

Ref: 16-702-L2
Date: 13 September 2024

JACKSON, JACKSON, & SONS LTD

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GEOENVIRONMENTAL SITE ASSESSMENT LETTER EDENFIELD ROAD, ROCHDALE

1. INTRODUCTION

1.1. BACKGROUND

Jackson, Jackson & Sons Ltd (the client) has commissioned E3P to undertake a Geoenvironmental Site Assessment at land north of Edenfield Road, Rochdale, herein referenced; the site.

This report is required to determine potential contaminated land liabilities, remediation requirements and geotechnical engineering works that will be required as part of the proposed development for a low-rise residential development.

1.2. PROPOSED DEVELOPMENT

Jackson, Jackson & Sons Ltd intends to construct a single low-rise residential property with associated landscaping, driveway and infrastructure. A snapshot of the proposed development layout is presented as Figure 1.





Figure 1 **Snapshot of Proposed Development**



1.3. **SCOPE OF WORKS**

The scope of works includes the elements included in Table 1.

Table 1 **Scope of Works**

GROUND INVESTIGATION

-  Design of suitable ground investigation
-  Hand excavated inspection pits
-  Soil sampling

TESTING AND MONITORING

-  Chemical and geotechnical analysis

ASSESSMENT AND REPORTING

-  Factual and interpretative reporting
-  Contamination risk assessment and conceptual site model
-  Geotechnical assessment and interpretation



1.4. PREVIOUS INVESTIGATIONS

Table 2 Previous Reports

AUTHOR	TITLE / REFERENCE	CLIENT	DATE
E3P	Coal Mining Risk Assessment (Ref: 16-702-R1-1)	Jackson, Jackson & Sons Ltd	April 2023
E3P	Mine Shaft Intrusive Investigation (Ref: 16-702-L1-1)		April 2024
E3P	Phase 1 Geoenvironmental Site Assessment (Ref: 16-702-R2-1)		August 2024

1.4.1. COAL MINING RISK ASSESSMENT (REF: 16-702-R1-1, APRIL 2023)

Geological mapping for the site shows a northwest-southeast trending fault bisecting the northeastern corner of the site. The local geology is indicated to generally dip 5-10° to the southeast. A coal seam (possibly the Bassey or Lower Foot seam) is indicated to crop the west of the site encroaching into the northwest corner of the site and terminating at the fault.

Unrecorded workings beneath the site are considered probable and a mine entry is recorded on the western site boundary (385414-017). On the basis that the seam beneath the site is the Lower Foot, with a workable thickness of 0.30 m, 3.00 m of competent rock cover would be required above the seam to mitigate risks of migrating voids propagating to the surface and resulting in subsidence (based on 10 x seam thickness). An investigation would be required to determine the depth to rockhead and the presence of any coal seams and/or workings beneath the site.

In respect of the mine shaft identified on the western boundary, the assumed shaft diameter is 2.50 m and the departure zone (margin of error for the position of the shaft) is 10.00 m. Based on this information and the inferred depth to rockhead of 5.00–9.00 m, the potential zone of influence (radial stand-off / no build zone) around the shaft may be up to 20.25 m if the position remains unconfirmed (reduced to 10.25 m if located, treated and capped).

There is concluded to be a high risk from mining related subsidence (associated with underground workings and the adjacent disused mine shaft) and a moderate to high risk from mine/ground gas.

Trial Trenching should be undertaken to investigate the potential presence of the mine shaft (385414-017) within the 10 m departure distance of its current recorded position. If the shaft is identified within the site boundary, treatment works would be required to stabilise the feature and a shaft cap or plug would be required at rockhead.

A series of rotary open holes should be advanced to a nominal depth of 30 m across the site to confirm the depth to rockhead and investigate the potential presence of the Bassy/Lower Foot Coal seam and any associated shallow workings.

Ground gas monitoring well should be installed within selected rotary boreholes to assess the risk from mine/ground gas.

Following the confirmation of the position of the mine shaft and the depth to rockhead a Zone of Influence/no build zone for 385414-017 should be calculated and if the proposed structure falls within this area, specialist foundation designs will require submission to the Coal Authority for an engineering appraisal.



1.4.2. MINE SHAFT INTRUSIVE INVESTIGATION (REF: 16-702-L1-1, APRIL 2024)

A shaft (CA Ref: 385414-017) is recorded on the western boundary of the site (NGR E385138 N414822). The Coal Authority has confirmed that the only reference to the shaft is a hand written annotation on the British Coal Lancashire 6-inch County Sheet, 1911 80 SE Map.

A series of trial trenches were excavated in the area of departure zone within the site boundary (east of the suspected mine entry). Off-site investigation was not completed.

Based on the investigation completed, a total of six trial trenches have been completed in the west of the site. All trial trenches were completed a maximum of 2 m apart to ensure that a shaft of diameter 2.5mbgl would be encountered and were 10 m long to fully cover the suspected departure area.

No evidence of anthropogenic features, such as a shaft lining that would indicate the recorded mine entry in this sector, was identified in the excavations. It is therefore likely that the mineshaft in question lies off site and is not located on-site.

Due to the presence of underlying cohesive drift deposits, the zone of influence will equate to 2.50 m based on bedrock encountered at 2.50 m bgl within this sector of the site. Therefore a no build zone should be adopted 2.50 m bgl from the site boundary. In this area, the potential zone of influence on-site should be supported by a SS40 geogrid.

1.4.3. PHASE 1 GEOENVIRONMENTAL SITE ASSESSMENT (REF: 16-702-R2-1, AUGUST 2024)

The subject site is a roughly square parcel of land located to the north of Edenfield road, Wolstenholme, Rochdale. In the eastern half of the site, former building footings and brick courses are present where construction of a property was commenced and then abandoned. Rough scrub vegetation is present across the remainder of the site.

The site appears to have remained undeveloped throughout the mapping history. Early mapping indicates the site formed part of a colliery, but with no discernible features within the site boundary. (The Coal Authority record a mine entry on the western site boundary; however, this does not appear on historical maps). The land adjacent to the west of the site is later labelled as a Brick Ground, however, no excavations are shown. By 2017, aerial imagery shows the beginning of construction of a single structure in the east of the site, which remains incomplete to the present day.

The superficial geology is recorded to be Glacial Till with the bedrock recorded to be Pennine Lower Coal Measures Formation.

The site is in an area where 3-5% of homes are estimated to be at or above the Action Level. Basic radon protection measures will be required for new developments.

Colliery spoil/infill material associated with the brick ground may be a source of heavy metals, inorganics, PAH and TPH. The overall risk to end users from soil contamination is considered moderate and intrusive investigation and assessment will be required to determine the level of mitigation measures and/or remediation.



Colliery spoil/infill materials may also be sources of leachable contaminants. Impacted groundwater could transport contaminants vertically and horizontally through permeable strata, if present, however, low permeability cohesive soils are anticipated, which would limit migration of contaminants to the underlying aquifer. There are no surface water receptors within influencing distance of the site. The overall risk to controlled waters is low.

A mine shaft is recorded on the western site boundary which may be a conduit for mine gas. Ground gases may migrate through permeable strata to enter enclosed spaces/excavations and proposed buildings. The risk from ground gas is considered moderate. Ground gas monitoring wells should be installed within selected rotary boreholes to assess the risk from mine/ground gas. Alternatively, installation of CS₂ gas protection measures may be sufficient to mitigate potential risks from ground gas and radon.

2. GROUND INVESTIGATION SUMMARY

2.1. GENERAL OVERVIEW

A ground investigation has been completed based on the findings of the desk study, with exploratory holes advanced to target potential contaminant sources and provide general site coverage. The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

Exploratory fieldwork was completed on 16th August 2024. The works are summarised in Table 3.

2.2. LIMITATIONS OF THE INVESTIGATION

Exploratory holes were limited to areas outside of the existing building footprint, outside of tree/root protection areas and a suitable distance from recorded services.

2.3. SUMMARY OF FIELDWORK

Table 3 Summary of Fieldwork

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
To investigate shallow ground conditions and obtain samples for chemical and geotechnical analysis	HP101	Hand Dug Trial Hole	0.70	N/A
	HP102		0.80	
	HP103		0.50	
	HP104		0.60	
	HP105		0.60	
	HP106		0.70	
	HP107		0.70	

2.4. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis, summarised in Table 44.



Table 4 Summary of Laboratory Analysis

CHEMICAL ANALYSIS

-  Metals
-  pH, total sulphate, water-soluble sulphate (2:1 extract)
-  Sulphide
-  Cyanide
-  Phenols
-  Total and speciated polycyclic aromatic hydrocarbons (PAHs)
-  Asbestos identification and quantification
-  Banded total petroleum hydrocarbons (TPHs)
-  Total Organic Carbon (TOC)

GEOTECHNICAL ANALYSIS

-  Liquid and plastic limit
-  Moisture content

2.5. STORAGE, PRESERVATION AND TRANSPORT OF SAMPLES

Measures are taken to ensure the quality and integrity of the collected samples, from collection to receipt of the samples by the laboratory. Samples were placed in appropriate containers (glass jars) and filled to minimise headspace prior to sealing and stored at a low temperature within cool boxes with cooling aids to minimise the loss of volatile contaminants and reduce microbial activity during the collection of samples.

Dedicated disposable nitrile gloves were worn and changed between sample collections to prevent cross-contamination.

Samples were stored and shipped in dedicated sample boxes provided by the laboratory. Sample details were recorded on the laboratory chain of custody form enclosed with the samples prior to dispatch. Scheduling information for the samples was confirmed with the laboratory via email.

Chemical analysis was undertaken by an accredited laboratory with the testing results summarised and discussed in Section 4 and the testing certificates are attached to this letter.

Geotechnical samples were collected as required per location immediately after excavation, labelled and sealed to minimise moisture loss. The geotechnical samples were collected and couriered by a dedicated courier to an accredited geotechnical testing laboratory. The testing results are summarised and discussed in Section 5 and the testing certificates are attached to this letter.



3. GROUND CONDITIONS

3.1. SUMMARY OF GROUND CONDITIONS

Table 5 Summary of Strata

HOLE	DEPTH TO STRATUM (m bgl)		
	TOPSOIL	MADE GROUND	BROWN CLAY
HP101	0.00–0.15	0.15–0.60	0.60–0.70
HP102	0.00–0.30	0.30–0.80	–
HP103	0.00–0.10	0.10–0.50	–
HP104	–	0.00–0.60	–
HP105	–	0.00–0.40	0.40–0.60
HP106	–	0.00–0.35	0.35–0.70
HP107	–	0.00–0.40	0.40–0.60

3.2. MADE GROUND

Made Ground deposits were encountered within all exploratory hole locations to depths of 0.35 to >0.80 m bgl and generally consisted of a reworked topsoil material described as dark brown slightly gravelly slightly sandy clay with frequent rootlets and gravel of brick, ceramic, glass, coal, and plastic.

A Depth of Made Ground Plan (drawing 16-702-006) is attached to this letter.

3.3. SUPERFICIAL DEPOSITS

Superficial deposits (natural strata) were beneath the Made Ground where proven and comprised brown mottled light grey slightly gravelly slightly sandy CLAY with gravel of fine to medium subrounded to rounded mudstone.

3.4. SOLID GEOLOGY

The solid bedrock geology was not encountered during this investigation, however, the previous trial trenching investigation (ref: 16-702-L1-1, April 2024) identified rockhead beneath the site as very weathered granular bedrock between 1.40 and 2.50 m bgl.

3.5. GROUNDWATER

Groundwater strikes were not encountered, however, the soils in HP102 were noted to be saturated.

3.6. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has not been identified during the site investigation.

3.7. OBSTRUCTIONS

No obstructions were identified during the course of the intrusive investigation.



4. GEOTECHNICAL TESTING

4.1. SOIL CONSISTENCY

During excavation, natural soils were inferred to be firm to stiff based on field observations.

4.2. SOIL PLASTICITY

Given the presence of trees on-site and cohesive strata, two soil samples have been submitted for liquid and plastic limit analysis. Results are summarised in Table 6 and attached to this letter.

Table 6 Summary of Plasticity Test Results

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 µm SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
HP101	0.70	31.8	19	45	26	94	24.44	Medium
HP106	0.60	30.2	21	49	28	98	27.44	Medium

The results indicate the clay to be of medium volume change potential in accordance with the classification system utilised by the LABC/NHBC industry guidance.

4.3. PH AND SULPHATE ANALYSIS

Chemical analyses for pH and soluble sulphate content is summarised in Table 7 and attached to this letter.

Table 7 Summary of pH and Sulphate Data

LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	PH VALUE	CLASSIFICATION
HP101	0.10	< 0.010	8.1	DS-1, AC1
HP102	0.80	0.022	8.0	DS-1, AC1
HP104	0.20	< 0.010	7.9	DS-1, AC1
HP105	0.60	< 0.010	7.8	DS-1, AC1
HP106	0.20	< 0.010	7.7	DS-1, AC1
HP107	0.60	< 0.010	8.5	DS-1, AC1

The results indicate the soils generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with BRE *Special Digest 1* (2005).

5. TIER 2 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 2 qualitative land risk assessment with respect to human health and ground gas to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.



5.1. SAMPLE ANALYSIS POPULATION

Table 8 Summary of Testing Schedule

TYPE OF SAMPLE	NO. OF SAMPLES	DETERMINANDS
Topsoil	1	Heavy metals, speciated PAH, banded TPH, asbestos ID, TOC, inorganics.
Made Ground	3	Heavy metals, speciated PAH, banded TPH, asbestos ID and quantification, TOC, inorganics.
Natural CLAY	2	Heavy metals, speciated PAH, banded TPH, asbestos ID, TOC, inorganics.

5.2. HUMAN HEALTH RISK ASSESSMENT

At Tier 2 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL (S4UL3267) for residential end use with plant uptake. To remain conservative at an early stage, the screening values based on a 1% SOM have been utilised for this assessment.

The results of the comparison have been summarised in Table 9.

Table 9 Summary of Tier 2 Assessment for a Residential End Use (with plant uptake)

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
Arsenic	mg/kg	37	6	15	N/A	1	No Further Action
Cadmium	mg/kg	11	6	0.21		1	
Chromium (VI)	mg/kg	6.0	6	<0.50		1	
Lead**	mg/kg	200	6	100		1	
Mercury	mg/kg	1.2	6	0.27		4	
Nickel	mg/kg	130	6	23		1	
Selenium	mg/kg	250	6	0.75		1	
Copper	mg/kg	2400	6	39		1	
Zinc	mg/kg	3700	6	99		1	
Cyanide – Total	mg/kg	791	6	0.60		1	
Phenols – Total	mg/kg	120	6	1.9		1	
Asbestos	Fibres	NFD	6	0.002%	HP102 0.80 m	3	Further Action
Naphthalene	mg/kg	2.3	6	1.5	N/A	4	No Further Action
Acenaphthylene	mg/kg	170	6	0.27		2	
Acenaphthene	mg/kg	210	6	0.19		2	
Fluorene	mg/kg	170	6	0.26		2	
Phenanthrene	mg/kg	95	6	1.40		2	
Anthracene	mg/kg	2400	6	0.32		2	
Fluoranthene	mg/kg	280	6	2.10		2	
Pyrene	mg/kg	620	6	1.80		2	
Benzo(a)Anthracene	mg/kg	7.2	6	0.83		2	
Chrysene	mg/kg	15	6	1.00		2	
Benzo(b)Fluoranthene	mg/kg	2.6	6	1.40		2	
Benzo(k)Fluoranthene	mg/kg	77	6	0.44	N/A	2	No Further Action
Benzo(a)Pyrene	mg/kg	2.2	6	1.00		2	
Indeno(123-cd)Pyrene	mg/kg	27	6	0.70		2	
Dibenzo(a,h)Anthracene	mg/kg	0.24	6	<0.10		2	
Benzo(ghi)Perylene	mg/kg	320	6	0.76		2	
TPH C5-C6 (aliphatic)*	mg/kg	42	6	<1.0		4	
TPH C6-C8 (aliphatic)*	mg/kg	100	6	<1.0		4	
TPH C8-C10 (aliphatic)*	mg/kg	27	6	<1.0		4	
TPH C10-C12 (aromatic)*	mg/kg	74	6	<1.0		4	



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
TPH C12-C16 (aromatic)*	mg/kg	140	6	19		4	
TPH C16-C21 (aromatic)*	mg/kg	260	6	16		1	
TPH C21-C35 (aromatic)*	mg/kg	1100	6	32		1	

Notes:

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas Inhalation

Abbreviations: GAC = general assessment criteria, N = number of samples, MC = maximum concentration; Loc of Ex = location of exceedance; PL = Contaminant Pathway; NFD = no fibres detected.

The pathway noted in the table is the primary pathway, however it may not be the only pathway of that contaminant

* The Tier 2 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. E3P has utilised the Tier 2 values for aliphatic compounds for the volatile and semi volatile fractions (C5-C12) and the Tier 2 values for aromatic compound for the non-volatile fractions (C12-C35). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.

** Tier 2 GAC for lead taken from C4SL CL:AIRE

5.2.1. SUMMARY OF RESULTS

Referring to Table7, the results show only asbestos to have been detected above the applicable guideline values.

Amosite, chrysotile and crocidolite asbestos fibres have been identified in the Made Ground in HP102 at 0.80 m bgl. The fibres have been quantified at 0.002% wt/wt.

S/VOCs were not analysed given no visual/olfactory evidence of contamination was observed.

5.2.2. EXPOSURE PATHWAYS

The main exposure pathway for asbestos fibres is fibre/dust inhalation (PL3).

5.2.3. DISCUSSION

Asbestos in the form of loose amosite, chrysotile and crocidolite asbestos fibres has been identified in the Made Ground in HP102 at 0.80 m bgl. No visual signs of ACM were encountered during the ground investigation; it is therefore likely that only trace fibres are present.

Delineation of the asbestos in HP102 is recommended prior to site stripping and redevelopment. Further testing of the stripped topsoil/Made Ground would also be recommended prior to reuse. Any materials to be retained on-site that are impacted with asbestos fibres should be managed according to the asbestos risk mitigation conceptual site model shown in Figure 1.

Notes

ND None Detect

0.001% Soils may contain $\leq 0.001\%$ asbestos using composite testing to ensure there is no potential risk to human health. This value is present within areas where there may be a short term low level exposure of soils containing trace asbestos fibres by construction workers where an appropriate level of asbestos management is employed (dust suppression)

0.1% Soils at a depth of $>1.00\text{m}$ bgl may contain $<0.1\%$ asbestos using composite testing where they will not be likely to be disturbed in the future and will therefore be in an area of low sensitivity. Risk assessment completed in accordance with Asbestos JIWG risk assessment tools.

Undefined- this will be dependent upon soils encountered during earthworks, which may be placed at these depths to ensure no potential risk to human health.

5.3. GAS RISK ASSESSMENT

5.3.1. SOURCES OF GROUND GAS

- Colliery spoil/Made Ground and potentially infilled brickfield
- Mineshaft and workings



5.3.2. DISCUSSION

Deep Made Ground/colliery spoil and evidence of infilling have not been identified on-site. Furthermore, trenching for the mineshaft did not locate this feature within the search area/departure zone.

With reference to CL:AIRE RB17 A Pragmatic Approach to Ground Gas Risk Assessment, Made Ground is considered to have low ground gas generation potential, particularly when less than 1.00 m thick and where soils were deposited a long time ago. However, the guidance also recommends that where the TOC is >1.0%, consideration for increasing the classification should be made.

The depth of Made Ground on-site is generally <1.00 m with no evidence of organic/degradable material observed, other than near-surface rootlets associated with on-site vegetation.

The organic matter within the Made Ground is however noted to range from 1.6-14%, which may ordinarily be considered to present a gas risk but given the nature of the site and the Made Ground containing coal fragments, it is likely that the coal dust within the soil is leading to the higher organic content.

The Made Ground in itself is therefore considered to present a minimal risk in terms of ground gas generation.

No evidence of extensive infilling has been encountered and there are no records for landfills (active or historic) within close proximity of the site. The identified mine shaft may lie off-site and be a conduit for ground gas migration, however, this would result in direct vertical migration, without any lateral migration to the site.

There does, however, remain the potential for open mine workings in shallow coal seams beneath the site, which may act as a gas reserve from which gas may migrate upwards through permeable pathways. The investigation has encountered low permeability clay soils beneath the Made Ground to a depth of c. 2.50-3.00 m bgl, directly overlying weathered Penning Coal Measures. It is acknowledged that this is not a significant 'cap' to mitigate upward migration of gas, and therefore the risk from gas in potential underground workings remains moderate.

Given that the site is located in an area where 3-5% of homes are estimated to be at or above the action level for radon, basic radon protection measures will be required for the proposed new dwelling. In the absence of gas monitoring, it is therefore recommended that gas protection measures including a more robust membrane resistant to radon, carbon dioxide and methane are incorporated into the design. Modern day build requirements (airtight construction with appropriately sealed membrane and subfloor ventilation will reduce the risk to future end users as the void will provide good protection against ground gas ingress and when designed and constructed correctly it will dilute any gas being emitted from the ground to acceptable levels. The minimum level of ventilation required to deal with condensation is considered capable of dealing with quite onerous ground gas regimes.



5.4. DEVELOPED CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 10 has been prepared for the site.

Table 10 **Developed Conceptual Model**

CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	MIGRATION PATHWAYS	RECEPTORS				
SOIL						
HUMAN HEALTH						
Made Ground Metals, inorganics, PAH	Accidental ingestion and/or dermal contact with contaminated soil and/or leachate. PL1/PL2 Inhalation of contaminated dust. PL3	Human Health – construction workers Human Health – end users	Low likelihood	Low	No elevated concentrations of heavy metals, inorganics or PAH have been encountered in the Made Ground or natural soils. Recommendation: Construction works to be completed with appropriate PPE and welfare facilities. A 300 mm growing medium (150 mm topsoil, 150 mm subsoil) is recommended in landscaped areas where Made Ground is present.	Low
Made Ground VOCs, TPH, volatile PAH (naphthalene)	Inhalation of vapours. PL4	Human Health – end users Human Health – Off-site receptors	Unlikely	Low	No sources or visual/olfactory evidence of volatile contamination have been identified.	Very low



CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	MIGRATION PATHWAYS	RECEPTORS				
Made Ground Asbestos	Inhalation (of fibres). Construction works disturbing bound material and releasing fibres. PL3	Human Health - Site personnel, end land users, and users of adjacent sites	Low likelihood	Moderate/ Low	Asbestos fibres have been identified in HP102 at 0.80 m bgl. Recommendation: Delineation prior to site stripping and redevelopment. Further testing of stripped topsoil/Made Ground would also be recommended prior to reuse. Any materials to be retained on-site impacted with asbestos fibres should be managed according to the E3P asbestos risk mitigation conceptual site model. If not delineated, a 600 mm cover system to garden and landscaped areas will prevent exposure to future site users. Construction works should be completed with PPE and provision of welfare.	Low
Made Ground Sulphate from potential ash within the Made Ground.	Sulphate attack on concrete. PL6	Building concrete	Unlikely	Low	Chemical analysis results indicate the soils generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1.	Very low



CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	MIGRATION PATHWAYS	RECEPTORS				
Made Ground Organic contaminants such as hydrocarbons, solvents	Ingestion of tainted water supply. PL7	Human Health – End Users Water pipeline	Low likelihood	Low	Low likelihood of contamination at pipeline depth across the west of the Site (0.75–1.35 m). Recommendation: PE pipe likely to be acceptable following a pipeline risk assessment.	Low
Made Ground Phytotoxic contaminants	Direct contact (plant uptake). PL8	Flora	Low likelihood	Low	No significant concentrations of phytotoxic contaminants (nickel, copper and zinc) have been identified.	Low
CONTROLLED WATERS						
Made Ground Metals, inorganics, PAH, TPH	Leaching of contaminants from Made Ground through infiltration and percolation of rainwater. PL5	Controlled waters - underlying Secondary A aquifer	Unlikely	Low	Significant leachable contamination has not been identified and is not anticipated. Low permeability cohesive soils would limit the migration of contaminants to the underlying aquifer. There are no surface water receptors within influencing distance of the site.	Very low
GROUND GAS						
Mine Workings, Off-Site Mine Shaft Ground gas (methane and carbon dioxide)	Inhalation of ground gas. PL4	Human Health – site personnel	Likely	Medium	The off-site mine shaft may be a conduit for ground gas migration; however, this would result in direct vertical migration, without any lateral migration to the site (low risk).	Low



CONTAMINANT RISK			LIKELIHOOD	SEVERITY	MITIGATION DISCUSSION	RESIDUAL RISK
SOURCES	MIGRATION PATHWAYS	RECEPTORS				
	Accumulation of ground gas in confined spaces (asphyxiation or explosion)				Open mine workings in shallow coal seams may also act as a gas reserve from which gas may migrate upwards through permeable pathways (moderate risk). Recommendation: Gas protection measures including a ventilated subfloor void and membrane resistant to radon, carbon dioxide and methane should be incorporated into the new dwellings.	
Radon	Inhalation of ground gas. PL4	Human Health – site personnel	Likely	Medium	Radon Class 3: 3-5% of homes are estimated to be at or above the Action Level. Recommendation: Basic radon protection measures are required.	Low

Notes:

Main Exposure Pathways: PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = vapour/gas inhalation; PL5 = vertical / lateral migration; PL6 = corrosion of concrete; PL7=tainting of water supply; PL8 = uptake by plants.

I trust the information provided in this letter report is satisfactory, however, if there is anything further please do not hesitate to contact me.

Yours sincerely,
For and on behalf of E3P Ltd

Jessica Sheridan
Senior Geoenvironmental Consultant

Enclosed:

Exploratory Hole Logs

Drawings

16-702-002 Proposed Development Layout

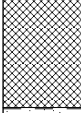
16-702-003 Historical Features Plan

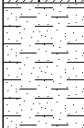
16-702-004 Site Features Plan

16-702-006 Exploratory Hole Location Plan

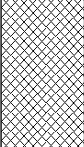
Chemtest laboratory report ref: 24-26691-1

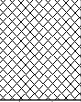
Murray Rix laboratory report ref: MRN 24005/198

				Trial Pit Log			TrialPit No HP101 Sheet 1 of 1		
Project Name: Edenfield Road				Project No. 16702		Co-ords: 385141.00 - 414818.00 Level:		Date 16/08/2024	
Location: Rochdale						Dimensions (m): 0.30 0.40		Scale 1:30	
Client: JACKSON, JACKSON & SONS LIMITED						Depth 0.70		Logged L. CALLISS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10	ES		0.15			Brown mottled light grey slightly sandy CLAY with frequent rootlets. (Topsoil). MADE GROUND: Dark brown mottled brown and light grey slightly sandy CLAY.		
	0.50	ES		0.60					
	0.70	B		0.70			Brown mottled light grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium subrounded to rounded of mudstone. End of Pit at 0.70m		
							1		
							2		
							3		
							4		
Trial Pit Photographs									
									
Handpit 101				Handpit 101 Spoil					
Remarks: 1. Complete. 2. WhatThreeWords Location: ///luggage.movie.galloping.									
Stability: STABLE									
									

				Trial Pit Log				TrialPit No HP102 Sheet 1 of 1	
Project Name: Edenfield Road				Project No. 16702		Co-ords: 385147.00 - 414823.00 Level:		Date 16/08/2024	
Location: Rochdale						Dimensions (m): 0.30 0.40		Scale 1:30	
Client: JACKSON, JACKSON & SONS LIMITED						Depth 0.80		Logged L. CALLISS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10	ES		0.30			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil).		
							MADE GROUND: Dark brown slightly sandy CLAY with frequent rootlets. Rare gravel of brick and ceramic (saturated).		
	0.80	ES		0.80			End of Pit at 0.80m		
							1		
							2		
							3		
							4		
Trial Pit Photographs									
									
Handpit 102					Handpit 102 Spoil				
Remarks: 1. Complete. 2. WhatThreeWords Location: ///indulgent.cursing.trader.									
Stability: STABLE									
									

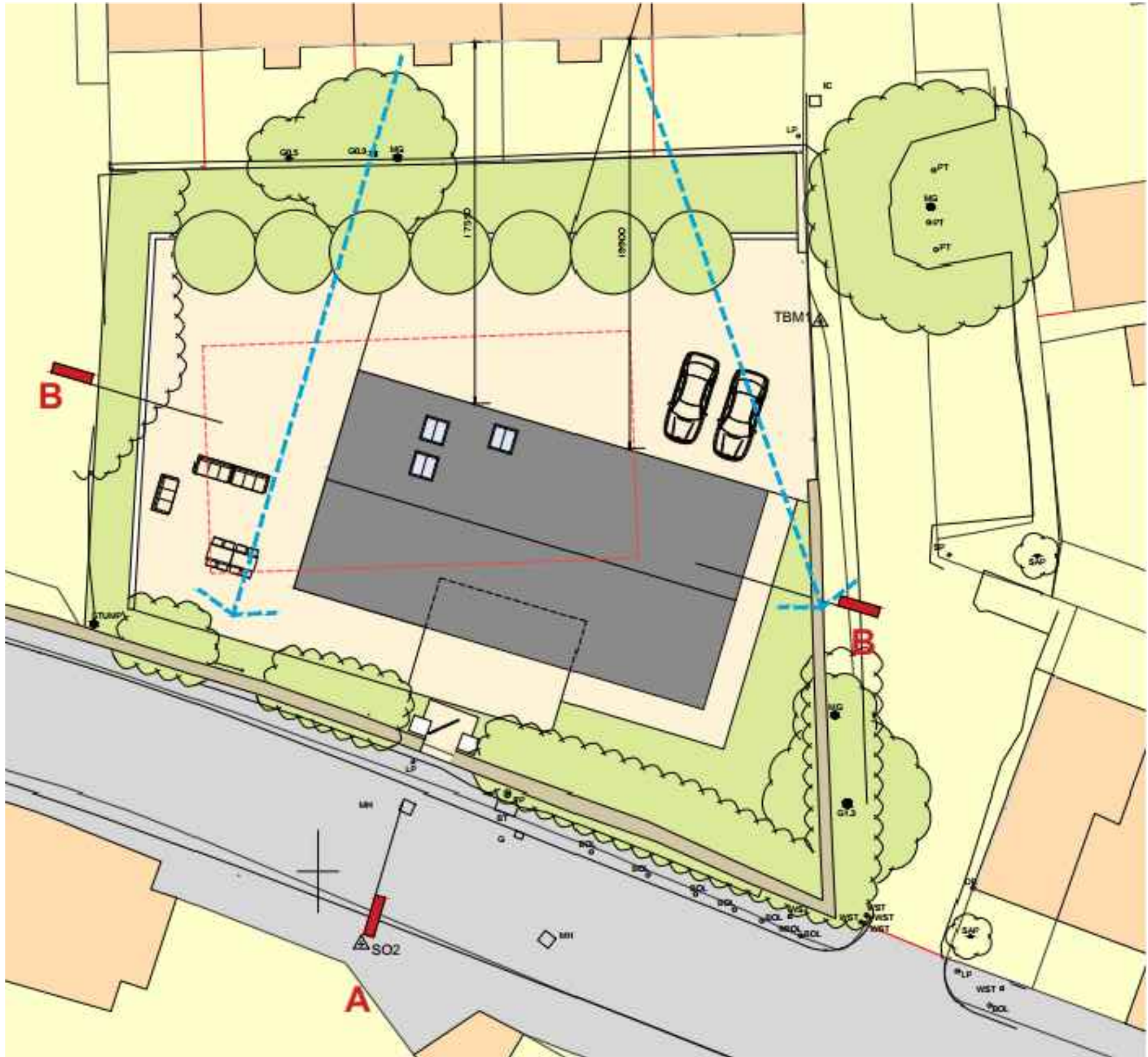
				Trial Pit Log			TrialPit No HP103 Sheet 1 of 1			
Project Name: Edenfield Road				Project No. 16702		Co-ords: 385164.00 - 414818.00 Level:		Date 16/08/2024		
Location: Rochdale						Dimensions (m): 0.30 0.40		Scale 1:30		
Client: JACKSON, JACKSON & SONS LIMITED						Depth 0.50		Logged L. CALLISS		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
	0.10	ES		0.10			Dark brown slightly sandy CLAY with frequent rootlets. (Topsoil). MADE GROUND: Brown mottled light grey slightly gravelly slightly sandy clay. Gravel is fine to medium subrounded to rounded of mudstone with fragments of concrete, brick, and plastic. End of Pit at 0.50m			
	0.50	ES		0.50						
									1	
									2	
									3	
									4	
Trial Pit Photographs										
										
Handpit 103					Handpit 103 Spoil					
Remarks: 1. Complete. 2. WhatThreeWords Location: ///atoms.limelight.junction.										
Stability: STABLE										
										

				Trial Pit Log			TrialPit No HP104 Sheet 1 of 1		
Project Name: Edenfield Road				Project No. 16702		Co-ords: 385171.00 - 414808.00 Level:		Date 16/08/2024	
Location: Rochdale						Dimensions (m): 0.30		Scale 1:30	
Client: JACKSON, JACKSON & SONS LIMITED						Depth 0.60		Logged L. CALLISS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20	ES B		0.60			MADE GROUND: Dark brown slightly gravelly slightly sandy clay with frequent rootlets. Gravel is fragments of brick, ceramic, glass, coal, and plastic. (Reworked topsoil).		
	0.30	End of Pit at 0.60m							
	0.60	ES							
1 2 3 4									
Trial Pit Photographs									
									
Handpit 104					Handpit 104 Spoil				
Remarks: 1. Refused on sandstone cobble. 2. WhatThreeWords Location: ///lost.dusts.habits.									
Stability: STABLE									
									

				Trial Pit Log			TrialPit No HP105 Sheet 1 of 1			
Project Name: Edenfield Road				Project No. 16702		Co-ords: 385146.00 - 414836.00 Level:		Date 16/08/2024		
Location: Rochdale						Dimensions (m): 0.40		Scale 1:30		
Client: JACKSON, JACKSON & SONS LIMITED						Depth 0.60		Logged L. CALLISS		
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
	0.20	ES		0.40			MADE GROUND: Dark brown slightly gravelly slightly sandy clay with frequent rootlets. Gravel is fragments of brick and ceramic. (Reworked topsoil).			
	0.60	ES		0.60			Brown mottled light grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium subrounded to rounded of mudstone. End of Pit at 0.60m			
									1	
									2	
									3	
									4	
Trial Pit Photographs										
										
Handpit 105					Handpit 105 Spoil					
Remarks: 1. Complete. 2. WhatThreeWords Location: ///responded.lifetimes.wager.										
Stability: STABLE										
										

				Trial Pit Log			TrialPit No HP106 Sheet 1 of 1		
Project Name: Edenfield Road				Project No. 16702		Co-ords: 385158.00 - 414829.00 Level:		Date 16/08/2024	
Location: Rochdale						Dimensions (m): 0.30 0.40		Scale 1:30	
Client: JACKSON, JACKSON & SONS LIMITED						Depth 0.70		Logged L. CALLISS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20	ES		0.35			MADE GROUND: Dark brown slightly gravelly slightly sandy clay with frequent rootlets. Gravel is fragments of brick, ceramic, and coal. (Reworked topsoil).		
	0.60	B					Brown mottled light grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium subrounded to rounded of mudstone.		
	0.70	ES		0.70			End of Pit at 0.70m		
Trial Pit Photographs									
									
Handpit 106					Handpit 106 Spoil				
Remarks: 1. Complete. 2. WhatThreeWords Location: ///kingpin.reviews.octagon.									
Stability: STABLE									
									





Notes:				
P1	REVA	01.08.2024	OW	PW
Phase	Issue	Date	Drawn	Checked

Client:	
JACKSON, JACKSON & SONS LIMITED	
Job Title:	
Edenfield Road, Rochdale	

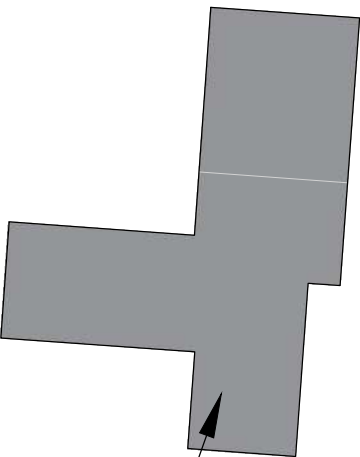
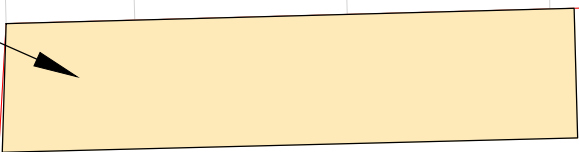
Job No:	16-702	Date:	01.08.2024
Drawing No:	002	Scale:	NTS
Drawing Title:		Proposed Development Plan	



Environmental Engineering Partnership Ltd
Taylor Road, Trafford Park
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Website: www.e3p.co.uk

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Former Building
Pre 1890 - Pre 1929



Construction of Foundations
Pre 2013 - Present



Historical Features

- Former Building
- Construction of Foundations

Notes:

P1	REVB	01.08.2024	OW	PW
P1	REVA	24.04.2023	OW	PW
Phase	Issue	Date	Drawn	Checked

Client:

JACKSON, JACKSON &
SONS LIMITED

Job Title:

Edenfield Road,
Rochdale

Job No:

16-702

Drawing No:

003

Date:

01.08.2024

Scale:

NTS



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- Site Features
- Old Brick Foundations
 - Semi Mature Trees
 - Rough Scrub Vegetation and Semi Mature Trees
 - Overhead Cables
 - Dry Stone Wall
 - General Slope Towards the SE

Notes:				
P1	REVB	01.08.2024	OW	PW
P1	REVA	24.04.2023	OW	PW
Phase	Issue	Date	Drawn	Checked

Client:
JACKSON, JACKSON & SONS LIMITED
Job Title:
Edenfield Road, Rochdale

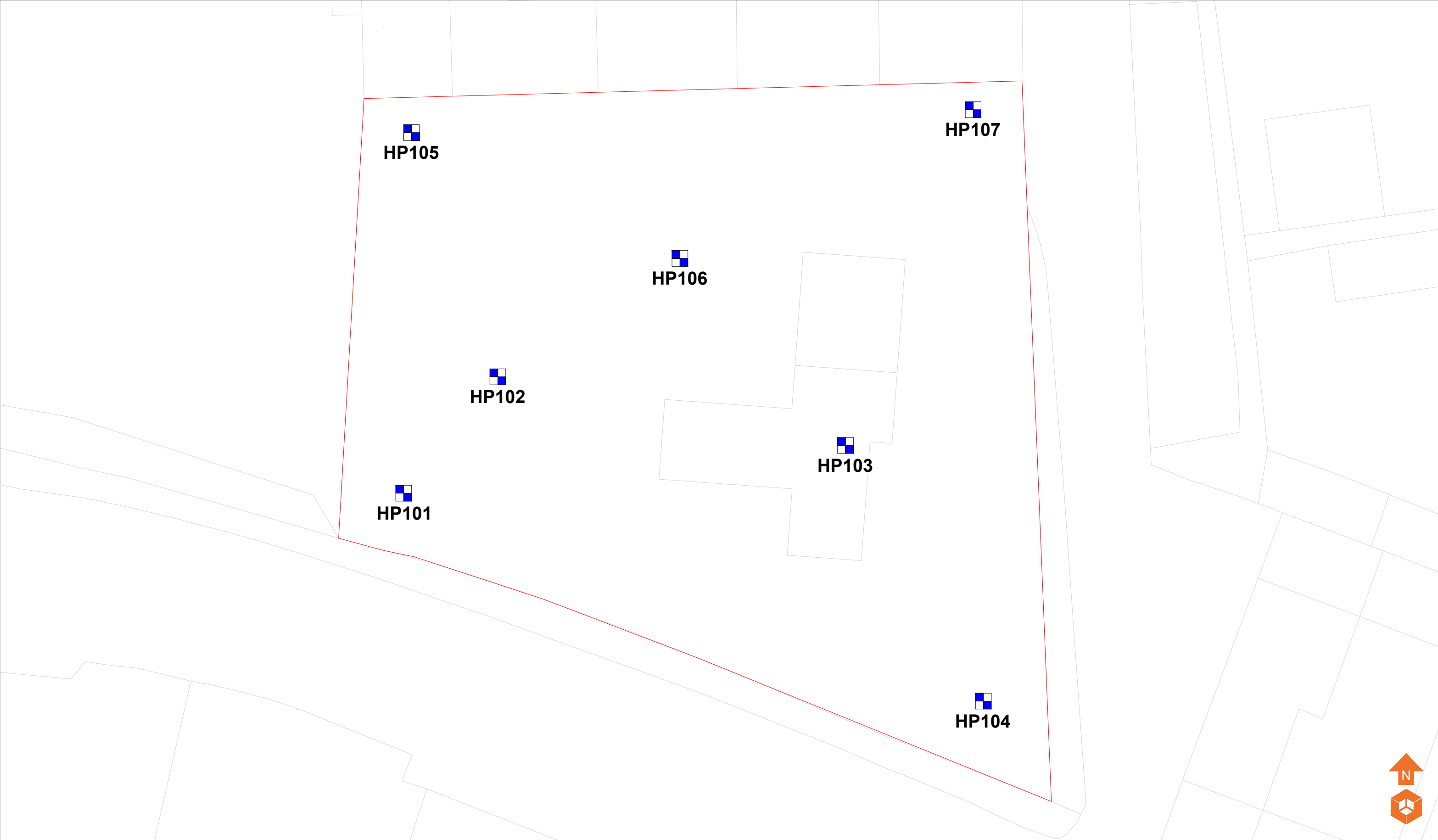
Job No:
16-702
Drawing No:
004

Date:
01.08.2024
Scale:
NTS



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Location Symbols  Approximate Hand Dug Pit Location	Notes:					Client: JACKSON, JACKSON & SONS LIMITED	Job No: 16-702	Date: 16.08.2024	 Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
							Drawing No: 005	Scale: NTS		
						Job Title: Edenfield Road, Rochdale	Drawing Title: Exploratory Hole Location Plan			The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
	P1 P1	REVB REVA	16.08.2024 24.04.2023	OW OW	PW PW					
	Phase	Issue	Date	Drawn	Checked					



Final Report

Report No.: 24-26691-1

Initial Date of Issue: 26-Aug-2024

Re-Issue Details:

Client E3P

Client Address: Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Contact(s): lcalliss@e3p.co.uk;
jsheridan@e3p.co.uk

Project Edenfield Road, Rochdale

Quotation No.: Q23-31421

Date Received: 20-Aug-2024

Order No.: 009147

Date Instructed: 20-Aug-2024

No. of Samples: 6

Turnaround (Wkdays): 5

Results Due: 27-Aug-2024

Date Approved: 26-Aug-2024

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: Edenfield Road, Rochdale

Client: E3P		Chemtest Job No.:						24-26691	24-26691	24-26691	24-26691	24-26691	24-26691
Quotation No.: Q23-31421		Chemtest Sample ID.:						1853698	1853699	1853700	1853701	1853702	1853703
		Client Sample ID.:						HP101	HP102	HP104	HP105	HP106	HP107
		Sample Type:						SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):						0.1	0.8	0.2	0.6	0.2	0.6
		Date Sampled:						16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024
		Time Sampled:						12:00	12:00	12:00	12:00	12:00	12:00
		Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD								
ACM Type		U	2192		N/A	-	Fibres/Clumps	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	Amosite Chrysotile Crocidolite	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Asbestos by Gravimetry		U	2192	%	0.001		0.002						
Total Asbestos		U	2192	%	0.001		0.002						
Moisture		N	2030	%	0.020	14	28	12	9.4	17	15		
Soil Colour		N	2040		N/A	Brown	Black	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	Stones and Roots	Roots	Stones	Stones and Roots	Stones		
Soil Texture		N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
pH at 20C		M	2010		4.0	8.1	8.0	7.9	7.8	7.7	8.5		
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010	0.022	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur		U	2175	%	0.010	0.050	0.060	0.10	0.020	0.070	0.14		
Cyanide (Total)		M	2300	mg/kg	0.50	< 0.50	0.60	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	13	7.3	5.2	17	4.6	4.0		
Sulphate (Total)		U	2430	%	0.010	0.021	0.080	0.061	0.033	0.076	0.073		
Arsenic		M	2455	mg/kg	0.5	6.8	14	15	6.9	14	12		
Cadmium		M	2455	mg/kg	0.10	< 0.10	0.21	0.20	< 0.10	0.14	0.15		
Chromium		M	2455	mg/kg	0.5	18	14	11	17	14	9.3		
Copper		M	2455	mg/kg	0.50	12	34	38	7.3	39	24		
Mercury		M	2455	mg/kg	0.05	< 0.05	0.27	0.15	0.06	0.20	0.14		
Nickel		M	2455	mg/kg	0.50	16	13	17	23	16	14		
Lead		M	2455	mg/kg	0.50	14	97	100	26	79	72		
Selenium		M	2455	mg/kg	0.25	0.75	0.58	0.71	0.54	0.62	0.58		
Zinc		M	2455	mg/kg	0.50	35	75	78	99	70	72		
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	1.6	11	14	1.6	7.2	12		
Total Organic Carbon		M	2625	%	0.20	0.95	6.4	8.2	0.93	4.2	6.7		
TPH >C6-C8	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C12-C16	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C16-C21	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	16	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C21-C25	EH_1D_Total	N	2670	mg/kg	1.0	22	< 1.0	32	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C25-C35	EH_1D_Total	N	2670	mg/kg	1.0	33	< 1.0	37	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C35-C40	EH_1D_Total	N	2670	mg/kg	1.0	20	< 1.0	3.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	75	< 10	110	< 10	< 10	< 10	< 10	< 10

Results - Soil

Project: Edenfield Road, Rochdale

Client: E3P		Chemtest Job No.:						24-26691	24-26691	24-26691	24-26691	24-26691	24-26691
Quotation No.: Q23-31421		Chemtest Sample ID.:						1853698	1853699	1853700	1853701	1853702	1853703
		Client Sample ID.:						HP101	HP102	HP104	HP105	HP106	HP107
		Sample Type:						SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):						0.1	0.8	0.2	0.6	0.2	0.6
		Date Sampled:						16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024
		Time Sampled:						12:00	12:00	12:00	12:00	12:00	12:00
		Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD								
Naphthalene		M	2800	mg/kg	0.10	< 0.10	1.4	1.5	0.70	1.0	< 0.10		
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	0.27	< 0.10	< 0.10	< 0.10	< 0.10		
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	0.19	< 0.10	< 0.10	< 0.10	< 0.10		
Fluorene		M	2800	mg/kg	0.10	< 0.10	0.26	< 0.10	< 0.10	< 0.10	< 0.10		
Phenanthrene		M	2800	mg/kg	0.10	< 0.10	1.4	0.59	0.48	0.92	< 0.10		
Anthracene		M	2800	mg/kg	0.10	< 0.10	0.32	< 0.10	< 0.10	< 0.10	< 0.10		
Fluoranthene		M	2800	mg/kg	0.10	< 0.10	2.1	0.50	0.33	1.0	< 0.10		
Pyrene		M	2800	mg/kg	0.10	< 0.10	1.8	0.50	0.30	0.90	< 0.10		
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10	0.83	0.21	< 0.10	0.41	< 0.10		
Chrysene		M	2800	mg/kg	0.10	< 0.10	1.0	0.31	< 0.10	0.50	< 0.10		
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10	1.4	< 0.10	< 0.10	0.59	< 0.10		
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10	0.44	< 0.10	< 0.10	0.25	< 0.10		
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10	1.0	< 0.10	< 0.10	0.46	< 0.10		
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10	0.70	< 0.10	< 0.10	0.33	< 0.10		
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10	0.76	< 0.10	< 0.10	0.35	< 0.10		
Total Of 16 PAH's		N	2800	mg/kg	2.0	< 2.0	14	3.6	< 2.0	6.7	< 2.0		
Total Phenols		M	2920	mg/kg	0.10	< 0.10	1.9	< 0.10	< 0.10	< 0.10	< 0.10		

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at $\leq 30^{\circ}\text{C}$ prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

- DW - Drinking Water
- GW - Ground Water
- LE - Land Leachate
- NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

TEST REPORT

Client e3p

Address Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Contract Edenfield Road,
Rochdale

Job Number MRN 24005/198
Date of Issue 10 September 2024
Page 1 of 3

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
- 5 The results included within the report are representative of the samples submitted for analysis.
- 6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.



Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

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MURRAY RIX

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



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

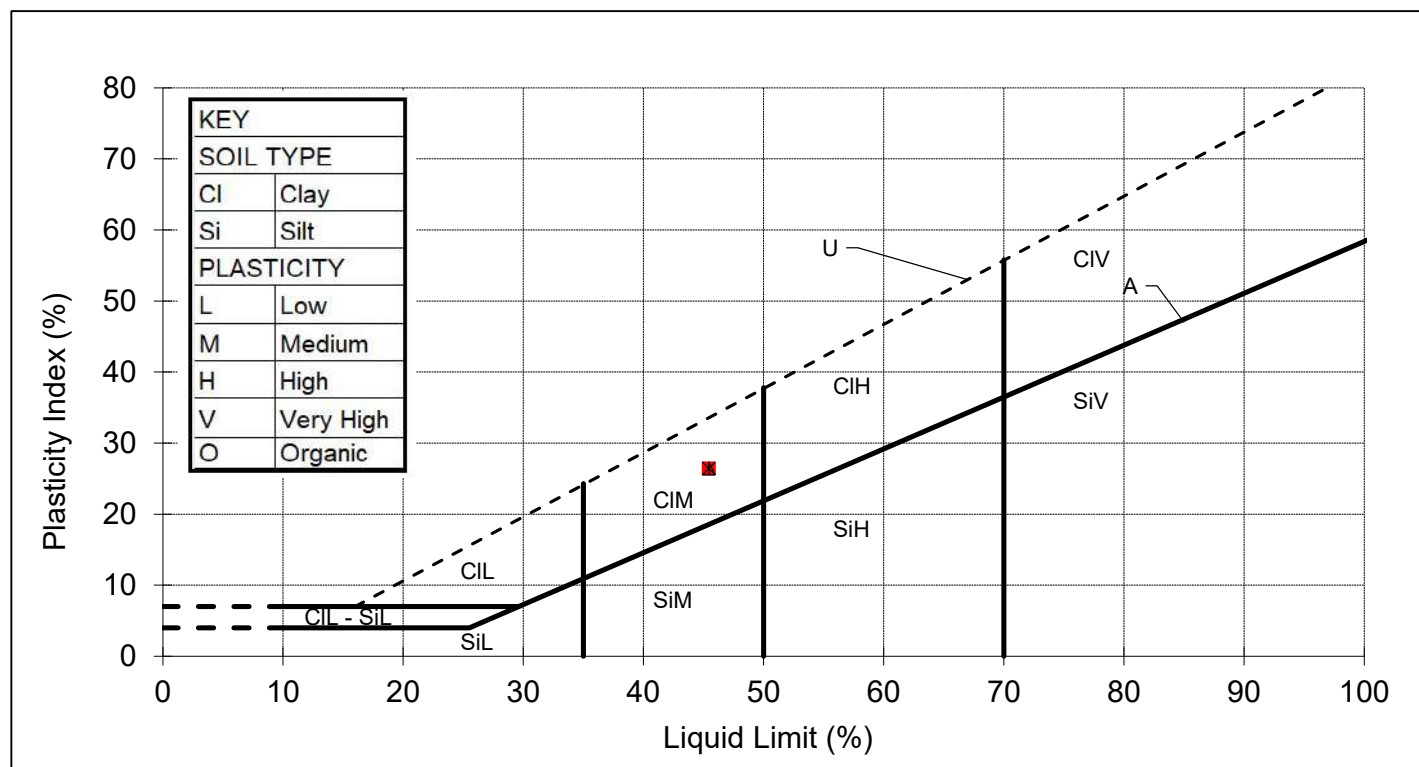
CLIENT	e3p
SITE	Edenfield Road, Rochdale
JOB NUMBER	MRN 24005/198

SAMPLE LABEL	HP101 0.7	DATE SAMPLED	16-Aug-24
SAMPLE No.	538401	DATE RECEIVED	21-Aug-24
DATE TESTED	27-Aug-24	SAMPLED BY	Client

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

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.6	44.4	1.026	
Determination 2 (avg)	18.5	44.2		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
31.8	45	19	26	94



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE

10-Sep-24

MURRAY RIX

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



TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD

PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5

WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

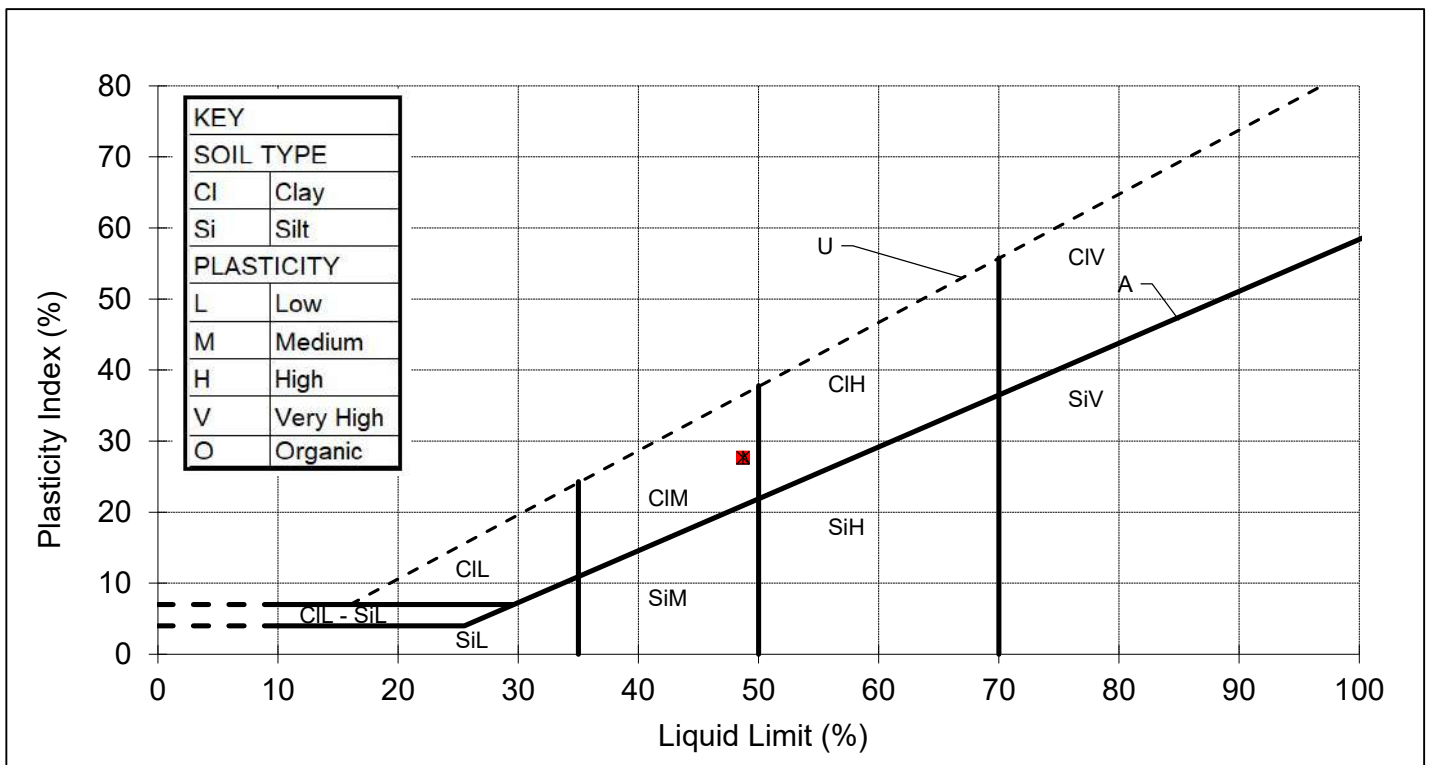
CLIENT	e3p
SITE	Edenfield Road, Rochdale
JOB NUMBER	MRN 24005/198

SAMPLE LABEL	HP106 0.6	DATE SAMPLED	16-Aug-24
SAMPLE No.	538402	DATE RECEIVED	21-Aug-24
DATE TESTED	27-Aug-24	SAMPLED BY	Client

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

Test Readings mm (average)		Water Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.0	48.6	1.000	
Determination 2 (avg)	20.0	48.8		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
30.2	49	21	28	98



REMARKS

SIGNED

NAME

O.P. Davies BA (Hons)
(Director / Head of Laboratory)

DATE

10-Sep-24