



GROUNDTECH
CONSULTING

Job title: Whitworth Road, Rochdale

Report type: Geo-Environmental Appraisal

Prepared for: Cornerstone Place

Date: July 2022

Document Control Form		
PROJECT	WHITWORTH ROAD, ROCHDALE	
REPORT NAME	GEO-ENVIRONMENTAL APPRAISAL	
REPORT REFERENCE	GRO-22083-3479	
STATUS	FINAL	
ISSUE DATE	01 JULY 2022	
REVISION	16 AUGUST 2022	1.1
CLIENT	CORNERSTONE PLACE	
CLIENT CONTACT	DAVID BALL	
For and Behalf of Groundtech Consulting		
SIGNATURE		
AUTHOR	Dominic Roberts BSc (Hons) FGS	
SIGNATURE		
CHECKED	Bradley Massey BSc (Hons) FGS	
SIGNATURE		
REVIEWED	James Doyle BSc (Hons) CGeol FGS	

SUMMARY

Site Details	
Site Location	<i>The site is located circa 1.08 miles north of Rochdale Town Centre and is approximately centred on National Grid Reference 389790, 414327.</i>
Site Area	<i>The sites are approximately 0.11 hectares in total area and are roughly rectangular in shape. The site comprises three individual parcels which are topographically level with some raised areas throughout the southern parcel. Each plot is in a state of disuse with generally poor surfacing conditions, dilapidated sheds and localised litter and fly tipping.</i>
Ground Model	
Made Ground Soils	<i>Made Ground was encountered within all exploratory holes to a maximum depth of 2.5m bgl. The Made Ground was not bottomed out in three locations (WS05, TP04 and TP05). The surfacing across the site comprised tarmac, paving slabs reworked topsoil. The main underlying Made Ground population comprised brown mottled grey sandy gravelly clay.</i>
Natural Soils	<i>Superficial deposits were encountered within all exploratory hole locations with the exception of TP04, TP05 and WS05 and comprised firm brown mottled grey variably gravelly sandy silty Clay.</i>
Bedrock	<i>Bedrock was encountered in WS01, WS02, WS03, WS04 and WS06 and consisted of extremely weak yellow orange residually weathered Sandstone recovered as sandy gravel.</i>
Groundwater	<i>Groundwater was encountered within WS01, WS02, TP02, TP03 and TP06 at depths of between 2.0m to 3.2m bgl in the sandy gravelly Clay deposits.</i>
Ground Engineering Assessment	
Foundations	<i>Trench fill foundations constructed within the underlying natural moderate to high Clay at depths of between 1.0m and 2.5m bgl are generally recommended for the proposed development.</i> <i>It is recommended that supplementary investigation and a watching brief is carried out during the grubbing up of existing construction and the excavation of new foundations in these areas to ensure a suitable bearing stratum is located. A deeper mini pile solution may be required if a shallow founding stratum is not identified.</i> <i>Foundations should be altered in accordance with appropriate guidance when building near trees.</i>
Highways	<i>CBR values of less than 3 to 5% are likely to be achieved in undisturbed natural cohesive soils for pavement design purposes. Untreated Made Ground should be assumed to have a CBR value of less than 2.5%, unless proven otherwise.</i>
SuDS	<i>SuDS drainage is unlikely to be feasible on the site due to the deep Made Ground and the natural cohesive strata underlying the site.</i>
Constraints	<i>The main constraints are detailed below:</i> <i>Unknown depth of Made Ground along the eastern edge of the northern parcel (WS05).</i>

	• Basement feature and unknow depth of Made Ground along the eastern edge of the central plot (TP04 and TP05). • Very low strength natural soils recorded at 3.0m bgl along the southern edge of the southern parcel (WS01). The above constraints will require supplementary investigation and a watching brief to be in place during the enabling works to ensure a suitable bearing stratum is located in these areas. Additional consideration should be given to the electricity substation on the northern parcel so as to not damage any associated services.
GQRA and Revised (PL) Assessment	
Human Health	Geo-environmental testing indicates that no elevated levels of any CoC have been recorded when compared to residential screening values (without plant uptake) and no asbestos has been detected. The site will predominantly be covered in hardsurfacing breaking the pollution linkage to site end users. The risk to human health from direct contact with soils considered to be is Low.
Controlled Waters	No mobile contamination has been observed and the risk to controlled waters is considered to be Very Low to Low.
Permanent Ground Gas	Interim gas monitoring results place the site in CS1 and gas precautions are not required for the proposed development. The site does not require any radon protective measures. The risk from permanent ground gases is considered to be Low and will be confirmed on completion of the monitoring.
Final Appraisal	

The following works is considered necessary before moving onto the construction phase:

- Completion of gas monitoring programme.
- Issue gas assessment.
- Demolition asbestos survey.
- Demolition of existing buildings.
- Supplementary investigation comprising trial pitting and window sampling.
- Watching brief during basement removal and foundation excavations.
- Tree survey by qualified arboriculturist.
- Detailed foundation design.
- Confirmation of recommendations made within this report with the Local Authority.

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	PROJECT OBJECTIVES	1
1.2	PROPOSED DEVELOPMENT	1
1.3	LIMITATIONS	2
2.0	SITE SETTING	3
2.1	LOCATION.....	3
2.2	SITE DESCRIPTION	3
3.0	SUMMARY OF PREVIOUS REPORTS	6
4.0	SCOPE OF INVESTIGATION AND RATIONALE	8
4.1	PROJECT OBJECTIVES	8
4.2	SCOPE OF WORKS	8
4.3	SOIL SAMPLING	9
4.4	GEO-ENVIRONMENTAL ANALYSIS	9
4.5	GAS AND GROUNDWATER MONITORING.....	10
4.6	GROUNDWATER SAMPLING.....	10
5.0	GROUND MODEL.....	11
5.1	MADE GROUND.....	11
5.2	NATURAL GROUND.....	11
5.3	BEDROCK.....	12
5.4	GROUNDWATER.....	12
5.5	WATCHING BRIEF.....	12
5.6	EXCAVATION STABILITY.....	12
5.7	EXCAVATION PROGRESS.....	12
6.0	GROUND ENGINEERING.....	13
6.1	GEOTECHNICAL TESTING RESULTS.....	13
6.2	ASSESSMENT BACKGROUND	13
6.3	GEOTECHNICAL PARAMETERS	14
6.4	PRELIMINARY FOUNDATION DESIGN.....	14
6.5	BUILDING NEAR TREES	16
6.6	FLOOR SLABS	16
6.7	CONSTRUCTION	17
6.8	CONCRETE CLASSIFICATION	17
6.9	HIGHWAY DESIGN	17
6.10	SUSTAINABLE URBAN DRAINAGE SYSTEM (SuDS)	18
7.0	LAND QUALITY.....	19
7.1	GEO-ENVIRONMENTAL TESTING RESULTS - SOILS	19
7.2	GENERIC QUANTITATIVE RISK ASSESSMENT - SOILS	20
7.3	GROUNDWATER ANALYSIS	20
7.4	PERMANENT GROUND GASES	21
7.5	REVISED POLLUTION LINKAGE ASSESSMENT	22
7.6	OUTLINE REMEDIAL STRATEGY	28
7.7	ASBESTOS IN SOILS	28
7.8	HEALTH AND SAFETY - CONSTRUCTION AND GROUND WORKERS	28
7.9	WASTE CLASSIFICATION BY ASSESSMENT.....	29
7.10	WASTE ACCEPTANCE CRITERIA (WAC) RESULTS.....	30

8.0	FINAL APPRAISAL.....	32
8.1	LAND QUALITY	32
8.2	GROUND ENGINEERING.....	32
8.3	REQUIRED SUPPLEMENTARY INVESTIGATION	33
9.0	RELEVANT INDUSTRY REFERENCES.....	34
	APPENDIX 1 - PLANS	
	APPENDIX 2 - SITE PHOTOGRAPHS	
	APPENDIX 3 - EXPLORATORY HOLE LOGS	
	APPENDIX 4 - GEO-ENVIRONMENTAL TESTING	
	APPENDIX 5 - GEOTECHNICAL TESTING	
	APPENDIX 6 - INTERIM GAS MONITORING RESULTS	
	APPENDIX 7 – GENERALISED GROUND MODEL	
	APPENDIX 8 – GENERIC SCREENING VALUES (RESIDENTIAL WITHOUT PLANT UPTAKE)	
	APPENDIX 9 – HAZWASTEONLINE CLASSIFICATION REPORT	
	APPENDIX 10 - RELEVANT LEGISLATIVE BACKGROUND	
	APPENDIX 11 - LIMITATIONS	

Plans		
<i>Plan Reference</i>	<i>Revision</i>	<i>Title</i>
<i>GRO-22083-P01</i>	-	<i>Project Location Plan</i>
<i>GRO-22083-P02</i>	-	<i>Exploratory Hole Location Plan</i>
<i>GRO-22083-P03A /03B</i>	-	<i>Generalised Ground Model</i>
<i>GRO-22083-P04</i>	-	<i>Illustrative CSM</i>

1.0 INTRODUCTION

1.1 Project Objectives

Groundtech Consulting Limited have been instructed by Cornerstone Place on behalf of their consultant PG Consulting to undertake a Geo-Environmental Appraisal for a site at Whitworth Street in Rochdale.

A main investigation was undertaken in accordance with BS 5930:2015, BS 10175:2013, BS 8576 and BS 22475 to revise the CSM and quantify the level of risk identified in the PRA. The Appraisal has been prepared in accordance with current UK Legislation and to discharge Land Quality pre-commencement planning conditions.

1.2 Proposed Development

The proposed development is residential end use comprising the erection of 3 blocks of 1 bedroom apartments including associated landscaping.



Block A located on the southernmost parcel of land comprises a two storey building with 8 No. apartments. Block B is on the central plot and will contain 4 No. apartments over a two storey building. The northern parcel of land houses Block C which comprises 2 No. apartments within a single storey building.



1.3 Limitations

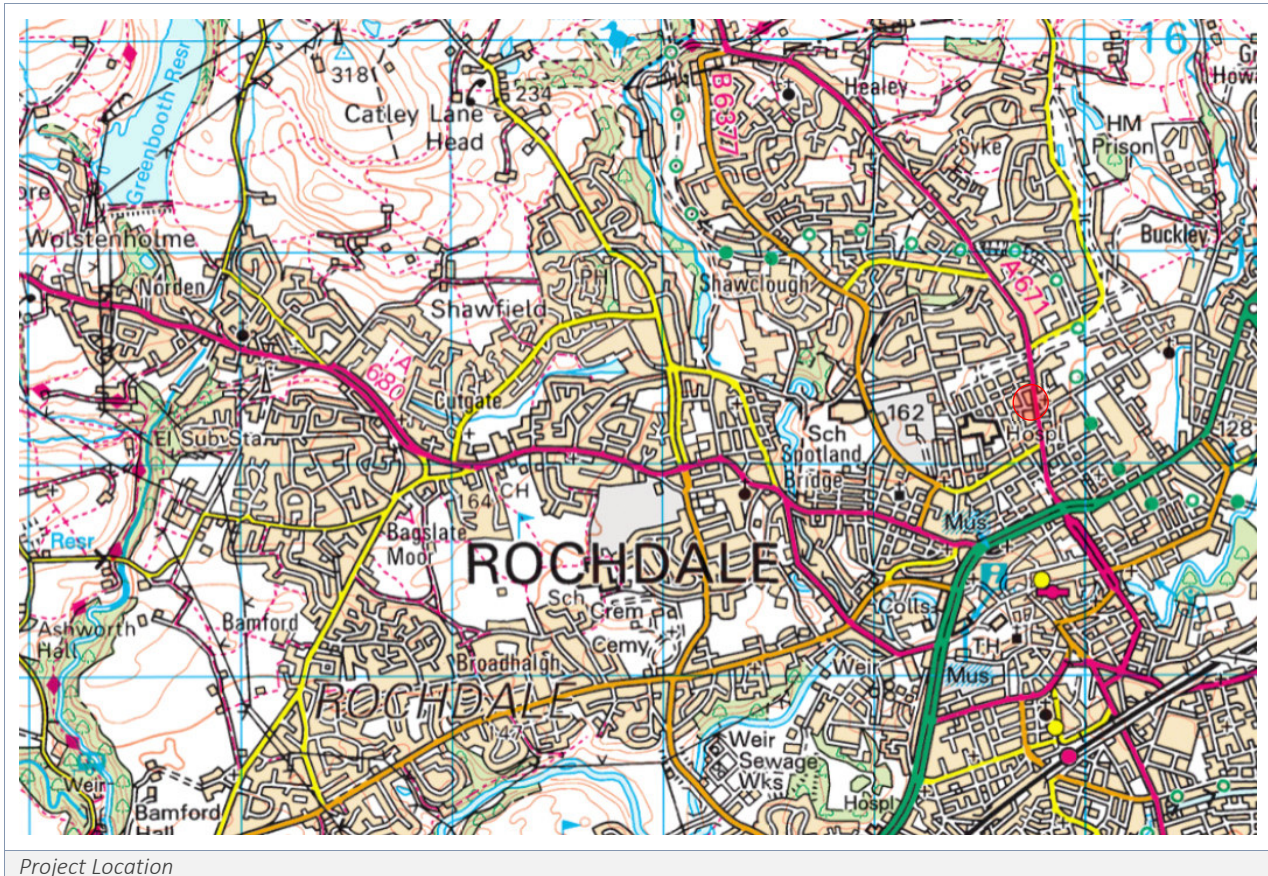
Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report, they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 1.08 miles north of Rochdale Town Centre, as shown on the Project Location Plan GRO-22083-P01 and is approximately centred on National Grid Reference 389790, 414327.



Access to the site is gained off Whitworth Road to the east.

2.2 Site Description

The site comprises three separate plots spread along the length of Whitworth Road, each plot is roughly rectangular in shape. As the plots are not adjacent to each other they will be discussed in separate sections below.

Northern Plot (Block C)

The northern plot is located at the intersection of Noon Sun Street and Grasmere Street, covers an area of c.0.025 hectares, and is topographically level.

This site comprises a tarmac surfaced area currently utilised as additional car parking spaces for the adjacent residential properties and for the nearby High Street. The tarmac surfacing across this plot is in poor condition with many potholes. Litter is present piled up along the internal site boundaries. Additionally, an electricity substation is present in the south east corner of the plot, it is excluded from the site boundary. No vegetation is present on the site or within an influencing distance of its boundaries.

This plot is bounded by the wooden fence of the adjacent residential properties to the north and west. The site is open to the footpath of Noon Street and Grasmere Street to the east and south respectively.

The plot is surrounded by following features/land uses:

- North - Residential properties.
- East - Noon Street, commercial properties and Whitworth Road.
- South - Grasmere Street, the central Plot, and residential properties.
- West - Residential properties.

Central Plot (Block B)

The central plot is located directly south of Grasmere Street, covers an area of c.0.015 hectares, and is topographically level.

The site currently comprises four storage sheds which are in very poor condition. The sheds are oriented in a row of three along the southern side of the site with one more in the north west corner. It appears the site once contained six sheds however two of the three northern ones have been demolished. The shed in the north west corner looks to have asbestos cement sheeting for its roofing.

The site is surfaced by a thin wedge of tarmac along its western extent with the remainder being surfaced by rough scrub and grass. A single c.4m high deciduous tree is present in the north east corner of the site. Evidence of fly tipping is noted in the north east part of the site with litter, general household waste and garden waste present heaped in the centre of this area.

This plot is bounded by the wall of the adjacent residential properties to the west and is open to the public footpath and Grasmere Street to the north. The site is open to the adjacent car park to the east and south.

The plot is surrounded by following features/land uses:

- North - Grasmere Street, the northern Plot, and residential properties.
- East - Car park and Whitworth Road.
- South - Car park and residential properties.
- West - Residential properties.

Southern Plot (Block A)

The southern plot is located south of Derwent Street and west of Whitworth Road, covers an area of c.0.078 hectares, and slopes gradually upwards from east to west.

This area of the site comprises a maintained grass surfaced lawn to the east and a disused children's play area to the west, the two areas are separated by a tarmac footpath.

The grass surfaced area to the east is largely featureless with the exception of an electrical advertising billboard in the south east corner with associated concrete surfaced base and small electrical junction box. A c.6m high deciduous tree is located along the southern boundary of the area.

The eastern children's play area comprises a fenced and gated play area which is surfaced by tarmac and paving slabs, all previous play equipment has been removed. A small wedge shaped strip of rough grass surfaced land is present directly to the south of the play area.



This plot is bounded by timber knee rail fencing to the east, is open to the adjacent car park and Derwent Street to the north, and is bounded by the wall of the adjacent properties to the south and west.

The plot is surrounded by following features/land uses:

- North - *Derwent Street and a car park, and residential properties.*
- East - *Whitworth Road followed by residential properties.*
- South - *Commercial and residential properties.*
- West - *Residential properties.*

Site photographs are presented in *Appendix 2*.

3.0 SUMMARY OF PREVIOUS REPORTS

A Phase 1 Geo-Environmental Desk Study was carried out by PG Consulting, referenced *PGC 388* and dated 9th February 2022. Groundtech Consulting have reviewed the document and a summary of the findings is presented below.

Site History

Earliest records indicate the site was occupied by residential properties from 1858. These buildings were demolished in the 1980s and replaced with a children's play area, garages and car park and are still present to date.

Geology

The superficial deposits are indicated to be Glacial Till and the solid geology is the Old Lawrence Rock which typically comprises Sandstone.

Hydrogeology

The superficial Glacial Till deposits beneath the site have been classified by the EA as a Secondary Undifferentiated Aquifer and the Old Lawrence Rock bedrock has been classified as a Secondary A Aquifer.

The site is not within 500m of a SPZ and there is one potable water abstraction located 432m north of the site.

Hydrology

The site is located in a Low Risk Flood Zone 1 and the closest watercourse is Hey Brook located 690m to the east.

Environmental Information

The following environmental information was identified:

- *The site is not within an area requiring radon protective measures.*
- *The Groundsure Report identified 5 No. active or recent landfills and 4 No. historic landfills within 500m of the site, the closest being 178m to the east.*
- *There was one pollution incident 71m south east of the site that had a minor water impact associated with inert construction waste.*
- *Data contained within the Groundsure Screening Report indicates that there is one past industrial use on the site that comprised an energy feature associated with the substation present adjacent to the northern plot.*

Generic Qualitative Risk Assessment

Made Ground is anticipated onsite associated with previous developments onsite and potential contaminants may include heavy metals, PAHs, hydrocarbon impacted soils and asbestos. The risk to human health is considered to be *Low to Moderate*.

Potential ground gas from both onsite and offsite sources have been identified which includes ground workings.

Made Ground may be impacted with potential sources of mobile hydrocarbon contamination however the underlying Glacial Till reduces the potential for the migration of mobile contaminants. The risk to controlled waters is considered to be *Moderate*.



Coal Mining

The site is not within or close to an area that may be affected by coal mining.

- *No previous coal mine workings.*
- *Coal in reserve at depth but no working currently planned.*
- *No mine entries are identified within 20m of the site.*

The site is considered to be at *Low Risk*.

4.0 SCOPE OF INVESTIGATION AND RATIONALE

4.1 Project Objectives

The aim of the fieldwork was to:

Determine the stratification beneath the site.
Maintain a watching brief for visual and olfactory evidence of contamination.
Obtain samples using methodology in current guidance for contamination analysis.
Identify realistic pollution linkages to groundwater.
Obtain relevant geotechnical parameters for preliminary foundation design to address both ULS and SLS conditions.
Determine if targeted supplementary investigation in areas of concern is required and for remedial design.
Install monitoring standpipes for gas and groundwater monitoring.
Assess the identified pollution linkages in the CSM.

4.2 Scope of Works

The following scope of works was completed on the date of 16th March 2022:

- 6 No. trial pits (TP01 to TP06) were excavated with a JCB 3CX excavator to a maximum depth of 3.6m bgl.
- 6 No. windowless sample boreholes (WS01 to WS06) were drilled to depths of 4.45m bgl using a Dando Terrier Windowless Sampling rig.

The exploratory hole locations are presented on Groundtech Plan GRO-22083-P02, and the logs are presented in Appendix 3.

The exploratory holes were positioned to establish the stratification beneath the site, and target any areas of concern as summarised in the table below:

Location	Target Rationale
WS01, WS02, WS06 TP01 to TP03	Block A
WS03, TP04 and TP05	Block B
WS04, WS05 and TP06	Block C
TP04 and TP05	Suspected basements

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

- BS 5930 'Code of Practice for Site Investigations' 2015.
- BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil'.
- BS EN ISO 14689:2002 'Geotechnical investigation and testing – Identification and classification of rock'.

4.3 Soil Sampling

During the intrusive investigation, representative samples were taken at regular intervals, changes of strata and where evidence of contamination existed. Laboratory analysis was scheduled on the samples obtained.

The samples obtained are summarised in the table below:

Soil Sample	Number
<i>Environmental Sample</i>	<i>41</i>
<i>Disturbed Sample</i>	<i>19</i>
<i>Undisturbed U100 Sample</i>	<i>3</i>

The samples have been taken in accordance with current environmental and geotechnical guidance. The sampling plan has been designed to obtain samples from all required strata using the correct methodology.

Disturbed samples of soil for chemical analysis were placed in the correct sampling containers as required by the laboratory in accordance with their MCERTS and UKAS Accreditation. Transportation was arranged in a timely manner and the samples were at the correct temperature.

The sample locations and depths are recorded on the exploratory logs.

4.4 Geo-Environmental Analysis

To inform the Generic Quantitative Risk Assessment, the following geo-environmental testing was scheduled to assess the risk from contamination on the site. The testing is based on the potential sources identified in the PRA and observations during the Ground Investigation.

Determinand	Matrix	Number
<i>Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc and pH.</i>	<i>Soil</i>	<i>7</i>
<i>Speciated PAHs</i>	<i>Soil</i>	<i>7</i>
<i>Asbestos Screening</i>	<i>Soil</i>	<i>7</i>

The Geo-Environmental Laboratory Testing Results are presented in *Appendix 4*.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

British Standard	Test Method	Number
<i>Part 2</i>	<i>Water Content</i>	<i>4</i>
<i>Part 2</i>	<i>Plasticity Index Analysis</i>	<i>4</i>
<i>Part 3</i>	<i>pH Value</i>	<i>4</i>
<i>Part 3</i>	<i>Water Soluble Sulphate Content</i>	<i>4</i>
<i>Part 7</i>	<i>Undrained Shear Strength in Triaxial Compression</i>	<i>3</i>

The Geotechnical Laboratory Testing Results are presented in *Appendix 5*.

4.5 Gas and Groundwater Monitoring

Gas and groundwater monitoring installations were constructed in the boreholes. The standpipes consisted of polyvinyl chloride (PVC) pipe - a bentonite seal was placed around the plain pipe and a clean gravel pack was placed around the slotted pipe. A summary of the installation construction is presented in the table below:

Location	Depth (m bgl)	Response Zone (m bgl)	Targeted Strata	Reason
WS01	4.0	1.0 – 4.0	Made Ground/ Natural Clay	Ground Gas
WS03	3.0	1.0 – 3.0	Made Ground/ Natural Clay	Ground Gas
WS04	3.0	1.0 – 3.0	Made Ground/ Natural Clay	Ground Gas
WS05	2.0	1.0 – 2.0	Made Ground	Ground Gas

Permanent gas and flow rate monitoring was carried out using a GFM 436 infrared gas monitor with integral electronic flow analyser. The measurements taken are listed below:

- Oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) as the percentage volume in air (%v/v).
- Hydrogen sulphide (H_2S) and carbon monoxide (CO) as the percentage volume in air (%v/v).
- Lower Explosive Limit (%LEL) of methane.
- Atmospheric and borehole pressure, including pressure trend.
- Flow measurements (l/hr).
- Weather and ground surface conditions.

Both peak and steady state conditions were monitored to understand the behaviour of the permanent ground gas, the steady state conditions were recorded by allowing the gas monitor to run for a minimum of 3 minutes.

Permanent gas and groundwater monitoring results are presented in *Appendix 6*.

4.6 Groundwater Sampling

Groundwater sampling was outside the scope of this investigation.

5.0 GROUND MODEL

5.1 Made Ground

Made Ground was recorded at the site to depths of between 0.8m and 2.5m bgl.

The surfacing across each of the three plots comprised tarmac (WS02, WS05, TP06), paving slabs and reworked dark brown clayey sandy gravelly topsoil including brick to a maximum depth of 0.46m bgl.

Two main Made Ground populations were encountered during the investigation and are described below:

- *Firm dark brown mottled grey sandy gravelly clay including sandstone and brick at depths between 0.1m and 2.5m bgl in all exploratory hole locations.*
- *Light grey gravelly sand was observed locally within TP06 at a depth of 0.1m to 0.35m bgl.*

The Made Ground was not bottomed out in TP04 and TP05 (Block B) due to the presence of the relic substructure comprising a historic basement. Additionally, it was not fully penetrated in WS05 (Block C) where a refusal was obtained at 2.35m bgl in the Made Ground clay.



Exploratory Hole Locations

5.2 Natural Ground

The natural strata encountered generally confirmed the published geological records.

One main natural stratification was encountered during the investigation and comprised firm, firm to stiff and stiff medium to high strength brown mottled grey variably gravelly sandy silty Clay at depths between 0.8m and 4.4m bgl within all exploratory hole locations except for TP04, TP05 and WS05 where the Made Ground was not fully penetrated.

Soft Clay was locally encountered in WS01 at 3.0m bgl.

5.3 Bedrock

Bedrock consisting of extremely weak yellow orange residually weathered Sandstone was observed during the Ground Investigation from depths of between 2.1m and 4.4m bgl. The bedrock was not encountered in the trial pits.

5.4 Groundwater

Groundwater strikes were encountered during the Ground Investigation as outlined in the table below:

Location	Depth (m bgl)	Stratum
WS01	2.0	Natural Clay
WS02	3.0	Natural Clay
TP02	3.2	Natural Clay
TP03	2.8	Natural Clay
TP06	2.7	Natural Clay

No groundwater was observed in the remaining exploratory holes.

5.5 Watching Brief

A watching brief was maintained during the Ground Investigation for visual and olfactory evidence of contamination.

No visual or olfactory contamination was noted within any exploratory hole locations with the majority of the anthropogenic material within the Made Ground soils comprising only brick and concrete.

5.6 Excavation Stability

No evidence of spalling or collapse was noted during excavation of the trial pits.

5.7 Excavation Progress

Slow progress while excavating the trial pits and drilling the boreholes was generally not experienced, except for when the Sandstone bedrock was observed and where the basement substructure was encountered within TP04 and TP05 between depths of 0.8m and 1.02m bgl. The excavations in the vicinity of the basement area were aborted due to the adjacent garages in close proximity being at risk of collapse.

6.0 GROUND ENGINEERING

6.1 Geotechnical Testing Results

Comparison of water content and the value of 0.4 times the Liquid Limit in accordance with BRE Digest 412 'Desiccation in Clay Soils' suggests significant desiccation has taken place when 0.4 times the Liquid Limit is greater than the actual water measured water content. This is a rudimentary method but also a good guide.

Results of the PI analysis and the volume change potential of the clays is summarised in the table below.

Reference	Depth (m bgl)	Modified PI	Volume Change Potential	Significantly Desiccated Y/N
WS01	2.0	13.2	Low	N
WS03	2.0	22.3	Medium	N
WS04	1.55	18.0	Low	N
TP01	2.5	24.5	Medium	N

Undrained triaxial testing was carried out on two samples of natural undisturbed Clay and the results are summarised below.

Reference	Depth (m bgl)	Undrained Shear Strength (kN/m ²)	Relative Strength
WS02	2.55 – 3.00	66	Medium
WS04	1.55 – 2.00	112	High

6.2 Assessment Background

The ground engineering investigation has been undertaken to formulate an accurate ground model in order to undertake preliminary foundation design. The ground model has been constructed with a moderate level of confidence.

The main constraint onsite is the possibility of areas of deep Made Ground soils which are greater than 2.5m bgl. This deep Made Ground is potentially present in the northern plot where the Made Ground was not bottomed out in one location and in the central plot relating the presence of suspected basements adjacent to the garages. Additionally, very low strength soils have been recorded along the southern extent of the southern plot.

It is advised that when the garages have been demolished and the basements are grubbed out that a watching brief is undertaken to determine the ground conditions beneath this area. A similar exercise should also be undertaken in the northern and southern plots to ensure a suitable bearing stratum is present at the proposed founding depths.

Consideration should be given to the electricity substation in the south east corner of the northern plot to ensure that the structure is not undermined by the proposed development and to not damage any services associated with it.

Additionally, based on desk-based information the site is indicated to be within a Low Flood Risk Zone I and allowances should be made for future flood events.

As part of the enabling works, the reworked topsoil should be stripped and stockpiled separately. In addition, all former construction should be grubbed up.

6.3 Geotechnical Parameters

The geotechnical test results have been evaluated to derive geotechnical parameters for the soils underlying the site. A 'depth to SPT 'N value' graph is presented on Groundtech Plan GRO-22083-P03A and a 'depth to cu value' graph is presented on Groundtech Plan GRO-22083-P03B to provide a generalised ground model for the sites. These are presented in *Appendix 7*.

Characterisation of the geotechnical parameters above has been undertaken to select a characteristic value, which is a cautious estimate of the value affecting the occurrence of the limit state.

Stratum	Parameter	Selected Characteristic Value
Southern Plot (Block A)		
<i>Soft Clay</i>	<i>Undrained Shear Strength (C_u)</i>	<i>15kN/m²</i>
<i>Firm medium strength Clay</i>	<i>Undrained Shear Strength (C_u)</i>	<i>60kN/m²</i>
<i>Residually weathered Sandstone</i>	<i>Drained angle of friction (ϕ')</i>	<i>30°</i>
Central Plot (Block B)		
<i>Firm high strength Clay</i>	<i>Undrained Shear Strength (C_u)</i>	<i>80kN/m²</i>
<i>Residually weathered Sandstone</i>	<i>Drained angle of friction (ϕ')</i>	<i>30°</i>
Northern Plot (Block C)		
<i>Firm medium strength Clay</i>	<i>Undrained Shear Strength (C_u)</i>	<i>60kN/m²</i>
<i>Residually weathered Sandstone</i>	<i>Drained angle of friction (ϕ')</i>	<i>30°</i>

From empirical data and published values, a magnitude of consolidation (m_v) of the underlying clays 0.20m²/MN has been selected.

6.4 Preliminary Foundation Design

As each of the areas have distinct ground conditions and development constraints, they will each be discussed separately below.

Northern Plot (Block C)

It is proposed to construct a small block of 2 No. flats across a detached single storey building. Three exploratory holes have been undertaken across this area WS04, WS05 and TP06. Made Ground was recorded to a maximum depth of 2.35m bgl across this parcel and was not bottomed out in WS05, the Made Ground was underlain by medium to high strength natural Clay in two of the three exploratory holes at depths of between 0.8m and 1.3m bgl.

It is considered that the most suitable founding solution for this plot are strip/trench fill foundations constructed within the medium to high strength natural Clay soils at depths of between 0.9m and 2.5m bgl. Preliminary foundation design has been undertaken by calculation, a safe allowable bearing capacity of 125kN/m² is provided for ultimate state limit design for a 0.6m wide strip footing foundation in the medium strength Clay at 2.5m bgl.

Using the above pressures settlement criteria of 25mm will not be exceeded and serviceability limit state conditions will be satisfied.

As the Made Ground was not bottomed out in WS05 the eastern area of this plot, a watching brief during the foundation excavations should be carried out to ensure a suitable bearing stratum is encountered at the proposed founding depth. If bedrock or a granular founding stratum is encountered in the eastern area the foundations should be reinforced to mitigate the risk of differential settlement.

If during the excavations no suitable bearing strata is found within 2.5m bgl an additional foundation solution should be considered, the most suitable solution would be mini piles end bearing in the underlying Sandstone bedrock. Detailed design should be undertaken if this foundation option is required or being considered.

Central Plot (Block B)

It is proposed to construct a small block of 4 No. flats across a detached two storey building. Three exploratory holes (WS03, TP04 and TP05) have been advanced across this area. Made Ground was recorded to a maximum depth of 2.0m bgl in WS03 only, the two additional exploratory holes could not bottom out the Made Ground due the presence of the relic basement structure encountered in TP04 at 1.02m bgl and a service in TP05 at 0.8m bgl. In WS03, the Made Ground was underlain by firm Clay to 3.0m bgl where Sandstone bedrock was recorded. Based on the parameters recorded in WS03, the most suitable foundations for the proposed development are considered to be trench fill foundations constructed within the medium to high strength Clay at a depth of 2.0m bgl.

Preliminary foundation design has been undertaken by calculation, a safe allowable bearing capacity of 125kN/m² is provided for ultimate state limit design for a 0.6m wide strip footing in the medium strength Clay at 2.0m bgl.

Using the above pressures settlement criteria of 25mm will not be exceeded and serviceability limit state conditions will be satisfied.

Currently, the foundation design of this area is based on a single exploratory hole, as little information regarding the eastern side could be obtained during the Ground Investigation. It is recommended that supplementary works comprising trial pitting and breaking out are undertaken in the area post demolition of the existing sheds, this would allow the depth of the relic substructure to be determined together with a suitable bearing stratum such that a more robust foundation recommendation can be determined.

As with the northern plot, if during the supplementary Ground Investigation a suitable bearing stratum is not identified within 2.5m bgl mini piles end bearing in the underlying Sandstone bedrock may be required.

Southern Plot (Block A)

It is proposed to construct a small block of 8 No. flats across a detached two storey building. Six exploratory holes have been undertaken across this area (WS01, WS02, WS06 and TP01 to TP03). Made Ground was recorded between depths of 1.0m and 2.5m bgl with an average depth of 2.0m bgl. The Made Ground was underlain by very low to medium strength Clay. Typically, the Clay across this plot was of medium strength however in WS01 located along the southern boundary, very low strength Clay was recorded at a depth of 3.0m bgl. Sandstone bedrock was identified from depths of between 2.1m to 4.4m bgl.

The most suitable solution for the proposed development are trench fill foundations constructed within the medium strength Clay typically encountered at a depths of between 1.0m and 2.5m bgl.

Preliminary foundation design has been undertaken by calculation, a safe allowable bearing capacity of 125kN/m² is provided for ultimate state limit design for a 0.6m wide strip footing founding in the medium strength Clay at 1.0m to 2.5m bgl.

Using the above pressures settlement criteria of 25mm will not be exceeded and serviceability limit state conditions will be satisfied.

There is a localised soft spot in the natural Clay at 3.0m along the southern extent of the site which was recorded in WS01, this borehole was not located within the proposed buildings footprint however the soft material may still extend under the southern area of the development. This will need to be investigated either through additional ground investigation comprising window sample boreholes or as a watching brief during the foundation excavations where in situ testing should be utilised to ensure the underlying founding strata is suitable.

As with the previous two plots, if during the supplementary Ground Investigation/foundation excavation watching brief no suitable bearing strata is identified within 2.5m bgl, mini piles end bearing in the underlying Sandstone bedrock at a depth of circa 4.0m bgl may be required.

General requirements

The cohesive strata beneath the site are of low to medium volume change potential therefore foundations should be constructed at a minimum depth of 0.9m bgl outside the influence of trees.

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

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

6.5 Building Near Trees

Foundation excavations will encounter cohesive strata in the vicinity of existing, proposed or recently removed trees, foundations should be adjusted in full accordance with NHBC Standards Chapter 4.2. Mature trees are situated along the eastern extent of the site.

All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings. The clay is of a low to medium volume change potential.

A survey of all trees and hedges on the site and within 30m of the site boundary should be undertaken to identify tree species, locations and heights. This information will be required in order to assess the effects of trees on the cohesive strata and inform a foundation schedule.

Guidance states that where Clay is of a medium volume change potential, a void former of 25mm is required against the side of the foundations and ground beam.

6.6 Floor Slabs

Due to the depth of the Made Ground soils recorded across much of the site, it is recommended that suspended floor slabs are adopted for the proposed residential apartment blocks.

A 100mm void should be incorporated beneath ground beams and suspended in-situ concrete ground floors, while a 250mm void should be incorporated under suspended precast concrete floors if they are utilised.

6.7 Construction

The trial pits indicate that instability of excavations is not anticipated provided they are not exposed to adverse weather conditions for any substantial period of time. Instability of the Made Ground is a possibility and should be considered in the groundworks method statements.

Tracked high specification plant is recommended to maintain the build programme. Breaking equipment will also be required locally to penetrate obstructions identified by the site investigation such as the basement underlying the central plot.

Groundwater strikes were observed at depths of between 2.0m and 3.2m bgl and therefore allowances should be made for the dewatering of foundation excavations.

6.8 Concrete Classification

Made Ground

Water soluble sulphate testing was undertaken on seven of the Made Ground samples. The range of soluble sulphate (SO_4) recorded is 11.3mg/l to 73.2mg/l and associated pH values ranged between 6.7 and 9.0 indicating slightly acidic to slightly alkaline conditions.

For a dataset containing five to nine results, the mean of the highest two of the sulphate test results and the lowest two pH results should be taken as the characteristic value. For the Made Ground, the characteristic water soluble sulphate concentration is 71.75mg/l and the pH value is 7.2.

Natural Strata

Water soluble sulphate testing was also undertaken on four samples of the natural ground. The range of soluble sulphate (SO_4) recorded is 28.9mg/l to 36mg/l and associated pH values ranged between 6.4 and 7.3 indicating slightly acidic to slightly alkaline conditions.

For a dataset containing less than five results, the highest sulphate testing result should be taken as the characteristic value along with the lowest pH result. For the natural ground, the characteristic water soluble sulphate concentration is 36mg/l and the pH value is 6.4.

As the underlying natural strata is cohesive the groundwater is considered to be static in this strata, however if the founding strata is the underlying Sandstone the Groundwater would be considered mobile.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1^d and sulphate class DS-1 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site-specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

6.9 Highway Design

CBR values of 3 to 5% are likely to be achieved in undisturbed natural cohesive soils for pavement design purposes, unless proven otherwise by in-situ testing at sub-base level by a specialist geotechnical engineer. As a minimum, the subgrade should be proof rolled prior to construction. Some reengineering of the subgrade is required prior to highway construction to achieve the required design CBR value.

Untreated Made Ground should be assumed to have a CBR value of less than 2.5%, unless proven otherwise. Highways Agency document HD25 'Interim Advice Note 73/06 Revision 1' (2009) states that where a subgrade has a CBR value lower than 2.5%, it is considered unsuitable support for a pavement foundation since it would tend to deform under construction traffic and must be improved.

Where highways are proposed in areas underlain by made ground, it is recommended that made ground to a depth of 1.0m below subgrade level is excavated, sorted and classified in accordance with Series 600 (Earthworks) of the Highways Agency "Specification for Highways Works". Following the above, any suitable material which can be used as part of highway construction shall be compacted in accordance with the earthworks specification.

The soils are considered to be frost susceptible due to the fines content and highway construction should be a minimum thickness of 450mm to mitigate the risk.

6.10 Sustainable Urban Drainage System (SuDS)

The use of SuDS drainage within the natural ground is not likely to be feasible at the site due to the presence of deep Made Ground and natural cohesive soils which exhibit low soil infiltration rates.

7.0 LAND QUALITY

7.1 Geo-Environmental Testing Results - Soils

Samples of Made Ground have been tested for a range of relevant Contaminants of Concern. In accordance with LCRM 'Land Contamination Risk Management', a Generic Quantitative Risk Assessment (GQRA) has been undertaken to determine the significance of the concentrations as derived through Geo-Environmental analysis.

The GQRA process comprises the comparison of the actual concentrations measured on site with Generic Assessment Criteria (GACs) for the protection of human health.

The GACs used for the assessment of soil concentrations have been derived using the CLEA model. The GACs used and their ranking of importance are listed below:

- *Soil Guideline Values (SGVs) which demonstrate minimal risk.*
- *LQM/CIEH S4ULs which use the same toxicological data as the SGVs but different exposure criteria.*
- *C4SLs which demonstrate low risk.*

In deriving the GACs for use on Brownfield sites, we have assumed a 1.0% Soil Organic Matter unless the results indicate otherwise.

The proposed end-use for the site is a residential development comprising 14 No. individual apartments. We have therefore undertaken the GQRA on the basis that the proposed development site falls under the Residential (without Plant Uptake) land-use scenario as defined in SR3 (EA, 2009b).

The relevant statistical tests have been undertaken where appropriate in accordance with guidance provided in CIEH & CLAIRE (2008).

Strata	Number of Samples Tested	Locations
<i>Granular Made Ground (Population 1)</i>	5	<i>WS01, WS05, TP01, TP04, TP06</i>
<i>Cohesive Made Ground (Population 2)</i>	2	<i>WS02, WS03</i>

A summary of the Geo-Environmental Testing results is presented below and the GQRA Screening Values are presented in *Appendix 8*:

Metals				
Contaminant	Range (mg/kg)	Screening Values (mg/kg)	Exceedances	Locations
Arsenic	6.2 – 14	40	0	-
Cadmium	<0.2 – 0.6	85	0	-
Chromium	9.8 – 40	910	0	-
Hexavalent Chromium	<0.4	21	0	-
Copper	28 - 3100	7100	0	-
Lead	21 – 290	310	0	-
Mercury	<0.3 – 0.6	1.2	0	-
Nickel	11 – 37	180	0	-
Selenium	<1	430	0	-
Zinc	42 – 290	40000	0	-

Polycyclic Aromatic Hydrocarbons (PAHs)				
Contaminant	Range (mg/kg)	Screening Values (mg/kg)	Exceedances	Locations
<i>Naphthalene</i>	<0.05 – 1.1	2.3	0	-
<i>Acenaphthylene</i>	<0.05	2900	0	-
<i>Acenaphthene</i>	<0.05 – 1.0	3000	0	-
<i>Fluorene</i>	<0.04 – 3.4	2800	0	-
<i>Phenanthrene</i>	<0.05 – 3.6	1300	0	-
<i>Anthracene</i>	<0.05 – 0.45	31000	0	-
<i>Fluoranthene</i>	<0.05 – 3.4	1500	0	-
<i>Pyrene</i>	<0.05 – 3.2	3700	0	-
<i>Benzo(a)anthracene</i>	<0.05 – 2.0	11	0	-
<i>Chrysene</i>	<0.05 – 1.8	30	0	-
<i>Benzo(b)fluoranthene</i>	<0.05 – 1.7	3.9	0	-
<i>Benzo(k)fluoranthene</i>	<0.05 – 1.2	110	0	-
<i>Benzo(a)pyrene</i>	<0.05 – 2.0	3.2	0	-
<i>Indeno(123cd)pyrene</i>	<0.05 – 0.86	45	0	-
<i>Dibenzo(ah)anthracene</i>	<0.05 – 0.26	0.31	0	-
<i>Benzo(ghi)perylene</i>	<0.05 – 0.91	360	0	-
Others				
<i>Organic Matter</i>			0.7 – 5.7%	
<i>pH Value</i>			6.7 – 9.0	
Asbestos Screen				
Position	Depth (m bgl)	Result	Asbestos Type	Mass %
WS01	0.10	None Detected	-	-
WS03	1.00	None Detected	-	-
WS05	0.30	None Detected	-	-
TP01	1.50	None Detected	-	-
TP04	0.20	None Detected	-	-
TP06	0.20	None Detected	-	-
WS02	0.50	None Detected	-	-

7.2 Generic Quantitative Risk Assessment - Soils

Made Ground has been encountered across all three plots of land to a maximum depth of 2.5m bgl and typically comprised dark brown clayey sandy gravel or firm brown mottled grey sandy gravelly clay. The Made Ground was not bottomed out in WS05 in the northern plot and in TP04 and TP05 in the central plot.

Based on the site having a residential without plant uptake end use, no elevated concentrations of metals or PAHs has been recorded in the samples of Made Ground that have been analysed. Additionally, no asbestos fibres have been detected in the samples screened.

7.3 Groundwater Analysis

Groundwater analysis was not within the scope of this Ground Investigation.

7.4 Permanent Ground Gases

The desk based assessment highlighted a risk from ground gases related to potential Made Ground associated with the historic building and the presence of 5 No. active or recent landfills within 500m of the subject site.

Four standpipes were installed for gas monitoring within WS01, WS03, WS04 and WS05. Four monitoring visits has been carried out between the 31st March and 10th May 2022, with two further visits scheduled.

The monitoring well installed in WS04 was destroyed recently after the Ground Investigation and was unable to be monitored during any of the four gas monitoring visits subsequently undertaken.

No concentrations of methane (CH₄) were recorded within any of the standpipe locations. Carbon dioxide (CO₂) was recorded within all standpipe locations at concentrations of between 0.0% v/v and 1.5% v/v. Detectable levels of oxygen (O₂) were recorded at concentrations between 16.9% v/v and 20.0% v/v.

No positive gas flow rates were detected during the monitoring period.

The atmospheric pressure ranged between 991mb to 1002mb and the monitoring was carried out during periods of falling and steady barometric pressure.

Groundwater was only recorded within WS01 at depths between 3.16m and 3.18m bgl and in WS05 between depths of 1.54m and 1.58m bgl. No groundwater was recorded within the remaining standpipes.

Characterisation of the Gas Screening Value (GSV)

Based upon the results recorded to date, in accordance with CIRIA Report C665, the risk to the site from ground gases has been assessed by converting the results to gas screening values (GSVs), calculated by multiplying the typical maximum gas concentrations with the recorded maximum positive flow rates. In addition, individual “hazardous gas flow rates” (Q_{hg}) have been derived for each monitoring point. As no levels of methane have been recorded a GSV for carbon dioxide only has been calculated.

$$GSV \text{ (l/hr)} = \text{max borehole flow rate (l/hr)} \times \text{max gas concentration (\%)}$$

For this assessment, the maximum recorded concentration of carbon dioxide of 1.5%v/v has been used. No positive gas flow rates have been detected therefore the limit of detection of the gas analyser of 0.1 l/hr has been selected to calculate the GSV.

$$\text{Carbon Dioxide GSV} = 0.015 \text{ (1.5\%)} \times 0.1 = 0.0015 \text{ l/hr}$$

In order to assess the ground gas regime beneath the site and the need to incorporate ground gas precautions, guidance was taken from CIRIA C665 ‘Assessing risks posed by hazardous ground gases to buildings’. Based on the site being developed for a residential apartment end use, the Wilson and Card method has been used to carry out the assessment.

When considering the results in accordance with CIRIA C665 (Section A Development and Table 8.5 – Modified Wilson and Card Classification) it can be seen that the GSV value for carbon dioxide is below the assessment GSV of 0.07 l/hr and based on the GSV the site falls into Characteristic Situation 1 and gas protection measures are not required.

Characteristic Situation 1

The proposed development is classified as a Building Type A in accordance with BS 8485:2015 and the site falls into CS1 in accordance with Table 2 of the above guidance based on the interim monitoring results. If the CS1 classification remains after the completion of gas monitoring programme, gas protection measures will not be required for the proposed apartments.

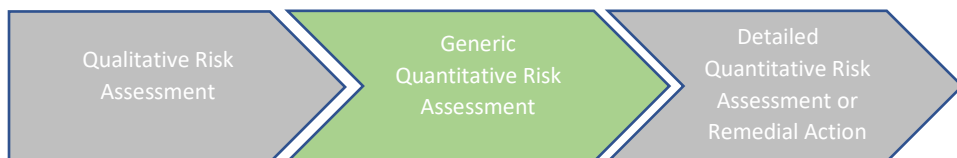
Radon

The site is located in an area where radon precautions are not required.

7.5 Revised Pollution Linkage Assessment

The pollution linkage assessment has been revised based on the findings of the Ground Investigation and testing in accordance with CIRA C552 to identify any realistic pollution linkages in order to quantify the risks to human health and controlled waters.

Human Health Pollution Linkage Assessment



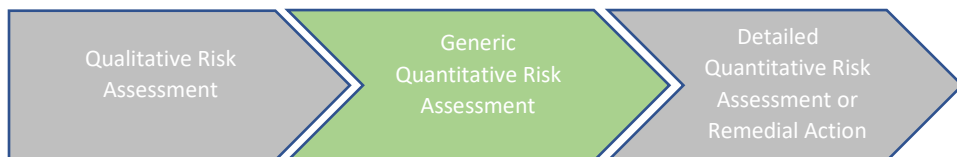
- The table below represents the second stage in the land quality risk assessment process - **the Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Unlikely	Medium	Low	<i>Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site.</i> <i>Made Ground was present beneath the site to a maximum depth of 2.5m bgl, however it was not bottomed out in select areas of the northern and central parcels. The site was formerly occupied by residential properties which have been demolished.</i> <i>No elevated Contaminates of Concern (CoCs) were identified through laboratory testing. In addition, no asbestos has been detected in the Made Ground samples that were screened.</i> <i>The proposed development is for 14 new apartments, the plans also indicate that the site will largely be covered in hardsurfacing effectively removing the pollution linkage to site end users. However, limited soft landscaping will be present.</i> <i>As contaminated Made Ground has not been identified, no pollution linkage is considered to exist.</i>

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL2	Contaminated Soils	Inhalation of vapour.	Unlikely	Medium to Severe	Low	This pollution linkage refers to hydrocarbon vapours migrating into confined spaces within the proposed development. No visual or olfactory evidence of contamination was observed. As a source has not been identified, no pollution linkage is considered to exist.
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	Pollution Linkage 3 relates to contamination on the subject site affecting adjacent site users. No mobile contamination has been identified and a viable pollution linkage has not been identified.
PL4	Contaminated Soils	Attacking potable water supply pipe.	Low likelihood	Medium	Low to Moderate	Pollution Linkage 4 refers to the possible contaminants permeating potable water supply pipes and consumption by the future site end users of the tainted water supply. Made Ground is present at the typical potable water supply pipe installation depth. Although no elevated determinands have been recorded there is potentially still a viable pollution linkage via any unrecorded areas of contamination. Based on the possible pollution linkage identified above, it is recommended that a local water company risk assessment is carried out prior to construction to advise on the level of protection required for the potable water supply.
PL5	Ground Gas	Migration and accumulation of	Unlikely	Medium to Severe	Low	Variable thicknesses of Made Ground are present beneath the site and generally appears inert.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
		ground gas in internal spaces.				Interim gas monitoring results have not identified any levels of methane and low concentrations of carbon dioxide have been recorded to a maximum of 1.5% v/v. The site is in CS1, and gas protection measures are not required based on the initial gas monitoring visits. The level of precautions will be confirmed on completion of the monitoring. The site is not within an area requiring radon precautions within foundations.

Controlled Waters Pollution Linkage Assessment



- The table below represents the second stage in the land quality risk assessment process – **Generic Quantitative Risk Assessment**.
- In order for a development site to be deemed 'suitable for use' the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL6	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point). Impaction of groundwater from groundwater plume.	Unlikely	Medium	Low	Made Ground has been identified beneath the site, no significant mobile contamination has been identified on the site. The site is indicated to be underlain by Glacial Till deposits (Secondary Undifferentiated Aquifer) and the bedrock is the Old Lawrence Rock (Secondary A Aquifer). The site has been shown to be underlain by natural Clay which will have prevented the downward migration of any potentially mobile contamination towards the underlying Secondary A Aquifer. The site is not located within a Source Protection Zone and the groundwater is not considered to be a sensitive resource. In addition, there are no nearby potable water abstractions. Furthermore, the proposed development will be predominantly covered with hardsurfacing and a new drainage system installed. This will considerably reduce infiltration and leaching of potential contaminants. Therefore, no pollution linkage is considered to exist.

Conceptual Site Model					Generic Quantitative Risk Assessment	
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Unlikely	Mild	Very Low	Pollution Linkage 7 refers to the impaction of surface waters from contaminated soils and groundwater. No surface waters have been identified within close proximity of the site with the nearest named watercourse being Hey Brook located 690m to the east. No elevated levels of any CoC have been recorded within the soils and as no surface water features are within close proximity to the site a pollution linkage is not considered to exist.

7.6 Outline Remedial Strategy

Soils

No elevated levels of any CoC have been identified when compared against the screening values for a residential end use without plant uptake. In addition, the development will be largely covered in hardsurfacing effectively acting as a cover system which would break the pathway to the underlying soils. No remediation in regard to soils is necessary.

The topsoil can be reused in areas of soft landscaping or removed from the site if there is a surplus. The topsoil may need sorting to remove any anthropogenic constituents such as glass and brick. It is not however suitable to be used as a growing medium for home produce as the development has been assessed against the residential screening criteria without plant uptake.

Groundwater

No remediation with respect to controlled waters is required due to lack of mobile contamination and underlying impermeable soils.

Ground Gas

Interim gas monitoring results indicate the site is in CS1 and gas protection measures will not be required for the proposed development. The level of precautions will be confirmed in the final assessment.

The site is not in an area requiring radon precautions.

Watching Brief

A watching brief should be in place during ground works and construction. If previously unidentified contamination is encountered, work should cease in that area and Groundtech Consulting contacted for advice.

Regulatory compliance should be obtained pre-commencement to avoid delays during the construction phase which will have cost implications.

7.7 Asbestos in Soils

No asbestos has been detected within any samples through laboratory screening.

Additional consideration should be given to the demolition of the existing sheds in the central plot to ensure that the postulated asbestos cement sheeting does not release fibres potentially impacting the surrounding area and surface soils.

7.8 Health and Safety - Construction and Ground Workers

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

Pollution Linkage Ref	Potential Source	Pollution Linkage	Likelihood	Severity	Level of Risk
PL8	Made Ground	Ingestion, direct contact, inhalation of dusts.	Unlikely	Medium	Low

No elevated concentrations of Contaminants of Concern have been determined in the Made Ground soils and no asbestos has been detected.

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

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

7.9 Waste Classification by Assessment

We have reviewed the testing results and inputted them into the HazWasteOnline model which allows users to code and classify waste as defined in the EWC (European Waste Catalogue 2002) based on EC Regulation 1272/2008 on the Classification, labelling and packaging of substances and mixtures (CLP) and latest Environment Agency guidance (WM3 “Guidance on the classification and assessment of waste (1st edition 2015)-Technical Guidance”).

This is a useful tool as waste producers have the legal responsibility to classify any waste they produce.

Seven samples were tested to assess whether they contained any contaminants in the hazardous range when screened against assessment criteria within WM3. The results are in the Waste Classification Report presented in *Appendix 9*.

Sample Name	Depth (m bgl)	Classification Result	Hazardous Properties
WS01	0.10	Non-Hazardous	-
WS02	0.50	Non-Hazardous	-
WS03	1.00	Non-Hazardous	-
WS05	0.30	Hazardous	Ecotoxic – Copper and Zinc
TP01	1.50	Non-Hazardous	-
TP04	0.20	Non-Hazardous	-
TP06	0.20	Non-Hazardous	-

Based on the HazWasteOnline assessment tool, the majority of Made Ground soils have been classified as Non-Hazardous for waste disposal purposes. However, the Made Ground in WS05 at 0.3m in the central parcel of land has ecotoxic hazardous properties related to copper and zinc and therefore is Hazardous.

The hazardous soil population was related to the granular Made Ground directly underlying the tarmac, as the central site houses the sheds a probable source relates to materials stored in the sheds. The material should remain in the ground in situ if possible to avoid removal the material to a hazardous landfill.

Total testing was not undertaken on any samples of the natural soils, and they are assumed to be Non-Hazardous for waste disposal.

No asbestos was detected within any of the samples screened.

7.10 Waste Acceptance Criteria (WAC) Results

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste) led to the establishment of a methodology for classifying wastes. Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. There are three different WAC, these are for:

- *Inert waste*
- *Non-Hazardous waste*
- *Hazardous waste*

Wastes should first be classified based on their total concentrations as detailed in the previous section. WAC testing is then required if the end disposal route is a landfill.

Waste Acceptance Criteria (WAC) testing was outside the scope of this investigation and the guidance given below is general.

The possibility of automatic inert classification of the natural soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing, this is the case if:

- *They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source) and*
- *There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other their disposal in other classes of landfill.*

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

Materials should be segregated and where necessary sufficient time is allowed to further classify the material properly, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is recommended that where possible, the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route.

The reuse of soils on the site this should be done in accordance with the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE CoP). Any re-use scheme should be designed to minimise disposal costs.

After a cut and fill balance plan/volume calculation has been carried out, a U1 and T5 exemption could be registered. This will allow the use of the following soils without a waste permit or under Dow CoP MMP:

- *1,000 tonnes (c.600m³) of non-hazardous soil.*
- *5,000 tonnes (c.3,000m³) of natural sand and gravels.*
- *50,000 tonnes (c.25,000m³) of bituminous material to be used in roadways.*



- 5,000 tonnes (c.3,000m³) of crushed concrete / stone.

8.0 FINAL APPRAISAL

8.1 Land Quality

Deep Made Ground of variable thickness was encountered beneath the site and generally to a maximum depth of 2.5m bgl, however the Made Ground soils were not fully penetrated in three locations. The Made Ground soils comprised dark brown clayey sandy gravelly topsoil typically underlain by firm dark brown sandy gravelly clay.

Geo-environmental testing indicates that no elevated levels of any CoC have been recorded when compared to residential screening values (without plant uptake) and no asbestos has been detected.

The site will predominantly be covered in hardsurfacing breaking the pollution linkage to site end users. The risk to human health from direct contact with soils considered to be *Low*.

No volatile contamination was recorded during the Ground Investigation and the risk from vapours is considered to be *Low*.

The surrounding area is largely residential which is considered to be a high sensitivity receptor, however as no exceedance or mobile contamination has been recorded, the risk to adjacent site users is considered to be *Low*.

Made Ground was recorded at typical potable water supply pipe installation depth and although no exceedances have been recorded when compared to residential screening values (without plant uptake) there is still considered to be a *Low to Moderate* risk to potable water supply pipes. A local water company risk assessment should be undertaken to determine to correct specification of water pipe to be used.

No mobile contamination has been observed and the risk to controlled waters is considered to be *Very Low to Low*.

Interim gas monitoring results place the site in CS1 and gas precautions are not required for the proposed development. The site does not require any radon protective measures. The risk from permanent ground gases is considered to be *Low* and will be confirmed on completion of the monitoring.

Generally, the Made Ground soils have been classified as *Non-Hazardous* for waste disposal purposes however, soils have been locally identified as *Hazardous* in WS05 at 0.3m bgl. Where possible, the hazardous material should be kept onsite.

Suitable measures should be in place during the removal of the existing sheds in the central plot to ensure that the postulated asbestos cement sheeting does not release fibres and impact the surrounding area and surface soils.

8.2 Ground Engineering

Trench fill foundations constructed within the underlying natural moderate to high Clay at depths of between 1.0m and 2.5m bgl are generally recommended for the proposed development. However, additional consideration will be required for certain areas across the site as outlined below:

- *The eastern edge of the northern parcel (Block C) where the Made Ground was not bottomed out in WS05.*

- *The eastern extent of the central parcel (Block B) where the relic basement structure was noted, and the Made Ground soils were not fully penetrated.*
- *The southern area of the southern parcel (Block A) where an area of very low strength Clay was recorded at a depth of 3.0m bgl.*

It is recommended that supplementary investigation and a watching brief is carried out during the grubbing up of existing construction and the excavation of new foundations in these areas to ensure a suitable bearing stratum is located. A deeper mini pile solution may be required if a shallow founding stratum is not identified.

Foundations should be altered in accordance with appropriate guidance when building near trees.

SuDS drainage is not considered feasible at the site due to the deep Made Ground and natural cohesive strata underlying the site.

CBR values of 3 to 5% are likely to be achieved in undisturbed natural cohesive soils for pavement design purposes. Untreated Made Ground should be assumed to have a CBR value of less than 2.5%, unless proven otherwise.

The results of laboratory pH and sulphate content indicate that ACEC Class AC-1^d and sulphate class DS-1 conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005.

8.3 Required Supplementary Investigation

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

Demolition Asbestos survey.

Demolition of existing buildings.

Supplementary investigation comprising trial pitting and window sampling.

Watching brief during basement removal and foundation excavations.

Tree survey by qualified arboriculturist.

Detailed foundation design.

Confirmation of the recommendations made within this report with the Local Authority.

9.0 RELEVANT INDUSTRY REFERENCES

- British Standards Institution. *Investigation of Potentially Contaminated sites - code of practice*. BS 10175:2017.
- British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:2015
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of soil*" BS EN ISO 14688:2002.
- British Standards Institution "*Geotechnical investigation and testing – Identification and classification of rock*" BS EN ISO 14689:2002.
- BRE Report BR211 '*Radon – Guidance on protective measures for new buildings*' 2015 Edition.
- BRE Special Digest 1: "*Concrete in Aggressive Ground*" 3rd Ed 2005.
- CIRIA 552 "*Contaminated Land Risk Assessment – A guide to good practice*" 2001.
- CIRIA C665 "*Assessing Risks Posed by Hazardous Ground Gases to Buildings*" 2007.
- Wilson & Card "*Proposed method classifying gassing sites*" Ground Engineering 1999.
- Card & Steve Wilson in "*A pragmatic approach to ground gas risk assessment for the 21st Century*" - CIRIA/Environmental Protection UK Ground gas seminar 2011
- BS 8576:2013 '*Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)*'
- BS 8485:2015 '*Code of practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings*'
- The Hazardous Waste (England) Regulations 2005.
- Environment Agency Hazardous Waste: "*Guidance on the classification and assessment of waste*" WM3 ver 1 May 2015.
- The National Planning Policy Framework (NPPF) March 2012
- DETR. Circular 02/2000 Contaminated Land.
- Environment Agency, 2009 '*Using Soil Guideline Values*'.
- Environment Agency, 2009 '*Updated Technical Background to the CLEA model*'.
- Environment Agency, 2009 '*Human health toxicological assessment of contaminants in soil*'.
- Department of the Environment, 1994, CLR Report No 1 '*A framework for assessing the impact of contaminated land on groundwater and surface water*'.
- Department of the Environment, 1994, CLR Report No 2 '*Guidance on Preliminary Site Inspection of Contaminated Land*'.
- Department of the Environment, 1994, CLR Report No 3 '*Documentary research on Industrial Sites*'.
- Department of the Environment, 1994, CLR Report No 4 '*Sampling Strategies for Contaminated Land*'.
- DEFRA and the Environment Agency, 2002-2004, CLR10 '*Soil Guideline Value Reports for Individual Soil Contaminants*'.
- Land Contamination Risk Management (LCRM), April 2021.
- Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R. C. and Nathanail, J.F. 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.
- CL:AIRE, 2014 '*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*'.
- Water Framework Directive.
- Environmental Quality Standards.

UK Drinking Water Standards: Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) and Water Supply (Water Quality) Regulations

UKWIR Report 10/WM/03/21 2010 "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites"

Health & Safety Executive, 1991. 'Protection of Workers & the General Public during the Development of Contaminated Land'.

Environment Agency & NHBC, 2000. R&D Publication 66. Guidance for the Safe Development of Housing on Land Affected by Contamination.

Environment Agency "Guidance on the classification and assessment of waste (1st edition 2015) Technical Guidance WM3"

NHBC Standards 2019

CL:AIRE "*The Definition of Waste: Development Industry Code of Practice*" Version 2 March 2011.

CIRIA "*Asbestos in soil and made ground: a guide to understanding and managing risks*" C733 2014

Control of Asbestos Regulations (CAR) 2012

Harris, M R, Herbert, S. M, Smith, M A 'Remedial Treatment for Contaminated Land' (twelve volumes), special publications 101-112, CIRIA 1996.

Department of the Environment. 1995. Industry Profiles - 48 separate publications available from The Stationery Office, London

BRE Digest 365 "Soakaway Design" 2015.

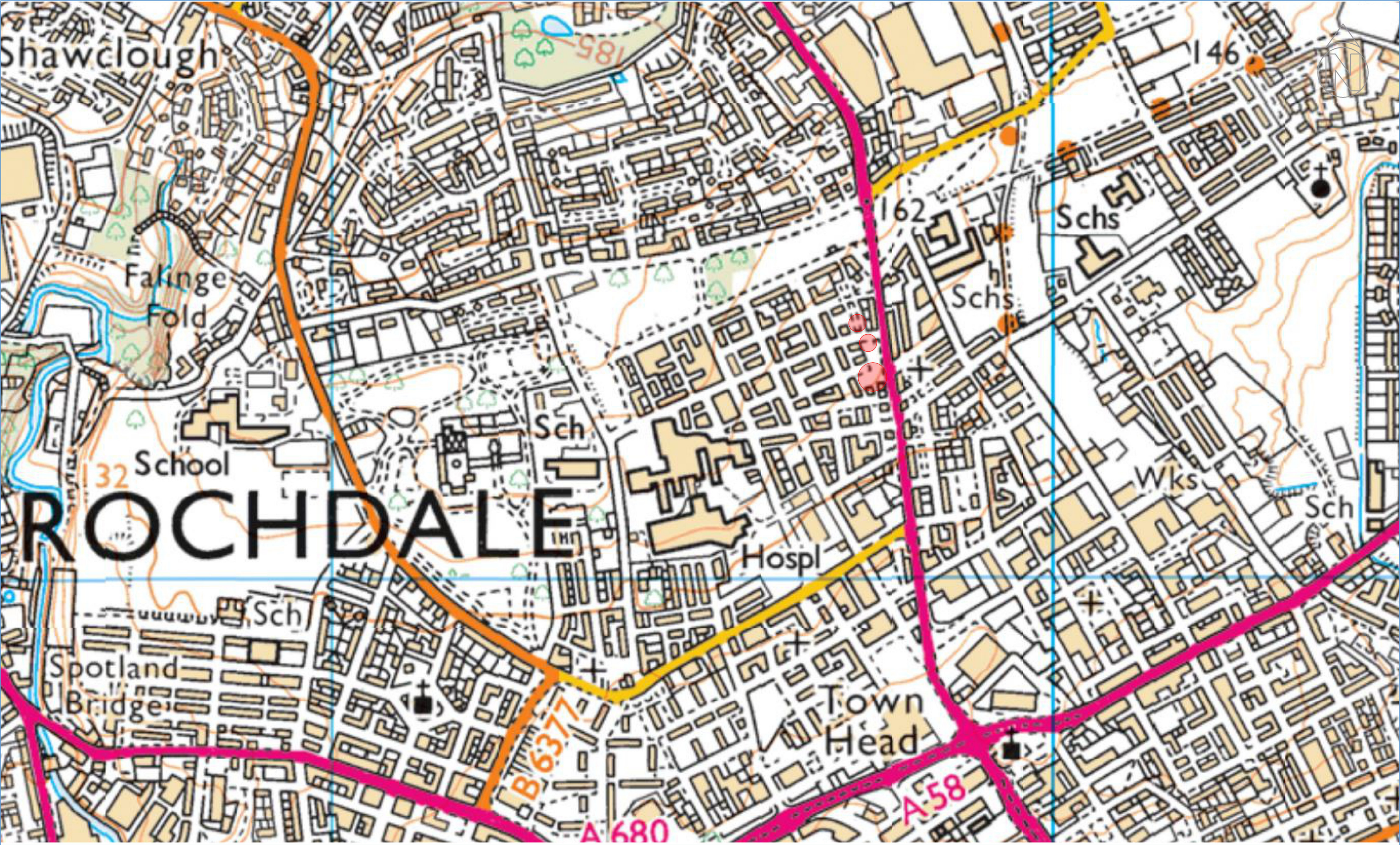
Environment Agency. R&D Publication 20. Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources. 1999.

Environment Agency Technical Guidance Note 01. Hydrogeological Risk Assessment for Landfills.

Specification for Highways Works – Series 600 Earthworks November 2017.



APPENDIX 1 - Plans



GROUNDTECH CONSULTING	CLIENT CORNERSTONE PLACE	DATE JUNE 2022				Status Preliminary Draft Issued For Comment Approved		Notes SITE LOCATION
	PROJECT TITLE WHITWORTH ROAD, ROCHDALE	SCALE NTS						
	PLAN TITLE PROJECT LOCATION PLAN	PLAN NUMBER GRO-22083-P01						
			Rev.	Details	Date			





GROUNDTECH CONSULTING	CLIENT	DATE			Status		Notes APPROXIMATE WINDOWLESS SAMPLE BOREHOLE LOCATION APPROXIMATE TRIAL PIT LOCATION
	CORNERSTONE PLACE	MAY 2022			Preliminary		
	PROJECT TITLE	SCALE			Draft		
	WHITWORTH ROAD, ROCHDALE	NTS			Issued		
	PLAN TITLE	PLAN NUMBER			For Comment		
	EXPLORATORY HOLE LOCATION PLAN	GRO-22083-P02	Rev.	Details	Date	Approved	

SOURCES

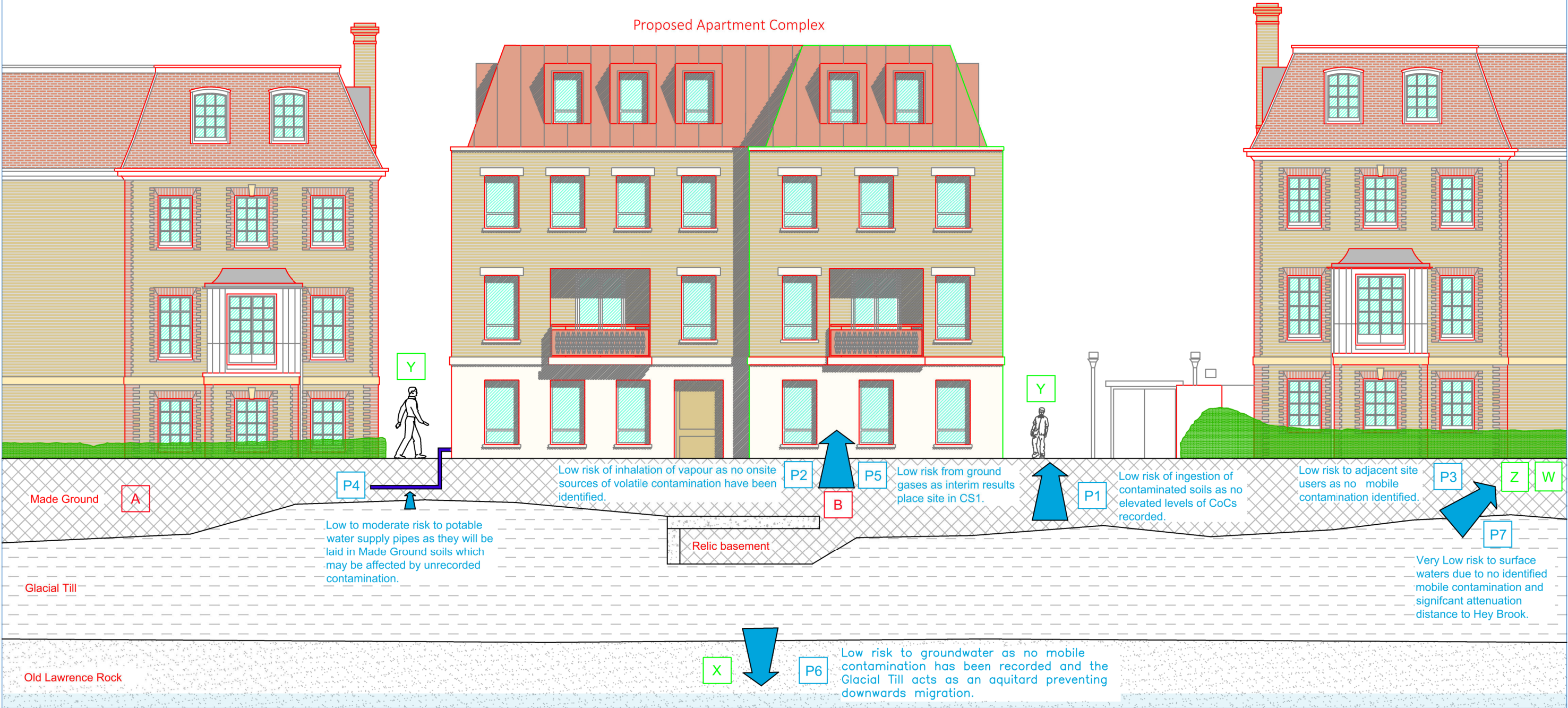
- A. Contaminated soils / Made Ground.
- B. Ground gas.

POLLUTION LINKAGES

- P1. Ingestion of soil and dust.
- P2. Inhalation of vapour.
- P3. Inhalation of soil dust by adjacent site users.
- P4. Attacking of potable water supply pipe.
- P5. Migration and accumulation of ground gas in internal places.
- P6. Impaction of groundwater from soil contamination.
- P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS

- W. Hey Brook located c.690m east.
- Y. Site end users.
- X. Groundwater within the Secondary A Aquifer.
- Z. Adjacent site users.



GROUNDTECH CONSULTING 	CLIENT	DATE				Status		Notes
	CORNERSTONE PLACE	JUNE 2022				Preliminary		
	PROJECT TITLE	SCALE				Draft		
	WHITWORTH ROAD, ROCHDALE	NTS				Issued		
	PLAN TITLE	PLAN NUMBER				For Comment		
	ILLUSTRATIVE CSM	GRO-22083-P04	Rev.	Details	Date	Approved		
								

APPENDIX 2 - Site Photographs



Photograph 1 – Block A soft landscaping area.



Photograph 2 – Play area Block A.



Photograph 3 – Block B garages.



Photograph 4 - Block B rear of garages.



Photograph 5 – Electric substation Block C.



Photograph 6 – Block C area.



APPENDIX 3 - Exploratory Hole Logs



GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS01

Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -

Hole Type
WS

Location: ROCHDALE

Level:

Scale
1:25

Client: CORNERSTONE PLACE

Dates: 16/03/2022 -

Logged By
DR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.20			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	
		0.30	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
		1.00	ES						1
		1.20		N=22 (3,4/7,7,5,3)					
		1.50	ES						
		2.00	D		2.00			Firm dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone.	2
		2.00	ES	N=12 (2,4/3,3,3,3)					
		2.10							
		3.00	D					Becoming soft from 3.0m bgl.	3
		3.00		N=3 (0,0/0,1,1,1)					
		4.00	D					Becoming firm to stiff from 4.0m bgl.	4
		4.00		N=14 (2,2/3,3,4,4)					
					4.40				
					4.45			Extremely weak yellow orange SANDSTONE residually weathered recovered as sandy gravel. End of borehole at 4.45 m	5

Remarks

1. Location cleared for utilities. 2. Hand dug inspection pit to 1.2m bgl. 3. Groundwater encountered at 2.0m bgl. 4. Installation to 4.0m bgl, 1.0m plain 3.0m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS02

Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -

Hole Type
WS

Location: ROCHDALE

Level:

Scale
1:25

Client: CORNERSTONE PLACE

Dates: 16/03/2022 -

Logged By
DR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Tarmac.	
		0.50	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	1
		1.00	ES						
		1.20		N=12 (3,3/3,3,3,3)					
		1.50	ES						
		2.00	ES					Firm medium strength dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone.	2
		2.00		N=16 (3,3/4,4,4,4)					
		2.40	ES		2.30				
		2.55 - 3.00	U						
		3.00		N=13 (1,2/3,3,3,4)	3.00			NO RETURN.	3
		4.00		N=50 (5,10/50 for 90mm)	4.00			Stiff dark brown sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone.	4
					4.10				
		4.30	D		4.30			Extremely weak yellow orange SANDSTONE residually weathered recovered as sandy gravel. End of borehole at 4.30 m	5

Remarks

1. Location cleared for utilities. 2. Hand dug inspection pit to 1.2m bgl. 3. Groundwater encountered at 3.0m bgl. 4. Borehole backfilled with arisings.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS03

Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -

Hole Type
WS

Location: ROCHDALE

Level:

Scale
1:25

Client: CORNERSTONE PLACE

Dates: 16/03/2022 -

Logged By
DR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES	N=7 (0,0/0,1,2,4)	0.30			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	1
		0.40	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
		1.00	ES						
		1.20							
		1.55 - 2.00	U	N=22 (1,3/5,5,6,6)	2.00			Firm dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone.	2
		2.00	D						
		2.00	ES						
		2.00							
		3.00	D	N=50 (5,7/50 for 235mm)	3.00			Extremely weak yellow orange SANDSTONE residually weathered recovered as sandy gravel.	3
		3.00							
		3.30 - 3.45	D		3.35			End of borehole at 3.35 m	4
									5

Remarks

1. Location cleared for utilities. 2. Hand dug inspection pit to 1.2m bgl. 3. No groundwater encountered. 4. Refusal on sandstone bedrock at 3.35m bgl. 5. Installation to 3.0m bgl, 1.0m plain 2.0m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS04

Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -

Hole Type
WS

Location: ROCHDALE

Level:

Scale
1:25

Client: CORNERSTONE PLACE

Dates: 16/03/2022 -

Logged By
DR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	
		0.30	ES					MADE GROUND: Dark brown black fine to coarse sand and subangular to subrounded gravel of mixed lithologies including brick.	
		0.60	ES		0.50			MADE GROUND: Firm brown mottled grey sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
		1.00	D						
		1.00	ES						
		1.20		N=15 (2,4/4,4,4,3)					
					1.30			Firm high strength dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone.	
		1.55 - 2.00	U						
		2.00	D						
		2.00		N=9 (2,2/2,2,2,3)					
		3.00	D					Extremely weak yellow orange SANDSTONE residually weathered recovered as sandy gravel.	3
		3.00		N=50 (1,2/50 for 235mm)	3.10				
		3.35	D		3.35				4
								End of borehole at 3.35 m	
									5

Remarks

1. Location cleared for utilities. 2. Hand dug pit to 1.2m bgl. 3. No groundwater encountered. 4. Refusal on sandstone bedrock at 3.35m bgl. 5. Installation to 3.0m bgl, 1.0m plain 2.0m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS05

Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -

Hole Type
WS

Location: ROCHDALE

Level:

Scale
1:25

Client: CORNERSTONE PLACE

Dates: 16/03/2022 -

Logged By
DR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Tarmac.	
		0.30	ES					MADE GROUND: Dark brown black fine to coarse sand and subangular to subrounded gravel of mixed lithologies including brick. <i>Brick cobbles between 0.5m and 1.0m bgl.</i>	
		1.10	ES	N=3 (1,2/0,0,1,2)	1.00			MADE GROUND: Firm brown mottled grey sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	1
		1.20							
		1.50	ES						
		2.00	D	N=50 (5,10/50 for 235mm)					2
		2.00			2.35			End of borehole at 2.35 m	
									3
									4
									5

Remarks

1. Location cleared for utilities. 2. Hand dug inspection pit to 1.2m bgl. 3. No groundwater encountered. 4. Refusal on sandstone bedrock at 2.35m bgl. 5. Installation to 2.0m bgl, 1.0m plain 1.0m slotted.





GROUNDTECH
CONSULTING

Borehole Log

Borehole No.

WS06

Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -

Hole Type
WS

Location: ROCHDALE

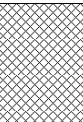
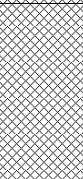
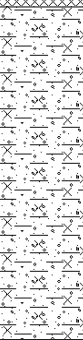
Level:

Scale
1:25

Client: CORNERSTONE PLACE

Dates: 16/03/2022 -

Logged By
DR

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20	ES	N=9 (2,3/2,2,2,3)	0.40			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	1		
		0.50	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.			
		1.00	D				Firm dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone.				
		1.10	ES								
		1.20									
		2.00	D		N=50 (4,4/50 for 235mm)		2.10		Extremely weak yellow orange SANDSTONE residually weathered recovered as sandy gravel.	2	
		2.00									
		2.35	D	2.35	----- End of borehole at 2.35 m			3			
											4

Remarks

1. Location cleared for utilities. 2. Hand dug inspection pit to 1.2m bgl. 3. No groundwater encountered. 4. Refusal on sandstone bedrock at 2.35m bgl. 5. Borehole backfilled with arisings.



Trial Pit Log

Trialpit No
TP01
Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -
Level:

Date
16/03/2022

Location: ROCHDALE

Dimensions (m):

Scale
1:25

Client: CORNERSTONE PLACE

Depth
2.70

Logged
JKP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.20			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	
	0.50	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay with medium cobble content of brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	1
	1.50	ES						
			HVP=82	2.00			Firm high strength dark brown mottled grey sandy gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone. Sand is fine.	2
	2.50 2.50	D ES						
			HVP=76	2.70			End of pit at 2.70 m	3
								4
								5

Remarks: 1. Location cleared for utilities. 2. No groundwater encountered. 3. Pit sides stable. 4. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP02
Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -
Level:

Date
16/03/2022

Location: ROCHDALE

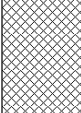
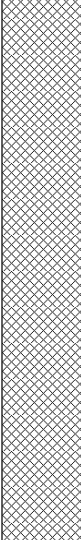
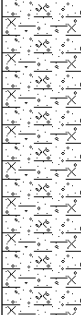
Dimensions
(m):

Scale
1:25

Client: CORNERSTONE PLACE

Depth
3.30

Logged
JKP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20 0.20	ES ES		0.40			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	1
							MADE GROUND: Firm brown mottled grey sandy gravelly clay with medium cobble content of brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
	1.20	ES						2
	2.60	D	HVP=73	2.20			Firm medium to high strength dark brown mottled grey sandy gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone. Sand is fine.	3
	3.00	ES	HVP=76	3.30			End of pit at 3.30 m	4
								5

Remarks: 1. Location cleared for utilities. 2. Groundwater encountered at 3.2m bgl. 3. Pit sides stable. 4. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP03
Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -
Level:

Date
16/03/2022

Location: ROCHDALE

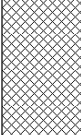
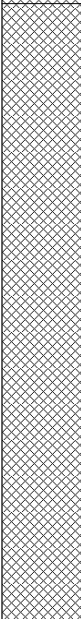
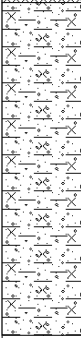
Dimensions
(m):

Depth
3.60

Scale
1:25

Logged
JKP

Client: CORNERSTONE PLACE

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.46			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	1
	0.70	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay with medium cobble content of brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
	1.50	ES		2.50				2
			HVP=65					
	3.00	ES		3.60			Firm medium strength dark brown mottled grey sandy gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone. Sand is fine.	3
	3.10	D					High strength from 3.0m bgl.	
			HVP=77					
			HVP=82					
							End of pit at 3.60 m	4
								5

Remarks: 1. Location cleared for utilities. 2. Groundwater encountered at 2.8m bgl. 3. Pit sides stable. 4. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP04
Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -
Level:

Date
16/03/2022

Location: ROCHDALE

Dimensions (m):

Scale
1:25

Client: CORNERSTONE PLACE

Depth
1.02

Logged
JKP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES					MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	
				0.44				
	0.70	ES					MADE GROUND: Firm brown mottled grey sandy gravelly clay with medium cobble content of brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
				1.02				
							End of pit at 1.02 m	1
								2
								3
								4
								5

Remarks: 1. Location cleared for utilities. 2. No groundwater encountered. 3. Pit sides stable. 4. Pit terminated as concrete obstruction encountered. 5. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP05
Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -
Level:

Date
16/03/2022

Location: ROCHDALE

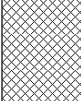
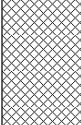
Dimensions
(m):

Scale
1:25

Client: CORNERSTONE PLACE

Depth
0.81

Logged
JKP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	ES		0.35			MADE GROUND: Dark brown clayey sandy gravelly topsoil. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including brick.	
				0.80			MADE GROUND: Firm brown mottled grey sandy gravelly clay with medium cobble content of brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
							End of pit at 0.81 m	
								1
								2
								3
								4
								5

Remarks: 1. Location cleared for utilities. 2. No groundwater encountered. 3. Pit sides stable. 4. Pit terminated as service encountered. 5. Trial pit backfilled with arisings.

Stability:



Trial Pit Log

Trialpit No
TP06
Sheet 1 of 1

Project Name: WHITWORTH ROAD

Project No.
GRO-22083

Co-ords: -
Level:

Date
16/03/2022

Location: ROCHDALE

Dimensions
(m):

Scale
1:25

Client: CORNERSTONE PLACE

Depth
2.80

Logged
JKP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES	HVP=66	0.10			MADE GROUND: Black tarmac.	1
				0.35			MADE GROUND: Light grey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse of limestone.	
	0.70	ES		0.80			MADE GROUND: Firm brown mottled grey sandy gravelly clay with medium cobble content of brick. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies including sandstone and brick.	
	1.20	ES						
	2.20	ES	HVP=74				Firm medium strength dark brown mottled grey sandy gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone. Sand is fine.	2
	2.50	D						
				2.80			End of pit at 2.80 m	3
								4
								5

Remarks: 1. Location cleared for utilities. 2. Groundwater encountered at 2.7m bgl. 3. Pit sides stable. 4. Trial pit backfilled with arisings.

Stability:



APPENDIX 4 - Geo-Environmental Testing

**Dom Roberts**

Groundtech Consulting Ltd
First Floor, Lloyd House
Oxford Court
Greenfold Way
WN7 3XJ

t: 07449819886

e: dr@groundtechconsulting.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 22-46574

Project / Site name:	Whitworth Road, Rochdale	Samples received on:	17/03/2022
Your job number:	GRO-22083	Samples instructed on/ Analysis started on:	21/03/2022
Your order number:	ORD-22083-2429	Analysis completed by:	29/03/2022
Report Issue Number:	1	Report issued on:	29/03/2022
Samples Analysed:	8 soil samples		

Signed: 

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 22-46574
Project / Site name: Whitworth Road, Rochdale
Your Order No: ORD-22083-2429

Lab Sample Number				2210189	2210190	2210191	2210192	2210193
Sample Reference				WS01	WS03	WS05	TP01	TP04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	1.00	0.30	1.50	0.20
Date Sampled				16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	22	15	5.6	12	17
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.7	8.1	9.0	7.7	7.9
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	34	24	150	59	23
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.012	0.073	0.029	0.011
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	16.9	12.1	73.2	29.3	11.3
Organic Matter (automated)	%	0.1	MCERTS	4.3	0.7	3.0	2.0	5.7

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.38	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.25	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.85	< 0.05	2.2	< 0.05	2
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.36	< 0.05	0.45
Fluoranthene	mg/kg	0.05	MCERTS	1.2	< 0.05	2.8	< 0.05	3.4
Pyrene	mg/kg	0.05	MCERTS	1.1	< 0.05	2.7	< 0.05	3.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.68	< 0.05	1.6	< 0.05	1.9
Chrysene	mg/kg	0.05	MCERTS	0.54	< 0.05	1.2	< 0.05	1.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.47	< 0.05	1.6	< 0.05	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.41	< 0.05	0.81	< 0.05	1.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.58	< 0.05	1.8	< 0.05	2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.23	< 0.05	0.72	< 0.05	0.86
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.24	< 0.05	0.26
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.29	< 0.05	0.85	< 0.05	0.91

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.28	< 0.80	17.4	< 0.80	19.7
-----------------------------	-------	-----	--------	------	--------	------	--------	------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	6.2	6.9	9.3	10
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.4	0.6
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	15	16	40	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	58	58	3100	53	49
Lead (aqua regia extractable)	mg/kg	1	MCERTS	71	21	190	54	150
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	12	30	37	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	95	42	290	92	110

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-46574
Project / Site name: Whitworth Road, Rochdale
Your Order No: ORD-22083-2429

Lab Sample Number				2210194	2210195	2210196
Sample Reference				TP06	WS01	WS03
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.20	2.10	2.00
Date Sampled				16/03/2022	16/03/2022	16/03/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	16	6.8
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.6

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-
Asbestos Analyst ID	N/A	N/A	N/A	DSA		

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.4	6.8	6.9
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	52	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.026	0.03	0.036
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	26.1	-	-
Organic Matter (automated)	%	0.1	MCERTS	1.5	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	-	-
-----------------------------	-------	-----	--------	--------	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.2	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.8	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	28	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	290	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	46	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-46574

Project / Site name: Whitworth Road, Rochdale

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2210189	WS01	None Supplied	0.1	Brown loam and clay with vegetation and gravel
2210190	WS03	None Supplied	1	Light brown clay and sand with vegetation and gravel.
2210191	WS05	None Supplied	0.3	Brown loam and sand with brick and rubble.
2210192	TP01	None Supplied	1.5	Brown clay and sand with gravel.
2210193	TP04	None Supplied	0.2	Brown loam and sand with vegetation and gravel.
2210194	TP06	None Supplied	0.2	Brown clay and sand with brick and glass.
2210195	WS01	None Supplied	2.1	Brown clay and sand.
2210196	WS03	None Supplied	2	Brown clay and sand.

Analytical Report Number : 22-46574

Project / Site name: Whitworth Road, Rochdale

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Dom Roberts

Groundtech Consulting Ltd
First Floor, Lloyd House
Oxford Court
Greenfold Way
WN7 3XJ

t: 07449819886

e: dr@groundtechconsulting.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

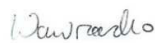
t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 22-46760

Project / Site name:	Whitworth Road, Rochadale	Samples received on:	17/03/2022
Your job number:	GRO-22083	Samples instructed on/ Analysis started on:	21/03/2022
Your order number:	ORD-22083-2429	Analysis completed by:	29/03/2022
Report Issue Number:	1	Report issued on:	29/03/2022
Samples Analysed:	1 soil sample		


Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 22-46760
 Project / Site name: Whitworth Road, Rochadale
 Your Order No: ORD-22083-2429

Lab Sample Number				2211231
Sample Reference				WS02
Sample Number				None Supplied
Depth (m)				0.50
Date Sampled				16/03/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	16
Total mass of sample received	kg	0.001	NONE	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	LFT

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	140
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.07
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	70.3
Organic Matter (automated)	%	0.1	MCERTS	3.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1.1
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	1
Fluorene	mg/kg	0.05	MCERTS	0.53
Phenanthrene	mg/kg	0.05	MCERTS	3.6
Anthracene	mg/kg	0.05	MCERTS	0.6
Fluoranthene	mg/kg	0.05	MCERTS	3.4
Pyrene	mg/kg	0.05	MCERTS	3.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2
Chrysene	mg/kg	0.05	MCERTS	1.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.79
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.64
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.21
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.79

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	22.7
-----------------------------	-------	-----	--------	------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	62
Lead (aqua regia extractable)	mg/kg	1	MCERTS	84
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	57

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-46760

Project / Site name: Whitworth Road, Rochadale

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2211231	WS02	None Supplied	0.5	Brown sand with gravel.

Analytical Report Number : 22-46760

Project / Site name: Whitworth Road, Rochadale

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

APPENDIX 5 - Geotechnical Testing



LABORATORY REPORT



4043

Contract Number: PSL22/2072

Report Date: 06 May 2022
Client's Reference: 22083
Client Name: Groundtech Consulting
First Floor
Lloyd House
Orford Court
Greenfold Way
WN7 3XJ

For the attention of: Dominic Roberts

Contract Title: Whitworth Road, Rochdale
Date Received: 21/3/2022
Date Commenced: 21/3/2022
Date Completed: 6/5/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Whitworth Road, Rochdale

Contract No:

PSL22/2072

Client Ref:

ORD-22083-2430

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



4043

PSL

Professional Soils Laboratory

Whitworth Road, Rochdale

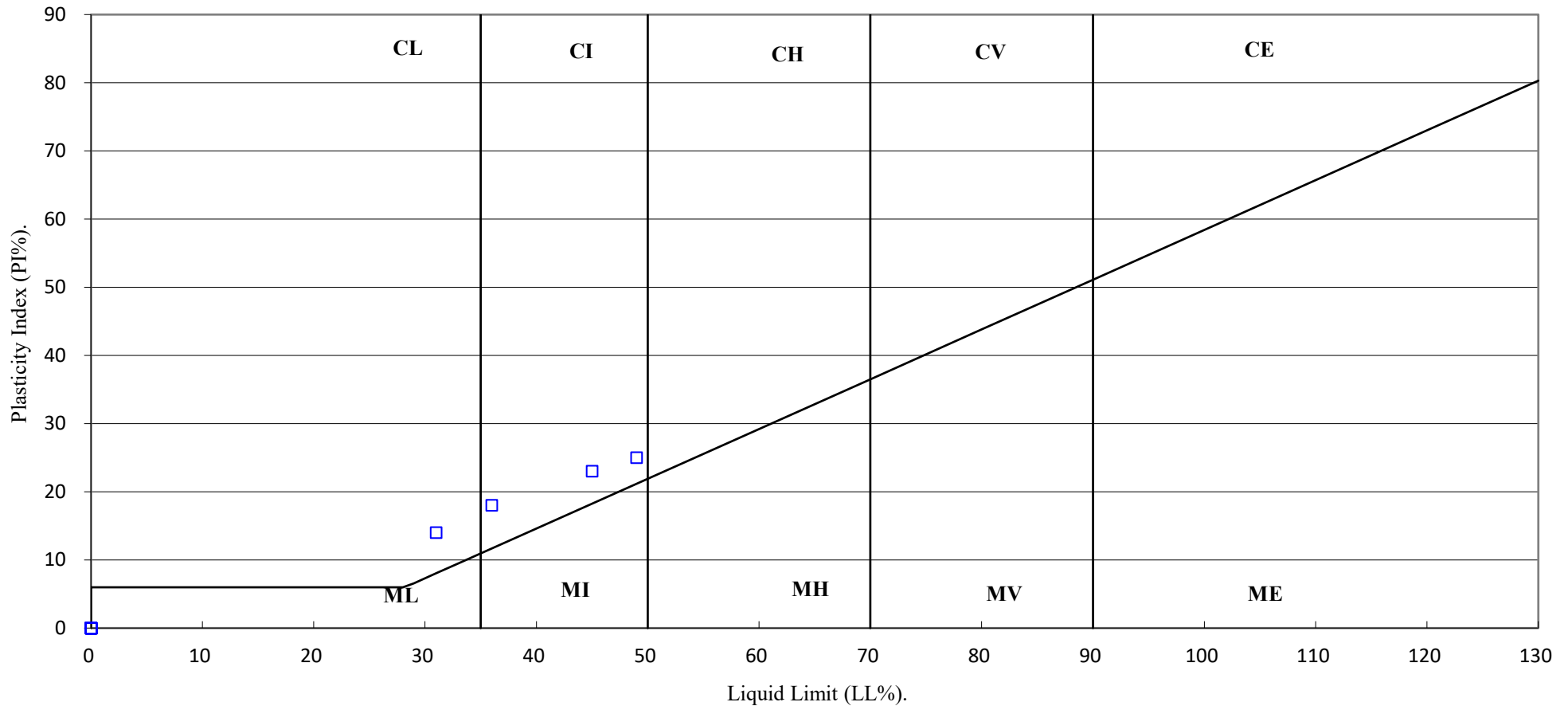
Contract No:

PSL22/2072

Client Ref:

ORD-22083-2430

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Whitworth Road, Rochdale

Contract No:

PSL22/2072

Client Ref:

ORD-22083-2430

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

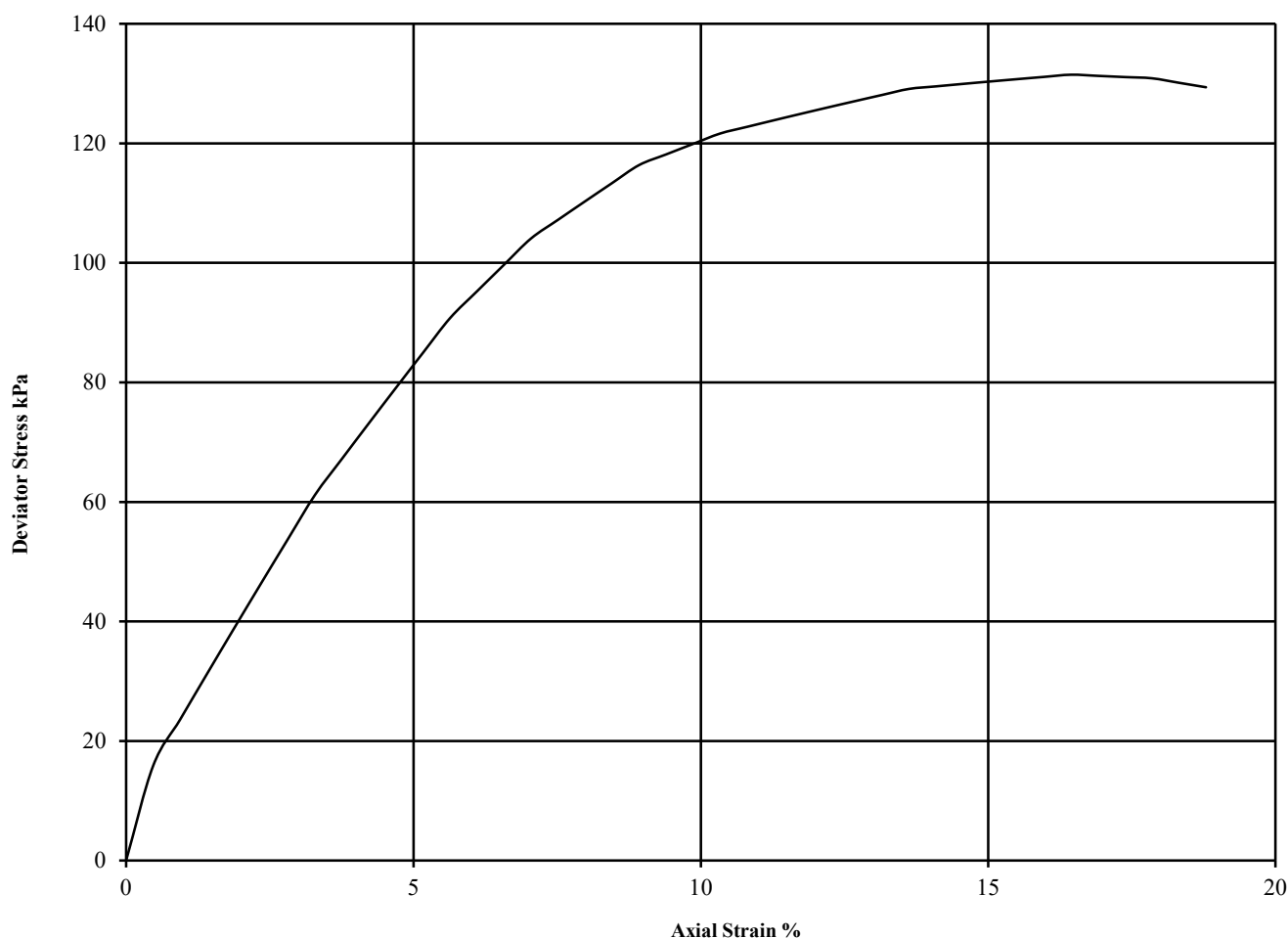
Hole Number: WS02

Top Depth (m): 2.55

Sample Number:

Base Depth (m): 3.00

Sample Type -



Diameter (mm):		70	Height (mm):		149	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.47 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	19	2.04	1.72	50	131	66	16.4	Plastic	



4043

PSL

Professional Soils Laboratory

Whitworth Road, Rochdale

Contract No:

PSL22/2072

Client Ref:

22083

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

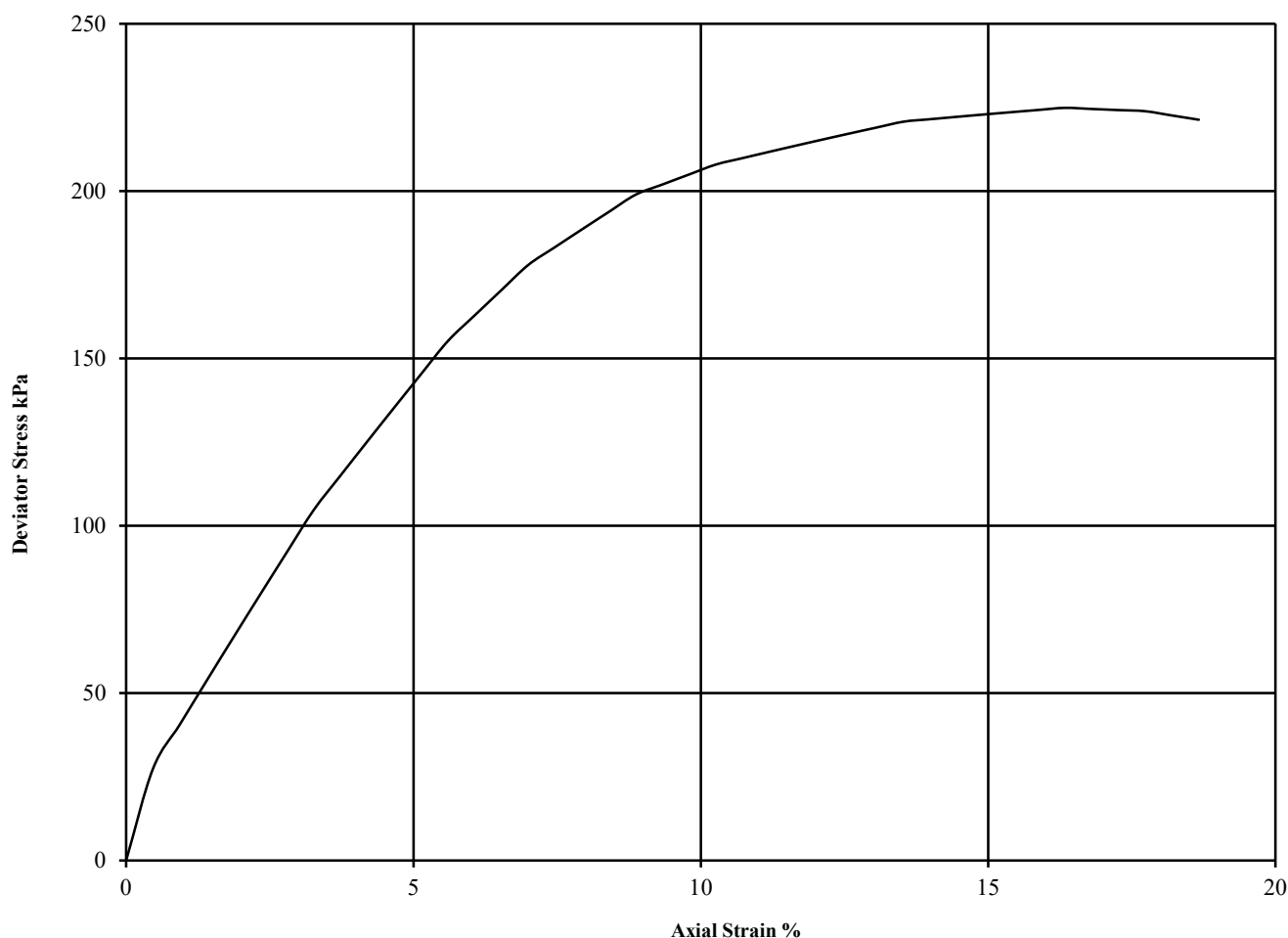
Hole Number: WS04

Top Depth (m): 1.55

Sample Number:

Base Depth (m): 2.00

Sample Type -



Diameter (mm):		70	Height (mm):		150	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.48 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	14	2.20	1.93	30	225	112	16.3	Plastic	



4043

PSL

Professional Soils Laboratory

Whitworth Road, Rochdale

Contract No:

PSL22/2072

Client Ref:

22083

SUMMARY OF LABORATORY HAND VANES

(BS1377 : PART 7 : 1990)

[illegible]

* This test is out of our UKAS scope



Whitworth Road, Rochdale

Contract No:

PSL22/2072

Client Ref:

ORD-22083-2430

Dom Roberts
Groundtech Consulting Ltd
First Floor, Lloyd House
Oxford Court
Greenfold Way
WN7 3XJ

t: 07449819886

e: dr@groundtechconsulting.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 22-49201

Project / Site name:	Whitworth Road, Rochdale	Samples received on:	21/03/2022
Your job number:	GRO-22083	Samples instructed on/ Analysis started on:	01/04/2022
Your order number:	ORD-22083-2429	Analysis completed by:	06/04/2022
Report Issue Number:	1	Report issued on:	11/04/2022
Samples Analysed:	2 soil samples		

Signed:

Martyna Langer
Martyna Langer
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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

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

Analytical Report Number: 22-49201

Project / Site name: Whitworth Road, Rochdale

Your Order No: ORD-22083-2429

Lab Sample Number				2223974	2223975
Sample Reference				TP1	TP6
Sample Number				None Supplied	None Supplied
Depth (m)				2.50	2.50
Date Sampled				16/03/2022	16/03/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	11
Total mass of sample received	kg	0.001	NONE	1.6	1.4

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.3	6.4
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	61	58
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.03	0.029
Water Soluble SO ₄ 10hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	30.3	28.9

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-49201

Project / Site name: Whitworth Road, Rochdale

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2223974	TP1	None Supplied	2.5	Brown clay.
2223975	TP6	None Supplied	2.5	Brown clay.

Analytical Report Number : 22-49201

Project / Site name: Whitworth Road, Rochdale

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

APPENDIX 6 - Interim Gas Monitoring Results

GROUNDTECH
CONSULTING

Pressure Trend:	Falling	Weather:	Sunny			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.4	0.0	0.0	0.0	0.0	0.0	
Finish	20.4	0.0	0.0	0.0	0.0	0.0	

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	0.5	0.2	19.6	20.0	0.0	0.0	0.0	0.0	0.0005	0.0000	994	-	N	NGW
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.0	19.6	20.0	0.0	0.0	0.0	0.0	0.0007	0.0000	994	-	N	NGW
WS04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	NA	NA
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	19.8	19.8	0.0	0.0	0.0	0.0	0.0000	0.0000	994	-	N	1.58
Notes: Unable to locate WS04.																				

GROUNDTECH
CONSULTING

Pressure Trend:	Steady	Weather:	Sunny			Equipment:	GFM 436	
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)		
Start	20	0.0	0.0	0.0	0.0	0.0		
Finish	20	0.0	0.0	0.0	0.0	0.0		

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	1.5	1.4	16.9	17.5	0.0	0.0	0.0	0.0	0.0015	0.0000	1000	-	N	NGW
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.3	19.2	19.7	0.0	0.0	0.0	0.0	0.0007	0.0000	1000	-	N	NGW
WS04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	NA	NA
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.2	0.0	19.4	19.8	0.0	0.0	0.0	0.0	0.0002	0.0000	1000	-	N	1.54
Notes: Unable to locate WS04.																				

GROUNDTECH
CONSULTING

Pressure Trend:	Steady	Weather:	Overcast			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.1	0.0	0.0	0.0	0.0	0.0	
Finish	20.1	0.0	0.0	0.0	0.0	0.0	

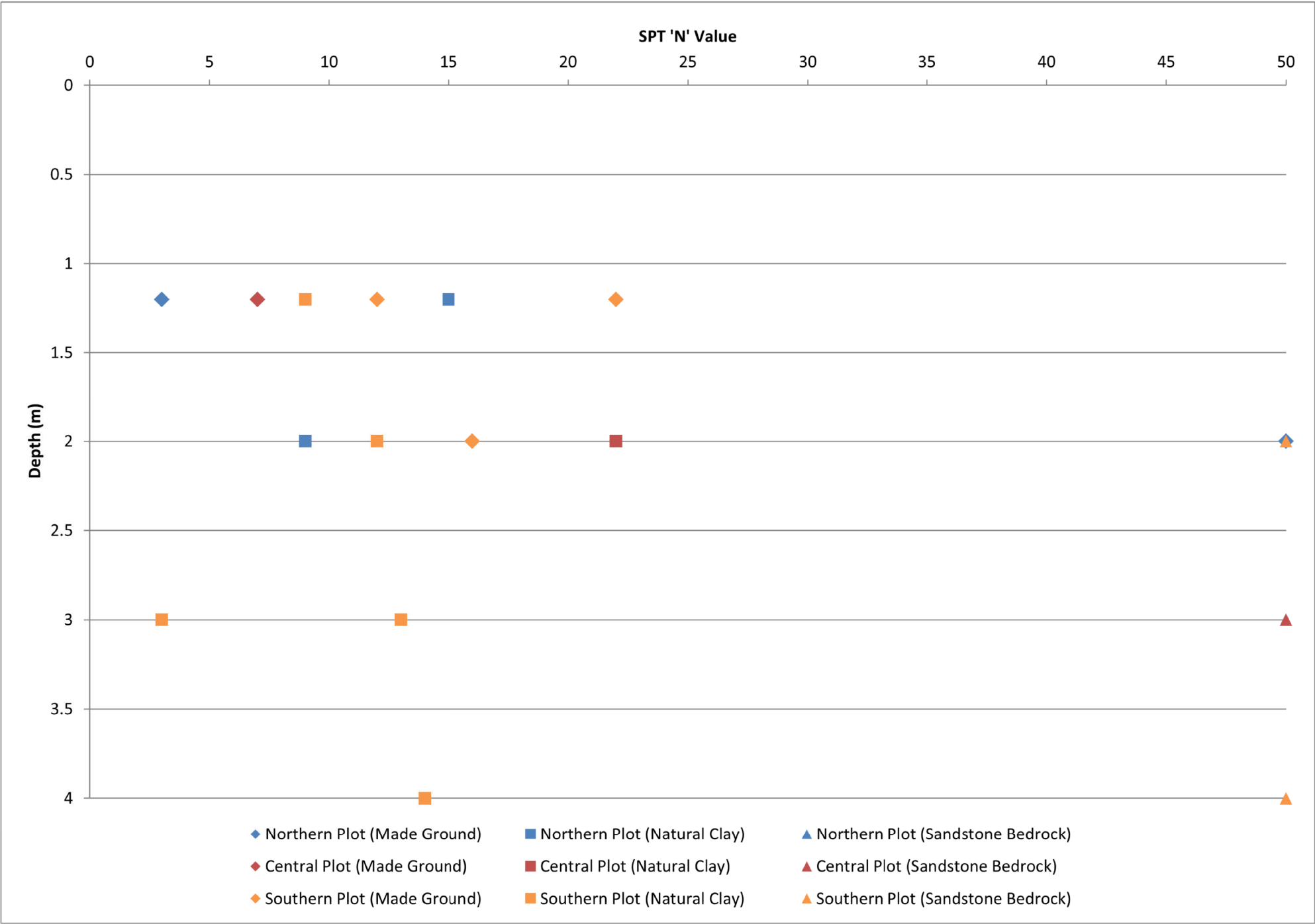
BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	1.5	0.8	17.5	18.7	0.0	0.0	0.0	0.0	0.0015	0.0000	1002	-	N	3.18
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.6	0.3	19.6	19.9	0.0	0.0	0.0	0.0	0.0006	0.0000	1002	-	N	NGW
WS04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	NA	NA
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0000	0.0000	1001	-	N	1.57
Notes: Unable to locate WS04.																				

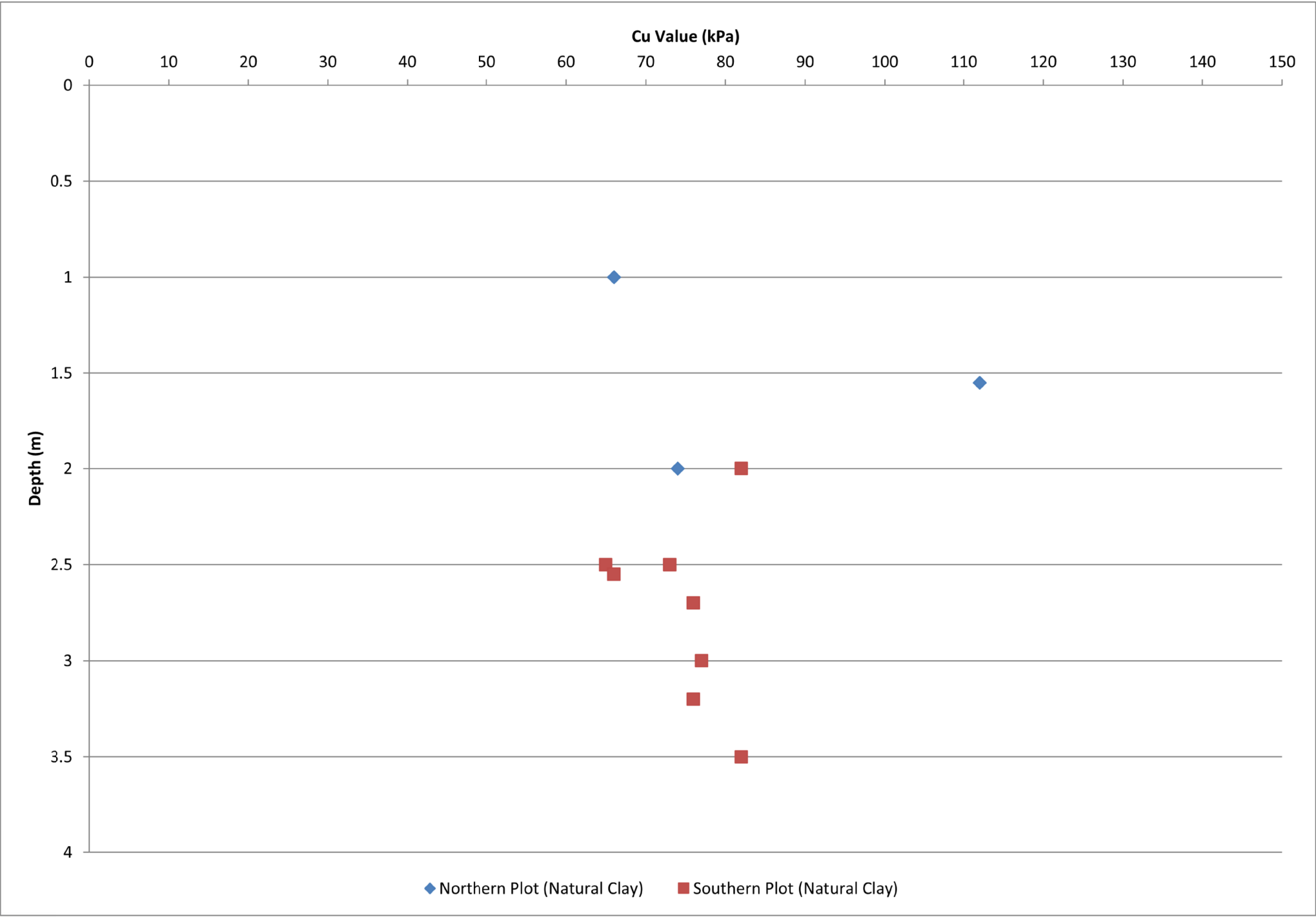
GROUNDTECH
CONSULTING

Pressure Trend:	Falling	Weather:	Overcast			Equipment:	GFM 436
Ambient:	O ₂ (%v/v)	CH ₄ (%v/v)	CO ₂ (%v/v)	LEL	H ₂ S (ppm)	CO (ppm)	
Start	20.1	0.0	0.0	0.0	0.0	0.0	
Finish	20.1	0.0	0.0	0.0	0.0	0.0	

BH Ref.	Gas Flow Rate (l/hr)		Borehole Pressure (mb)	Methane (%v/v)			Carbon Dioxide (%v/v)		Oxygen (%v/v)		Hydrogen Sulphide (ppm)		Carbon Monoxide (ppm)		Q _{hg} CO ₂ (l/hr)	Q _{hg} CH ₄ (l/hr)	Atmos Press (mb)	PID (ppm)	Sheen (Y/N)	Depth to Water (m bgl)
	Peak	Steady		Peak	Steady	LEL	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
WS01	0.0	0.0	0.00	0.0	0.0	0.0	1.4	1.3	17.7	17.9	0.0	0.0	0.0	0.0	0.0014	0.0000	991	-	N	3.16
WS03	0.0	0.0	0.00	0.0	0.0	0.0	0.7	0.5	19.2	19.5	0.0	0.0	0.0	0.0	0.0007	0.0000	991	-	N	NGW
WS04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-	NA	NA
WS05	0.0	0.0	0.00	0.0	0.0	0.0	0.6	0.5	18.9	19.1	0.0	0.0	0.0	0.0	0.0006	0.0000	991	-	N	1.55
Notes: Unable to locate WS04.																				

APPENDIX 7 – Generalised Ground Model





APPENDIX 8 – Generic Screening Values (Residential Without Plant Uptake)

Proposed End Use	Unit	Residential with Plant Uptake			Residential without plant uptake			Source
SOM	%	1	2.5	6	1	2.5	6	
Arsenic	mg/kg	32	32	32	40	40	40	SGVs
Beryllium	mg/kg	1.7	1.7	1.7	1.7	1.7	1.7	LQM S4ULs
Boron (water soluble)	mg/kg	290	290	290	11000	11000	11000	LQM S4ULs
Cadmium	mg/kg	10	10	10	85	85	85	SGVs
Chromium (Total)	mg/kg	910	910	910	910	910	910	LQM S4ULs
Chromium (VI)	mg/kg	21	21	21	-	-	-	DEFRA C4SLs
Copper	mg/kg	2400	2400	2400	7100	7100	7100	LQM S4ULs
Lead	mg/kg	200	200	200	310	310	310	DEFRA C4SLs
Mercury	mg/kg	1	1	1	1.2	1.2	1.2	SGVs
Nickel	mg/kg	130	130	130	180	180	180	SGVs
Selenium	mg/kg	350	350	350	430	430	430	SGVs
Vanadium	mg/kg	410	410	410	1200	1200	1200	LQM S4ULs
Zinc	mg/kg	3700	3700	3700	40000	40000	40000	LQM S4ULs
Aliphatic EC 5 - 6	mg/kg	42	78	160	42	78	160	LQM S4ULs
Aliphatic EC 6 - 8	mg/kg	100	230	530	100	230	530	LQM S4ULs
Aliphatic EC 8 - 10	mg/kg	27	65	150	27	65	150	LQM S4ULs
Aliphatic EC 10 - 12	mg/kg	130 (48) ^{vap}	330 (118) ^{vap}	760 (283) ^{vap}	130 (48) ^{vap}	330 (118) ^{vap}	770 (283) ^{vap}	LQM S4ULs
Aliphatic EC 12 - 16	mg/kg	1100 (24) ^{sol}	2400 (59) ^{sol}	4300 (142) ^{sol}	1100 (24) ^{sol}	2400 (59) ^{sol}	4400 (142) ^{sol}	LQM S4ULs
Aliphatic EC 16 - 35	mg/kg	65000 (8.48) ^{f,sol}	92000 (21) ^{f,sol}	110000 ^f	65000 (8.48) ^{f,sol}	92000 (21) ^{f,sol}	110000 ^f	LQM S4ULs
Aliphatic EC 35 - 44	mg/kg	65000 (8.48) ^{f,sol}	92000 (21) ^{f,sol}	110000 ^f	65000	92000 (21) ^{f,sol}	110000 ^f	LQM S4ULs
Aromatic EC 5 - 7	mg/kg	70	140	300	370	690	1400	LQM S4ULs
Aromatic EC 7 - 8	mg/kg	130	290	660	860	1800	3900	LQM S4ULs
Aromatic EC 8 - 10	mg/kg	34	83	190	47	110	270	LQM S4ULs
Aromatic EC 10 - 12	mg/kg	74	180	380	250	590	1200	LQM S4ULs
Aromatic EC 12 - 16	mg/kg	140	330	660	1800	2300	2500	LQM S4ULs
Aromatic EC 16 - 21	mg/kg	260 ^f	540 ^f	930 ^f	1900	1900	1900	LQM S4ULs
Aromatic EC 21 - 35	mg/kg	1100 ^f	1500 ^f	1700 ^f	1900	1900	1900	LQM S4ULs
Aromatic EC 35 - 44	mg/kg	1100 ^f	1500 ^f	1700 ^f	1900	1900	1900	LQM S4ULs
Benzene	mg/kg	0.33	0.33	0.33	0.38	0.7	1.4	SGVs
Toluene	mg/kg	610	610	610	880	1900	3900	SGVs
Ethyl Benzene	mg/kg	350	350	350	83	190	440	SGVs
Xylene - o	mg/kg	250	250	250	88	210	480	SGVs
Xylene - m	mg/kg	240	240	240	82	190	450	SGVs
Xylene - p	mg/kg	230	230	230	79	180	430	SGVs
MTBE (methyl tert-butyl ether)	mg/kg	49	84	160	-	-	-	CL:AIRE 2010
Acenaphthene	mg/kg	210	510	1100	3000	4700	6000	LQM SAULs
Acenaphthylene	mg/kg	170	420	920	2900	4600	6000	LQM S4ULs
Anthracene	mg/kg	2400	5400	11000	31000	35000	37000	LQM S4ULs
Benzo(a)anthracene	mg/kg	7.2	11	13	11	14	15	LQM S4ULs
Benzo(a)pyrene	mg/kg	2.2	2.7	5*	3.2	3.2	3.2	DEFRA C4SL*/LQM S4ULs
Benzo(b)fluoranthene	mg/kg	2.6	3.3	3.7	3.9	4	4	LQM S4ULs
Benzo(ghi)perylene	mg/kg	320	340	350	360	360	360	LQM S4ULs
Benzo(k)fluoranthene	mg/kg	77	93	100	110	110	110	LQM S4ULs
Chrysene	mg/kg	15	22	27	30	31	32	LQM S4ULs
Dibenzo(ah)anthracene	mg/kg	0.24	0.28	0.3	0.31	0.32	0.32	LQM S4ULs
Fluoranthene	mg/kg	280	560	890	1500	1600	1600	LQM S4ULs
Fluorene	mg/kg	170	400	860	2800	3800	4500	LQM S4ULs
Indeno(123-cd)pyrene	mg/kg	27	36	41	45	46	46	LQM S4ULs
Naphthalene	mg/kg	2.3 ^f	5.6 ^f	13 ^f	2.3	5.6	13	LQM S4ULs
Phenanthrene	mg/kg	95	220	440	1300	1500	1500	LQM S4ULs
Pyrene	mg/kg	620	1200	2000	3700	3800	3800	LQM S4ULs

Proposed End Use	Unit	Residential with Plant Uptake			Residential without plant uptake			Source
SOM	%	1	2.5	6	1	2.5	6	
Phenols	mg/kg	420	420	420	-			SGVs
Chlorophenols	mg/kg	0.87 ^s	2	4.5	-			LQM S4ULs
Pentachlorophenol	mg/kg	0.22	0.52	1.2	-			LQM S4ULs
Carbon disulphide	mg/kg	0.14	0.29	0.62	-			LQM S4ULs
Hexachlorobutadiene	mg/kg	0.29	0.7	1.6	-			LQM S4ULs
1,1,1,2 Tetrachloroethane	mg/kg	1.6	3.4	7.5	-			LQM S4ULs
1,1,1 Trichloroethane	mg/kg	8.8	18	39	-			LQM S4ULs
Trichloroethene	mg/kg	0.016	0.034	0.075	-			LQM S4ULs
Tetrachloromethane (Carbon Tetrachloride)	mg/kg	0.026	0.056	0.13	-			LQM S4ULs
1,2-Dichloroethane	mg/kg	0.0071	0.011	0.019	-			LQM S4ULs
Chloroethene (Vinyl chloride)	mg/kg	0.00064	0.00087	0.0014	-			LQM S4ULs
Trichloromethane (Chloroform)	mg/kg	0.91	1.7	3.4	-			LQM S4ULs
Tetrachloroethene	mg/kg	0.18	0.39	0.9	-			LQM S4ULs
Hexachlorobenzene	mg/kg	1.8 (0.2) ^{vap}	3.3 (0.5) ^{vap}	4.9	-			LQM S4ULs
Pentachlorobenzene	mg/kg	5.8	12	22	-			LQM S4ULs
1,2,4,5-Tetrachlorobenzene	mg/kg	0.33	0.77	1.6	-			LQM S4ULs
1,2,3,5-Tetrachlorobenzene	mg/kg	0.66	1.69	3.7	-			LQM S4ULs
1,2,3,4-Tetrachlorobenzene	mg/kg	15	36	78	-			LQM S4ULs
1,3,5-Trichlorobenzene	mg/kg	0.33	0.81	1.9	-			LQM S4ULs
1,2,4-Trichlorobenzene	mg/kg	2.6	6.4	15	-			LQM S4ULs
1,2,3-Trichlorobenzene	mg/kg	1.5	3.6	8.6	-			LQM S4ULs
1,4-dichlorobenzene	mg/kg	61 ^f	150 ^f	350 ^f	-			LQM S4ULs
1,3-dichlorobenzene	mg/kg	0.4	1	2.3	-			LQM S4ULs
1,2-Dichlorobenzene	mg/kg	23	55	130	-			LQM S4ULs
Chlorobenzene	mg/kg	0.46	1	2.4	-			LQM S4ULs
Gamma-Hexachlorocyclohexanes	mg/kg	0.06	0.14	0.33	-			LQM S4ULs
Beta-Hexachlorocyclohexane	mg/kg	0.085	0.2	0.46	-			LQM S4ULs
Alpha - Hexachlorocyclohexane	mg/kg	0.23	0.55	1.2	-			LQM S4ULs
Beta -Endosulfan	mg/kg	7	17	39	-			LQM S4ULs
Alpha-Endosulfan	mg/kg	7.4	18	41	-			LQM S4ULs
Dichlorvos	mg/kg	0.032	0.066	0.14	-			LQM S4ULs
Atrazine	mg/kg	3.3	7.6	17.4	-			LQM S4ULs
Dieldrin	mg/kg	0.97	2	3.5	-			LQM S4ULs
Aldrin	mg/kg	5.7	6.6	7.1	-			LQM S4ULs
HMX	mg/kg	5.7	13	26	-			LQM S4ULs
2,4,6-Trinitrotoulene	mg/kg	1.6	3.7	8.1	-			LQM S4ULs
RDX	mg/kg	120	250	540	-			LQM S4ULs

^{sol} S4UL exceeds the solubility saturation limit (which is presented in brackets)

^{vap} S4ULs presented exceeds the vapour saturation limit, which is presented in brackets

^f For naphthalene, the S4UL is based on a comparison of inhalation exposure with the TDI_{inhal} for localised effects

^f S4UL based on comparison of inhalation exposure with inhalation TDI for localised effects

^{dtr} S4ULs based on a threshold protective direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only)



APPENDIX 9 – HazWasteOnline Classification Report

Waste Classification Report

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

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



P7MS3-Z9VYE-XTJXJ

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

Job name

22-46574_HWOL_Results

Description/Comments

Project

GRO-22083

Site

Whitworth Road

Classified by

Name: **Bradley Massey**
Date: **25 May 2022 09:35 GMT**
Telephone: **01618 201368**
Company: **Groundtech Consulting Limited**
First Floor, Lloyd House, Orford Court,
Greenfold Way
Leigh
WN7 3XJ

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
Hazardous Waste Classification

Date

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01--16032022-0.10		Non Hazardous		2
2	WS03--16032022-1.00		Non Hazardous		4
3	WS05--16032022-0.30		Hazardous	HP 14	6
4	TP01--16032022-1.50		Non Hazardous		8
5	TP04--16032022-0.20		Non Hazardous		10
6	TP06--16032022-0.20		Non Hazardous		12
7	WS01--16032022-2.10		Non Hazardous		14
8	WS03--16032022-2.00		Non Hazardous		15

Related documents

#	Name	Description
1	22-46574_HWOL_Results.hwol	.hwol file used to create the Job

Report

Created by: Bradley Massey

Created date: 25 May 2022 09:35 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	16
Appendix B: Rationale for selection of metal species	17
Appendix C: Version	17

Classification of sample: WS01--16032022-0.10

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

Sample details

Sample name:	LoW Code:
WS01--16032022-0.10	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
22% (wet weight correction)	

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4 mg/kg	2.27	<9.08 mg/kg		<0.000908 %		<LOD
	024-017-00-8										
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				12 mg/kg	1.895	17.733 mg/kg		0.00177 %	✓	
	033-005-00-1										
3	cadmium { cadmium iodide }				<0.2 mg/kg	3.258	<0.652 mg/kg		<0.0000652 %		<LOD
	048-007-00-8	232-223-6	7790-80-9								
4	copper { copper(II) chloride dihydrate }				58 mg/kg	2.683	121.368 mg/kg		0.0121 %	✓	
		231-210-2	10125-13-0								
5	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg		<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel diiodide }				23 mg/kg	5.324	95.518 mg/kg		0.00955 %	✓	
	028-029-00-4	236-666-6	13462-90-3								
7	lead { lead di(acetate) }			1	71 mg/kg	1.57	86.941 mg/kg		0.00554 %	✓	
	082-005-00-8	206-104-4	301-04-2								
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg		<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				95 mg/kg	4.398	325.886 mg/kg		0.0326 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
10	pH				6.7 pH		6.7 pH		6.7 pH		
			PH								
11	naphthalene				<50 µg/kg		<0.05 mg/kg		<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		205-917-1	208-96-8								
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-469-6	83-32-9								
14	fluorene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-695-5	86-73-7								
15	phenanthrene				0.85 mg/kg		0.663 mg/kg		0.0000663 %	✓	
		201-581-5	85-01-8								
16	anthracene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	fluoranthene	205-912-4	206-44-0		1.2 mg/kg		0.936 mg/kg	0.0000936 %	✓	
18	pyrene	204-927-3	129-00-0		1.1 mg/kg		0.858 mg/kg	0.0000858 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6		0.68 mg/kg		0.53 mg/kg	0.000053 %	✓	
20	chrysene	601-048-00-0	205-923-4		0.54 mg/kg		0.421 mg/kg	0.0000421 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.47 mg/kg		0.367 mg/kg	0.0000367 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.41 mg/kg		0.32 mg/kg	0.000032 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.58 mg/kg		0.452 mg/kg	0.0000452 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.23 mg/kg		0.179 mg/kg	0.0000179 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		0.29 mg/kg		0.226 mg/kg	0.0000226 %	✓	
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		21 mg/kg	1.462	30.693 mg/kg	0.00307 %		
Total:								0.0665 %		

Key

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

Classification of sample: WS03--16032022-1.00

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

Sample details

Sample name:	LoW Code:
WS03--16032022-1.00	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4 mg/kg	2.27	<9.08 mg/kg		<0.000908 %		<LOD
	024-017-00-8										
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				6.2 mg/kg	1.895	9.984 mg/kg		0.000998 %	✓	
	033-005-00-1										
3	cadmium { cadmium iodide }				<0.2 mg/kg	3.258	<0.652 mg/kg		<0.0000652 %		<LOD
	048-007-00-8	232-223-6	7790-80-9								
4	copper { copper(II) chloride dihydrate }				58 mg/kg	2.683	132.26 mg/kg		0.0132 %	✓	
		231-210-2	10125-13-0								
5	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg		<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel diiodide }				12 mg/kg	5.324	54.308 mg/kg		0.00543 %	✓	
	028-029-00-4	236-666-6	13462-90-3								
7	lead { lead di(acetate) }			1	21 mg/kg	1.57	28.023 mg/kg		0.00179 %	✓	
	082-005-00-8	206-104-4	301-04-2								
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg		<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				42 mg/kg	4.398	157.006 mg/kg		0.0157 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
10	pH				8.1 pH		8.1 pH		8.1 pH		
			PH								
11	naphthalene				<50 µg/kg		<0.05 mg/kg		<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		205-917-1	208-96-8								
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-469-6	83-32-9								
14	fluorene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-695-5	86-73-7								
15	phenanthrene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-581-5	85-01-8								
16	anthracene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
19	benzo[a]anthracene	601-033-00-9	200-280-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	chrysene	601-048-00-0	205-923-4		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		15 mg/kg	1.462	21.923 mg/kg	0.00219 %		
Total:								0.0407 %		

Key

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

Classification of sample: WS05--16032022-0.30

Hazardous Waste
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS05--16032022-0.30	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
5.6%	Entry:
(wet weight correction)	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

copper(II) chloride dihydrate: (compound conc.: 0.785%)

zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]: (compound conc.: 0.12%)

Determinands

Moisture content: 5.6% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4	mg/kg	2.27	<9.08	mg/kg	<0.000908 %		<LOD
	024-017-00-8											
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				6.9	mg/kg	1.895	12.34	mg/kg	0.00123 %	✓	
	033-005-00-1											
3	cadmium { cadmium iodide }				<0.2	mg/kg	3.258	<0.652	mg/kg	<0.0000652 %		<LOD
	048-007-00-8	232-223-6	7790-80-9									
4	copper { copper(II) chloride dihydrate }				3100	mg/kg	2.683	7850.835	mg/kg	0.785 %	✓	
		231-210-2	10125-13-0									
5	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
6	nickel { nickel diiodide }				30	mg/kg	5.324	150.784	mg/kg	0.0151 %	✓	
	028-029-00-4	236-666-6	13462-90-3									
7	lead { lead di(acetate) }			1	190	mg/kg	1.57	281.577	mg/kg	0.0179 %	✓	
	082-005-00-8	206-104-4	301-04-2									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				290	mg/kg	4.398	1203.976	mg/kg	0.12 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
10	pH				9	pH		9	pH	9pH		
11	naphthalene				<50	µg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
12	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									

#	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							
13	acenaphthene	201-469-6	83-32-9		0.38 mg/kg		0.359 mg/kg	0.0000359 %	✓	
14	fluorene	201-695-5	86-73-7		0.25 mg/kg		0.236 mg/kg	0.0000236 %	✓	
15	phenanthrene	201-581-5	85-01-8		2.2 mg/kg		2.077 mg/kg	0.000208 %	✓	
16	anthracene	204-371-1	120-12-7		0.36 mg/kg		0.34 mg/kg	0.000034 %	✓	
17	fluoranthene	205-912-4	206-44-0		2.8 mg/kg		2.643 mg/kg	0.000264 %	✓	
18	pyrene	204-927-3	129-00-0		2.7 mg/kg		2.549 mg/kg	0.000255 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6		1.6 mg/kg		1.51 mg/kg	0.000151 %	✓	
20	chrysene	601-048-00-0	205-923-4		1.2 mg/kg		1.133 mg/kg	0.000113 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.6 mg/kg		1.51 mg/kg	0.000151 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.81 mg/kg		0.765 mg/kg	0.0000765 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.8 mg/kg		1.699 mg/kg	0.00017 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.72 mg/kg		0.68 mg/kg	0.000068 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.24 mg/kg		0.227 mg/kg	0.0000227 %	✓	
26	benzo[ghi]perylene	205-883-8	191-24-2		0.85 mg/kg		0.802 mg/kg	0.0000802 %	✓	
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16 mg/kg	1.462	23.385 mg/kg	0.00234 %		
Total:								0.945 %		

Key

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

Classification of sample: TP01--16032022-1.50

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

Sample details

Sample name:	LoW Code:
TP01--16032022-1.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
12% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4 mg/kg	2.27	<9.08 mg/kg		<0.000908 %		<LOD
	024-017-00-8										
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				9.3 mg/kg	1.895	15.505 mg/kg		0.00155 %	✓	
	033-005-00-1										
3	cadmium { cadmium iodide }				0.4 mg/kg	3.258	1.147 mg/kg		0.000115 %	✓	
	048-007-00-8	232-223-6	7790-80-9								
4	copper { copper(II) chloride dihydrate }				53 mg/kg	2.683	125.124 mg/kg		0.0125 %	✓	
		231-210-2	10125-13-0								
5	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg		<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel diiodide }				37 mg/kg	5.324	173.359 mg/kg		0.0173 %	✓	
	028-029-00-4	236-666-6	13462-90-3								
7	lead { lead di(acetate) }			1	54 mg/kg	1.57	74.601 mg/kg		0.00475 %	✓	
	082-005-00-8	206-104-4	301-04-2								
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg		<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				92 mg/kg	4.398	356.056 mg/kg		0.0356 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
10	pH				7.7 pH		7.7 pH		7.7 pH		
			PH								
11	naphthalene				<50 µg/kg		<0.05 mg/kg		<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		205-917-1	208-96-8								
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-469-6	83-32-9								
14	fluorene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-695-5	86-73-7								
15	phenanthrene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-581-5	85-01-8								
16	anthracene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
19	benzo[a]anthracene	601-033-00-9	200-280-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	chrysene	601-048-00-0	205-923-4		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		40 mg/kg	1.462	58.462 mg/kg	0.00585 %		
Total:								0.079 %		

Key

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

Classification of sample: TP04--16032022-0.20

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

Sample details

Sample name:	LoW Code:
TP04--16032022-0.20	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4 mg/kg	2.27	<9.08 mg/kg		<0.000908 %		<LOD
	024-017-00-8										
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				10 mg/kg	1.895	15.725 mg/kg		0.00157 %	✓	
	033-005-00-1										
3	cadmium { cadmium iodide }				0.6 mg/kg	3.258	1.622 mg/kg		0.000162 %	✓	
	048-007-00-8	232-223-6	7790-80-9								
4	copper { copper(II) chloride dihydrate }				49 mg/kg	2.683	109.108 mg/kg		0.0109 %	✓	
		231-210-2	10125-13-0								
5	mercury { mercury dichloride }				0.6 mg/kg	1.353	0.674 mg/kg		0.0000674 %	✓	
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel diiodide }				12 mg/kg	5.324	53.03 mg/kg		0.0053 %	✓	
	028-029-00-4	236-666-6	13462-90-3								
7	lead { lead di(acetate) }			1	150 mg/kg	1.57	195.452 mg/kg		0.0124 %	✓	
	082-005-00-8	206-104-4	301-04-2								
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg		<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				110 mg/kg	4.398	401.531 mg/kg		0.0402 %	✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
10	pH				7.9 pH		7.9 pH		7.9 pH		
			PH								
11	naphthalene				<50 µg/kg		<0.05 mg/kg		<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		205-917-1	208-96-8								
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-469-6	83-32-9								
14	fluorene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		201-695-5	86-73-7								
15	phenanthrene				2 mg/kg		1.66 mg/kg		0.000166 %	✓	
		201-581-5	85-01-8								
16	anthracene				0.45 mg/kg		0.374 mg/kg		0.0000374 %	✓	
		204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	fluoranthene	205-912-4	206-44-0		3.4 mg/kg		2.822 mg/kg	0.000282 %	✓	
18	pyrene	204-927-3	129-00-0		3.2 mg/kg		2.656 mg/kg	0.000266 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6		1.9 mg/kg		1.577 mg/kg	0.000158 %	✓	
20	chrysene	601-048-00-0	205-923-4		1.8 mg/kg		1.494 mg/kg	0.000149 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.7 mg/kg		1.411 mg/kg	0.000141 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		1.2 mg/kg		0.996 mg/kg	0.0000996 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		2 mg/kg		1.66 mg/kg	0.000166 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.86 mg/kg		0.714 mg/kg	0.0000714 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.26 mg/kg		0.216 mg/kg	0.0000216 %	✓	
26	benzo[ghi]perylene	205-883-8	191-24-2		0.91 mg/kg		0.755 mg/kg	0.0000755 %	✓	
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		36 mg/kg	1.462	52.616 mg/kg	0.00526 %		
Total:								0.0787 %		

Key

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

Classification of sample: TP06--16032022-0.20

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

Sample details

Sample name:	LoW Code:
TP06--16032022-0.20	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
13% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4 mg/kg	2.27	<9.08 mg/kg	<0.000908 %			<LOD
	024-017-00-8										
2	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				7.2 mg/kg	1.895	11.867 mg/kg	0.00119 %		✓	
	033-005-00-1										
3	cadmium { cadmium iodide }				<0.2 mg/kg	3.258	<0.652 mg/kg	<0.0000652 %			<LOD
	048-007-00-8	232-223-6	7790-80-9								
4	copper { copper(II) chloride dihydrate }				28 mg/kg	2.683	65.352 mg/kg	0.00654 %		✓	
		231-210-2	10125-13-0								
5	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
6	nickel { nickel diiodide }				11 mg/kg	5.324	50.954 mg/kg	0.0051 %		✓	
	028-029-00-4	236-666-6	13462-90-3								
7	lead { lead di(acetate) }			1	290 mg/kg	1.57	396.085 mg/kg	0.0252 %		✓	
	082-005-00-8	206-104-4	301-04-2								
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
9	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				46 mg/kg	4.398	176.005 mg/kg	0.0176 %		✓	
	030-006-00-9	231-793-3 [1]	7446-19-7 [1]								
		231-793-3 [2]	7733-02-0 [2]								
10	pH				8.4 pH		8.4 pH	8.4 pH			
			PH								
11	naphthalene				<50 µg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-917-1	208-96-8								
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
14	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
15	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
16	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
19	benzo[a]anthracene	601-033-00-9	200-280-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	chrysene	601-048-00-0	205-923-4		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		9.8 mg/kg	1.462	14.323 mg/kg	0.00143 %		
Total:								0.0584 %		

Key

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

Classification of sample: WS01--16032022-2.10



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

Sample details

Sample name:	LoW Code:
WS01--16032022-2.10	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	• pH				6.8 pH		6.8	pH	6.8 pH		
			PH								
Total:									0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS03--16032022-2.00

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

Sample details

Sample name:	LoW Code:
WS03--16032022-2.00	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
6.8%	Entry:
(wet weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	• pH				6.9 pH		6.9	pH	6.9 pH		
			PH								
Total:									0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Appendix A: Classifier defined and non GB MCL determinands

■ **copper(II) chloride dihydrate** (EC Number: 231-210-2, CAS Number: 10125-13-0)

Description/Comments: C&L for copper (II) chloride (anhydrous) CAS 7447-39-4

Data source:

Data source date: 03 Nov 2016

Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 4; H302 , Eye Dam. 1; H318 , Acute Tox. 4; H312 , STOT SE 3; H335 , Eye Irrit. 2; H319 , Acute Tox. 3; H301 , Acute Tox. 4; H332 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **lead di(acetate)** (EC Number: 206-104-4, CAS Number: 301-04-2)

GB MCL index number: 082-005-00-8

Description/Comments: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2.

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium

www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

■ **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

▪ **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

Appendix B: Rationale for selection of metal species

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

Worst case scenario.

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case scenario.

cadmium {cadmium iodide}

Worst case scenario

copper {copper(II) chloride dihydrate}

Worst case scenario

mercury {mercury dichloride}

Worst case scenario

nickel {nickel diiodide}

Worst case scenario

lead {lead di(acetate)}

Worst case scenario

selenium {nickel selenate}

Worst case scenario

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

Worst case scenario

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

Worst case scenario

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2022.144.5151.9706 (24 May 2022)

HazWasteOnline Database: 2022.144.5151.9706 (24 May 2022)

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

Waste Classification Report

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

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



6NIBN-C2K6D-25NB2

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

Job name

22-46760_HWOL_Results

Description/Comments

Project

GRO-22083

Site

Whitworth Road

Classified by

Name: **Bradley Massey**
Date: **25 May 2022 09:37 GMT**
Telephone: **01618 201368**
Company: **Groundtech Consulting Limited**
First Floor, Lloyd House, Orford Court,
Greenfold Way
Leigh
WN7 3XJ

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: **Hazardous Waste Classification**

Date

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS02--16032022-0.50		Non Hazardous		2

Related documents

#	Name	Description
1	22-46760_HWOL_Results.hwol	.hwol file used to create the Job

Report

Created by: Bradley Massey

Created date: 25 May 2022 09:37 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	4
Appendix B: Rationale for selection of metal species	5
Appendix C: Version	5

Classification of sample: WS02--16032022-0.50

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

Sample details

Sample name:	LoW Code:
WS02--16032022-0.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<4 mg/kg	2.27	<9.08 mg/kg		<0.000908 %		<LOD
	024-017-00-8										
2	pH				8.3 pH		8.3 pH		8.3 pH		
			PH								
3	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				14 mg/kg	1.895	22.28 mg/kg		0.00223 %	✓	
	033-005-00-1										
4	cadmium { cadmium iodide }				<0.2 mg/kg	3.258	<0.652 mg/kg		<0.0000652 %		<LOD
	048-007-00-8	232-223-6	7790-80-9								
5	copper { copper(II) chloride dihydrate }				62 mg/kg	2.683	139.718 mg/kg		0.014 %	✓	
		231-210-2	10125-13-0								
6	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg		<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel diiodide }				24 mg/kg	5.324	107.338 mg/kg		0.0107 %	✓	
	028-029-00-4	236-666-6	13462-90-3								
8	lead { lead di(acetate) }			1	84 mg/kg	1.57	110.772 mg/kg		0.00706 %	✓	
	082-005-00-8	206-104-4	301-04-2								
9	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg		<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
10	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				57 mg/kg	4.398	210.573 mg/kg		0.0211 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
11	naphthalene				1100 µg/kg		0.924 mg/kg		0.0000924 %	✓	
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		205-917-1	208-96-8								
13	acenaphthene				1 mg/kg		0.84 mg/kg		0.000084 %	✓	
		201-469-6	83-32-9								
14	fluorene				0.53 mg/kg		0.445 mg/kg		0.0000445 %	✓	
		201-695-5	86-73-7								
15	phenanthrene				3.6 mg/kg		3.024 mg/kg		0.000302 %	✓	
		201-581-5	85-01-8								
16	anthracene				0.6 mg/kg		0.504 mg/kg		0.0000504 %	✓	
		204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	fluoranthene	205-912-4	206-44-0		3.4 mg/kg		2.856 mg/kg	0.000286 %	✓	
18	pyrene	204-927-3	129-00-0		3.1 mg/kg		2.604 mg/kg	0.00026 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6		2 mg/kg		1.68 mg/kg	0.000168 %	✓	
20	chrysene	601-048-00-0	205-923-4		1.5 mg/kg		1.26 mg/kg	0.000126 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.7 mg/kg		1.428 mg/kg	0.000143 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.79 mg/kg		0.664 mg/kg	0.0000664 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.7 mg/kg		1.428 mg/kg	0.000143 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.64 mg/kg		0.538 mg/kg	0.0000538 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.21 mg/kg		0.176 mg/kg	0.0000176 %	✓	
26	benzo[ghi]perylene	205-883-8	191-24-2		0.79 mg/kg		0.664 mg/kg	0.0000664 %	✓	
27	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		17 mg/kg	1.462	24.846 mg/kg	0.00248 %		
Total:								0.0607 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

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

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

- **copper(II) chloride dihydrate** (EC Number: 231-210-2, CAS Number: 10125-13-0)

Description/Comments: C&L for copper (II) chloride (anhydrous) CAS 7447-39-4
Data source:
Data source date: 03 Nov 2016
Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 4; H302 , Eye Dam. 1; H318 , Acute Tox. 4; H312 , STOT SE 3; H335 , Eye Irrit. 2; H319 , Acute Tox. 3; H301 , Acute Tox. 4; H332 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **lead di(acetate)** (EC Number: 206-104-4, CAS Number: 301-04-2)

GB MCL index number: 082-005-00-8
Description/Comments: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2.
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium
www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **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

Appendix B: Rationale for selection of metal species

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

Worst case scenario.

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case scenario.

cadmium {cadmium iodide}

Worst case scenario

copper {copper(II) chloride dihydrate}

Worst case scenario

mercury {mercury dichloride}

Worst case scenario

nickel {nickel diiodide}

Worst case scenario

lead {lead di(acetate)}

Worst case scenario

selenium {nickel selenate}

Worst case scenario

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

Worst case scenario

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

Worst case scenario

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2022.144.5151.9706 (24 May 2022)

HazWasteOnline Database: 2022.144.5151.9706 (24 May 2022)

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



APPENDIX 10 - Relevant Legislative Background

Legislative Background

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

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

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

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

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

- **Source** - substances that are potential contaminants or pollutants that may cause harm;
- **Pathway** - a potential route by which contaminants can move from the source to the receptor;
- **Receptor** - a receptor that may be harmed, for example the water environment, humans and water.

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

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

Relevant Guidance Documents

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

- LCRM – Model Procedures;
- Contamination and Environmental Matters - Their implications for Property Professionals (2nd Edition RICS Nov 2003);
- Brownfields – Managing the development of previously developed land – A client's guide, CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides, dated March 2002;
- DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002;

Relevant Legislative Documents

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

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX 11 - Limitations

Limitations

This report (Report) forms part of the Services and if applicable Additional Services undertaken by Groundtech Consulting Ltd pursuant to a written contract (Agreement) which contains detailed provisions including express limitations of the liability of Groundtech Consulting Ltd.

This Report was prepared using reasonable skill and care as stated in the Agreement for the purpose including intended end use stated by the Client (Purpose) and the liability of Groundtech Consulting Ltd in respect of the form and content of this Report is no greater than its liability under the Agreement. All records, measurements notes, or any other data (Data) obtained by or for the benefit of the Consultant were obtained at a specific point in time and it may not be assumed by the Client or any person relying on this Report that the Data will remain unaffected by the passage of time, the seasons, weather conditions, changes in the water table or the carrying out and completion of works at the Site.

Unless otherwise agreed this Report has been prepared exclusively for the use and reliance of the Client and may not be relied upon, by any other party except as provided for in the Agreement. A third party who relies on this Report, does so at their own and sole risk and Groundtech Consulting Ltd has no liability to such parties.

Groundtech Consulting Ltd that this Report is to be used for the Purpose. The Purpose was instrumental in determining the scope and of the Services provided. If the Purpose should change, the Client may not be able to rely on the Report without the separate agreement of Groundtech Consulting Ltd.

Since the Report was written, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change (see below) and should be investigated if there is any significant delay in acting on the findings of this Report. The period 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 in this Report should not be relied upon in the future without written confirmation from Groundtech Consulting Ltd that it is safe to do so.

The observations and conclusions outlined in this Report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting Ltd.

Groundtech Consulting Ltd is not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The Report is based upon Groundtech Consulting Ltd's observations of existing physical conditions at the Site gained from site reconnaissance together with 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 Groundtech Consulting Ltd have relied upon such information assuming it to be correct.

Groundtech Consulting Ltd accepts no responsibility for errors or inaccuracies in third party information presented in this Report. Groundtech Consulting Ltd was not authorised 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 or Additional Services. Groundtech Consulting Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting Ltd and forms the contract with the client.

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 may also vary due to the ground's heterogeneous properties and because investigation exploratory locations 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, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. If so stipulated in the Agreement, geo-environmental testing was carried out for a limited number of parameters



based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

Any groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and groundwater levels may occur at other times of the year which are higher than were recorded during this investigation.

Any site drawings provided in this Report are preliminary and used to present the general relative locations of features on, and surrounding, the Site.

