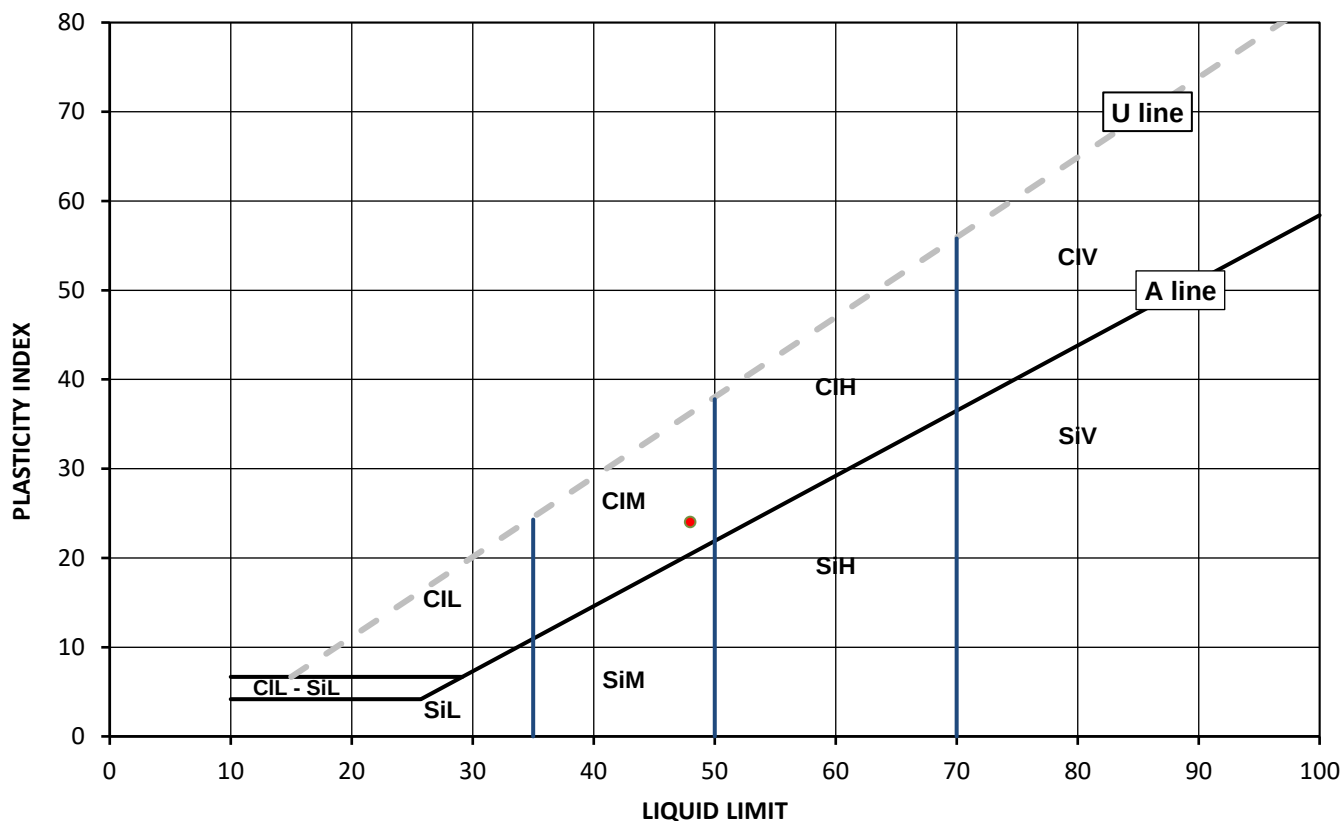
Test Results:

Laboratory Reference: 537051
Hole No.: TP01
Sample Reference: Not Given
Sample Description: Blueish brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 0.60
Depth Base [m]: 1.00
Sample Type: D

Sample Preparation: Tested after >0.425 mm removed by hand;
Cone Type: 80g/30deg

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
22.8	48	1.021	24	24	-0.04	1.04	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity	Liquid Limit
Cl	Clay	L Low	below 35
Si	Silt	M Medium	35 to 50
		H High	50 to 70
		V Very high	exceeding 70
		O Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed:

Monika Siewior

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022,
cl 5.3, 6

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Environmental Science

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Client: Brownfield Solutions Ltd
Client Address: William Smith House, 173 - 183 Witton Street,
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CW9 5LP
Contact: Maeve Sutterby
Site Address: Springside Road, Bury

Client Reference: C6123
Job Number: 25-023170-1
Date Sampled: 29/04/2025
Date Received: 07/05/2025
Date Tested: 13/05/2025
Sampled By: Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

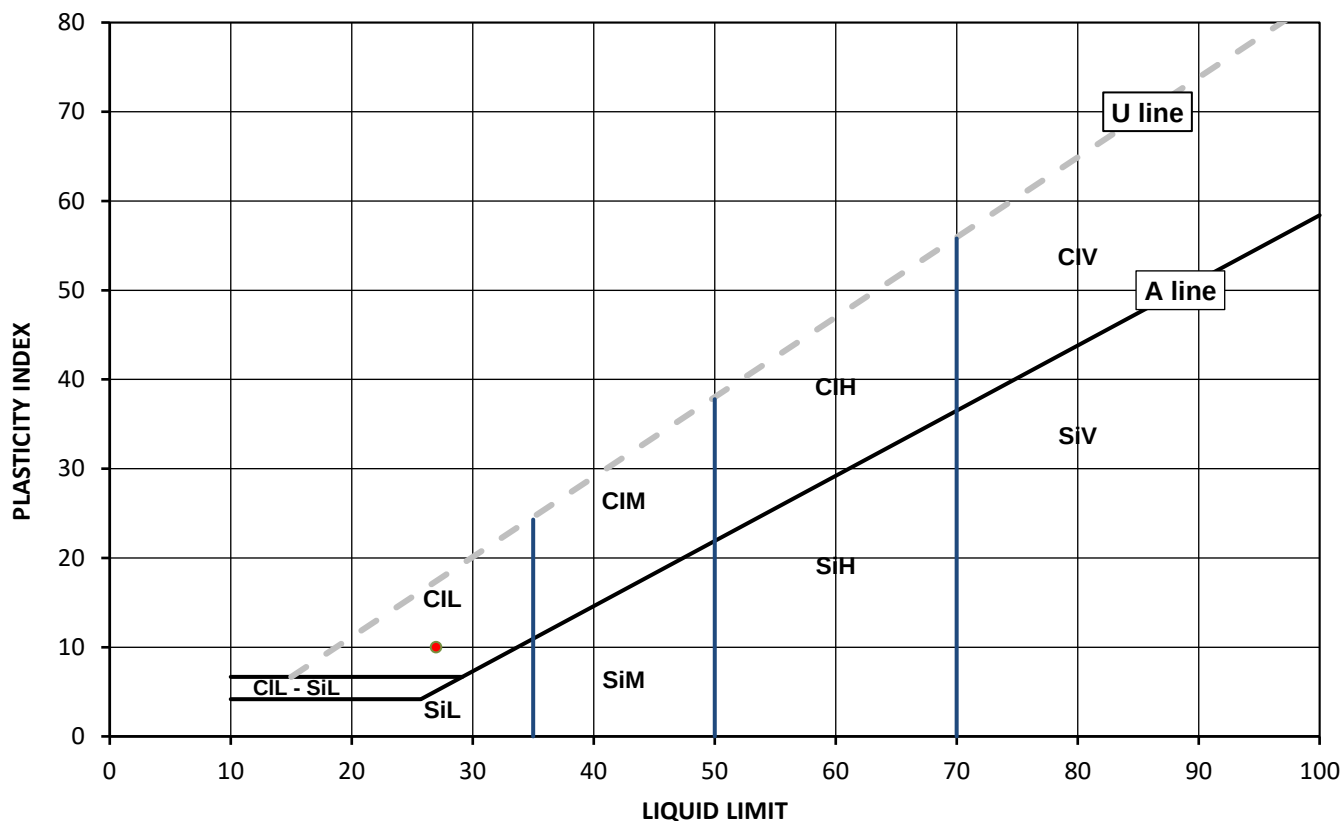
Test Results:

Laboratory Reference: 537052
Hole No.: TP08
Sample Reference: Not Given
Sample Description: Greyish brown slightly gravelly very sandy CLAY

Depth Top [m]: 0.40
Depth Base [m]: 1.00
Sample Type: D

Sample Preparation: Tested after >0.425 mm removed by hand;
Cone Type: 80g/30deg

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
17.7	27	1.000	17	10	0.10	0.90	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L	Low
	M	Medium
	H	High
	V	Very high
	O	Organic
		append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed:

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022,
cl 5.3, 6

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Contact: Maeve Sutterby
Site Address: Springside Road, Bury
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6123
Job Number: 25-023170-1
Date Sampled: 28/04/2025
Date Received: 07/05/2025
Date Tested: 13/05/2025
Sampled By: Client - MAS

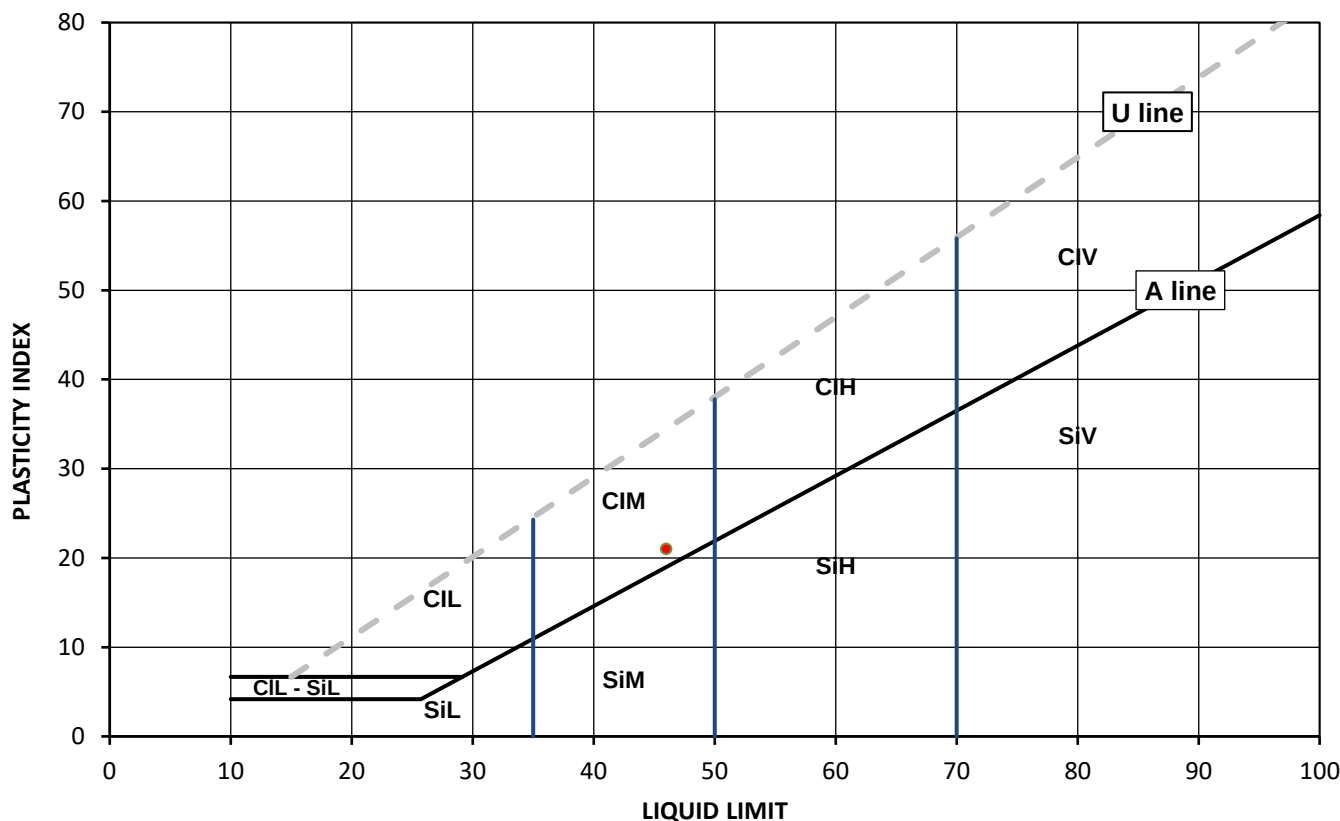
Test Results:

Laboratory Reference: 537053
Hole No.: WS02
Sample Reference: Not Given
Sample Description: Blueish brown slightly gravelly slightly sandy silty CLAY

Depth Top [m]: 0.90
Depth Base [m]: 1.60
Sample Type: D

Sample Preparation: Tested after >0.425 mm removed by hand;
Cone Type: 80g/30deg

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
23.4	46	1.020	25	21	-0.10	1.10	95



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Plasticity		Liquid Limit	
Cl	Clay	L	Low
Si	Silt	M	Medium
		H	High
		V	Very high
		O	Organic
			append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022,
cl 5.3, 6

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Environmental Science

4041

Client: Brownfield Solutions Ltd
Client Address: William Smith House, 173 - 183 Witton Street,
Northwich, Cheshire,
CW9 5LP
Contact: Maeve Sutterby
Site Address: Springside Road, Bury

Client Reference: C6123
Job Number: 25-023170-1
Date Sampled: 28/04/2025
Date Received: 07/05/2025
Date Tested: 13/05/2025
Sampled By: Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

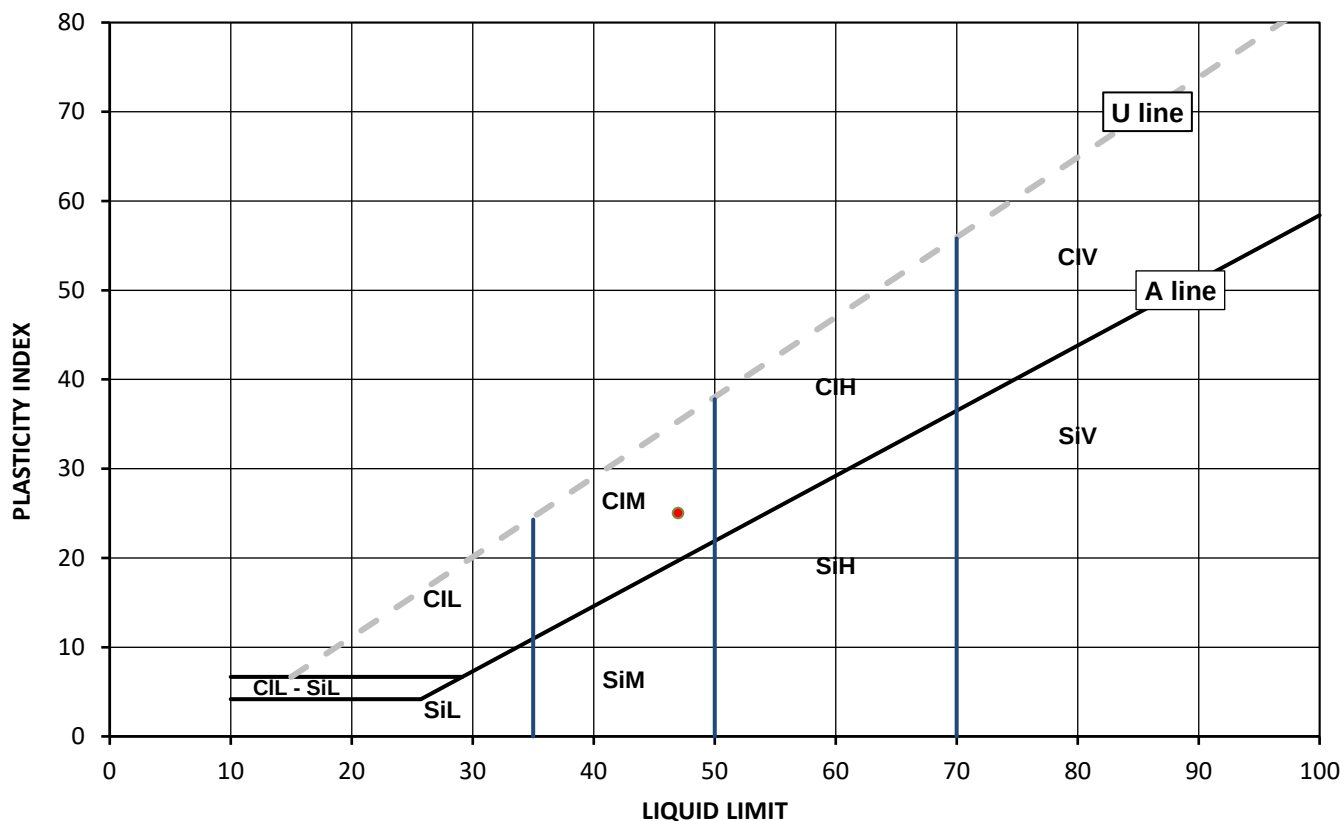
Test Results:

Laboratory Reference: 537054
Hole No.: WS04
Sample Reference: Not Given
Sample Description: Grey slightly gravelly slightly sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: 2.50
Sample Type: D

Sample Preparation: Tested after >0.425 mm removed by hand;
Cone Type: 80g/30deg

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
26.8	47	1.000	22	25	0.20	0.80	97



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	
	V Very high	
	O Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Signed:

Monika Siewior

Monika Siewior
Senior Reporting Specialist
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SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

Tested in Accordance with:

4041

Client: Brownfield Solutions Ltd
Client Address: William Smith House, 173 - 183 Witton Street,
Northwich, Cheshire, CW9 5LP
Contact: Maeve Sutterby
Site Address: Springside Road, Bury

BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6. Correlation Factor by Clayton C.R.I and Jukes A.W (1978). W by BS EN ISO 17892-1:2014+A1:2022.

Client Reference: C6123
Job Number: 25-023170-1
Date Sampled: 28/04 - 29/04/2025
Date Received: 07/05/2025
Date Tested: 13/05/2025
Sampled By: Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	W	Liquid & Plastic Limit							Density		
		Reference	Depth Top	Depth Base	Type				% Passing 425um	WL*	Correlation Factor	Wp	Ip	Cone type	Sample Preparation	bulk	dry	PD
			m	m														
537051	TP01	Not Given	0.60	1.00	D	Blueish brown slightly gravelly slightly sandy CLAY	Atterberg 1 Point	22.8	99	48	1.021	24	24	80g/30 deg	R			
537052	TP08	Not Given	0.40	1.00	D	Greyish brown slightly gravelly very sandy CLAY	Atterberg 1 Point	17.7	98	27	1.000	17	10	80g/30 deg	R			
537053	WS02	Not Given	0.90	1.60	D	Blueish brown slightly gravelly slightly sandy silty CLAY	Atterberg 1 Point	23.4	95	46	1.020	25	21	80g/30 deg	R			
537054	WS04	Not Given	2.00	2.50	D	Grey slightly gravelly slightly sandy CLAY	Atterberg 1 Point	26.8	97	47	1.000	22	25	80g/30 deg	R			

Note: # Non accredited; NP - Non plastic; N - Tested in natural condition, R - Tested after >0.425mm removed by hand, WR - Tested after washing to remove >425mm; * - One point liquid limit corrected as per the report Correlation Factor by Clayton C.R.I and Jukes A.W (1978)

Comments:

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Signed:

Monika Siewior

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd



SUMMARY REPORT
DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS EN ISO 17892-1:2014+A1:2022, BS 1377-2: 2022, clause 4.1

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Brownfield Solutions Ltd
Client Address: William Smith House, 173 - 183 Witton Street,
Northwich, Cheshire,
CW9 5LP
Contact: Maeve Sutterby
Site Address: Springside Road, Bury

Client Reference: C6123
Job Number: 25-023170-1
Date Sampled: 28/04 - 29/04/2025
Date Received: 07/05/2025
Date Tested: 13/05/2025
Sampled By: Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC											
		Reference	Depth Top m	Depth Base m	Type														
537051	TP01	Not Given	0.60	1.00	D	Blueish brown slightly gravelly slightly sandy CLAY		22.8											
537052	TP08	Not Given	0.40	1.00	D	Greyish brown slightly gravelly very sandy CLAY		17.7											
537053	WS02	Not Given	0.90	1.60	D	Blueish brown slightly gravelly slightly sandy silty CLAY		23.4											
537054	WS04	Not Given	2.00	2.50	D	Grey slightly gravelly slightly sandy CLAY		26.8											

Comments:

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Signed:

Monika Siewior

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

APPENDIX D

Chemical Testing Results

Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
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Analytical Report Number : 25-022794

Project / Site name:	Springside Road, Bury	Samples received on:	02/05/2025
Your job number:	C6123	Samples instructed on/ Analysis started on:	02/05/2025
Your order number:	MAS/C6123/6396	Analysis completed by:	09/05/2025
Report Issue Number:	1	Report issued on:	09/05/2025
Samples Analysed:	4 soil samples		



Signed:

Dominika Liana
Junior 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
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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: 25-022794
Project / Site name: Springside Road, Bury
Your Order No: MAS/C6123/6396

Lab Sample Number				534240	534241	534242	534243
Sample Reference				TP02	TT01	WS03	WS04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				1.60-2.00	0.50-1.50	0.50-1.20	0.10-0.40
Date Sampled				29/04/2025	29/04/2025	28/04/2025	28/04/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				

Stone Content	%	0.1	NONE	< 0.1	41	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	24	14	22
Total mass of sample received	kg	0.1	NONE	0.6	0.6	0.7	0.7

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected
Asbestos Analyst ID	N/A	N/A	N/A	SPU	SPU	SPU	SPU
Analysis completed	N/A	N/A	N/A	08/05/2025	08/05/2025	08/05/2025	08/05/2025
Actinolite detected	Type	N/A	ISO 17025	-	-	-	Not-detected
Amosite detected	Type	N/A	ISO 17025	-	-	-	Not-detected
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	Not-detected
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	Detected
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	Not-detected
Tremolite detected	Type	N/A	ISO 17025	-	-	-	Not-detected

Asbestos % by hand picking/weighing	%	0.001	ISO 17025	-	-	-	< 0.001
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Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	Loose Fibres
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General Inorganics

pH (L099)	pH Units	N/A	MCERTS	6.2	6.9	7.6	7.2
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	100	870	65	55
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	49.9	433	32.5	27.5
Organic Matter (automated)	%	0.1	MCERTS	1.8	6.7	1.5	4.3

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.34	< 0.05	0.08
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.11
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.19	< 0.05	0.09
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.1	< 0.05	0.12
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	2.4	< 0.05	1.7
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.24	< 0.05	0.29
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.6	< 0.05	2.7
Pyrene	mg/kg	0.05	MCERTS	< 0.05	3.1	< 0.05	2.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.4	< 0.05	1.5
Chrysene	mg/kg	0.05	MCERTS	< 0.05	1.9	< 0.05	1.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	1.5	< 0.05	1.6
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.88	< 0.05	0.77
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.3	< 0.05	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.51	< 0.05	0.61
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.16	< 0.05	0.17
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.71	< 0.05	0.73

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	18.3	< 0.80	16
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Analytical Report Number: 25-022794
Project / Site name: Springside Road, Bury
Your Order No: MAS/C6123/6396

Lab Sample Number				534240	534241	534242	534243
Sample Reference				TP02	TT01	WS03	WS04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				1.60-2.00	0.50-1.50	0.50-1.20	0.10-0.40
Date Sampled				29/04/2025	29/04/2025	28/04/2025	28/04/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9	68	4	16
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	U/S ^{*U/S f}	< 0.2	0.6
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	38	28	22	24
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	39	29	22	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	37	240	21	43
Lead (aqua regia extractable)	mg/kg	1	MCERTS	22	800	16	190
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	2	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	59	71	14	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	2.1	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	94	390	31	90

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



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Analytical Report Number: 25-022794
Project / Site name: Springside Road, Bury
Your Order No: MAS/C6123/6396

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample	Analysis completed	Analyst ID
534243	WS04	0.10-0.40	141	Loose Fibres	Chrysotile	< 0.001	< 0.001	08/05/2025	SPU

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number : 25-022794
Project / Site name: Springside Road, Bury

* 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 *
534240	TP02	None Supplied	1.60-2.00	Brown clay
534241	TT01	None Supplied	0.50-1.50	Brown loam and sand with gravel and stones
534242	WS03	None Supplied	0.50-1.20	Brown clay and sand with gravel
534243	WS04	None Supplied	0.10-0.40	Brown loam and clay with gravel and vegetation

Analytical Report Number : 25-022794

Project / Site name: Springside Road, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
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	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazine followed by colorimetry	In-house method	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references	HSE Report No: 83/1996, HSG 248 (2021), HSG 264 (2012) & SCA Blue Book (draft)	A006B	D	ISO 17025

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 30°C.

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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

*U/S f- Unsuitable for analysis due to sample matrix (Impossible to determine Cd concentration due to interference)

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Analytical Report Number : 25-023171

Project / Site name:	Springside Road, Bury	Samples received on:	07/05/2025
Your job number:	C6123	Samples instructed on/ Analysis started on:	07/05/2025
Your order number:	MAS/C6123/6396	Analysis completed by:	15/05/2025
Report Issue Number:	1	Report issued on:	15/05/2025
Samples Analysed:	4 soil samples		



Signed:

Rafa Szczepaczyk
Technical Reviewer
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
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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: 25-023171
 Project / Site name: Springside Road, Bury
 Your Order No: MAS/C6123/6396

Lab Sample Number				537055	537056	537057	537058
Sample Reference				TP03	TP04	TP07	WS05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				1.70-2.50	0.60-1.20	0.50-1.50	1.30-2.00
Date Sampled				29/04/2025	29/04/2025	29/04/2025	28/04/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status	

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	18	22	17
Total mass of sample received	kg	0.1	NONE	0.4	0.4	0.4	0.4

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	6.1	5.2	7.7	6.7
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	82	56	100	86
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	40.9	27.9	50.4	42.7

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

Analytical Report Number : 25-023171

Project / Site name: Springside Road, Bury

* 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 *
537055	TP03	None Supplied	1.70-2.50	Brown clay and loam with gravel
537056	TP04	None Supplied	0.60-1.20	Brown clay and sand with gravel
537057	TP07	None Supplied	0.50-1.50	Brown clay and sand with gravel
537058	WS05	None Supplied	1.30-2.00	Brown clay with gravel

Analytical Report Number : 25-023171

Project / Site name: Springside Road, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	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 30°C.

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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Human Health Assessment Summary - Soils Test Data			Soil Type: Location: Depth:			TP02 1.60-2.00	TT01 0.50-1.50	WS03 0.50-1.20	WS04 0.10-0.40	TP03 1.70-2.50	TP04 0.60-1.20	TP07 0.50-1.50	WS05 1.30-2.00
Contaminant	GAC (mg/kg)	No. Samples	Min. Value	Max. Value	No. Samples ≥GAC								
Moisture Content	-	8	14.00	24.00	-	19	24	14	22	19	18	22	17
Soil Organic Matter	-	4	1.50	6.70	-	1.8	6.7	1.5	4.3				
pH	-	8	5.20	7.70	-	6.2	6.9	7.6	7.2	6.1	5.2	7.7	6.7
Water Soluble Sulphate (2:1 Leachate Equivalent) (mg/l)	Note mg/l	8	27.50	433.00	-	49.9	433.0	32.5	27.5	40.9	27.9	50.4	42.7
Arsenic	37	4	4.00	68.00	1	9.0	68.0	4.0	16.0				
Cadmium	11	3	< LOD	0.60	0	0.5		< 0.2	0.6				
Chromium (III)	910	4	22.00	38.00	0	38.0	28.0	22.0	24.0				
Hexavalent Chromium (VI)	6	4	< LOD	<LOD	0	< 1.8	< 1.8	< 1.8	< 1.8				
Copper	2400	4	21.00	240.00	0	37.0	240.0	21.0	43.0				
Lead	200	4	16.00	800.00	1	22.0	800.0	16.0	190.0				
Mercury	1.2	4	< LOD	2.00	1	< 0.3	2.0	< 0.3	< 0.3				
Nickel	130	4	14.00	71.00	0	59.0	71.0	14.0	24.0				
Selenium	250	4	< LOD	2.10	0	< 1.0	2.1	< 1.0	< 1.0				
Zinc	3700	4	31.00	390.00	0	94.0	390.0	31.0	90.0				
Cyanide (free)	34	4	0.00	<LOD	0	-	-	-	-				
Phenol (total)	200	4	0.00	<LOD	0	-	-	-	-				
Naphthalene	5.6	4	< LOD	0.34	0	< 0.05	0.34	< 0.05	0.08				
Acenaphthylene	420	4	< LOD	0.11	0	< 0.05	< 0.05	< 0.05	0.11				
Acenaphthene	510	4	< LOD	0.19	0	< 0.05	0.19	< 0.05	0.09				
Fluorene	400	4	< LOD	0.12	0	< 0.05	0.10	< 0.05	0.12				
Phenanthrene	220	4	< LOD	2.40	0	< 0.05	2.40	< 0.05	1.70				
Anthracene	5400	4	< LOD	0.29	0	< 0.05	0.24	< 0.05	0.29				
Fluoranthene	560	4	< LOD	3.60	0	< 0.05	3.60	< 0.05	2.70				
Pyrene	1200	4	< LOD	3.10	0	< 0.05	3.10	< 0.05	2.60				
Benzo(a)anthracene	11	4	< LOD	1.50	0	< 0.05	1.40	< 0.05	1.50				
Chrysene	22	4	< LOD	1.90	0	< 0.05	1.90	< 0.05	1.50				
Benzo(b)fluoranthene	3.3	4	< LOD	1.60	0	< 0.05	1.50	< 0.05	1.60				
Benzo(k)fluoranthene	93	4	< LOD	0.88	0	< 0.05	0.88	< 0.05	0.77				
Benzo(a)pyrene	2.2	4	< LOD	1.50	0	< 0.05	1.30	< 0.05	1.50				
Indeno(1,2,3-cd)pyrene	36	4	< LOD	0.61	0	< 0.05	0.51	< 0.05	0.61				
Dibenz(a,h)anthracene	0.28	4	< LOD	0.17	0	< 0.05	0.16	< 0.05	0.17				
Benzo(ghi)perylene	340	4	< LOD	0.73	0	< 0.05	0.71	< 0.05	0.73				
Asbestos Detected (Detected or Not-Detected)	Y	4	0.00	0.00	0	Not-detected	Not-detected	Not-detected	Detected				
Asbestos Quantification (% w/w)	0.001	4	< LOD	<LOD	0	-	-	-	< 0.001				
Mean Average SOM			3.6										
Mean Average pH			6.7										
			Residential with Homegrown Produce 2.5% SOM			Values in RED are > the relevant screening levels and further assessment is required.							
Job Number: C6123						Exceedance of the screening levels alone may not mean a risk is posed.							
Client: Edgefold Homes													
Site: Springside Road, Bury													
Soil Group Type Combined Results													

APPENDIX E

Monitoring Results

Ground Gas Monitoring Results



CLIENT:		Date	Operator	Analysar	Weather Observations				Temp (°C)	Pressure Trend	Min Barometric Pressure (mb)	Notes
EDGEFOLD HOMES		12/05/2025	AR/CMC	GFM436	Intermittent cloud	Light breeze	Warm	18	Rising		1011	
JOB NO.		04/06/2025	SJ	GFM436	Sunny	No wind	Warm	17	Falling		993	
C6123		25/06/2025	AR	GFM436	Overcast	Light breeze	Warm	17	Falling		1017	
SITE:		09/07/2025	AR	GFM436	Overcast	No wind	Warm	17	Steady		1021	
SPRINGSIDE ROAD, BURY		28/07/2025	AR	GFM436	Overcast	Light breeze	Warm	17	Falling		1019	
		04/08/2025	AF	GFM436	Light rain	Windy	Warm	17	Falling		996	

Notes: mb = millibars; CH₄ = methane; LEL = lower explosive limit = 5%v/v; CO₂ = carbon dioxide; O₂ = oxygen; CO=carbon monoxide; H₂S = hydrogen sulphide; TVOC= Total volatile organic compounds; PPM = parts per million. Where the flow is less than the limit of detection of the instrument, the detection limit is reported (Highlighted in green). Gas Screening Values (GSVs) are rounded to 3 decimal places. Calibration Records for analysers used available on request.

Date	Time	Location	Response zone (m)	Pressures (mb)		Gas flows (l/hr)		CH ₄ (%v/v)		CH ₄ (%LEL)		CO ₂ (%v/v)		O ₂ (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH ₄) (l/hr)	Gas Screening Value (CO ₂) (l/hr)	Notes
				Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H ₂ S	TVOC (PID)					
Summary Statistics																							
				Max. values:	1021	0.0	0.3	0.0	0.0	0.0	0.0	9.5	3.5	21.2	20.9	0.0	0.0	0.0	0.0	4.8	0.000	0.000	Highlight Box - Methane >1.0% v/v
				Min. values:	989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	16.3	0.0	0.0	0.0	0.0	1.4	0.000	0.000	Highlight Box - Carbon Dioxide >5.0% v/v
				Top	Worst-case (note - not worst credible) GSVs based on maximum recorded steady flow and maximum individual peak concentrations:																0.000	0.010	Highlight Box - Water above Response Zone
				Bottom																			
12/05/2025	AM	Ambient		996				0.0	0.0	0.0	0.0	0.0	0.0	20.5									
		WS01	3.00	5.00		0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	18.9	20.8	0.0	0.0	0.0	NGW	4.76	0.000	0.000	
		WS04	0.50	1.50		0.0	0.3	0.0	0.0	0.0	0.0	1.9	2.1	19.5	19.4	0.0	0.0	0.0	NGW	1.40	0.000	0.000	
		WS05	1.00	5.00		0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.9	19.2	19.6	0.0	0.0	0.0	NGW	1.95	0.000	0.000	
		Ambient			997			0.0	0.0	0.0	0.0	0.0	0.0	20.6									
04/06/2025	AM	Ambient		989				0.0	0.0	0.0	0.0	0.0	0.0	20.7									
		WS01	3.00	5.00		0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	19.4	20.7	0.0	0.0	0.0	NGW	4.80	0.000	0.000	
		WS04	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.9	17.5	19.3	0.0	0.0	0.0	NGW	1.40	0.000	0.000	
		WS05	1.00	5.00		0.0	0.0	0.0	0.0	0.0	0.0	3.7	3.1	17.3	17.8	0.0	0.0	0.0	NGW	1.96	0.000	0.000	
		Ambient			990			0.0	0.0	0.0	0.0	0.0	0.0	20.7									
25/06/2025	AM	Ambient		998				0.0	0.0	0.0	0.0	0.0	0.0	21.0									
		WS01	3.00	5.00		0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	19.7	20.9	0.0	0.0		NGW	4.77	0.000	0.000	
		WS04	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.1	19.4	20.1	0.0	0.0		NGW	1.41	0.000	0.000	
		WS05	1.00	5.00		0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.5	15.0	16.3	0.0	0.0		NGW	1.97	0.000	0.000	
		Ambient			997			0.0	0.0	0.0	0.0	0.0	0.0	20.8									
09/07/2025	AM	Ambient						0.0	0.0	0.0	0.0	0.0	0.0	21.0									
		WS01	3.00	5.00	1021	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	19.1	20.8	0.0	0.0		NGW	4.76	0.000	0.000	
		WS04	0.50	1.50	1021	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.1	14.9	20.7	0.0	0.0		NGW	1.40	0.000	0.000	
		WS05	1.00	5.00	1021	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.1	16.2	20.7	0.0	0.0		NGW	1.94	0.000	0.000	
		Ambient						0.0	0.0	0.0	0.0	0.0	0.0	21.0									
28/07/2025	AM	Ambient						0.0	0.0	0.0	0.0	0.0	0.0	20.9									
		WS01	3.00	5.00	1019	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	18.8	20.6	0.0	0.0		NGW	4.78	0.000	0.000	
		WS04	0.50	1.50	1019	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0	14.3	20.3	0.0	0.0		NGW	1.41	0.000	0.000	
		WS05	1.00	5.00	1019	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.0	7.8	20.0	0.0	0.0		NGW	1.94	0.000	0.000	
		Ambient						0.0	0.0	0.0	0.0	0.0	0.0	21.0									
04/08/2025	AM	Ambient						0.0	0.0	0.0	0.0	0.0	0.0	21.2									
		WS01	3.00	5.00	996	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	12.7	20.6	0.0	0.0		NGW	4.77	0.000	0.000	
		WS04	0.50	1.50	995	0.0	0.0	0.0	0.0	0.0	0.0	6.4	0.0	16.0	20.3	0.0	0.0		NGW	1.39	0.000	0.000	
		WS05	1.00	5.00	1019	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0	20.6	20.0	0.0	0.0		NGW	1.94	0.000	0.000	
		Ambient						0.0	0.0	0.0	0.0	0.0	0.0	21.1									

APPENDIX F

Waste Assessment Report

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Analytical Report Number : 25-022795

Project / Site name:	Springside Road, Bury	Samples received on:	02/05/2025
Your job number:	C6123	Samples instructed on/ Analysis started on:	02/05/2025
Your order number:	MAS/C6123/6396	Analysis completed by:	12/05/2025
Report Issue Number:	1	Report issued on:	12/05/2025
Samples Analysed:	2 10:1 WAC samples		



Signed:

Rafał Szczepańczyk
Technical Reviewer
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
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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: 25-022795
 Project / Site name: Springside Road, Bury
 Your Order No: MAS/C6123/6396

Lab Sample Number				534244	534245
Sample Reference				TP02	TT01
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				1.60-2.00	0.50-1.50
Date Sampled				29/04/2025	29/04/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	41
Moisture Content	%	0.01	NONE	19	24
Total mass of sample received	kg	0.1	NONE	0.6	0.6

General Inorganics

pH (L005B)	pH Units	N/A	MCERTS	6.3	6.6
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.1	3.9
Loss on Ignition @ 450°C	%	0.2	MCERTS	3.9	12
Acid Neutralisation Capacity	mmol/kg +/-	-9999	NONE	-26	-4.2

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.34
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.19
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.1
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	2.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.24
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	3.6
Pyrene	mg/kg	0.05	MCERTS	< 0.05	3.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.4
Chrysene	mg/kg	0.05	MCERTS	< 0.05	1.9
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	1.5
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.88
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.51
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.16
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.71
Coronene	mg/kg	0.05	NONE	< 0.05	0.19

Total PAH

Total WAC-17 PAHs	mg/kg	0.85	NONE	< 0.85	18.5
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Petroleum Hydrocarbons

Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	< 10	< 10
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VOCs

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0

Total BTEX	µg/kg	10	MCERTS	< 10	< 10
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Analytical Report Number: 25-022795
 Project / Site name: Springside Road, Bury
 Your Order No: MAS/C6123/6396

Lab Sample Number				534244	534245
Sample Reference				TP02	TT01
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				1.60-2.00	0.50-1.50
Date Sampled				29/04/2025	29/04/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

PCBs by GC-MS

PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001 ~	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007

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

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Waste Acceptance Criteria Analytical Results

Waste Acceptance Criteria Analytical Results							
Report No:	25-022795						
					Client: BSL		
Location	Springside Road, Bury						
Lab Reference (Sample Number)	534244				Landfill Waste Acceptance Criteria		
Sampling Date	29/04/2025				Limits		
Sample ID	TP02				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Depth (m)	1.60-2.00						
Solid Waste Analysis							
TOC (%)**	1.1				3%	5%	6%
Loss on Ignition (%) **	3.9				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH, ID, CU, AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	6.3				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-26				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test		
	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00157			0.0157	0.5	2	25
Barium *	0.00802			0.0802	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	< 0.00040			< 0.0040	0.5	10	70
Copper *	0.0019			0.019	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0019			0.019	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	0.0049			0.049	0.1	0.5	7
Zinc *	0.00096			0.0096	4	50	200
Chloride *	0.78			7.8	800	15000	25000
Fluoride*	0.23			2.3	10	150	500
Sulphate *	5.0			50	1000	20000	50000
TDS*	14			140	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	4.93			49.3	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.6						
Dry Matter (%)	81						
Moisture (%)	19						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.					* = UKAS accredited (liquid eluate analysis only)		
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation					** - MCERTS accredited		

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



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Report No:	25-022795						
					Client: BSL		
Location	Springside Road, Bury						
Lab Reference (Sample Number)	534245				Landfill Waste Acceptance Criteria		
					Limits		
Sampling Date	29/04/2025				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TT01						
Depth (m)	0.50-1.50						
Solid Waste Analysis							
TOC (%)**	3.9				3%	5%	6%
Loss on Ignition (%) **	12				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH, ID, CU, AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	18.5				100	--	--
pH (units)**	6.6				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-4.2				--	To be evaluated	To be evaluated
Eluate Analysis		10:1		10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)					using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
		mg/l		mg/kg			
Arsenic *	0.00545			0.0545	0.5	2	25
Barium *	0.0180			0.180	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0017			0.017	0.5	10	70
Copper *	0.0085			0.085	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.00225			0.0225	0.5	10	30
Nickel *	0.0022			0.022	0.4	10	40
Lead *	0.012			0.12	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.011			0.11	4	50	200
Chloride *	0.55			5.5	800	15000	25000
Fluoride*	0.29			2.9	10	150	500
Sulphate *	3.3			33	1000	20000	50000
TDS*	20			200	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.54			55.3	500	800	1000
Leach Test Information							
Stone Content (%)	41.0						
Sample Mass (kg)	0.6						
Dry Matter (%)	76						
Moisture (%)	24						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and I2 cannot be held responsible for any discrepancies with current legislation							
** = UKAS accredited (liquid eluate analysis only)							
** = MCERTS accredited							

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.

This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 25-022795

Project / Site name: Springside Road, Bury

* 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 *
534244	TP02	None Supplied	1.60-2.00	Brown clay
534245	TT01	None Supplied	0.50-1.50	Brown loam and sand with gravel and stones

Analytical Report Number : 25-022795

Project / Site name: Springside Road, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1 ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025

Analytical Report Number : 25-022795

Project / Site name: Springside Road, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

~- Quality control surrogate recovery outside of limits, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



CP57X-86RZH-64EDK

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in **pale yellow**.

Report is invalid if pages are removed.

Job name

C6123 Springside Road, Bury

Description/Comments

Project

C6123

Site

Springside Road, Bury

Classified by

Name: **Jack Mather**
Date: **12 May 2025 12:27 GMT**
Telephone: **01606334844**
Company: **Brownfield Solutions Limited**
173-183 Witton Street
Northwich
CW9 5LP

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

09 Feb 2023

Next 3 year Refresher due by Feb 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Land off Springside Road, Bury

Post Code BL9 5JQ

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

Redevelopment of a proportion of agricultural land into 12 residential houses.

Description of the specific process, sub-process and/or activity that created the waste

Waste created during the excavation of soils for residential development.

Description of the waste

"Mixed made ground comprising granular material with additions of brick, glass, coal, ceramic, metal, and plastic. One sample had slight hydrocarbon odour."



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP02	1.60-2.00	Non Hazardous		3
2	TT01	0.50-1.50	Non Hazardous		5
3	WS03	0.50-1.20	Non Hazardous		7
4	WS04	0.10-0.40	Non Hazardous		9

Related documents

#	Name	Description
1	BSL Suite	waste stream template used to create this Job

Report

Created by: Jack Mather

Created date: 12 May 2025 12:27 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	11
Appendix B: Rationale for selection of metal species	12
Appendix C: Version	12



Classification of sample: TP02

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP02	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.60-2.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				6.2 pH		6.2	pH	6.2 pH		
2	arsenic { arsenic trioxide }				9 mg/kg	1.32	9.625	mg/kg	0.000963 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
3	cadmium { cadmium sulfide }			1	0.5 mg/kg	1.285	0.521	mg/kg	0.0000405 %	✓	
	048-010-00-4	215-147-8	1306-23-6								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.8 mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				38 mg/kg	1.462	44.987	mg/kg	0.0045 %	✓	
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				37 mg/kg	1.126	33.743	mg/kg	0.00337 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	22 mg/kg		17.82	mg/kg	0.00178 %	✓	
	082-001-00-6										
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				59 mg/kg	1.579	75.484	mg/kg	0.00755 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	zinc { zinc oxide }				94 mg/kg	1.245	94.773	mg/kg	0.00948 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
12	naphthalene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
13	acenaphthylene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8								
14	acenaphthene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0277 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification



Classification of sample: TT01

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TT01	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50-1.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
24%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 24% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	• pH				6.9 pH		6.9	pH	6.9 pH		
2	• arsenic { arsenic trioxide }				68 mg/kg	1.32	68.234	mg/kg	0.00682 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
3	• chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.8 mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
4	• chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				28 mg/kg	1.462	31.102	mg/kg	0.00311 %	✓	
		215-160-9	1308-38-9								
5	• copper { dicopper oxide; copper (I) oxide }				240 mg/kg	1.126	205.362	mg/kg	0.0205 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
6	• lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	800 mg/kg		608	mg/kg	0.0608 %	✓	
	082-001-00-6										
7	• mercury { mercury dichloride }				2 mg/kg	1.353	2.057	mg/kg	0.000206 %	✓	
	080-010-00-X	231-299-8	7487-94-7								
8	• nickel { nickel dihydroxide }				71 mg/kg	1.579	85.23	mg/kg	0.00852 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
9	• selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2.1 mg/kg	1.405	2.242	mg/kg	0.000224 %	✓	
	034-002-00-8										
10	• zinc { zinc oxide }				390 mg/kg	1.245	368.933	mg/kg	0.0369 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
11	naphthalene				0.34 mg/kg		0.258	mg/kg	0.0000258 %	✓	
	601-052-00-2	202-049-5	91-20-3								
12	• acenaphthylene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8								
13	• acenaphthene				0.19 mg/kg		0.144	mg/kg	0.0000144 %	✓	
		201-469-6	83-32-9								
14	• fluorene				0.1 mg/kg		0.076	mg/kg	0.0000076 %	✓	
		201-695-5	86-73-7								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	phenanthrene	201-581-5	85-01-8		2.4 mg/kg		1.824 mg/kg	0.000182 %	✓	
16	anthracene	204-371-1	120-12-7		0.24 mg/kg		0.182 mg/kg	0.0000182 %	✓	
17	fluoranthene	205-912-4	206-44-0		3.6 mg/kg		2.736 mg/kg	0.000274 %	✓	
18	pyrene	204-927-3	129-00-0		3.1 mg/kg		2.356 mg/kg	0.000236 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6		1.4 mg/kg		1.064 mg/kg	0.000106 %	✓	
20	chrysene	601-048-00-0	205-923-4		1.9 mg/kg		1.444 mg/kg	0.000144 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.5 mg/kg		1.14 mg/kg	0.000114 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.88 mg/kg		0.669 mg/kg	0.0000669 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.3 mg/kg		0.988 mg/kg	0.0000988 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.51 mg/kg		0.388 mg/kg	0.0000388 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.16 mg/kg		0.122 mg/kg	0.0000122 %	✓	
26	benzo[ghi]perylene	205-883-8	191-24-2		0.71 mg/kg		0.54 mg/kg	0.000054 %	✓	
Total:								0.139 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification



Classification of sample: WS03

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS03	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50-1.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH				7.6 pH		7.6 pH	7.6 pH		
2	arsenic { arsenic trioxide }				4 mg/kg	1.32	4.542 mg/kg	0.000454 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				22 mg/kg	1.462	27.653 mg/kg	0.00277 %	✓	
		215-160-9	1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }				21 mg/kg	1.126	20.334 mg/kg	0.00203 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	16 mg/kg		13.76 mg/kg	0.00138 %	✓	
	082-001-00-6									
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				14 mg/kg	1.579	19.017 mg/kg	0.0019 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	zinc { zinc oxide }				31 mg/kg	1.245	33.184 mg/kg	0.00332 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
12	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
17	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0118 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification



Classification of sample: WS04

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS04	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.10-0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
22%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				7.2 pH		7.2	pH	7.2 pH		
2	arsenic { arsenic trioxide }				16 mg/kg	1.32	16.478	mg/kg	0.00165 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
3	cadmium { cadmium sulfide }			1	0.6 mg/kg	1.285	0.601	mg/kg	0.0000468 %	✓	
	048-010-00-4	215-147-8	1306-23-6								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.8 mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				24 mg/kg	1.462	27.36	mg/kg	0.00274 %	✓	
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				43 mg/kg	1.126	37.762	mg/kg	0.00378 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	190 mg/kg		148.2	mg/kg	0.0148 %	✓	
	082-001-00-6										
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				24 mg/kg	1.579	29.568	mg/kg	0.00296 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	zinc { zinc oxide }				90 mg/kg	1.245	87.379	mg/kg	0.00874 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
12	naphthalene				0.08 mg/kg		0.0624	mg/kg	0.00000624 %	✓	
	601-052-00-2	202-049-5	91-20-3								
13	acenaphthylene				0.11 mg/kg		0.0858	mg/kg	0.00000858 %	✓	
		205-917-1	208-96-8								
14	acenaphthene				0.09 mg/kg		0.0702	mg/kg	0.00000702 %	✓	
		201-469-6	83-32-9								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		0.12 mg/kg		0.0936 mg/kg	0.00000936 %	✓	
16	phenanthrene	201-581-5	85-01-8		1.7 mg/kg		1.326 mg/kg	0.000133 %	✓	
17	anthracene	204-371-1	120-12-7		0.29 mg/kg		0.226 mg/kg	0.0000226 %	✓	
18	fluoranthene	205-912-4	206-44-0		2.7 mg/kg		2.106 mg/kg	0.000211 %	✓	
19	pyrene	204-927-3	129-00-0		2.6 mg/kg		2.028 mg/kg	0.000203 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		1.5 mg/kg		1.17 mg/kg	0.000117 %	✓	
21	chrysene	601-048-00-0	205-923-4		1.5 mg/kg		1.17 mg/kg	0.000117 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.6 mg/kg		1.248 mg/kg	0.000125 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.77 mg/kg		0.601 mg/kg	0.0000601 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.5 mg/kg		1.17 mg/kg	0.000117 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.61 mg/kg		0.476 mg/kg	0.0000476 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.17 mg/kg		0.133 mg/kg	0.0000133 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		0.73 mg/kg		0.569 mg/kg	0.0000569 %	✓	
28	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
Total:								0.036 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

• pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

• chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• lead compounds with the exception of those specified elsewhere in this Annex

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

• acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

• acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

• fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410



■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Absence of hexavalent chromium indicates it unlikely that lead chromate is present within the site soils.

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulposelenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc oxide}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils. Furthermore, the presence of clinker suggests oxides of zinc will be present.

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**
HazWasteOnline Classification Engine Version: 2025.127.6614.12023 (07 May 2025)
HazWasteOnline Database: 2025.127.6614.12023 (07 May 2025)



This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v3.0 - version 3.0 of 11th January 2024

GB MCL List v4.0 - version 4.0 of 2nd March 2024

GB MCL List v5.0 - version 5.0 of 26th June 2024

GB MCL List v6.0 - version 6.0 of 15th February 2025

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