





EARTH ENVIRONMENTAL & GEOTECHNICAL

Site Investigation Report

Wells Road

Dewsbury

March 2023

On behalf of

Faisal Building Solution

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GEOENVIRONMENTAL SITE INVESTIGATION REPORT

WELLS ROAD

DEWSBURY

Report Ref: A4553/23/SI

MARCH 2023

DRAFT

Prepared on Behalf of:

FAISAL BUILDING SOLUTION

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Report Reference: A4553/23/SI

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Prepared for: Faisal Building Solution

Prepared by: Earth Environmental & Geotechnical Ltd
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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 INTRODUCTION 2

2.1 BACKGROUND 2
2.2 TERMS OF REFERENCE 2
2.3 REPORT SCOPE 2
2.4 LIMITATIONS OF THE STUDY 2

3.0 SITE LOCATION & DESCRIPTION 3

3.1 PROPOSED DEVELOPMENT 6

4.0 SITE INVESTIGATION 7

4.1 EXPLORATORY FIELDWORK 7
4.2 LABORATORY TESTING 10
4.2.1 Geotechnical Testing 10
4.2.2 Environmental Testing 10

5.0 GROUND CONDITIONS ENCOUNTERED 11

5.1 SOIL PROFILE ENCOUNTERED 11
5.2 OBSERVABLE INDICATIONS OF CONTAMINATION 11
5.3 OBSTRUCTIONS 12
5.4 GROUNDWATER 12

6.0 ENGINEERING PROPERTIES OF SOILS ENCOUNTERED 13

6.1 GENERAL 13
6.2 MADE GROUND/TOPSOIL 13
6.3 SUPERFICIAL DEPOSITS 13
6.3.1 Granular 13
6.3.2 Clay 14

7.0 GEOTECHNICAL ASSESSMENT 19

7.1 PROPOSED DEVELOPMENT 19
7.2 GROUND CONDITIONS ENCOUNTERED 19
7.3 FOUNDATION CONSIDERATIONS 19
7.3.1 *Conventional Shallow Depth Strip/Pad Foundations* 19
7.3.2 *Driven Piles* 21
7.4 PAVEMENT DESIGN 22
7.5 CHEMICAL ATTACK ON BURIED CONCRETE 23
7.6 SUITABILITY OF EXCAVATED MATERIALS 23
7.7 TEMPORARY WORKS 23

8.0 SOIL CONTAMINATION RISK ASSESSMENT 24

8.1 TIER I HUMAN HEALTH SOIL RISK ASSESSMENT – GROUNDWORKERS DURING DEVELOPMENT 24
8.2 TIER I HUMAN HEALTH SOIL RISK ASSESSMENT – FUTURE SITE USERS 24
8.3 SOIL WASTE ASSESSMENT 27

9.0 CONCLUSIONS & RECOMMENDATIONS 29

9.1 SOIL CONTAMINATION 29
9.2 ASBESTOS 29
9.3 FOUNDATIONS 29
9.4 SOIL DISPOSAL 29
9.5 PAVEMENT DESIGN 29
9.6 RISK TO BURIED (WATER) SERVICES 29
9.7 SITE PERSONNEL 30
9.8 OTHER MATTERS 30

DRAFT

LIST OF FIGURES

Figure 1 Aerial Photograph of Site
Figure 2 General Site Photographs
Figure 3 Proposed Development Plan
Figure 4 Exploratory Hole Location Plan
Figure 5 SPT v Depth Plot
Figure 6 Plasticity Chart

TABLES

Table 1 Sampling Location Justification
Table 2 Shear Strength Definitions
Table 3 Summary of Exploratory Holes Undertaken
Table 4 Summary of Laboratory Geotechnical Tests Undertaken
Table 5 Summary of Ground Conditions Encountered
Table 6 Summary of Laboratory Geotechnical Test Results
Table 7 Summary of Design Parameters (Granular)
Table 8 Summary of Design Parameters (Clay)
Table 9 Soil Desiccation Indicators in the Clay
Table 10 Summary of Allowable Bearing Pressures (Clay)
Table 11 Summary of Allowable Bearing Pressures (Granular)
Table 12 Summary of Anticipated Settlement (Clay)
Table 13 Summary of Anticipated Settlement (Granular)
Table 14 Comparison of Capping Thickness with and without Geotextile
Table 15 Summary of Guideline Values for Protection of Workers and the General Public During Development of Contaminated Land
Table 16 Soil Results Comparison with C4SL/S4UL Values
Table 17 Waste Classification of Soils
Table 18 Summary of WAC Test Results

APPENDICES

Appendix 1 Exploratory Hole Logs
Appendix 2 Geotechnical Testing Results
Appendix 3 Chemical Testing Results
Appendix 4 Soil Waste Assessment
Appendix 5 Report Limitations

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1.0 EXECUTIVE SUMMARY

Appointment	A Site Investigation has been commissioned by Faisal Building Solution (the Client), to examine ground conditions for a proposed new build just off of Wells Road, Dewsbury.
The Investigation	The investigation comprised tow windowless sample boreholes, with associated sampling and in situ testing, laboratory geotechnical and contamination testing.
The Site	The site is located to the North just off Wells Road, Dewsbury. The site is approximately 2.8km to the North of Dewsbury Town Centre. The site is a 'L' shaped parcel of land, to the north is a sheer drop to the car park of a local public house, to the south and east of site are residential housing. Access to site is at the South East through gap in the Heras fencing.
Ground Conditions Encountered	Made ground was encountered in both exploratory hole locations WS1 – WS2 between ground level and 2.60m bgl, underlying this layer in WS1 was a weathered sandstone bedrock to a maximum depth of 2.80m/bgl where the window sample rig refused. Underlying the made ground in WS2 however was a brown clayey sandy GRAVEL to a maximum depth of 2.10m/bgl, underlying this layer was a brown sandy gravelly CLAY to a maximum depth of 3.90m/bgl; this layer is then finally underlain by the same weathered sandstone bedrock and the window sample rig refused at 4.00m/bgl.
Geotechnical Assessment	Based on the ground conditions encountered, conventional shallow strip/pad foundations are considered suitable for this site.
Contamination Assessment	Risk from contamination to groundworkers during development – Moderate to low Risk from contamination to future commercial site users – Low No asbestos was identified in the samples analysed. No remediation of the site is required for the proposed development. Soil Waste Assessment: 4no. samples classified as Non-Hazardous. Waste Acceptance Criteria Testing: 1no. sample accepted at an Inert Waste Facility.
This sheet is intended to provide a summary only of the report. It does not provide a definitive engineering analysis for the purposes of costing or construction and is subject to the limitation of the agreed brief.	

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2.0 INTRODUCTION

2.1 Background

A Site Investigation has been commissioned by Faisal Building Solution (the Client), to examine ground conditions for a proposed new detached residential dwelling just off of Wells Road, Dewsbury.

2.2 Terms of Reference

Earth Environmental and Geotechnical Ltd (EEG) have been commissioned by the Client, to undertake a Site Investigation of the site in accordance with proposal A4552/23 dated 18th January 2023. The objectives of this investigation are as follows:

- *Provide factual information on the work undertaken including sampling location plan, borehole logs, geotechnical and chemical testing.*
- *Tier 1 (semi-quantitative) risk assessment will be undertaken. This will compare the concentrations of soil contaminants identified against current and appropriate published guidelines, in relation to identified receptors, e.g., existing/ future end users and site neighbours.*
- *Classification of soils for offsite disposal.*
- *Assessment of ground conditions for foundation design.*

2.3 Report Scope

This report presents full factual records of the site work carried out, the ground conditions encountered in the exploratory holes, the in situ and laboratory test results. All information collected has been used to provide an interpretation of the ground conditions, with recommendations on geotechnical design and potential ground contamination risks for the proposed development.

2.4 Limitations of the Study

The report is written in the context of an agreed scope of work and budget and should not be used in a different context. New information, improved practices or changes in legislation may require a reinterpretation of the report in whole or in part. EEG reserve the right to amend either conclusions or recommendations in light of any further information that may become available. The report is provided for the sole use by the client and is confidential to them.

Recommendations within this report are also based on exploratory records and examination of samples and, where applicable, laboratory tests. No liability can be accepted for conditions not revealed by the boreholes particularly at intervening locations. Whilst every effort is made to ensure accuracy of data supplied, all opinions expressed as to the spatial distribution of strata between sampling locations is for guidance only and no responsibility is accepted as to its accuracy.

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3.0 SITE LOCATION & DESCRIPTION

The site is located to the North just off Wells Road, Dewsbury. The site is approximately 2.8km to the North of Dewsbury Town Centre.

The approximate National Grid Reference for the centre of the site is SE 25306 18993, (X: 425306, Y:418993) with the closest postcode being WF12 0LE.

The maximum dimensions of the site are 25m east to west, and 15m north to south.

The site is a 'L' shaped parcel of land, to the north is a sheer drop to the car park of a local public house, to the south and east of site are residential housing. Access to site is at the South East through gap in the Heras fencing.

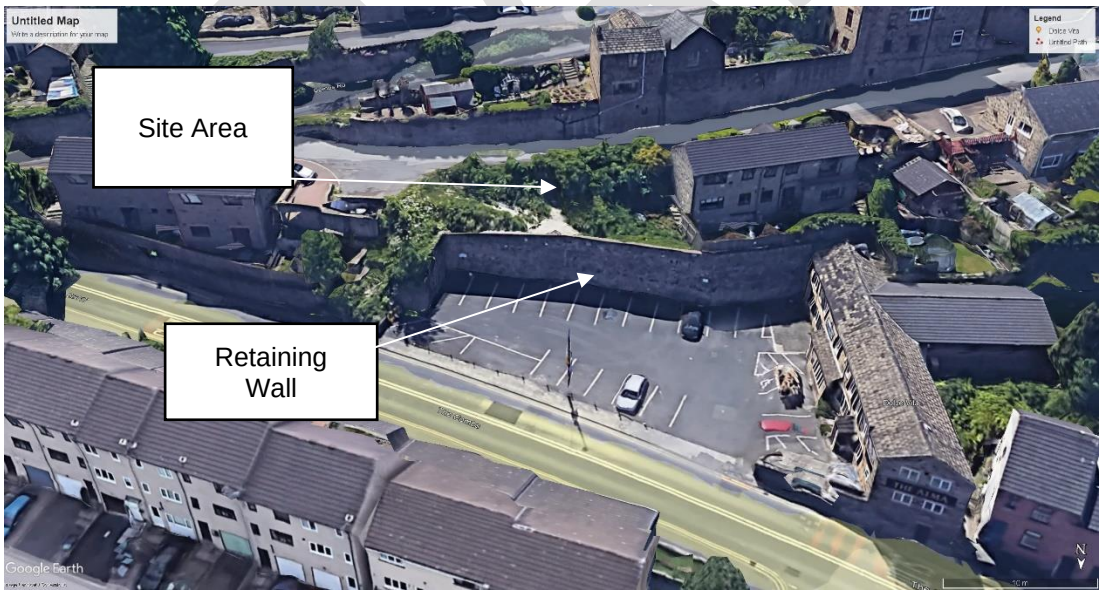
The site is steeply sloping and supported by a large stone built retaining wall along The Comb road.

The site is mainly soft standing although the north and north-west of site has some hardstanding.

The site is partially overgrown with brambles with various fly-tipped material across site including metal, wooden, crates and bricks.

The site location is shown in the aerial photograph presented as Figure 1, below.

Figure 1: Aerial Photograph of Site



General site photographs are presented in Figure 2 overleaf.

Figure 2: General Site Photographs

Photograph taken viewing East of site

Photograph taken showing North-west of site


Photograph taken of strata (WS1)



Photograph taken of SPT Sample (WS1)

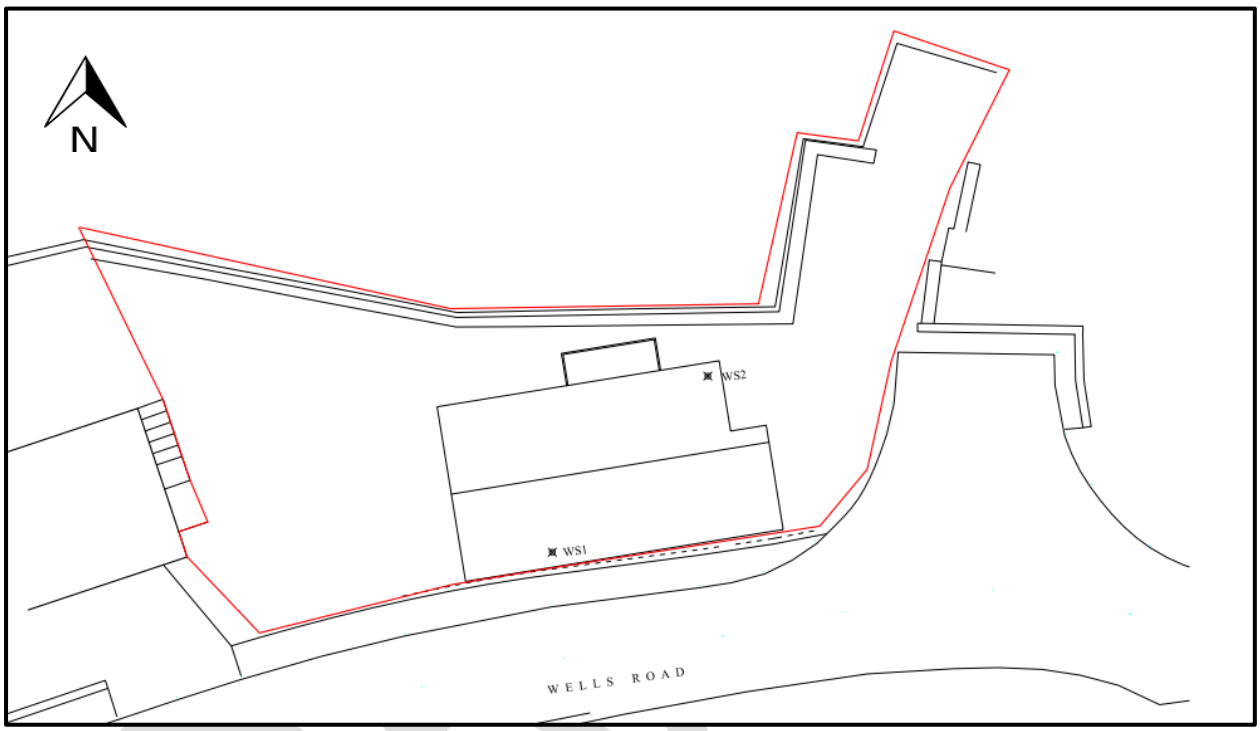


3.1 Proposed Development

It is understood that the client wishes to construct a residential property on the site just off of The Combs and Wells Road.

The proposed development layout details are shown in Figure 3 below.

Figure 3: Proposed Development Plan



4.0 SITE INVESTIGATION

4.1 Exploratory Fieldwork

The fieldwork was carried out by EEG on the 26th of January 2023 and comprised:

- Two modular LMSR window sample boreholes (designated WS1 – WS2 inclusive) were sunk to a maximum depth of 4.00m below existing ground level. Window sampler boring is carried out with a small, track-mounted rig, which uses a chain-driven trip hammer to drive sampling tubes or penetrometers into the ground. These tools are coupled to the anvil of the hammer by solid drill rods. Sampling tubes comprise "windowless samplers", which are plain sampler tubes in which a continuous disturbed sample is recovered within a semi-rigid plastic liner. In order to reduce friction within the borehole, sampling tubes of progressively smaller diameter are used as the borehole depth increases. Sampler diameters generally range from between approximately 90mm to 50mm. Standard Penetration Tests (SPTs) were undertaken in the boreholes in accordance with BS EN ISO 22476-3. Groundwater observations were noted where possible. These observations relate to the time of the investigation only, and do not necessarily reflect seasonal fluctuations. Exploratory hole logs are included in Appendix 1.

Exploratory hole locations were selected prior to the site works by EEG Ltd based on the proposed development and avoiding known services.

Table 1 below indicates the appropriate features targeted.

Table 1: Sampling Location Justification

Exploratory Hole	Sampling Location
WS1 – WS2	Foundation design

Each exploratory location was scanned using a Cable Avoidance Tool (CAT) in order to locate unrecorded underground services, and the exploratory locations were repositioned if necessary.

On completion, samples recovered from the site were taken to specialist laboratories for chemical and geotechnical testing.

Soil samples were recovered in 250g glass amber jars and 1kg plastic tubs. If collection was not possible the same day, then samples were stored in the sample storage fridge at the EEG offices below 4˚C.

Samples were tracked using appropriate Chain of Custody forms provided by DETS.

It should be noted that hexavalent chromium soil is analysed using the USEPA recommended method of alkaline leach. This method limits chromium (VI) reduction to chromium (III).

All site investigation work was supervised full time by a representative of EEG. The logging of soils and rocks has been carried out in accordance with BS5930(2015+A1:2020) except where superseded by the soil and rock description methodology in BS EN14688-1(2002), BS EN 14688-2(2004) and BS EN 14689-1(2003).

All sampling locations were surveyed by use of a hand-held Trimble GeoXH GPS instrument that is capable of surveying to an accuracy of less than 10mm depending on satellite coverage, proximity to trees and building structures.

The descriptive terminologies such as firm, etc formerly used within older versions of BS5930 to describe strength now solely relate to consistency. Shear strength is now defined related to results obtained in the field (using a hand vane for example) or in the laboratory (from triaxial tests), as detailed in Table 2 below.

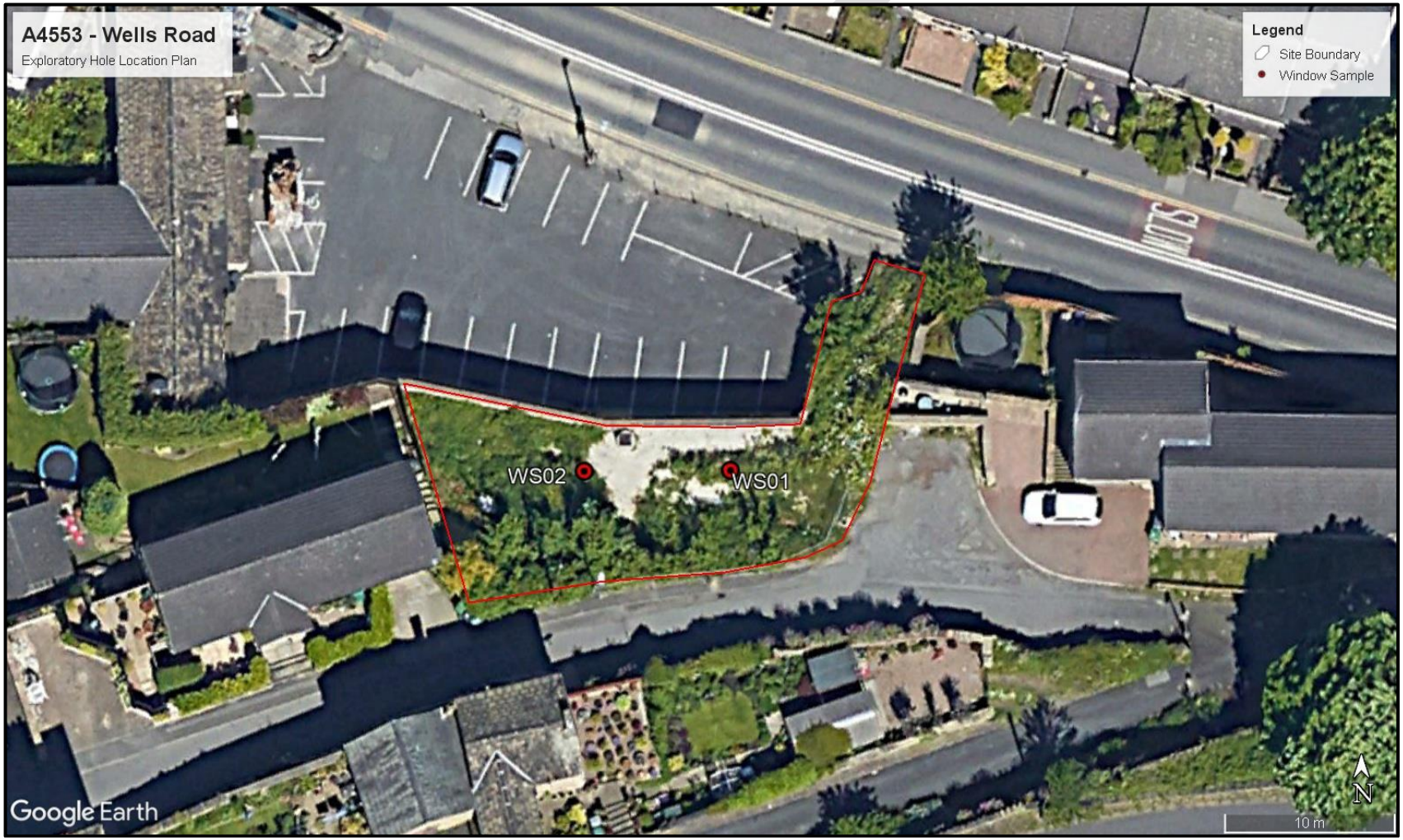
Table 2: Shear Strength Definitions

Term based on measurement	Undrained Strength (c_u) definition in kN/m² (from BS EN ISO 14688-2: 2004, 5.3, Table 5)
Extremely Low Strength	<10
Very Low Strength	10 to 20
Low Strength	20 to 40
Medium Strength	40 to 75
High Strength	75 to 150
Very High Strength	130 to 300
Extremely High Strength	300 to 600

An Exploratory Hole Location Plan is presented as Figure 4, overleaf.

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Figure 4: Exploratory Hole Location Plan



A summary of exploratory holes undertaken during the investigation are presented in Table 3 below.

Table 3: Summary of Exploratory Holes Undertaken

Hole	Type*	Depth (m)	Date Started	Date Finished	Easting (m)	Northing (m)	Backfill Details**
WS1	WS	6.00	26/01/23	26/01/23	425312	418994	A
WS2	WS	6.00	26/01/23	26/01/23	425304	418994	A
*WS = Window Sample Borehole **A = Arisings							

4.2 Laboratory Testing

4.2.1 *Geotechnical Testing*

A programme of laboratory testing was carried out on samples taken from the various strata to assist in classification and determine the engineering properties of the materials underlying the site. The tests were scheduled by EEG and carried out by Murray Rix. The test procedures used were generally in accordance with the methods described in BS1377:1990. Details of the specific tests used in each case are given in Table 4, below.

Table 4: Summary of Laboratory Geotechnical Tests Undertaken

TEST	STANDARD	No.
Liquid Limit, Plastic Limit, Plasticity Index	BS1377:1990 Part 2, Clause 4/5	2
Particle size distribution (wet)	BS1377:1990 Part 2, Clause 9.2	2
Sulphate content of 2:1 soil: water extract	BS1377:1990 Part 3, Clause 5	2
pH value	BS1377:1990 Part 3, Clause 9	2

The results of the laboratory geotechnical tests are discussed in Section 6 and included in Appendix 2.

4.2.2 *Environmental Testing*

The environmental chemistry of the ground was investigated by specialist chemical analysis of selected samples, scheduled by EEG, and carried out by DETS, a UKAS and MCERTS accredited laboratory.

Chemical analyses were carried out on four soil samples and were submitted for the following suite of determinants:

Asbestos Screen, pH, TOC, Total Sulphate, Sulphide, Total Cyanide, As, Cr, Cr $^{(vi),}$ Cu, Pb, Se, Zn, Cd, Hg, Ni, Vanadium, Barium, Beryllium, WS Boron, Mono Phenol, Speciated PAH and Speciated TPH.

Waste Acceptance Criteria testing was carried on one soil sample.

Full results of the laboratory contamination tests are discussed in Section 8 and included in Appendix 3.

5.0 GROUND CONDITIONS ENCOUNTERED

5.1 Soil Profile Encountered

BGS digital mapping shows no record of superficial deposits. The solid geology beneath the site is recorded as the Thornhill Rock formation, comprising generally fine grained, thickly bedded sandstone. The sequence of strata encountered beneath the site was as follows:

- **Made Ground –** Made ground was encountered in the exploratory holes to a maximum depth of 2.60m bgl, comprising:
  - Brown slightly sandy gravelly CLAY with rootlets throughout. Gravel is red brick and sandstone.
  - Brown sandy Gravel with low cobble content. Cobble is sandstone. Gravel is red brick and sandstone.

- **Gravel** – was encountered in WS2 exploratory hole locations to a maximum depth of 2.10m bgl, comprising:
  - Medium dense brown clayey sandy GRAVEL. Gravel is sandstone.

- **Clay** – was encountered in WS2 exploratory hole locations to a maximum depth of 3.90m bgl, comprising:
  - Stiff brown sandy gravelly CLAY. Gravel is sandstone.

- **Thornhill Rock Formation**– was encountered in all exploratory hole locations to a maximum depth of 4.00m bgl, comprising:
  - Weathered sandstone bedrock.

The depths of the various materials encountered in the exploratory holes are summarised in Table 5, below.

Table 5: Summary of Ground Conditions Encountered

Hole	MADE GROUND		NATURAL		THORNHILL ROCK FORMATION	GROUND WATER (m bgl)
	GRANULAR	COHESIVE	GRANULAR	COHESIVE	SANDSTONE	
WS1	0.30 – 2.60	0.00 – 0.30	-	-	2.60 – 2.80	-
WS2	-	0.00 – 0.70	0.70 – 2.10	2.10 – 3.90	3.90 – 4.00	-

5.2 Observable Indications of Contamination

During the site investigation there was no visual or olfactory evidence of contamination.

5.3 Obstructions

No man-made obstructions were encountered in any of the exploratory hole locations.

5.4 Groundwater

Groundwater was not encountered in any of the exploratory holes.

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6.0 ENGINEERING PROPERTIES OF SOILS ENCOUNTERED

6.1 General

The following sections discuss the engineering properties of the strata encountered, based on results of in situ testing and laboratory testing obtained during this investigation.

The results of laboratory geotechnical testing are summarised in the following table.

Table 6: Summary of Laboratory Geotechnical Test Results

Location	Depth (m)	Strata*	CLASSIFICATION												STRENGTH	CHEMICAL	
			Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Modified Plasticity Index (%)	PSD Cobbles %)	PSD Gravel (%)	PSD Sand (%)	PSD Silt (%)	PSD Clay (%)	Bulk Density Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	pH Value	Water Soluble Sulphate SO_4 (mg/l)
WS1	2.00	CLAY	-	-	-	-	-	100	81	61	22	17	-	-	-	7.3	170
WS2	1.00	GRAVEL	-	-	-	-	-	100	15	11	3	1	-	-	-	8.1	320
WS1	2.80	CLAY	12.0	32	13	20	-	-	-	-	-	-	-	-	-	-	-
WS2	2.10	CLAY	17.8	34	13	21	-	-	-	-	-	-	-	-	-	-	-

6.2 Made Ground/Topsoil

Made ground was encountered in both exploratory hole locations WS1 – WS2 between ground level and 2.60m bgl, underlying this layer in WS1 was a weathered sandstone bedrock to a maximum depth of 2.80m/bgl where the window sample rig refused.

Underlying the made ground in WS2 however was a brown clayey sandy GRAVEL to a maximum depth of 2.10m/bgl, underlying this layer was a brown sandy gravelly CLAY to a maximum depth of 3.90m/bgl; this layer is then finally underlain by the same weathered sandstone bedrock and the window sample rig refused at 4.00m/bgl.

Made ground is not typically considered to be a suitable founding material, although due to the lack of natural material in WS1 both samples from this hole were taken from made ground.

6.3 Superficial Deposits

As discussed in Section 5, there is no record of superficial deposits.

6.3.1 Granular

SPT N value of 18 was obtained, as can be seen from the SPT v Depth Plot. This result suggests the granular material is Medium dense.

For design purposes, N values of 18 has been adopted. Based on the correlation by Peck, Hanson and Thornburn(1974), this gives an **angle of shearing resistance** of between ϕ=32.5.

Table 7: Summary of Design Parameters (Granular)

Depth	SPT N Value Range	Average N Value	Design N Value*	Equivalent Soil Density	Angle of Internal Friction (degrees^{O})**
1.20	18	18	18	Medium Dense	32.5
*Based on lower quartile N value **Based on the correlation by Peck, Hanson and Thornburn (1974)					

6.3.2 Clay

Natural clay was encountered in one (WS2) exploratory hole location at a depth between 2.10m/bgl and 3.90m bgl.

Made ground clay was encountered in both exploratory hole locations between depths of 0.00m/bgl and 0.70m/bgl.

The **water-soluble sulphate** content of the clay sample was 170mg/l SO_4, with **pH values** of 7.3.

A Particle Size Distribution (PSD) test was carried out on one sample of clay. The laboratory described the material as a stiff grey silty slightly gravelly CLAY.

SPT tests carried out in the clay were corrected for drilling energy efficiency and overburden pressure and resulted in **N1(60) values** of between 16 and 28, as shown on the SPT v Depth Plot in Figure 5 (overleaf). The results suggest the clay is stiff..

Recommended N values and derived design values for the cohesive soils are summarised in Table 7, below.

Table 8: Summary of Design Parameters (Clay)

Depth (m)	SPT N1(60) Value Range	Average N1(60) Value	Design N1(60) Value*	Equivalent Shear Strength** (kN/m^2)	Coefficient of Volume Compressibility** (mv)
2	28	28.00	28.00	135	0.07
3	16	16.00	16.00	77	0.12
*Based on lower quartile N value and correlations by Peck Hanson and Thornburn (1974) **Based on correlation by Stroud & Butler (1975)					

It is recommended that for assessing ultimate bearing capacities, where the lower values are critical, the lower quartile value of N values is used. Based on the N Values in the above table, the equivalent shear strength values range between 77kN/m^2 and 135kN/m^2, suggesting the clay is high strength to very high strength at the depths tested, in accordance with Table 2.

Atterberg Limit tests were carried out on two samples of the clay. Results of the tests reported **liquid limit** values in the range 32% to 34% and **plastic limit** value of 13%, resulting in values of **plasticity index** in the range of 20% to 21%. These results suggest the samples of clay tested are of **intermediate plasticity** as shown on the Plasticity Chart in Figure 6, overleaf.

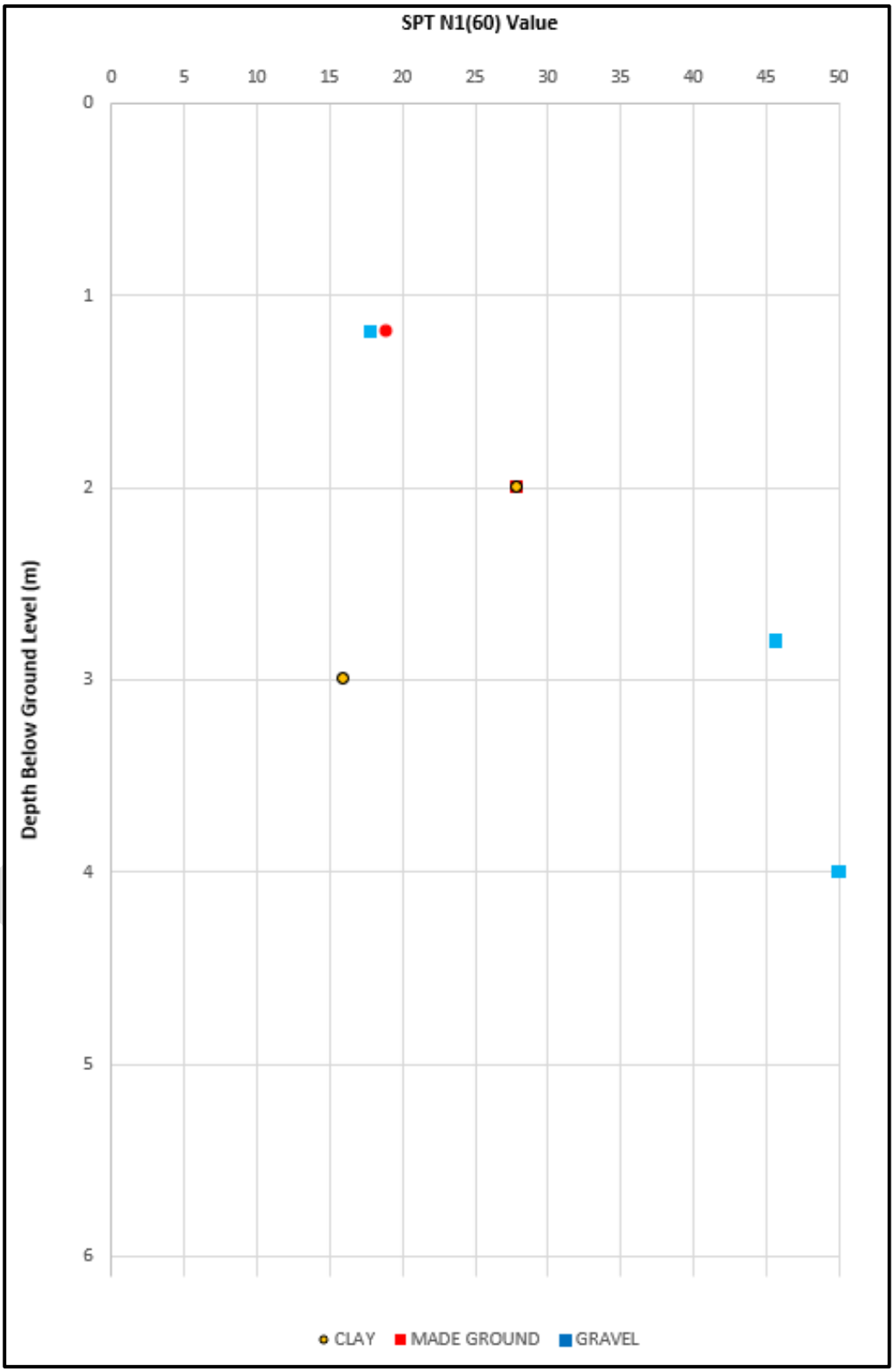
For design purposes, a value of plasticity index = 21% is recommended, based on the upper quartile of the results.

The **coefficient of volume compressibility (mv)** has been estimated using the following correlation by Stroud and Butler (1975): for a clay with a plasticity index of 21%, mv = 1 / (0.49 x N value).

This correlation gives values of the coefficient of volume compressibility of between 0.07m^2/MN and 0.12m^2/MN, as shown in Table 7, above. The results suggest the clay has **very low to low compressibility.**

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Figure 5: SPT v Depth Plot



In accordance with NHBC Chapter 4.2 Building Near Trees (2003) soils can be classified in terms of volume change potential, using the relationship:

$$I_{p'} = I_p \times \frac{\% \text{ less than } 425\mu m}{100\%}$$

$I_{p'}$ = modified plasticity index,
I_p = plasticity index.

Based on the laboratory test results, the above relationship and Table 1 of NHBC Chapter 4.2, the samples of Clay are shown to have a **low to medium volume change potential**.

The **Natural Moisture Content** (NMC) and **Liquid Limit** (LL) of the soil can be used to give an indication of **soil desiccation**, i.e., where the NMC is less than 40% of the LL, the soil is inferred to be desiccated, as summarised in Table 8, below.

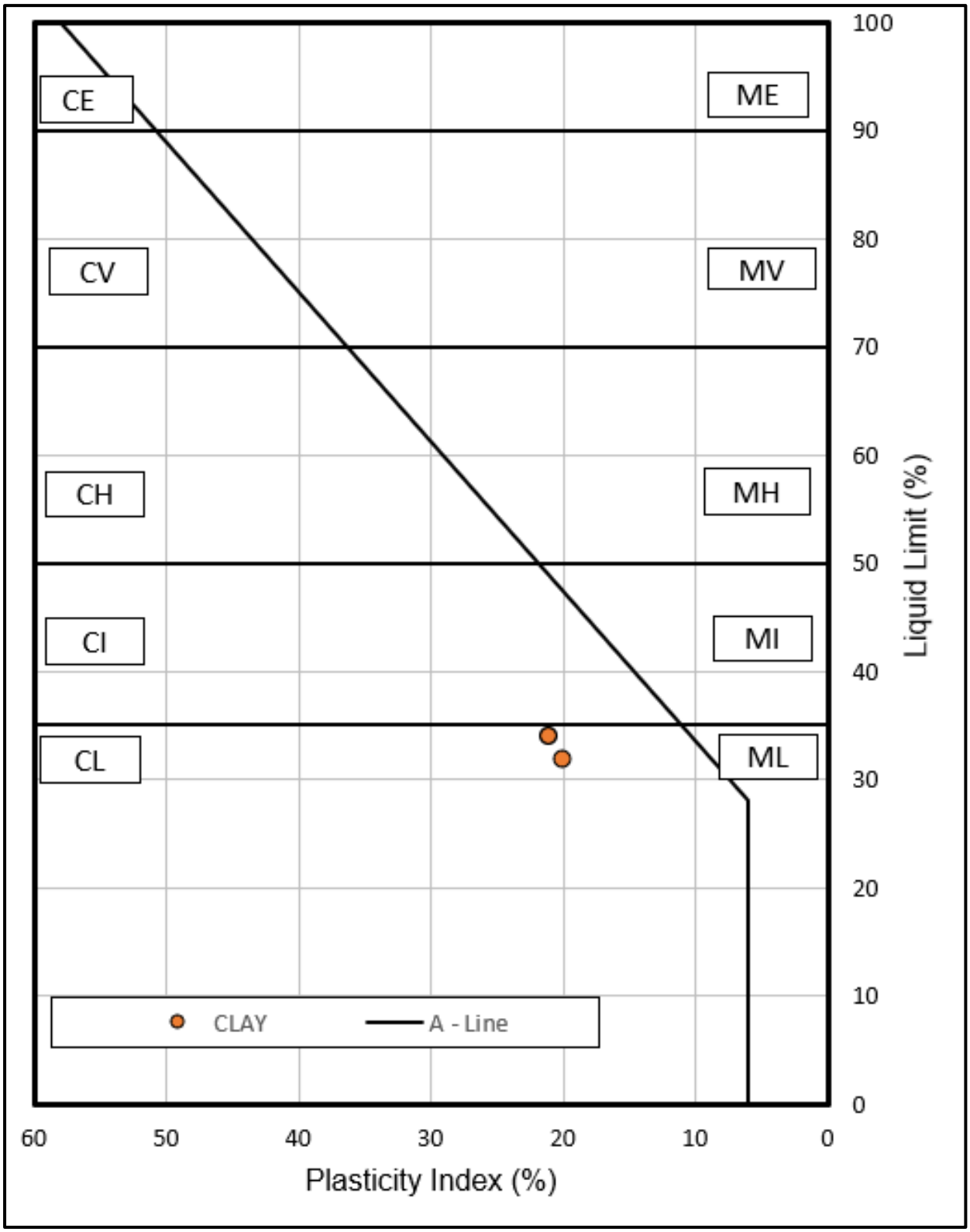
Table 9: Soil Desiccation Indicators in the Clay

Location	Depth (m)	Liquid Limit (%)	40% Liquid Limit (%)	Natural Moisture Content (%)	Desiccation
WS1	2.80	32	12.8	12.0	**Yes**
WS2	2.10	34	13.6	17.8	**No**

The results in the above table show that the samples tested from WS1 show signs of desiccation.

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Figure 6: Plasticity Chart



7.0 GEOTECHNICAL ASSESSMENT

7.1 Proposed Development

It is understood that the client wishes to construct a residential property on the site just off of Wells Road, Dewsbury.

Detailed information regarding structural loadings and proposed foundation type was not available at the time of authoring this report.

7.2 Ground Conditions Encountered

Made ground was encountered in the exploratory holes to a maximum depth of 2.60m bgl, comprising either a brown slightly sandy gravelly CLAY or brown sandy GRAVEL with low cobble content. Exploratory hole WS1 refused on a weathered sandstone at 2.80mbgl.

Underlying the made ground in WS2 is a medium dense brown clayey sandy GRAVEL to a maximum depth of 2.10m/bgl. Underlying this layer is a stiff brown sandy gravelly CLAY to a maximum depth of 3.90m/bgl. This exploratory hole refused on weathered sandstone at 4.00mbgl.

Groundwater was not observed in any of the exploratory holes.

7.3 Foundation Considerations

Based on the ground conditions encountered, conventional shallow strip/pad foundations are considered suitable for this site, providing the anticipated structural loadings are relatively low and subject to tolerance of structure to settlement.

The shallow strip/pad foundations are discussed below in 7.3.1.

7.3.1 *Conventional Shallow Depth Strip/Pad Foundations*

Strip/pad foundations should be taken down below any Made Ground and placed in the Devensian Till beneath. If any Made Ground, particularly loose or soft material, is encountered at foundation level this should be excavated and replaced with suitable granular fill or the foundation extended at least 150mm into suitable natural strata.

Foundations should be placed in materials of similar bearing and consolidation characteristics to avoid potential differential settlement occurring.

Table 10 & 11 overleaf summarise anticipated allowable bearing pressures for strip/pad foundations placed in the clay, sand, or gravel. The bearing capacities are calculated based on Hansen's (1978) method and assuming a factor of safety against bearing capacity failure of 3.

Table 10: Summary of Allowable Bearing Pressures (CLAY)

Foundation Strata	Design Value (Section 6)	Foundation Depth (m bgl)	Foundation Type	Foundation Size (m)	Allowable Bearing Pressure (kN/m²)
CLAY	c_u = 135 kN/m²	2.0	Strip	0.4	365
				0.9	345
			Pad	1.0 x 1.0	406
				2.0 x 2.0	370
	c_u = 135 kN/m²	2.50	Strip	0.4	370
				0.9	353
			Pad	1.0 x 1.0	416
				2.0 x 2.0	384
	c_u = 77 kN/m²	3.0	Strip	0.4	217
				0.9	209
			Pad	1.0 x 1.0	246
				2.0 x 2.0	229

Table 11: Summary of Allowable Bearing Pressures (Granular)

Foundation Strata	Design Value (Section 6)	Foundation Depth (m bgl)	Foundation Type	Foundation Size (m)	Allowable Bearing Pressure (kN/m²)
GRANULAR	ϕ = 32.5°	1.2	Strip	0.4	180
				0.9	192
			Pad	1.0 x 1.0	271
				2.0 x 2.0	280
	ϕ = 32.5°	1.5	Strip	0.4	222
				0.9	234
			Pad	1.0 x 1.0	339
				2.0 x 2.0	344

Table 10 below summarise anticipated settlements of the above foundations in the clay and gravel based on design values discussed in Section 6. Settlement in cohesive soils typically comprises a small amount of immediate settlement as loads are applied and a larger proportion of consolidation settlement, which will occur over a longer period of time.

As the proposed foundation loading is not known, for the purposes of these calculations a foundation loading of 75kN/m² has been used.

Table 12: Summary of Anticipated Settlement (Clay)

Foundation Strata	Foundation Depth (m bgl)	Foundation Type	Foundation Size (m)	Foundation Loading (kN/m²)	Settlement (mm)		
					At Centre	At Corner	Average
CLAY	2.0	Strip	0.4	75	-	-	**3**
			0.9	75	-	-	**5**
		Pad	1.0 x 1.0	75	7	2	**5**
			2.0 x 2.0	75	8	2	**6**
	2.5	Strip	0.4	75	-	-	**2**
			0.9	75	-	-	**3**
		Pad	1.0 x 1.0	75	5	1	**3**
			2.0 x 2.0	75	5	1	**4**
	3.0	Strip	0.4	75	-	-	1
			0.9	75	-	-	1
		Pad	1.0 x 1.0	75	2	0	1
			2.0 x 2.0	75	2	1	2

Table 13: Summary of Anticipated Settlements (Granular)

Foundation Depth (m bgl)	Foundation Strata	Foundation Type	Foundation Size (m)	Pad Foundation Loading (kN/m²)	Settlement* (mm)		
					Lower Limit	Upper Limit	Best Estimate
1.2	GRAVEL	Strip	0.4	75	1	5	**2**
			0.9	75	2	8	**3**
		Pad	1.0 x 1.0	75	1	6	**2**
			2.0 x 2.0	75	2	9	**4**
1.5	GRAVEL	Strip	0.4	75	1	5	**2**
			0.9	75	2	8	**3**
		Pad	1.0 x 1.0	75	1	6	**2**
			2.0 x 2.0	75	2	9	**4**
*Immediate settlement							

Floor slabs should be designed as suspended if Made Ground of 600mm thickness or greater is present. Made ground is not considered an appropriate bearing stratum due to its variable nature. Floor slabs may be designed as ground bearing where Made Ground is excavated and replaced with suitable granular fill.

All foundation excavations should be inspected by a suitable qualified engineer to prove that the founding strata is suitable and uniform along the length of the foundation, and capable of taking the anticipated structural loadings. If foundations cross from granular to cohesive soils, nominal reinforcement should be incorporated.

7.3.2 *Driven Piles*

For the ground conditions at this site, driven or bored piles could be adopted. Driven piles would have the advantage of minimising the spoil that is generated, however, the noise and vibration associated with the installation of driven piles may prevent this type of pile from being selected. It should also be noted that driven piles can also potentially create preferential pollutant pathways.

Short bored (cast in-situ) piles installed using continuous flight auger (CFA) techniques may therefore be more appropriate but given the various advantages and limitations of each pile type,

and the cost implications, advice should be sought from specialist piling contractors to determine the most suitable and cost-effective type.

They should also be able to give recommended pile diameters and depths and likely pile capacities, with guaranteed performance. It is recommended a pile test be carried out to confirm pile capacities. In assessing the pile capacities, contractors should make an allowance for the effects of negative skin friction, particularly in any Made Ground.

It is essential the advice of a specialist piling contractor is sought and that positive assurances are provided by the piling contractor that their proprietary system is capable of providing the required working loads in the ground conditions encountered.

Floor slabs should be designed as suspended if a piled solution is used.

7.4 Pavement Design

The ground investigation identified the soil type at the subgrade level to typically be made ground or topsoil. Based on the recommendations for design CBR values provided in Interim advice note 73/06, Revision 1 (2009), a conservative design CBR value of 1% should be adopted in areas where Made Ground is encountered at subgrade level.

If pavement design is altered so that the subgrade comprises Natural Strata (typically at depths in the region of 1.20m bgl), a CBR value of 3 to 5% should be adopted for the clay.

Consideration should be given to the potential differing ground conditions near surface, which could cause pavements to be constructed on variable made ground. In this context a flexible pavement design may be required.

Consideration should also be given to the use of geotextiles to allow reduction of capping thickness. For examples biaxial geogrids such as Tensar SSLA20 and SSLA30 are often used to reduce capping thickness. The advice of a suitable contractor should be sought as to the most appropriate type of geotextile to use in the ground conditions encountered at this site. For guidance, the following table gives a comparison of granular layer thickness with and without the use of a geotextile, in accordance with the requirement of HA25/94 Part 2.

It should be noted the type of construction will depend on proposed finished pavement levels across the site and it is recommended the pavement design is reviewed once these levels are known. In this context, it is essential further in situ CBR testing is carried out once formation levels are known to confirm design CBR values.

Table 14: Comparison of Capping Thickness with and without Geotextile

CBR	Unreinforced			Reinforced with Tensar Geogrid				
	Sub-base	Capping	Total	Sub-base	Capping	No. of grids	Total	Thickness saving
0.5%	Design not suitable			200mm	400mm	2	600mm	-
1.0%	150mm	600mm	750mm	400mm	0	1	400mm	350mm
1.5%	150mm	600mm	750mm	310mm	0	1	310mm	440mm
2.0%	150mm	600mm	750mm	260mm	0	1	260mm	490mm
3.0%	150mm	350mm	500mm	210mm	0	1	210mm	290mm
4.0%	150mm	300mm	450mm	175mm	0	1	175mm	275mm
5.0%	150mm	250mm	400mm	160mm	0	1	160mm	240mm
These figures are suitable for light access roads and car parks, based on 1000 standard axles. For heavier loaded pavements, the advice of specialist contractor should be sought.								

All formation excavations should be examined by a suitably experienced engineer or inspector to check for soft or unsuitable material, which should be removed and replaced with compacted granular fill. Also, to ensure good compaction and remove unevenness, the formation should be compacted with equipment suitable for use in the ground conditions encountered. Careful inspection of this work will also help identify any soft spots at or just below formation level.

7.5 Chemical Attack on Buried Concrete

Chemical tests (see Appendices) show low levels of water-soluble sulphates and neutral conditions. Based on these conditions, it is recommended that for concrete placed in natural strata the Design Sulphate Class for the site, as defined in BRE Special Digest 1$^{(2005)}$, be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1s. The recommendations of BRE Special Digest 1 should be followed for concrete foundations and ground bearing floor slabs.

7.6 Suitability of Excavated Materials

Acceptability criteria and testing, and methods of compaction/placement will depend on the type of contract and specification used for the construction of the proposed development and it is recommended that earthworks specifications are reviewed by a suitably qualified engineer once these have been prepared by the relevant parties.

Granular Made Ground and natural sand could be suitable for re-use as structural fill, providing it is not contaminated and does not contain excessive amounts of clay and providing moisture contents are controlled during placement. The control of moisture contents will be important as the cohesive content of this stratum is likely to be sensitive to moisture content changes.

7.7 Temporary Works

Formations will be susceptible to damage both by weather and trafficking, and should be protected immediately on exposure, particularly in areas where construction plant will access the site.

Excavations in Made Ground are likely to be unstable and should be battered back to an angle of 1 in 2, or a system of close sheeting and shoring adopted to ensure stability, and in particular where personnel are required to enter excavations. All excavations should be adequately supported where personnel are required to enter.

Groundwater seepages could be encountered near surface within excavations, particularly during the wetter months of the year. Pumping of excavations from a suitable located sump is likely to be required to keep excavations dry.

All natural materials on site should be capable of being excavated using conventional excavating machinery.

8.0 SOIL CONTAMINATION RISK ASSESSMENT

8.1 Tier I Human Health Soil Risk Assessment – Groundworkers During Development

To assess the risk of soil contamination to construction and ground workers during development, guidelines from the HSE Document 'Protection of workers and the general public during development of contaminated land' (1991) are used. The document assesses soil contamination test results and classifies the site as being uncontaminated or contaminated with varying degrees of contamination from 'slight' to 'unusually heavy'. The guideline values and laboratory test results are summarised in the following table:

Table 15: Summary of Guideline Values for Protection of Workers and the General Public During Development of Contaminated Land

Contaminant	Typical Values* for:					Test Results	Class
	Uncontaminated Soils	Slight Contamination	Contaminated	Heavy Contamination	Unusually Heavy Contamination		
	Class A	Class B	Class C	Class D	Class E		
pH (acid)	6 - 7	5 - 6	4 - 5	2 - 4	<2	-	-
pH (alkaline)	7 - 8	8 - 9	9 - 10	10 - 12	12	7.5 – 7.8	A
Arsenic	0 - 30	30 - 50	50 - 100	100 - 500	500	5 - 15	A
Cadmium	0 - 1	1 - 3	3 - 10	10 - 50	50	< 0.2	A
Chromium	0 - 100	100 - 200	200 - 500	500 - 2500	2500	11 - 16	A
Copper	0 - 100	100 - 200	200 - 500	500 - 2500	2500	15 - 24	A
Lead	0 - 500	500 - 1000	1000 - 2000	2000 – 1%	1.0%	17 - 49	A
Mercury	0 - 1	1 - 3	3 - 10	10 - 50	50	< 1	A
Nickel	0 - 20	20 - 50	50 - 200	200 - 1000	1000	10 - 22	A – B
Zinc	0 - 250	250 - 500	500 - 1000	1000 - 5000	5000	60 - 112	A
Boron	0 - 2	2 - 5	5 - 50	50 - 250	250	< 1	A
Selenium	0 - 1	1 - 3	3 - 10	10 - 50	50	< 2	A - B
Barium	0-500	500-1000	1000-2000	2000-1.0%	1.0%	45 - 75	A
Beryllium	0 - 5	5 - 10	10 - 20	20 - 50	50	< 0.5 – 0.8	A
Vanadium	0 - 100	100 - 200	200 - 500	500 - 2500	2500	17 - 23	A
Sulphate	0 - 2000	2000 - 5000	5000 – 1%	1% - 5%	5.05%	477 -6174	A - C
Sulphide	0 - 10	10 - 20	20 - 100	100 - 500	500	< 5	A
Cyanide (free)	0 - 1	1 - 5	5 - 50	50 - 100	100	< 1	A
Phenol	0 - 2	2 - 5	5 - 50	50 - 250	250	< 2	A

Based on the above results, the soils range from heavily contaminated to uncontaminated. Therefore, there is a **MODERATE to LOW** potential risk from soil contamination to construction workers, ground workers and members of the public during construction. Appropriate measures, such as PPE, site health plans, and appropriate disposal of material arisings will further mitigate this risk.

8.2 Tier I Human Health Soil Risk Assessment – Future Site Users

The following section provides a Human Health Soil Assessment for future site users. Based on the proposed development type, the following section compares the results of contamination analyses to residential types of end development as specified by Defra/LQM/CIEH. As part of the contamination assessment, the chemical results obtained by EEG have been screened against accepted compliance criteria, namely:

- Defra C4SL Health Criteria Values (March 2014), where available; and

- Tier 1 assessment values - based on LQM/CIEH Suitable 4 Use Levels (2015) (S4ULs).

The contaminated land guidance has recently changed the evaluation of risk from 'minimal' (SGVs) to 'low' (referred to as Lowest Level of Toxicological Concern (LLTCs)). The policy companion document and supporting letter by DEFRA, states that C4SLs 'could be used under the planning regime, as well as within Part 2A'.

Based on these comments EEG considers the justifications and assumptions used to generate 'low' risk are suitable for the planning regime.

Where no C4SLs have been generated EEG will use the LQM S4ULs. Similar assumptions and land use to C4SLs have been used. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions. If contaminants are not present as C4SLs or S4ULs then EEG will use CL:AIRE GACs. These follow the 'minimal' risk principal and more stringent exposure parameters and will be conservative.

EEG consider the main risk drivers for PAHs are benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P possibly being a carcinogen and most toxic of the PAHs and naphthalene the most volatile and soluble. The new C4SLs indicate B(a)P as a surrogate marker for carcinogenic PAHs, since the risk from other non-carcinogenic PAHs are considered negligible. Naphthalene will be treated separately using the LQM S4ULs.

As a preliminary screening assessment, all results have been compared to residential end use criteria with plant uptake.

The soil chemical testing results are summarised in Table 16, overleaf.

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Table 16: Soil Results Comparison with C4SL/S4UL Values

Determinand	C4SL/S4UL Levels Residential (mg/kg)	WS1 0.10m	WS1 0.40m	WS2 0.15m	WS2 0.80m	No of Exceedances
Metals						
Arsenic	37	15	14	7	5	0
Beryllium	1.7	0.7	0.6	< 0.5	0.8	0
Boron	290	< 1	< 1	< 1	< 1	0
Cadmium	11	< 0.2	< 0.2	< 0.2	< 0.2	0
Chromium	910	16	12	11	16	0
Chromium VI	21	< 2	< 2	< 2	< 2	0
Copper	2400	24	15	22	19	0
Lead	200	49	44	23	17	0
Mercury	40	< 1	< 1	< 1	< 1	0
Nickel	130	13	16	10	22	0
Selenium	250	< 2	< 2	< 2	< 2	0
Vanadium	410	19	23	17	18	0
Zinc	3700	112	97	60	69	0
Petroleum Hydrocarbons						
Benzene	0.087	< 0.002	< 0.002	< 0.002	< 0.002	0
Toluene	130	< 0.005	< 0.005	< 0.005	< 0.005	0
Ethylbenzene	47	< 0.002	< 0.002	< 0.002	< 0.002	0
o-xylenes	60	< 0.002	< 0.002	< 0.002	< 0.002	0
m-xylenes	59	< 0.002	< 0.002	< 0.002	< 0.002	0
p-xylenes	56	< 0.002	< 0.002	< 0.002	< 0.002	0
Aliphatic EC >5-6	42	< 0.01	< 0.01	< 0.01	< 0.01	0
Aliphatic EC >6-8	100	< 0.05	< 0.05	< 0.05	< 0.05	0
Aliphatic EC >8-10	27	< 2	< 2	< 2	< 2	0
Aliphatic EC >10-12	130	< 2	< 2	< 2	< 2	0
Aliphatic EC >12-16	1100	< 3	< 3	< 3	< 3	0
Aliphatic EC >16-21	65000	< 3	< 3	< 3	< 3	0
Aliphatic EC >21-35	65000	< 10	< 10	< 10	< 10	0
Aromatic EC >5-7	70	< 0.01	< 0.01	< 0.01	< 0.01	0
Aromatic EC >7-8	130	< 0.05	< 0.05	< 0.05	< 0.05	0
Aromatic EC >8-10	34	< 2	< 2	< 2	< 2	0
Aromatic EC >10-12	74	< 2	< 2	< 2	< 2	0
Aromatic EC >12-16	140	< 2	4	< 2	< 2	0
Aromatic EC >16-21	260	3	14	3	< 3	0
Aromatic EC >21-35	1100	< 10	25	< 10	10	0
Polycyclic Aromatic Hydrocarbons						
Naphthalene	2.3	< 0.1	0.15	< 0.1	< 0.1	0
Acenaphthylene	170	< 0.1	< 0.1	< 0.1	< 0.1	0
Acenaphthene	210	< 0.1	< 0.1	< 0.1	< 0.1	0
Fluorene	170	< 0.1	0.15	< 0.1	< 0.1	0
Phenanthrene	95	0.27	1.73	0.36	0.12	0
Anthracene	2400	< 0.1	0.36	< 0.1	< 0.1	0
Fluoranthene	280	0.62	2.47	0.77	0.19	0
Pyrene	620	0.54	2.08	0.68	0.17	0
Benzo(a)anthracene	7.2	0.35	1.18	0.42	< 0.1	0
Chrysene	15	0.32	1.12	0.39	< 0.1	0
Benzo(a)pyrene	5	0.35	1.07	0.48	0.12	0
Benzo(b)fluoranthene	2.6	0.4	1.28	0.52	0.14	0
Benzo(k)fluoranthene	77	0.14	0.46	0.18	< 0.1	0
Indeno(1,2,3-cd) pyrene	27	0.22	0.66	0.28	< 0.1	0
Dibenzo (a, h) anthracene	0.24	< 0.1	0.12	< 0.1	< 0.1	0
Benzo(ghi)perylene	320	0.17	0.55	0.23	< 0.1	0
Phenols						
Phenol	120	< 2	< 2	< 2	< 2	0

Based on the above table, no contaminant concentrations were found in exceedance of the screening criteria relevant to a residential end use.

Asbestos fibres and fragments were not identified in any of the samples tested.

8.3 Soil Waste Assessment

An assessment of the disposal characteristics of the soil in accordance with Environment Agency guidance WM3.1, edition of June 2018, "Guidance on the classification and assessment of waste" has been carried out on soils recovered from the site, using HazWasteOnline.

The results are summarised in Table 17 below and presented in full in Appendix 4.

Table 17: Waste Classification of Soils

Location	Depth (m bgl)	WM3.1 Classification
WS1	0.10	Non-Hazardous
WS1	0.40	Non-Hazardous
WS2	0.15	Non-Hazardous
WS2	0.80	Non-Hazardous

Table 17 above shows that all of the samples collected from WS1 – WS2 were classified as **Non-Hazardous** in accordance with WM3.1.

For Waste Acceptance Criteria (WAC) testing, EEGL have compared solid waste and leachate values with guideline values in Landfill Regulations. The following table summarises the results of the solid waste analysis and leachate testing, together with limit values for Non-Hazardous waste and Hazardous waste as described in the Landfill Regulations.

The results summarised in Table 18, overleaf show the soil sample retrieved from WS2 at 0.15m contained concentrations of contaminants within the limits acceptable for disposal at an Inert Waste Facility.

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Table 18: Summary of WAC Test Results

Determinand	Landfill Regulations Limits (mg/kg unless otherwise indicated)			WS2 0.15m (mg/kg)
	Inert Waste	Stable Non-Reactive non-hazardous waste	Hazardous Waste	
TOC (%)	3%	5%	6%	0.9
Loss on ignition (%)	-	-	10%	7.8
BTEX (mg/kg)	6	-	-	< 0.05
Sum of PCBs (mg/kg)	1	-	-	< 0.1
Mineral Oil (mg/kg)	500	-	-	< 10
Total PAH (mg/kg)	100	-	-	4.3
pH (units)	-	>6	-	7.7
Acid Neutralisation Capacity (mol/kg)	-	*To be evaluated*		< 1
Arsenic	0.5	2	25	< 0.01
Barium	20	100	300	0.02
Cadmium	0.04	1	5	< 0.005
Chromium	0.5	10	70	< 0.20
Copper	2	50	100	< 0.5
Mercury	0.01	0.2	2	< 0.005
Molybdenum	0.5	10	30	< 0.1
Nickel	0.4	10	40	< 0.2
Lead	0.5	10	50	< 0.2
Antimony	0.06	0.7	5	< 0.05
Selenium	0.1	0.5	7	< 0.05
Zinc	4	50	200	< 0.2
Chloride	800	15000	25000	24
Fluoride	10	150	500	6.3
Sulphate	1000	20000	50000	52
Total Dissolved Solids	4000	60000	100000	2077
Phenol Index	1	-	-	< 0.5
DOC	500	800	1000	187

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9.0 CONCLUSIONS & RECOMMENDATIONS

9.1 Soil Contamination

There is a **MODERATE to LOW** potential risk from soil contamination to construction workers and ground workers during development, and appropriate measures such as PPE, site health plans, appropriate disposal of material arisings will be required to mitigate this risk.

Based on the results of the chemical testing, no contaminant concentrations were found in exceedance of the screening criteria relevant to a commercial end use.

Therefore, the risk to commercial end users is **LOW** and no remediation of the soil is required for the proposed development.

9.2 Asbestos

Asbestos fibres or fragments were not identified in any of the samples tested.

9.3 Foundations

Based on the ground conditions encountered, conventional shallow strip/pad foundations are considered suitable for this site.

9.4 Soil Disposal

Soils should be disposed of at a suitable site, registered to take the levels of contamination encountered. The soils collected from all WS1 – WS2 have been classified as Non-Hazardous for the purpose of off-site disposal in accordance with Environment Agency guidance WM3.1.

Further Waste Acceptance Criteria (WAC) testing of the sample taken from WS2 at 0.15m/bgl showed the material will be accepted at an Inert Waste Facility.

9.5 Pavement Design

Based on the findings of the site investigation, the soil type at subgrade level was typically Topsoil or Made Ground. Based on the recommendations for design CBR values provided in Interim advice note 73/06, Revision 1 (2009), a conservative design CBR value of 1% should be adopted in areas where Made Ground is encountered at subgrade level.

If pavement design is altered so that the subgrade comprises Natural Strata (typically at depths in the region of 1.20m bgl), a CBR value of 3 to 5% should be adopted for the clay.

9.6 Risk to Buried (Water) Services

It is considered that, due to the absence of BTEX & MTBE, phenols, aliphatic and aromatic hydrocarbon contamination, standard materials should be suitable for new water pipes. However, further advice should be sought from the local water company.

Previous guidance on buried water pipes was contained in Water Regulations Advisory Scheme (WRAS) Guidance Note No. 9-04-03(2002), however this has been superseded by the UK Water

Industry Research Report 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' Ref 10/WM/03/21 (January 2011).

9.7 Site Personnel

As with all construction sites, personnel working on the site during the construction period should be encouraged to maintain a high standard of personal hygiene and on-site washing facilities should be available.

9.8 Other Matters

Due diligence is required during the construction period, and should any further evidence of contamination be found, appropriate investigation and / or action should be taken. The significance of any contamination not discovered by this investigation is outside the scope of this report.

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APPENDIX 1

EXPLORATORY HOLE LOGS

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APPENDIX 2

GEOTECHNICAL TESTING RESULTS

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APPENDIX 3

CHEMICAL TESTING RESULTS

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APPENDIX 4

SOIL WASTE ASSESSMENT

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APPENDIX 5

REPORT LIMITATIONS

REPORT LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2023 and should be read in light of any subsequent changes in legislation, statutory requirements, and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Stockport
SK5 6DA

Borehole Log

Borehole No.
WS01
Sheet 1 of 1

Project Name: Wells Road, Dewsbury	Project No. A4553	Co-ords: 425309.00 - 418991.00	Hole Type WS
Location: Dewsbury, West Yorkshire		Level:	Scale 1:25
Client: Faisal Building Solution		Dates: 26/01/2023 - 26/01/2023	Logged By OQ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.30			MADE GROUND: Brown slightly sandy gravelly CLAYwith rootlets throughout. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded red brick and sandstone.
		0.40	ES					MADE GROUND: Brown sandy GRAVEL with low cobble content.Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded red brick and sandstone. Cobble is sub-rounded sandstone.
								No recovery.
		1.20		N=17 (5,4/3,3,5,6)				
		2.00 2.00	D	N=28 (7,6/5,6,8,9)				
					2.60			Weathered sandstone.
		2.80 2.80	D	N=50 (25 for 20mm/50 for 10mm)	2.80			End of borehole at 2.80 m

1
2
3
4
5

Remarks
1) Location scanned with CAT prior to excavation.
2) Hand dug pit excavated to 1.2m.
3) No monitoring installation, hole backfilled.
4) No groundwater encountered.

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Houldsworth Mill Business Centre
Houldsworth Street
Stockport
SK5 6DA

Borehole Log

Borehole No. **WS02**
Sheet 1 of 1

Project Name: Wells Road, Dewsbury	Project No. A4553	Co-ords: 425302.00 - 418995.00	Hole Type WS
Location: Dewsbury, West Yorkshire		Level:	Scale 1:25
Client: Faisal Building Solution		Dates: 26/01/2023 -	Logged By OQ

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES					MADE GROUND: Brown slightly sandy gravelly CLAYwith rootlets throughout. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded red brick and sandstone.
		0.80	ES		0.70			Medium dense brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded sandstone.
		1.00	D					
		1.20		N=18 (1,3/2,5,5,6)				
		2.00		N=28 (1,2/6,6,8,8)				
		2.10	D		2.10			Stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded sandstone.
		3.00		N=16 (7,7/4,4,4,4)				
		4.00		N=50 (4,6/8,12,14,16)	3.90 4.00			Weathered sandstone. End of borehole at 4.00 m

Remarks
1) Location scanned with CAT prior to excavation.
2) Hand dug pit excavated to 1.2m.
3) No monitoring installation, hole backfilled.
4) No groundwater encountered.

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Earth Environmental & Geotechnical Ltd

Address Houldsworth Mill Business & Arts Centre
Houldsworth Mill
Reddish
Stockport
SK5 6DA

Contract A4553 -
Wells Road, Dewsbury

Job Number MRN 4589/12
Date of Issue 14 February 2023
Page 1 of 6

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

5 The results included within the report are representative of the samples submitted for analysis.

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

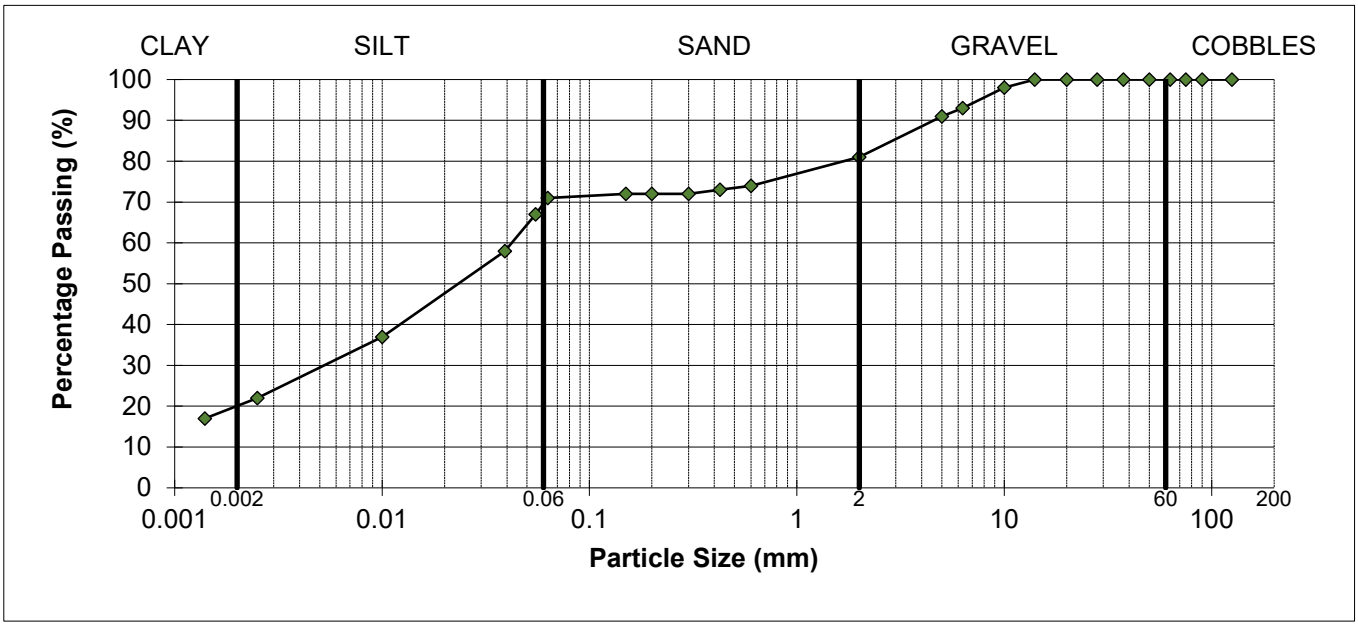
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	A4553 - Wells Road, Dewsbury
JOB NUMBER	MRN 4589/12

SAMPLE LABEL	WS1 D 2.00	DATE SAMPLED	26-Jan-23
LAB SAMPLE No	120857	DATE RECEIVED	30-Jan-23
DATE TESTED	01-Feb-23	SAMPLED BY	Client

MATERIAL	Stiff grey silty slightly gravelly CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	81	
90	100		0.6	74	
75	100		0.425	73	
63	100		0.3	72	
50	100		0.2	72	
37.5	100		0.15	72	
28	100		0.063	71	
20	100		0.055	67	
14	100		0.039	58	
10	98		0.01	37	
6.3	93		0.0025	22	
5	91		0.0014	17	



REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 14-Feb-23

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

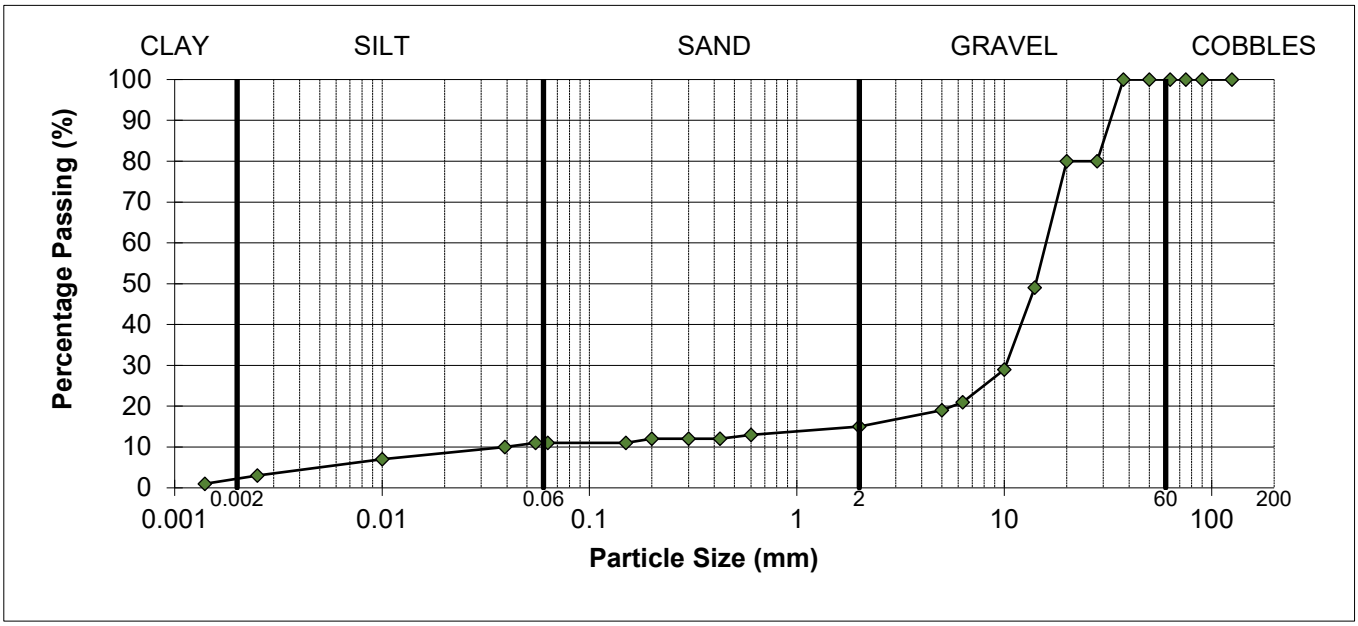
Determination of Water Content in accordance with BS EN ISO 17892-1:2014 (Oven Dry)

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	A4553 - Wells Road, Dewsbury
JOB NUMBER	MRN 4589/12

SAMPLE LABEL	WS2 D 1.00	DATE SAMPLED	26-Jan-23
LAB SAMPLE No	120859	DATE RECEIVED	30-Jan-23
DATE TESTED	01-Feb-23	SAMPLED BY	Client

MATERIAL	Grey slightly clayey slightly silty slightly sandy GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	15	
90	100		0.6	13	
75	100		0.425	12	
63	100		0.3	12	
50	100		0.2	12	
37.5	100		0.15	11	
28	80		0.063	11	
20	80		0.055	11	
14	49		0.039	10	
10	29		0.01	7	
6.3	21		0.0025	3	
5	19		0.0014	1	



REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 14-Feb-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014

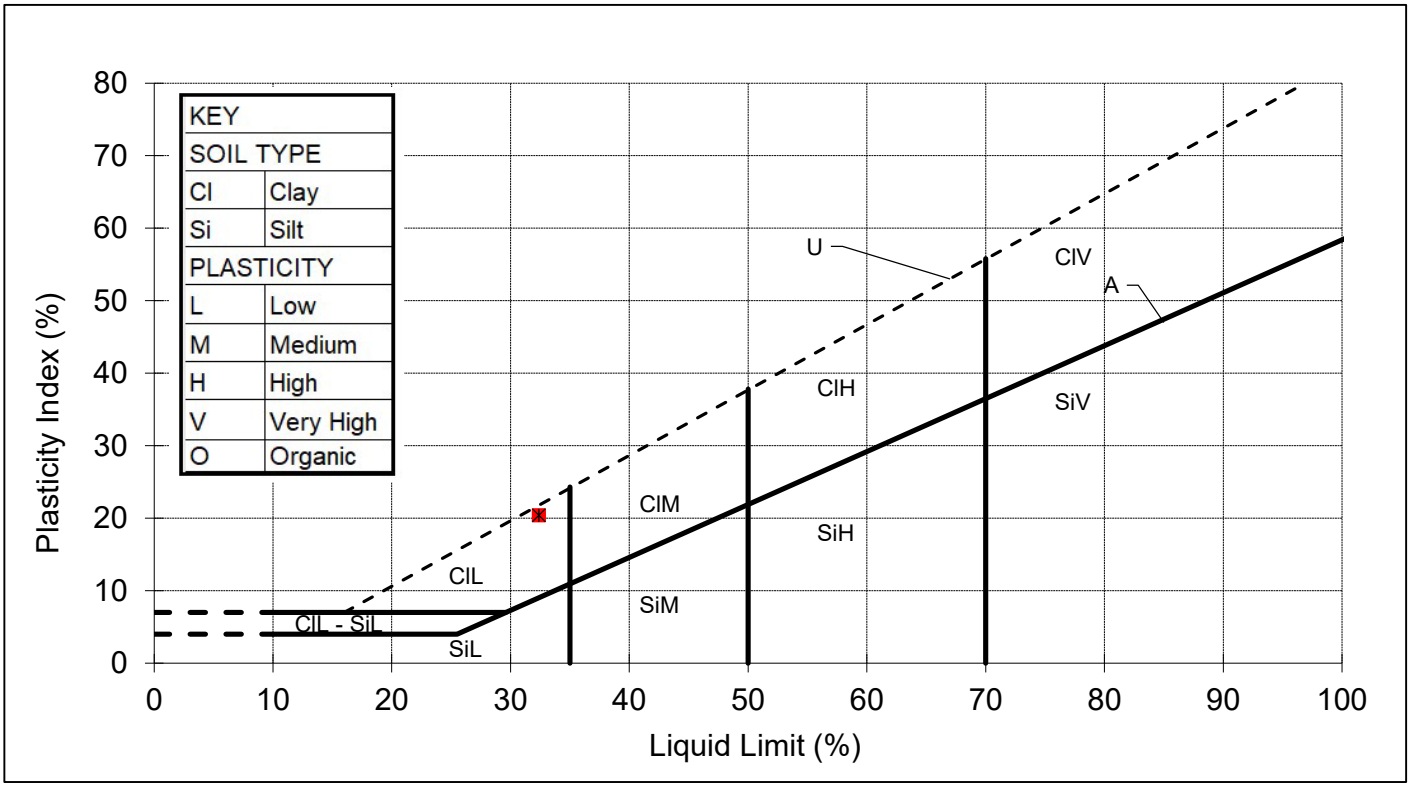
CLIENT	Earth Environmental & Geotechnical Ltd
SITE	A4553 - Wells Road, Dewsbury
JOB NUMBER	MRN 4589/12

SAMPLE LABEL	WS1 D 2.80	DATE SAMPLED	26-Jan-23
SAMPLE No.	120858	DATE RECEIVED	30-Jan-23
DATE TESTED	05-Feb-23	SAMPLED BY	Client

MATERIAL	Stiff grey silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.9	31.8	1.018	
Determination 2 (avg)	18.7	31.8		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
12.0	32	12	20	88



REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 14-Feb-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A1:2021 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014

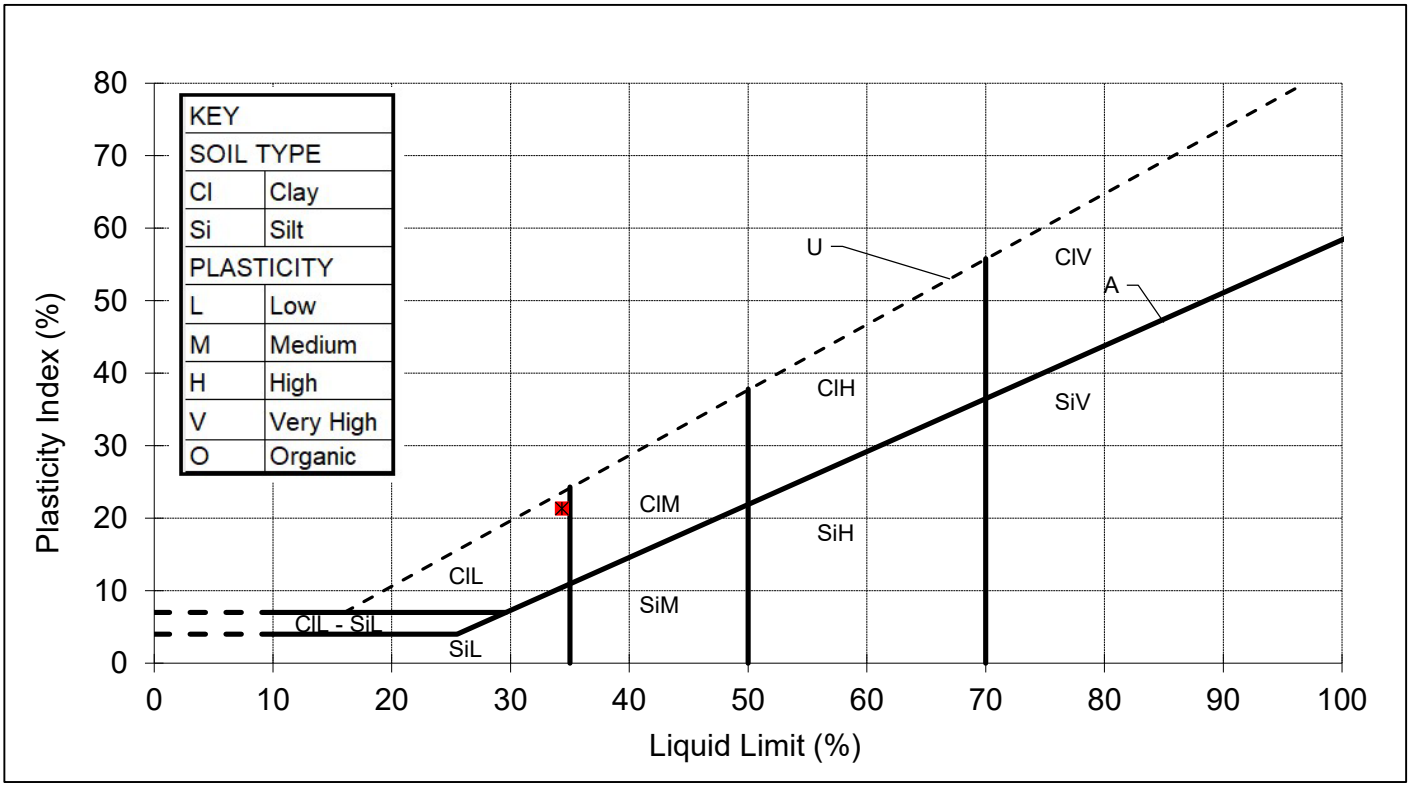
CLIENT	Earth Environmental & Geotechnical Ltd
SITE	A4553 - Wells Road, Dewsbury
JOB NUMBER	MRN 4589/12

SAMPLE LABEL	WS2 D 2.10	DATE SAMPLED	26-Jan-23
SAMPLE No.	120860	DATE RECEIVED	30-Jan-23
DATE TESTED	05-Feb-23	SAMPLED BY	Client

MATERIAL	Stiff grey silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.9	34.1	1.001	
Determination 2 (avg)	20.0	34.5		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.8	34	13	21	98



REMARKS

NAME O.P. Davies BA (Hons) (Laboratory Manager) DATE 14-Feb-23

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF WATER-SOLUBLE SULPHATE IN SOIL
& DETERMINATION OF THE pH VALUE
BS 1377-3:2018+A1:2021, Cl. 7.3 & Cl. 12

CLIENT	Earth Environmental & Geotechnical Ltd
SITE	A4553 - Wells Road, Dewsbury
JOB NUMBER	MRN 4589/12

DATE TESTED	02-Feb-23	DATE SAMPLED	26-Jan-23
SAMPLED BY	Client	DATE RECEIVED	30-Jan-23
PRE-TREATMENT	Air Dried	ADVISED SOURCE	Site Investigation Samples

Sample Number	Sample Label	Material	% Ret. 2mm	pH Value	Water Soluble Sulphate as SO_4 (mg/l)
120857	WS1 D 2.00	Stiff grey silty slightly gravelly CLAY	19	7.3	170
120859	WS 2 D 1.00	Grey slightly clayey slightly silty slightly sandy GRAVEL	85	8.1	320

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 14-Feb-23

Oliver Quinn
Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Reddish
Stockport
Cheshire
SK5 6DA

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-01248

Site Reference:	Wells Road, Dewsbury
Project / Job Ref:	A4553
Order No:	A4553
Sample Receipt Date:	31/01/2023
Sample Scheduled Date:	01/02/2023
Report Issue Number:	1
Reporting Date:	08/02/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 23-01248	**Date Sampled**	26/01/23	26/01/23	26/01/23	26/01/23	
Earth Environmental & Geotechnical Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Wells Road, Dewsbury	**TP / BH No**	WS1	WS1	WS2	WS2	
Project / Job Ref: A4553	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: A4553	**Depth (m)**	0.10	0.40	0.15	0.80	
Reporting Date: 08/02/2023	**DETS Sample No**	631352	631353	631354	631355	

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	
pH	pH Units	N/a	MCERTS	7.5	7.7	7.7	7.8	
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Complex Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	893	719	6174	477	
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.09	0.07	0.62	0.05	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	16	13	< 10	86	
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.02	0.01	< 0.01	0.09	
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	
Organic Matter (SOM)	%	< 0.1	MCERTS	6.9	2.8	1.5	0.9	
Arsenic (As)	mg/kg	< 2	MCERTS	15	14	7	5	
Barium (Ba)	mg/kg	< 2.5	MCERTS	68	75	59	41	
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.7	0.6	< 0.5	0.8	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	16	12	11	16	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	24	15	22	19	
Lead (Pb)	mg/kg	< 3	MCERTS	49	44	23	17	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	13	16	10	22	
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Vanadium (V)	mg/kg	< 1	MCERTS	19	23	17	18	
Zinc (Zn)	mg/kg	< 3	MCERTS	112	97	60	69	
Total Phenols (monohydric)	mg/kg	< 1	NONE	< 2	< 2	< 2	< 2	
EPH (C10 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	29	67	27	47	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-01248	**Date Sampled**	26/01/23	26/01/23	26/01/23	26/01/23	
Earth Environmental & Geotechnical Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Wells Road, Dewsbury	**TP / BH No**	WS1	WS1	WS2	WS2	
Project / Job Ref: A4553	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: A4553	**Depth (m)**	0.10	0.40	0.15	0.80	
Reporting Date: 08/02/2023	**DETS Sample No**	631352	631353	631354	631355	

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.27	1.73	0.36	0.12	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.36	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	0.62	2.47	0.77	0.19	
Pyrene	mg/kg	< 0.1	MCERTS	0.54	2.08	0.68	0.17	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.35	1.18	0.42	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	0.32	1.12	0.39	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.40	1.28	0.52	0.14	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.14	0.46	0.18	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.35	1.07	0.48	0.12	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.22	0.66	0.28	< 0.1	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.17	0.55	0.23	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	3.4	13.4	4.3	< 1.6	

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-01248	**Date Sampled**	26/01/23	26/01/23	26/01/23	26/01/23	
Earth Environmental & Geotechnical Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Wells Road, Dewsbury	**TP / BH No**	WS1	WS1	WS2	WS2	
Project / Job Ref: A4553	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: A4553	**Depth (m)**	0.10	0.40	0.15	0.80	
Reporting Date: 08/02/2023	**DETS Sample No**	631352	631353	631354	631355	

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	4	< 2	< 2	
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	3	14	3	< 3	
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	25	< 10	10	
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	43	< 21	< 21	
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	43	< 42	< 42	

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-01248	**Date Sampled**	26/01/23	26/01/23	26/01/23	26/01/23	
Earth Environmental & Geotechnical Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Wells Road, Dewsbury	**TP / BH No**	WS1	WS1	WS2	WS2	
Project / Job Ref: A4553	**Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: A4553	**Depth (m)**	0.10	0.40	0.15	0.80	
Reporting Date: 08/02/2023	**DETS Sample No**	631352	631353	631354	631355	

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 23-01248		**Date Sampled**	26/01/23					**Landfill Waste Acceptance Criteria Limits**		
Earth Environmental & Geotechnical Ltd		**Time Sampled**	None Supplied					**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Wells Road, Dewsbury		**TP / BH No**	WS2							
Project / Job Ref: A4553		**Additional Refs**	None Supplied							
Order No: A4553		**Depth (m)**	0.15							
Reporting Date: 08/02/2023		**DETS Sample No**	631354							
Determinand	**Unit**	**MDL**								
TOC[MU]	%	< 0.1	0.9					3%	5%	6%
Loss on Ignition	%	< 0.01	7.80					--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05					6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1					1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10					500	--	--
Total PAH[MU]	mg/kg	< 1.7	4.3					100	--	--
pH[MU]	pH Units	N/a	7.7					--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1					--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01	< 0.01		< 0.2		0.5	2	25
Barium[U]			0.03	0.02		0.2		20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02		0.04	1	5
Chromium[U]			< 0.005	< 0.005		< 0.20		0.5	10	70
Copper[U]			< 0.01	< 0.01		< 0.5		2	50	100
Mercury[U]			< 0.0005	< 0.0005		< 0.005		0.01	0.2	2
Molybdenum[U]			0.005	0.005		< 0.1		0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2		0.4	10	40
Lead[U]			< 0.005	< 0.005		< 0.2		0.5	10	50
Antimony[U]			< 0.005	< 0.005		< 0.05		0.06	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.05		0.1	0.5	7
Zinc[U]			0.071	0.005		< 0.2		4	50	200
Chloride[U]			4	2		24		800	15000	25000
Fluoride[U]			0.9	0.6		6.3		10	150	500
Sulphate[U]			5	5		52		1000	20000	50000
TDS			221	206		2077		4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5		1	-	-
DOC			22.9	18.1		187		500	800	1000
Leach Test Information										
Sample Mass (kg)			0.19							
Dry Matter (%)			92.4							
Moisture (%)			8.2							
Stage 1										
Volume Eluate L2 (litres)			0.34							
Filtered Eluate VE1 (litres)			0.19							

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions
DETS Report No: 23-01248
Earth Environmental & Geotechnical Ltd
Site Reference: Wells Road, Dewsbury
Project / Job Ref: A4553
Order No: A4553
Reporting Date: 08/02/2023

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
631352	WS1	None Supplied	0.10	19.7	Brown loamy sand with stones and concrete
631353	WS1	None Supplied	0.40	10.5	Brown gravelly sand with stones and concrete
631354	WS2	None Supplied	0.15	7.6	Brown sandy clay with vegetation and concrete
631355	WS2	None Supplied	0.80	6.8	Brown gravelly sand with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-01248
Earth Environmental & Geotechnical Ltd
Site Reference: Wells Road, Dewsbury
Project / Job Ref: A4553
Order No: A4553
Reporting Date: 08/02/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-01248
Earth Environmental & Geotechnical Ltd
Site Reference: Wells Road, Dewsbury
Project / Job Ref: A4553
Order No: A4553
Reporting Date: 08/02/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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List of HWOL Acronyms and Operators
DETS Report No: 23-01248
Earth Environmental & Geotechnical Ltd
Site Reference: Wells Road, Dewsbury
Project / Job Ref: A4553
Order No: A4553
Reporting Date: 08/02/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
EPH (C10 - C40) - EH_1D_Total
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
Mineral Oil (C10 - C40) (BS EN 12457-3) - EH_CU_1D_AL
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
Total BTEX (BS EN 12457-3) - HS_1D_MS_Total
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	10.4	%
Loss on Ignition	Soil	BS EN 12457	16.9	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	21.1	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	17.9	%
pH	Soil	BS EN 12457	0.282	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	19.5	%
Barium	Leachate	BS EN 12457	12.2	%
Cadmium	Leachate	BS EN 12457	17.2	%
Chromium	Leachate	BS EN 12457	20.7	%
Copper	Leachate	BS EN 12457	14.1	%
Mercury	Leachate	BS EN 12457	16.7	%
Molybdenum	Leachate	BS EN 12457	13.3	%
Nickel	Leachate	BS EN 12457	14.0	%
Lead	Leachate	BS EN 12457	12.1	%
Antimony	Leachate	BS EN 12457	16.1	%
Selenium	Leachate	BS EN 12457	15.5	%
Zinc	Leachate	BS EN 12457	14.0	%
Chloride	Leachate	BS EN 12457	15.7	%
Fluoride	Leachate	BS EN 12457	19.1	%
Sulphate	Leachate	BS EN 12457	27.6	%
TDS	Leachate	BS EN 12457	10.0	%
Phenol Index	Leachate	BS EN 12457	12.9	%
DOC	Leachate	BS EN 12457	20.4	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	16.9	%
pH	Soil	BS 3882: 2015	0.282	Units
Carbonate	Soil	BS 3882: 2015	12.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	19.8	%
Copper	Soil	BS 3882: 2015	23.2	%
Nickel	Soil	BS 3882: 2015	32.6	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%

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:

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

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

BAFJK-BVIS7-80119

Job name

A4553 Wells Road, Dewsbury

Description/Comments

Project

A4553

Site

Wells Road, Dewsbury

Classified by

Name:
Luke Glover
Date:
22 Feb 2023 09:38 GMT
Telephone:

Company:
Earth Environmental & Geotechnical Ltd

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: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

Wells Road, Dewsbury **Post Code** WF12 0LE

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Residential development.

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

Preliminary check.

Description of the waste

Made ground and natural.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1	0.1	Non Hazardous		3
2	WS1[2]	0.4	Non Hazardous		5
3	WS2	0.15	Non Hazardous		8
4	WS2[2]	0.8	Non Hazardous		10

Related documents

#	Name	Description
1	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Luke Glover

Created date: 22 Feb 2023 09:38 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	12
Appendix B: Rationale for selection of metal species	13
Appendix C: Version	14

Classification of sample: WS1

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

Sample details

Sample name:
WS1
Sample Depth:
0.1 m
Moisture content:
19.7%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 19.7% Dry Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15 mg/kg	1.32	16.545 mg/kg	0.00165 %	✓	
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7 mg/kg	2.775	1.623 mg/kg	0.000162 %	✓	
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16 mg/kg	1.462	19.536 mg/kg	0.00195 %	✓	
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<2 mg/kg	2.27	<4.54 mg/kg	<0.000454 %		<LOD
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		24 mg/kg	1.126	22.574 mg/kg	0.00226 %	✓	
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	49 mg/kg	1.56	63.852 mg/kg	0.00409 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		13 mg/kg	2.976	32.324 mg/kg	0.00323 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		112 mg/kg	2.774	259.569 mg/kg	0.026 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<42 mg/kg		<42 mg/kg	<0.0042 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
19		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
20		pH			PH		7.5	pH		7.5	pH	7.5 pH		
21		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
22		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
23		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25		phenanthrene		201-581-5	85-01-8		0.27	mg/kg		0.226	mg/kg	0.0000226 %	✓	
26		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27		fluoranthene		205-912-4	206-44-0		0.62	mg/kg		0.518	mg/kg	0.0000518 %	✓	
28		pyrene		204-927-3	129-00-0		0.54	mg/kg		0.451	mg/kg	0.0000451 %	✓	
29		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.35	mg/kg		0.292	mg/kg	0.0000292 %	✓	
30		chrysene	601-048-00-0	205-923-4	218-01-9		0.32	mg/kg		0.267	mg/kg	0.0000267 %	✓	
31		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.4	mg/kg		0.334	mg/kg	0.0000334 %	✓	
32		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.14	mg/kg		0.117	mg/kg	0.0000117 %	✓	
33		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.35	mg/kg		0.292	mg/kg	0.0000292 %	✓	
34		indeno[123-cd]pyrene		205-893-2	193-39-5		0.22	mg/kg		0.184	mg/kg	0.0000184 %	✓	
35		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
36		benzo[ghi]perylene		205-883-8	191-24-2		0.17	mg/kg		0.142	mg/kg	0.0000142 %	✓	
37		phenol	604-001-00-2	203-632-7	108-95-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
											Total:	0.0457 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS1[2]

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

Sample details

Sample name:
WS1[2]
Sample Depth:
0.4 m
Moisture content:
10.5%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 10.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14 mg/kg	1.32	16.728 mg/kg	0.00167 %	✓	
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6 mg/kg	2.775	1.507 mg/kg	0.000151 %	✓	
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12 mg/kg	1.462	15.872 mg/kg	0.00159 %	✓	
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<2 mg/kg	2.27	<4.54 mg/kg	<0.000454 %		<LOD
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15 mg/kg	1.126	15.284 mg/kg	0.00153 %	✓	
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	44 mg/kg	1.56	62.11 mg/kg	0.00398 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		16 mg/kg	2.976	43.095 mg/kg	0.00431 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		97 mg/kg	2.774	243.522 mg/kg	0.0244 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		43 mg/kg		38.914 mg/kg	0.00389 %	✓	
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
19		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
20		pH			PH		7.7	pH		7.7	pH	7.7 pH		
21		naphthalene	601-052-00-2	202-049-5	91-20-3		0.15	mg/kg		0.136	mg/kg	0.0000136 %	✓	
22		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
23		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24		fluorene		201-695-5	86-73-7		0.15	mg/kg		0.136	mg/kg	0.0000136 %	✓	
25		phenanthrene		201-581-5	85-01-8		1.73	mg/kg		1.566	mg/kg	0.000157 %	✓	
26		anthracene		204-371-1	120-12-7		0.36	mg/kg		0.326	mg/kg	0.0000326 %	✓	
27		fluoranthene		205-912-4	206-44-0		2.47	mg/kg		2.235	mg/kg	0.000224 %	✓	
28		pyrene		204-927-3	129-00-0		2.08	mg/kg		1.882	mg/kg	0.000188 %	✓	
29		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.18	mg/kg		1.068	mg/kg	0.000107 %	✓	
30		chrysene	601-048-00-0	205-923-4	218-01-9		1.12	mg/kg		1.014	mg/kg	0.000101 %	✓	
31		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.28	mg/kg		1.158	mg/kg	0.000116 %	✓	
32		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.46	mg/kg		0.416	mg/kg	0.0000416 %	✓	
33		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.07	mg/kg		0.968	mg/kg	0.0000968 %	✓	
34		indeno[123-cd]pyrene		205-893-2	193-39-5		0.66	mg/kg		0.597	mg/kg	0.0000597 %	✓	
35		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.12	mg/kg		0.109	mg/kg	0.0000109 %	✓	
36		benzo[ghi]perylene		205-883-8	191-24-2		0.55	mg/kg		0.498	mg/kg	0.0000498 %	✓	
37		phenol	604-001-00-2	203-632-7	108-95-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
											Total:	0.0445 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free phase product.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00389%)

Classification of sample: WS2

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

Sample details

Sample name:
WS2
Sample Depth:
0.15 m
Moisture content:
7.6%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.6% Dry Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7 mg/kg	1.32	8.589 mg/kg	0.000859 %	✓	
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		<0.5 mg/kg	2.775	<1.388 mg/kg	<0.000139 %		<LOD
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		11 mg/kg	1.462	14.942 mg/kg	0.00149 %	✓	
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<2 mg/kg	2.27	<4.54 mg/kg	<0.000454 %		<LOD
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22 mg/kg	1.126	23.02 mg/kg	0.0023 %	✓	
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	23 mg/kg	1.56	33.342 mg/kg	0.00214 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		10 mg/kg	2.976	27.66 mg/kg	0.00277 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		60 mg/kg	2.774	154.692 mg/kg	0.0155 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<42 mg/kg		<42 mg/kg	<0.0042 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD

#		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									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17		ethylbenzene				<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
20		pH				7.7	pH		7.7	pH	7.7 pH		
				PH									
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
25		phenanthrene				0.36	mg/kg		0.335	mg/kg	0.0000335 %	✓	
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
27		fluoranthene				0.77	mg/kg		0.716	mg/kg	0.0000716 %	✓	
			205-912-4	206-44-0									
28		pyrene				0.68	mg/kg		0.632	mg/kg	0.0000632 %	✓	
			204-927-3	129-00-0									
29		benzo[a]anthracene				0.42	mg/kg		0.39	mg/kg	0.000039 %	✓	
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				0.39	mg/kg		0.362	mg/kg	0.0000362 %	✓	
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				0.52	mg/kg		0.483	mg/kg	0.0000483 %	✓	
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				0.18	mg/kg		0.167	mg/kg	0.0000167 %	✓	
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				0.48	mg/kg		0.446	mg/kg	0.0000446 %	✓	
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				0.28	mg/kg		0.26	mg/kg	0.000026 %	✓	
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				0.23	mg/kg		0.214	mg/kg	0.0000214 %	✓	
			205-883-8	191-24-2									
37		phenol				<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
										Total:	0.0317 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS2[2]

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

Sample details

Sample name:
WS2[2]
Sample Depth:
0.8 m
Moisture content:
6.8%
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.8% Dry Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5 mg/kg	1.32	6.181 mg/kg	0.000618 %	✓	
2	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.8 mg/kg	2.775	2.079 mg/kg	0.000208 %	✓	
3	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16 mg/kg	1.462	21.896 mg/kg	0.00219 %	✓	
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<2 mg/kg	2.27	<4.54 mg/kg	<0.000454 %		<LOD
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19 mg/kg	1.126	20.03 mg/kg	0.002 %	✓	
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	17 mg/kg	1.56	24.829 mg/kg	0.00159 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22 mg/kg	2.976	61.309 mg/kg	0.00613 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		69 mg/kg	2.774	179.229 mg/kg	0.0179 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<42 mg/kg		<42 mg/kg	<0.0042 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
17		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<**LOD**
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<**LOD**
19		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<**LOD**
20		pH			PH		7.8	pH		7.8	pH	7.8 pH		
21		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
22		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
23		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
24		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
25		phenanthrene		201-581-5	85-01-8		0.12	mg/kg		0.112	mg/kg	0.0000112 %	✓	
26		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		fluoranthene		205-912-4	206-44-0		0.19	mg/kg		0.178	mg/kg	0.0000178 %	✓	
28		pyrene		204-927-3	129-00-0		0.17	mg/kg		0.159	mg/kg	0.0000159 %	✓	
29		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
30		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
31		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.14	mg/kg		0.131	mg/kg	0.0000131 %	✓	
32		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
33		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.12	mg/kg		0.112	mg/kg	0.0000112 %	✓	
34		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
35		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
36		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
37		phenol	604-001-00-2	203-632-7	108-95-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<**LOD**
											Total:	0.0369 %		

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 Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

- **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

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
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 2B (77) 2000

- **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

- **pH** (CAS Number: PH)

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

- **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}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

beryllium {beryllium oxide}

Reasonable case CLP species based on hazard statements/molecular weight. Industrial sources include: most common (non alloy) form, used in ceramics (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

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

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.51.5529.10230 (20 Feb 2023)
HazWasteOnline Database: 2023.51.5529.10230 (20 Feb 2023)

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