



Rochdale Road, Manchester

Phase 2 Geo – Environmental Investigation, Risk Assessment and Outline Remediation Strategy

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Client
McGoff Construction Ltd



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EXECUTIVE SUMMARY

Site Details

Location	North of Rochdale Road, east of Gould Street, Manchester. Centred at National Grid Reference 384705E 399140N.
Area	1580m ² .
Topography	51-52 metres above ordnance datum (AOD). Site is approximately level.
Current Site Use	Currently site comprises small pay and display carpark to the south and south-west, disused shop to the south and compound area for the use of storing building material, waste skips and concrete silos associated with the adjacent Phase 1 part of the development.
Proposed Development	Erection of a 17 storey residential apartment building (Use Class C3 (a), with associated access, amenity, landscaping, public realm, infrastructure and other associated works. Demolition of existing vacant building on site, comprising of ground floor retail and a first floor apartment.

Site Setting

Main Historical Features	Onsite: Rochdale Road Gas Works, Ashley Street, Back Ashley Street, residential building, depot, car park/vehicle storage. Surrounding Area: Rochdale Road Gas Works, depots, reservoirs, pit, tanks.
Geology / Hydrogeology	Artificial: MG recorded to the north and centre of site boundary, no artificial ground recorded to the south. Superficial: Till (Diamicton), Secondary Undifferentiated Aquifer. Bedrock: Chester Formation (sandstone), Principle Aquifer.
Landfills / Infilled Ground	No recorded landfills. Potentially infilled ground identified.
Other Relevant Environmental Settings etc.	Site is within a Nitrate Vulnerable Zone.
Site Reconnaissance	Site is located east of Gould Street and west of Clive Street. Site currently comprises pay and display carpark adjacent to The Marble Arch Inn pub and compound area for the use of storing building material, waste skips and concrete silos to the north, east and west of site boundary.
Recommendations	Site Investigation was recommended to further assess geo-environmental risk.

Ground Investigation Work Undertaken

Date of Investigation:	24 th to 28th June 2025.
Intrusive Investigation Work Undertaken:	6no. window sample boreholes. 1no. cable percussion borehole with follow on rotary core. Contamination and geotechnical testing. Gas monitoring. Falling head tests.

Ground Conditions

Made Ground	The made ground within car park area generally comprised very gravelly slightly silty sand with anthropogenic material such as, brick, clinker, ceramic, metal, glass, ash, plastic. Made ground material within the compound was crushed fill material and comprised very sandy gravel with anthropogenic material such as, brick, slate, coal, glass, ash clinker and concrete.
Superficial	Superficial strata comprised stiff to very stiff gravelly sandy silty clay with rare coal fragments, recorded to depths of 21.00mbgl. Possible sandstone boulder encountered at 21.00 – 21.50mbgl.

	Horizon of clay recorded to a depth of 23.00mbgl with cobly gravelly slightly slightly silty SAND recorded to 26.50mbgl.
Bedrock	Slightly weathered sandstone bedrock was encountered from 26.50-37.00mbgl.
Groundwater	None recorded.
Obstructions	None recorded.
Permeability	Not permeable.
Other Observations	None recorded.

Geotechnical Assessment

Undrained Shear Strength and Allowable Bearing Pressure	Natural cohesive deposits will return an undrained shear strength (s_u) of 141kPa at depths of between 4.00m and 9.00mbgl Sandstone bedrock will offer an Unconfined Compressive Strength of 8MN/m ² .
Anticipated Foundation Type	A piled foundation solution is considered the most economic and reliable option for the development.
Other Considerations	Temporary supports of excavations will be required. Detailed design should be carried out by structural engineer. Concrete Requirements DS1-AC-1.

Contamination Risk Assessment

PL	Contaminant	Risk	Recommendations
1	PAHs, Metals, Asbestos	Moderate	Remediation required.
	Petroleum hydrocarbons	Low	No remediation required.
2	Petroleum Hydrocarbons, creosote, solvents, phenols, naphthalene	Low	No remediation required.
3	Carbon dioxide and methane. Radon	Moderate / Low	Gas and radon protection measures are not required.
4	Groundwater (mobile contaminants)	Low	No remediation required.
5	Organic contaminants.	Low	Utility provider risk assessment to be completed. No remediation recommended.

PL	Recommendation
1	Environmental cover system required in soft landscaping and garden areas.
2	No remediation required.
3	Gas and radon protection measures are not required.
4	No remediation required.
5	Potable water pipe assessment required. No remediation required.

Further Work Requirements

Additional drilling is required in the area of the existing building site when access comes available. Following demolition of the disused shop in the south of the site, this area will require investigation and an update to the risk assessment.

TABLE OF CONTENTS

1.	Introduction	1
1.1.	Background	1
2.	Summary of Preliminary Risk Assessment (PRA) and Summary of Previous Work	2
2.1.	Phase 1 Preliminary Risk Assessment (PRA)	2
2.2.	Previous Site Investigations.....	3
2.3.	Conceptual Model.....	4
3.	Ground Investigation	7
3.1.	Site Investigation Design and Methodology	7
3.2.	Well Installations.....	7
3.3.	Sampling Protocol	7
3.4.	In-situ Testing	9
3.5.	Gas Monitoring	9
4.	Ground Conditions	10
4.1.	Geology	10
4.2.	Groundwater	10
4.3.	Permeability Tests	11
5.	Geotechnical Assessment	12
5.1.	Proposed Development	12
5.2.	Summary of Ground Conditions.....	12
5.3.	Site Preparation.....	12
5.4.	Foundation Conditions and Bearing Capacity.....	12
5.5.	Foundation	13
5.6.	Ground Floor Slabs.....	15
5.7.	Pavement Construction.....	15
5.8.	Drainage	16
5.9.	Concrete Durability	16
5.10.	Excavations.....	16
5.11.	Construction Activity and Inspection	16
5.12.	Enabling Works.....	17
6.	Generic Risk Assessment	18
6.1.	Introduction	18
6.2.	Soil Risk Assessment	18
6.3.	Gas Risk Assessment	21
6.4.	Controlled Water Assessment.....	22
6.5.	Potable Water Supply (Pollutant Linkage 5).....	22
6.6.	Revised Contamination Conceptual Model.....	23
7.	Summary Conclusions	25
7.1.	Ground Conditions	25
7.2.	Geotechnical	25
7.3.	Contamination Assessment.....	25
8.	Outline Remediation Strategy.....	27
8.1.	Further Work.....	27
8.2.	Remediation and Validation Recommendations.....	27
8.3.	Other Considerations	28
8.4.	Validation of Imported / Site Won Soils	29
8.5.	Site Completion Report	30

Figures

Figure 1 – Site Location and Boundary Plan

Figure 2 – Proposed Development Plan

Figure 3 – Site Investigation Location Plan

Appendices

Appendix A – Risk Matrix

Appendix B – Profile Logs

Appendix C – Certificates of Analysis (Soil)

Appendix D – Certificates of Analysis (Geotechnical)

Appendix E – Gas Monitoring Results

Appendix F – Falling Head Tests

Appendix G – Generic Assessment Criteria Values

Appendix H – References

1. Introduction

1.1. Background

LK Consult Ltd (LKC) has been commissioned to carry out a Phase 2 Geo-Environmental Investigation, Risk Assessment and Outline Remediation Strategy for Rochdale Road, Manchester. The investigation was undertaken in support of a planning application to develop the site for residential use.

The following work has previously been undertaken:

- A phase 2 investigation has previously been undertaken by Groundtech Consulting as part of a larger site investigation (Ref: GRO-22292-3965, November 2022),
- Preliminary Risk Assessment (PRA) report, undertaken by LKC (Ref: LKC251336-A1-PRA-Rochdale Road, Manchester R0, dated July 2025).

This investigation has been undertaken to confirm the ground conditions below the site and to allow a contamination and geotechnical assessment to be undertaken.

The investigation will aim to confirm the risks of the potential pollutant linkages identified in the PRA and recommend further assessment / remediation, as required.

Further site investigation works are yet to be completed within the compound area to the north-east of the site boundary. The additional works comprises of cable percussive drilling to bedrock with 10.00m of rock coring using rotary drilling for detailed piling socket design. Works can commence once the compound is no longer an active construction site with plant, building material and hoists.

A summary of the site details is presented in Table 1-1. Figure 1 indicates the site location and boundary plan. Figure 2 indicates the proposed development.

Location	North of Rochdale Road, east of Gould Street, Manchester. Centred at National Grid Reference 384705E 399140N.
Area	1580m ² .
Topography	51-52 metres above ordnance datum (AOD). Site is approximately level.
Current Site Use	Currently site comprises small pay and display carpark to the south and south-west, disused shop to the south and compound area for the use of storing building material, waste skips and concrete silos associated with the adjacent Phase 1 part of the development.
Proposed Development	Erection of a 17 storey residential apartment building (Use Class C3 (a), with associated access, amenity, landscaping, public realm, infrastructure and other associated works. Demolition of existing vacant building on site, comprising of ground floor retail and a first floor apartment.

Table 1-1: Summary of site details.

2. Summary of Preliminary Risk Assessment (PRA) and Summary of Previous Work

2.1. Phase 1 Preliminary Risk Assessment (PRA)

Pertinent information has been summarised from the PRA in Table 2-1.

Main Historical Features	Onsite: Rochdale Road Gas Works, Ashley Street, Back Ashley Street, residential building, depot, car park/vehicle storage. Surrounding Area: Rochdale Road Gas Works, depots, reservoirs, pit, tanks.
Geology / Hydrogeology	Artificial: MG recorded to the north and centre of site boundary, no artificial ground recorded to the south. Superficial: Till (Diamicton), Secondary Undifferentiated Aquifer. Bedrock: Chester Formation (sandstone), Principal Aquifer.
Landfills / Infilled Ground	No recorded landfills. Potentially infilled ground identified.
Other Relevant Environmental Settings etc.	Site is within a Nitrate Vulnerable Zone.
Site Reconnaissance	Site is located east of Gould Street and west of Clive Street. Site currently comprises pay and display carpark adjacent to The Marble Arch Inn pub and compound area for the use of storing building material, waste skips and concrete silos associated with the adjacent Phase 1 development.
Recommendations	Site Investigation was recommended to further assess geo-environmental risk.

Table 2-1: Summary of site details, historical review, environmental settings, and site reconnaissance.

Table 2-2 summarises the geotechnical constraints. This has been updated to consider the previous site investigation work.

Coal Mining	Site is not within a high development risk area. No further assessment required.
Slope Stability	Site is relatively flat. No slope stability assessment required.
Made Ground	Unknown depth and constituent of made ground across the site.
Superficial	Initial information indicates relatively deep made ground.
Bedrock	Unknown strength of soils for foundation design.
Groundwater	Unknown depth to bedrock on LKC study site. Previous work suggests surrounding bedrock between 15.00-26.00mbgl deep.
Plasticity	Unknown depth and variability of groundwater.
Sulphate	Plasticity of clay deposits should be confirmed.
Road / Pavement Design	Unknown sulphate content of the made ground and natural.

Table 2-2: Summary of geotechnical constraints.

2.2. Previous Site Investigations

A phase 2 investigation has previously been undertaken by Groundtech Consulting as part of a larger site investigation (Ref: GRO-22292-3965, November 2022), which included the LKC study site. Below is a summary of the phase 2 investigation:

Site work was undertaken between 26th September 2022 and 19th October 2022 and comprised:

- 23no. trial pits to maximum depth of 4.20mbgl. 3no. percolation tests carried out at 2.00mbgl depth.
- 7no. cable percussion boreholes to maximum depth of 26.00mbgl with 3no. rotary follow on to max depth of 36.00mbgl.
- 5no. Window sample boreholes to maximum depth of 3.00mbgl.
- 5no. Plate load tests carried out at 0.50mbgl.
- 6no. hand dug pits excavated to maximum depth of 1.20mbgl.

TP101-TP106 and WS105 relate to the northern sector of the LKC study area, no locations were undertaken in the southern sector. Ground conditions in this area are summarised below:

Made Ground

- Made ground was present within all WS and TP locations within the LKC study area to depths between 0.90-3.80mbgl and comprised horizons of gravel, sand, silt and clay with anthropogenic material including ash, brick, clinker, wood, concrete, glass, ceramic, plastic and coal. The base of made ground within the TP locations was not found so the full extent of the made ground in these areas is unknown.
- A concrete obstruction was encountered within TP104 at 0.40mbgl. No superficial deposits were found within any of the TPs.
- No visual or olfactory evidence of gross contamination was noted on the logs, however a PID value of 23ppm was noted at 1.50mbgl within TP106, suggesting possible low levels of contamination present.
- Elevated concentrations of contamination were not recorded within the two samples collected within the LKC study area. However, coverage within this area is very limited. Elevated concentrations of metals, cyanide, TPH, PAHs and phenols were recorded within soil samples collected to the north of the LKC study area boundary.

Superficial

- Within the LKC study area, superficial ground was only found within WS101 at 0.90mbgl and comprised a soft to firm gravelly sandy clay, increasing in consistency and gravel content with depth.
- The wider site investigation encountered superficial as predominantly firm to stiff gravelly sandy clay. Deeper strata of gravelly clayey sand were noted within multiple boreholes.

Bedrock

- No bedrock was encountered within the LKC study area. The wider site encountered red weathered sandstone bedrock at depths between 18.50-36.00mbgl.

Groundwater

- No groundwater was encountered within the LKC study area.

2no. gas monitoring visits were undertaken as part of the wider investigation. All flow readings were recorded as <0.1l/hr and no carbon dioxide or methane readings were recorded as elevated (above 5%v/v and 1%v/v respectively).

2.3. Conceptual Model

The preliminary contamination conceptual model using contaminant-pathway-receptor linkages based on guidance in LCRM¹ has been summarised in Table 2-3.

Each pollutant linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552². The risk matrix is provided in Appendix A.

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Assessment and Recommendations
1	PAHs, Heavy Metals, Asbestos (Made Ground, Gas Works, Depots, Demolished Buildings)	Dermal contact. Inhalation of soil, fibres, and dust. Ingestion of soils, dust, soil Windblown dust.	Future site users. Offsite receptors.	Likely	Medium	Moderate	Likely probability given history of site. Previous work noted ash, clinker and ceramic onsite. Potential pathway to future receptors in soft landscaping. Recommendation: Intrusive investigation required to include soil sampling.
	Petroleum Hydrocarbons, creosote, solvents, phenols (Gas Works, Depots)			Low Likelihood		Moderate / Low	The site has predominantly been hardstood, which would limit downward migration of contamination. The previous work did not encounter any visual or olfactory evidence of gross contamination within the site vicinity; however some areas of site were not fully investigated. Recommendations: Investigation required, testing subject to ground conditions.
2	Petroleum Hydrocarbons, creosote, solvents, phenols, naphthalene (Deep made ground, Gas Works, Depot)	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users. Offsite receptors.	Low Likelihood	Medium	Moderate / Low	Contamination possible given site history, however previous investigation didn't identify visual evidence of volatile contamination or elevated potential volatile contaminants in the soil on LKC site study area. Limited investigation areas across previously. Recommendations: Investigation required, testing subject to ground conditions.
3	Hazardous gas: methane, carbon dioxide (deep made ground, possible infilled basements)	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings. Offsite receptors.	Low Likelihood	Severe	Moderate	Low probability as previous SI in the north of the LKC study site did not indicate any significantly putrescible or organic ground conditions and limited gas monitoring data did not identify elevated gas concentrations. However, areas in the south of the LKC study area not investigated. Recommendations: Gas monitoring required, no radon protection required.

Table 2-3: Preliminary Contamination Conceptual Model

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Assessment and Recommendations
4	PAHs, metals, Petroleum hydrocarbons (gas works, deep made ground, depots)	Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater	Low Likelihood	Medium	Moderate / Low	Likely probability considering sensitive principal bedrock aquifer present. Although no evidence of mobile contamination identified in the north of LKC site during previous investigation, only limited tested undertaken and no investigation undertaken in the south of LKC site where depots were located and potentially mobile contamination identified in wider investigation area. Recommendations: Intrusive investigation required. Groundwater sampling required subject to ground conditions.
5	Naphthalene, petroleum hydrocarbons, organic contaminants (gas works, deep made ground, depots)	Permeation of pipes. Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Medium	Moderate	Likely probability due to history of site and deep made ground likely present at pipe depth. Recommendations: Sampling and analysis of soils at anticipated pipeline depths (c. 0.75-1.35mbgl). Water pipe assessment required.

Table 2-4 (Cont): Preliminary Contamination Conceptual Model.

3. Ground Investigation

3.1. Site Investigation Design and Methodology

The investigation was carried out on 24th to 28th June 2025 and comprised the following:

- 6no. window sample boreholes drilled to 0.4-5.95 metres below ground level (mbgl) (ref. WS101 to WS106).
- 1no. cable percussion borehole drilled to 27.00mbgl with follow on rotary core to 37.5mbgl (ref. BH103).

All site investigation locations are shown in Figure 3.

The locations were chosen to allow adequate assessment of ground conditions across the site. Table 3-1 details the site investigation locations.

Site Investigation Locations	Rationale
BH103	To confirm ground conditions and depth of bedrock beneath the footprint of the proposed phase 2 development and assist the structural engineer with detailed piling socket design.
WS101-WS103	General site coverage and gas monitoring wells.
WS104-WS106	General site coverage and to gain an understanding of ground conditions within the compound area of the active construction site.

Table 3-1: Summary of Sampling Locations.

The proposed boreholes BH101 and BH102 have not been drilled to date due to access issues.

2no. window sample locations were not undertaken due to unknown location of attenuation tank and building material located within the compound area.

The number of site investigation points corresponds to approximately one location per 15m square centres. This is considered to be a conservative sampling density and is in line with BS10175³ for a 'detailed investigation'.

3.2. Well Installations

3no. (ref: WS101-WS103) of the boreholes were installed with monitoring wells for gas monitoring. Monitoring wells were installed in accordance with BS10175 and CIRIA C665⁴ and generally comprised approximately 1m plain pipe over a length of slotted pipe surrounded by pea gravel and sealed at the top with bentonite and concrete.

Well installation details are provided in Profile Logs in Appendix B.

3.3. Sampling Protocol

3.3.1. Soil Sampling (Contamination)

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation⁵.

Soil was collected for onsite testing for total volatile organic compounds (TVOCs) using a photoionisation detector (PID) fitted with a 10.6eV lamp and moisture trap. A plastic zip bag was half filled with soil allowing a suitably sized headspace. The bag was sealed and stored for at least 20 minutes before being tested. Results of the PID readings are presented on the profile logs (Appendix B). The onsite monitoring was carried out in line CIRIA C665⁶ to aid in screening samples for volatile analysis.

Soil samples of approximately 500g were recovered in amber jars and plastic tubs. All the samples were sent to DETS laboratory for chemical testing.

Many of the contamination tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix C. Table 3-2 shows the soil testing undertaken.

Testing	No. Samples	Justification
Metals / metalloids, pH, water soluble sulphate, speciated PAHs, SOM and asbestos screen.	11	A basic suite with a broad selection of contaminants where no significant evidence of contamination was identified (except for occasional ash, clinker, brick, ceramic, plastic, metal and glass).
TPHCWG, BTEX, MTBE and SOM.	4	Petroleum hydrocarbon suite to confirm the absence of hydrocarbons from the former Rochdale Road Gas Works.
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM, asbestos screen and Waste Acceptance Criteria (WAC).	1	Although no evidence of contamination identified, detailed suite undertaken to confirm the absence of contamination and to support waste classification.

Table 3-2: Summary of Soil Testing.

Notes:

If asbestos present during screen identification and quantification will be undertaken.

Metal/metalloids=arsenic, cadmium, chromium, (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc, and boron; TPHCWG=carbon banded and aromatic/aliphatic split petroleum hydrocarbons; PAH=polycyclic aromatic hydrocarbons, BTEX=benzene, toluene, ethylbenzene, and xylenes; MTBE=Methyl tert-butyl ether.

3.3.2. Soil Sampling (Geotechnical)

Soil samples taken during the investigation were collected in tubs, bulk bags and sealed U100 tubes for in-house testing, Murray Rix Laboratories and DETS for geotechnical testing.

Further details are given in the laboratory report presented in Appendix D. Table 3-3 shows the geotechnical testing undertaken.

Testing	No. Samples
Unconfined Compressive Strength (UCS) testing	4
Point Load Tests	51
Atterberg Limits (plasticity testing)	3
Single Stage Triaxial	2
BRE Suite Short	7

Table 3-3: Summary of Geotechnical Testing Undertaken.

3.3.3. Water Sampling

Groundwater sampling was not carried out as part of this investigation.

No groundwater was encountered during the investigation and no significant contamination sources were identified within the soils, therefore no groundwater sampling was undertaken.

3.4. In-situ Testing

3.4.1. Geotechnical Testing

In-situ geotechnical tests were performed in the boreholes to further characterise the sub-soil conditions. The following tests were undertaken:

- Standard Penetration Tests (SPTs) were performed in the window sample boreholes and cable percussion boreholes at approximately 1m intervals within the first 5m, alternate SPT and U100 were undertaken to 12.50mbgl. SPT's were undertaken every 1.50mbgl from 12.50mbgl to 27.00mbgl.
- Pocket penetrometer tests (giving undrained shear strength) were performed in the window sample boreholes within cohesive strata.
- Continuous SPT's undertaken within WS101 from 3.00mbgl to 4.90mbgl due to borehole instability.

The results are provided within Appendix B/C.

3.4.2. Falling Head Tests

LKC undertook falling head tests in WS101, WS102 and WS103 to assess the permeability of the ground. The tests were carried out in general accordance with guidance given in BS5930⁷ and BS22282⁸.

The tests were carried out in cased window sample boreholes during drilling work.

The results are presented in Appendix F.

3.5. Gas Monitoring

Six gas monitoring visits have been undertaken in all installed boreholes.

The typical / idealised monitoring period and frequency is in line with C665⁹ for a very low gasing potential of a source and high sensitivity of development (residential with gardens).

Monitoring was undertaken using a Geotechnical Instruments GA5000 in accordance with the monitoring protocol outlined in CIRIA C665¹⁰ (flow rate measured first). The monitoring was undertaken over a range of weather conditions (including low and falling barometric pressure and heavy rain) to demonstrate worst-case conditions.

The gas monitoring results are reproduced in full in Appendix E.

4. Ground Conditions

4.1. Geology

The ground conditions beneath the site are summarised below. Logs are provided in Appendix B.

4.1.1. Made Ground

Made ground was recorded in all boreholes to depths of 0.05-2.50mbgl. The made ground generally comprised very gravelly slightly silty sand with anthropogenic material such as, brick, clinker, ceramic, metal, glass, ash, plastic.

Made ground clay was recorded in WS101 and BH103 only, comprising gravelly slightly sandy silty clay with anthropogenic material such as, brick, coal and ceramic to a depth of 4.00-4.94mbgl. WS101 assumed to a depth of 4.94 due to SPT-C undertaken.

Made ground within boreholes WS104-WS106 was significantly different to the boreholes undertaken within the carpark area. Anecdotal evidence suggests that the made ground material comprised crushed fill material, this was confirmed by window sample boreholes and comprised very sandy gravel with anthropogenic material such as, brick, slate, coal, glass, ash clinker and concrete.

4.1.2. Natural Strata

Superficial strata comprised stiff to very stiff gravelly sandy silty clay with rare coal fragments, recorded to depths of 21.00mbgl.

Possible sandstone boulder encountered at 21.00 – 21.50mbgl.

Horizon of clay recorded to a depth of 23.00mbgl with cobly gravelly slightly silty SAND recorded to 26.50mbgl.

Slightly weathered sandstone bedrock was encountered from 26.50-37.00mbgl.

4.1.3. Contamination

There was no visual / olfactory evidence of hydrocarbons or volatile contaminants in any locations. The PID recorded a maximum of 0.2ppm TVOC in the samples.

4.2. Groundwater

4.2.1. Groundwater Levels

No groundwater strikes were recorded, unknown groundwater strike during rotary core drilling due to water flush used.

4.2.2. Contamination

No evidence of contamination was identified in the groundwater during investigation work or monitoring. No free phase hydrocarbons were detected.

4.3. Permeability Tests

4.3.1. *Falling Head Tests*

The results of the falling head tests are presented in Appendix G.

BS5930¹¹ indicates that if 'H₀' is taken as the groundwater 'Head' above baseline conditions following the addition of water at the start of the permeability test; and 'H' is the measured groundwater 'Head' above baseline conditions at any given time during the test, then the time taken to reach a head ratio (H/H₀) of 0.37 is used to calculate the permeability of the soils.

Permeability testing was undertaken in WS102 and WS103 and both tests failed suggesting soils are impermeable.

5. Geotechnical Assessment

5.1. Proposed Development

It is understood that the proposed development will comprise erection of a 17 storey residential apartment building (Use Class C3 (a), with associated access, amenity, landscaping, public realm, infrastructure and other associated works. Demolition of existing vacant building on site, comprising of ground floor retail and a first floor apartment. Details of the proposed loadings are not known.

The finished ground levels have not been provided and it is therefore anticipated that they will not vary significantly from current levels. However, should the development proposals or finished levels be altered then the comments/recommendations in this section may require revising.

The depths of any underground engineering works (sewers etc.) are unknown and therefore have not been considered in the following assessment. Any such works should be designed so as not to influence, or compromise, proposed or existing foundations or ground stability.

Given the nature of the proposed development the structure meets the criteria of Geotechnical Category 2 of Eurocode 7¹².

5.2. Summary of Ground Conditions

Ground conditions identified at the site are detailed in Section 4.1 and typically comprises made ground to proven depths of 2.30mbgl (WS102) and 4.00mbgl (CP103). The made ground was not proven in WS101 (>4.93mbgl), WS104 (>0.40m), WS105 (>1.58) and WS106 (>1.65mbgl). Natural strata comprises stiff becoming very stiff variably sandy gravelly CLAY (Glacial Till) to 23.00mbgl over very dense gravelly slightly silty SAND with cobbles to 26.50mbgl (completely to highly weathered sandstone). Bedrock comprising moderately strong Sandstone (Chester Formation) was recorded from 26.50mbgl to a maximum proven depth of 37.50mbgl.

5.3. Site Preparation

The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works¹³. This should include:

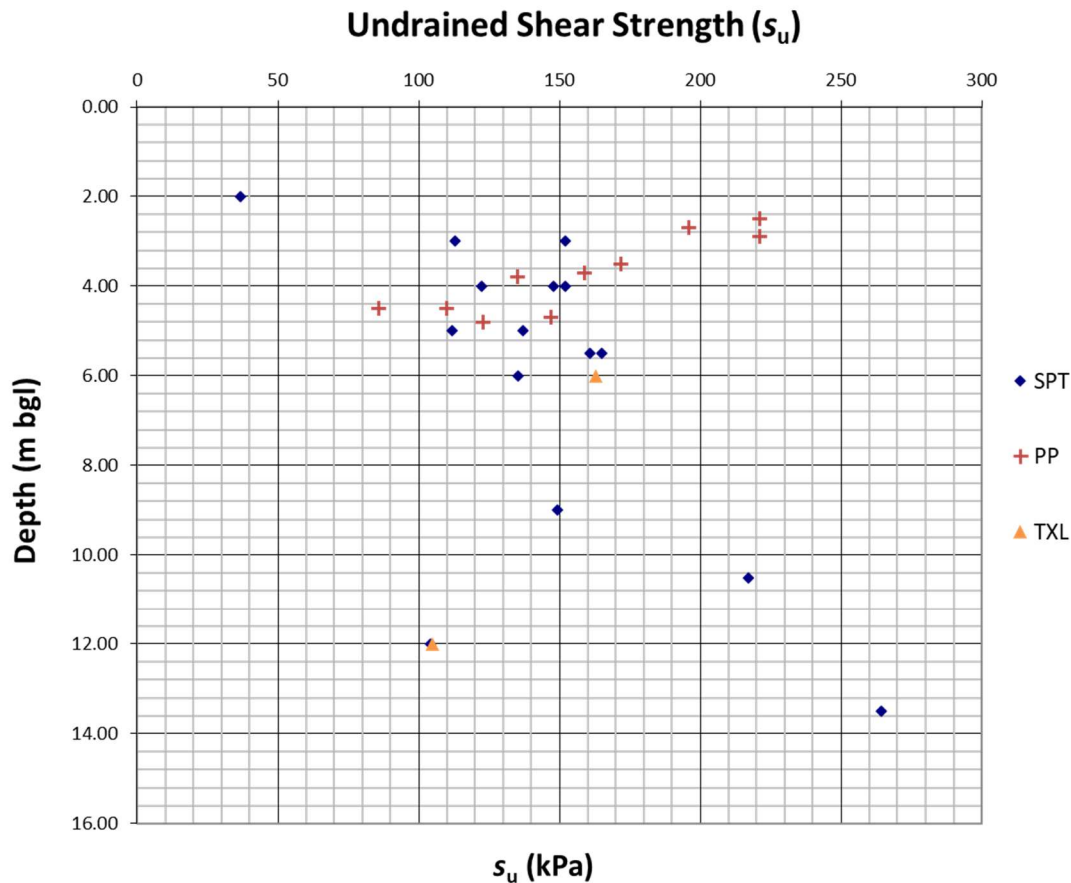
- Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill; and,
- Buried structures and old foundations have been encountered on site. These should be excavated from below the proposed development footprint with the resulting void backfilled.

The near surface soils may potentially be disturbed by weathering and site traffic. Precautions should be taken to avoid this, as excessive disturbance may result in more onerous floor slab design, road cap thickness and increased amount of site disposal etc. Based on site observations the near surface soils may require at least some treatment or reinforcing to allow safe movement of construction plant and labour. A working platform will be required for piling plant.

5.4. Foundation Conditions and Bearing Capacity

5.4.1. General

The natural cohesive material has been assessed using in-situ testing by SPT, and Pocket Penetrometer (PP) along with results of single stage undrained laboratory Triaxial (TXL) tests, to obtain the undrained shear strength (s_u) of the material. The results of the testing have been plotted against depth and is shown in Graph 5-1.



Graph 5-1: Summary of S_u Vs. Depth from In-Situ SPT, PP and laboratory TXL Testing.

Graph 5-1 demonstrates that the strength of the cohesive deposits beneath the made ground ranges in strength, typically stiff and very stiff returning s_u of between 86kPa and 196kPa to a depth of 9mbgl (disregarding the outliers at 2.00m bgl (36.54kPa) and 2.50-2.90mbgl (221kPa)). These results return an average of 141kPa.

All SPTs within the cable percussive borehole below 15mbgl recorded refusal ($N > 50$) which when extrapolating the results return an s_u of > 800 kPa.

A representative s_u of 140kPa is assigned to the cohesive material from a depth of c. 3mbgl for the natural superficial deposits.

5.4.2. Plasticity

Clay samples were subjected to Atterberg Limits (plasticity) and Moisture Content testing. Results are provided in Appendix D.

The clay is classified as medium plasticity.

The modified plasticity index as detailed in Chapter 4.2-D5 of the NHBC standards (modified plasticity index = plasticity index x % less than 425 μ m sieve / 100%) characterises the clay as having a low volume change potential.

5.5. Foundation

The proposed structure will comprise a multistorey residential apartment block and it is anticipated that significant loads will be imposed by the structure when constructed. It is considered that a piled foundation solution will be required to support the structure.

5.5.1. Piled Foundations

Bored piles are recommended due to the presence of infrastructure and historic buildings in the local area that could be affected by vibrations, should driven piles be used. However, arisings from bored piles will have to be disposed of and are likely to be contaminated.

It is recommended that the present hard standing and made ground is first removed down to at least 0.3mbgl and replaced with a suitably compacted material to allow safe deployment of the piling rig. Any obstructions, such as old foundations, should be grubbed out at the same time to not interfere with the bored piles. It is recommended that the emplaced fill is of a granular type and is tested and rolled in line with Specification For Highways Works Series 600¹⁴. Plate Load and CBR Tests should be used to ensure the working platform is suitable for rig loadings. It may be possible to crush and reuse hardstanding, or excavate the existing made ground, riddle, and sort it to remove any unsuitable deleterious materials.

Static load tests should be undertaken on the first few piles installed to confirm the pile design. Shaft friction in fine grained soils in generally take as no more than 100kN/m², unless higher values can be proven either using pile testing, or through experience in similar ground conditions¹⁵. Negative skin friction imposed on the piles by the made ground needs to be considered.

Dynamic load tests may also be recommended to ensure the concrete has cured well and that there is no bulging or thinning of the pile shaft once it has been drilled.

Casing is required while drilling the piles through the made ground due to the presence of granular material (sand). This will help minimise ground disturbance and prevent collapse into the borehole causing areas of weakness.

Due to the deep made ground (c. >4.84m) with potential for obstructions, and the presence of granular material in the made ground, bored piles are recommended over the use of Continuous Flight Auger. This should be discussed with a piling contractor who may feel, from previous experience with similar ground in the local area and the information available, the CFA could be suitable.

For preliminary purposes the following initial pile carrying capacities have been calculated. When undertaking these preliminary calculations, the following parameters have been used:

- Modelling based on assumed strata of made ground to 4.00mbgl, natural clay to 23.00mbgl.
- Groundwater not recorded in any of the exploratory holes during the siteworks or subsequent monitoring.
- The natural clay is predominately stiff to very stiff so assumed to be 19.00kN/m³.
- Average undrained shear strength value of 141kPa within the clay (conservative Nc value of 9).
- Adhesion Factor of 0.45 for a bored pile.
- Global Factor of Safety of 3.
- Assuming no shaft friction in the made ground.
- This does not consider the potential for negative skin friction due to settlement of the made ground.
- Settlement of pile has not been considered.

Depth (mbgl)	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
8	132	224	535
12	227	368	526
16	232	511	718
20	419	655	909

Table 5-1: Preliminary Pile Carrying Capacity.

The above examples are not intended to constitute any form of recommendation regarding pile size or type, but merely to illustrate the use of ground coefficients for combination of friction and end bearing piles within the cohesive strata. Should piles be end bearing, socketed into the sandstone bedrock then greater loads can be supported. Results of Unconfined Compressive Strength (UCS) tests on the sandstone returned values of between 8.0 to 9.9MN/m², a conservative UCS of 8MN/m² is applied to the sandstone.

Should greater loadings be anticipated then socketing the piles into bedrock using larger diameter piles will allow greater loads to be carried. Preliminary calculations for a 30m deep pile, socketed into the sandstone from 26.50mbgl, using a s_u of 141kPa for the clay strata and a UCS of 8MPa for the sandstone, would give the pile carrying capacities shown in Table 5-2 below:

Depth (mbgl)	Pile Carrying Capacity (kN)	
	600mm dia	750mm dia
30	8,400	13,000

Table 5-2: Preliminary Pile Carrying Capacity for larger diameter piles socketed into sandstone.

The above is based on a single pile only and not a pile group. Pile design should be undertaken by a specialist contractor to allow them to reduce the Factor or Safety based on their extensive pile testing data and for the design of appropriate piling scheme.

The potential for negative skin friction must also be considered due to made ground being recorded in excess of 4.94m at the location of WS101.

Should a piled foundation solution be the preferred option, then warranty providers such as the NHBC or LABC, may require further information on ground conditions to a minimum of 5m below the base of the pile.

5.6. Ground Floor Slabs

During the investigation, three exploratory holes were completed in the southern section of the footprint of the proposed development. No voids or organic materials were recorded in these exploratory holes. It is recommended that further exploratory holes are undertaken beneath the footprint of the proposed development in the central and northern areas and if no voids or organic materials are encountered then it is recommended to excavate to formation level and replacing with suitable compacted granular material to allow a ground bearing floor slab to be utilised. The granular material should be placed and compacted in line with a suitable earthworks specification, such as SHW 600, with confirmatory Plate Load Testing to ensure that the material is compacted to provide a suitable CBR value (minimum 5%).

5.7. Pavement Construction

Untreated made ground is considered unsuitable as a sub-grade due to its potential variability and potentially low strength/high compressibility. It should be removed to a depth of 0.5m below formation level and sorted to remove any unsuitable or deleterious materials. The sub formation should be rolled, and suitable excavated material can then be replaced, up to formation level, in fully compacted thin layers. Any deficit should be made up with suitable imported fill compacted as above. Following this treatment an overall design CBR of 2-5% should be available, although this will require confirmation through in-situ CBR tests.

Based on the modified plasticity index the soils may be frost susceptible. Frost action can cause differential heaving, surface roughness and cracking, blocked drainage, and a reduction in Bearing Capacity during thaw periods. In areas of proposed roads and car parking it may be necessary to remove the frost susceptible soils and replace with non-frost susceptible material to the expected frost depth penetration.

Following excavation, the sub formation should be proof rolled and any soft material inspected and removed.

5.8. Drainage

The presence of substantial depths of made ground across the site may result in settlement. It is therefore recommended that drain runs are designed using steeper gradients and flexible joints to allow for some differential settlement.

5.9. Concrete Durability

Based upon the results of the chemical analyses (Appendix D), subsurface concrete can be designed in accordance with Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with the recommendations provided in BRE Special Digest 1 (2005).

One sample obtained from WS106 at 0.15mbgl returned a high sulphate reading of 546mg/l indicating an increased concrete classification of DS-2, AC-2 but this was an isolated result and when considering the highest 20% of the readings in accordance with BRE SD1, the concrete classification averages out as DS-1, AC-1. All of the samples used in the 20% analysis were obtained from similar depths in similar material.

5.10. Excavations

Site observations indicated that excavations should be feasible in the near surface with normal plant, however obstructions were identified in the near surface including former foundations and former floor slabs (WS104 at 0.30mbgl and WS105 at 1.58mbgl). It is anticipated that any obstructions will be grubbed out during the reduced level dig for the sub structure works.

Due to the variability of the made ground all excavations should be supported or battered back in accordance with guidance contained in CIRIA R97¹⁶.

5.11. Construction Activity and Inspection

The following activities and inspections should be incorporated into the site works:

- Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations and pavement construction.
- Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97¹⁷ utilised.
- De-watering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond.
- Where access to confined spaces is required appropriate mitigation measures should be addressed within the Construction Stage Health and Safety Plan. Particular account should be taken of the gas results.
- The presence of potential contamination and mitigation measures should be addressed as part of the Construction Stage Health and Safety Plan and should include measures to design out the risks, reduce their impact and finally the use of Personnel Protective Equipment (PPE).

5.12. Enabling Works

It is considered that the ground will require preparation to facilitate a developable platform for the first stage of construction works.

As referenced in Section 5.3, obstacles such as foundations, floor slabs, services, basements etc. can be anticipated on site from historical land uses and it is recommended that these are grubbed out as part of a general site turnover to remove obstacles.

The enabling works should also cover activities such as undertaking site preparation works including pre commencement surveys of the site and surrounding areas, preparation of access routes and providing suitable piling mats if required, surveying the site and producing topographical plans on completion of the earthworks, as well as installation of safety signs and security fencing.

6. Generic Risk Assessment

6.1. Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM¹⁸). Information gathered from the risk assessment has been collated in the revised contamination conceptual model in Section 6.6.

6.2. Soil Risk Assessment

6.2.1. Methodology

With regards to the soil risk assessment LKC will use the following hierarchy:

- Category 4 Screening Levels (C4SLs)^{19, 20}.
- LQM Suitable 4 Use Levels (S4ULs)^{21, 22, 23, 24}.

The proposed development is for residential apartments with shared soft landscaping, therefore the assessment criteria for residential without plant uptake has been used.

All criteria have been generated using the CLEA V1.06 model²⁵ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

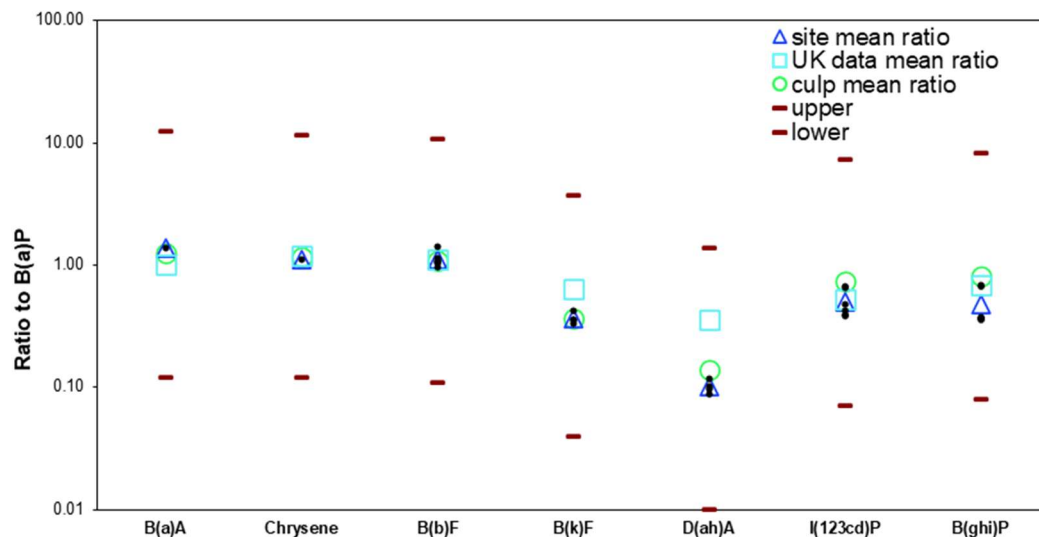
A summary of the generic assessment criteria used in this assessment is provided in Appendix H.

B(a)P as Surrogate Marker

LKC consider the main risk drivers for PAHs are benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P possibly being a carcinogen and most toxic of the PAHs^{26,27} and naphthalene the most volatile and soluble²⁸. The C4SLs indicate B(a)P as a surrogate marker for carcinogenic PAHs, if it falls within appropriate limits, since the risk from other non-carcinogenic PAHs are considered negligible²⁹. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)³⁰ and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

LKC undertook an assessment of the PAH data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et al.*³¹, which was based on coal tar mixtures (>80,000mg/kg of total PAHs) fed in food to mice over a two-year carcinogenicity study.

Graph 6-1 summarises the study site data with respect to how the ratios of carcinogenic PAHs relate to B(a)P, within the confidence limits provided in the HPA document.



Graph 6-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 10 samples (where values were >LOD to allow the calculation of a ratio).

Notes:

B(a)P=Benzo(a)pyrene; D(ah)A=Dibenzo(ah)anthracene; B(a)A=Benzo(a)anthracene; B(b)F=Benzo(b)fluoranthene; B(k)F=Benzo(k)fluoranthene; I(123cd)P=Indeno(123cd)pyrene; B(ghi)P=Benzo(ghi)perylene.

All the data points that could be used to calculate ratios fall inside the upper or lower limits.

Based on this distribution of data LKC considers B(a)P can be used as a surrogate marker for carcinogenic PAHs and the C4SL criteria is suitable for this dataset.

6.2.2. Soil Results Comparison against Assessment Criteria

All analysis sheets are presented in Appendix C. All the data has been compared to relevant assessment criteria and is presented in Appendix I. Elevated results are presented in Table 6-1.

Sample Location / Depth (mbgl)	Contaminant	Criteria, 6%	Total No. of Samples Tested	Sample Result > Criteria
WS104 (0.00-0.40)	Benzo(a)pyrene	5.3	11	5.49
WS105 (0.50-1.20)			11	7.43
WS101 (0.10-0.50)	Lead	310	11	423

Table 6-1: Summary of Elevated Results.

Notes:

All units in mg/kg.

Only results that exceeded assessment criteria have been shown and results from all depths are noted.

Results have been compared to the nearest appropriate SOM for the assessment criteria hierarchy described in Section 6.2.

Asbestos was identified, as detailed in Table 6-2.

Sample Location	ID	Type	Total Asbestos (%)
WS104 (0.00-0.40)	Chrysotile and Crocidolite	Fibres bundles	0.003
WS105 (0.50-1.20)	Chrysotile	Fibre bundles	0.002

Table 6-2: Details of Asbestos Identified.

6.2.3. Direct Contact Risk – Pollutant Linkage 1

Elevated Benzo(a)pyrene) has been identified within WS104 and WS105, this is in the area of current compound associated with the construction of adjacent apartment blocks. It is understood that approximately c.8.00m of crushed 'fill' beneath the compound area. The proposed plan shows this area to be shared amenity space with soft landscaping.

The source of the contamination is expected to be the made ground comprising brick, concrete, glass, ash, clinker, coal and metal noted during the site investigation.

Elevated lead has been identified within WS101 to the west of site within the carpark area. The source of the contamination is expected to be the brick, ash, clinker, ceramic, glass, and slate noted in the made ground.

At the concentrations identified, the contaminants are considered to pose a potential risk to future site users (residents) in soft landscaped areas, where made ground may be exposed. The principal pathways are the ingestion pathways (soil and dust) and dermal contact.

The probability of PAH and lead contamination affecting site users is likely. With a medium consequence, the risk is considered to be moderate, and remediation is recommended.

Asbestos

Asbestos (crocidolite and chrysotile) identified in WS104 present as fibre bundles quantified as 0.003%, asbestos (Chrysotile) was identified in WS105 present as fibre bundles quantified as 0.002%. The source of the asbestos is likely to be from c.8.00m of crushed 'fill'.

Asbestos may affect site users in soft landscaping and garden areas in localised areas of the site, via the inhalation of fibres. The probability is considered to be likely. With a medium consequence, the risk as assumed to be moderate, remediation is recommended within the soft landscaped areas.

Additional consideration should also be given to the risk to workers during groundworks and construction. This is discussed further in Section 7.3.

6.2.4. Risk from Inhalation of Vapours – Pollutant Linkage 2

No elevations:

No visual / olfactory evidence of volatile contaminants was identified during the investigation. The PID did not detect any significant TVOCs. Confirmatory soil analysis did not detect any VOCs / SVOCs above assessment criteria.

LKC therefore consider the probability of volatile contaminants affecting site users as unlikely. The consequence is expected to be medium, giving a low risk and no remediation is required.

6.3. Gas Risk Assessment

6no. gas monitoring visits have been undertaken on the study site. Full gas monitoring results are presented in Appendix F and summarised in Table 6-3. Following guidance set out in CIRIA C665³² and BS8485³³ peak methane and carbon dioxide concentrations have been used in the gas risk assessment. In addition, and as per guidance, flow rates were measured first.

Borehole Ref.	Visit	Peak CH ₄ (%v/v)	Peak CO ₂ (%v/v)	Min O ₂ (%v/v)	Flow (l/h)	Groundwater Level (mbgl)	Pressure (mb)	Prev 24hr Pressure Trend
WS101	1	<0.1	0.5	19.6	<0.1	Dry	1003	Falling
	2	<0.1	0.6	19.5	<0.1	Dry	1015	Falling
	3	<0.1	0.6	19.2	<0.1	Dry	1008	Falling
	4	<0.1	0.7	18.1	<0.1	Dry	997	Falling
	5	<0.1	0.6	19.5	<0.1	Dry	1006	Rising
	6	<0.1	0.7	20.1	<0.1	Dry	1020	Falling
WS102	1	<0.1	0.9	19.1	<0.1	Dry	1004	Falling
	2	<0.1	0.6	18.9	<0.1	Dry	1015	Falling
	3	<0.1	1.1	18.6	<0.1	Dry	1008	Falling
	4	<0.1	0.2	19.9	<0.1	Dry	998	Falling
	5	<0.1	2.0	17.0	<0.1	Dry	1006	Rising
	6	<0.1	1.5	18.9	<0.1	Dry	1021	Falling
WS103	1	<0.1	2.2	17.8	<0.1	Dry	1005	Falling
	2	<0.1	2.5	16.2	<0.1	Dry	1013	Falling
	3	<0.1	2.2	15.8	<0.1	Dry	1008	Falling
	4	<0.1	1.8	18.5	<0.1	Dry	999	Falling
	5	<0.1	1.3	18.9	<0.1	Dry	1005	Rising
	6	<0.1	1.1	18.3	<0.1	Dry	1021	Falling

Table 6-3: Gas Monitoring Assessment.

No elevated carbon dioxide (above 5%v/v) or methane (above 1%v/v) has been recorded on any of the six gas monitoring visits with highest carbon dioxide reading recorded within WS103 at 2.5%v/v and methane reading recorded at <0.1%v/v. Flow rates were recorded as <0.1L/hr

Carbon monoxide was recorded in all boreholes (ref: WS101-WS103). The maximum concentration was recorded as 22ppm (WS102). This did not appear to correlate with significant oxygen depletion in any of these locations.

Only workplace exposure limits defined by the HSE are available for carbon monoxide and are not fully applicable to a residential setting. A Short-Term Exposure Limit of 200ppm (15-minute period) and Long-Term Exposure Limit of 30ppm have been defined (8-hour period).

Carbon monoxide is not expected to pose a significant risk to the proposed site receptors.

Gas Screening Value

In accordance with CIRIA C665³⁴, a Gas Screening Value (GSV) may be calculated. Assuming worst-case scenario maximum gas concentrations and flow for each borehole have been used to calculate the GSV. The GSV can be used to determine the characteristic situation (CS).

Table 6-4 shows the maximum GSV for each borehole and the appropriate characteristic situation (based on GSV only). An overall site assessment (WS101-WS103) has also been included (worst case values across the site).

Boreholes	Max GSV (l/hr)	CS
WS101	0.0002	CS1
WS102	0.0018	CS1
WS103	0.0025	CS1
WS101-103	0.0001 (CH ₄) 0.0025 (CO ₂)	CS1

Table 6-4: Summary of Worst-Case Gas Screening Values (GSV).

Notes:

CS = Characteristic Situation.

The gas can potentially migrate into buildings, accumulate in confined spaces, and cause explosions (methane) and asphyxiation. LKC consider the probability of carbon dioxide and methane gas affecting site users and buildings as unlikely. Assuming a severe consequence, there is a moderate / low risk. Given the minimal gas concentrations and flow, a low risk is considered most appropriate, and no remediation is required.

Given the risk to radon was <1% of homes above action level and no protective measures are necessary no further consideration is required.

6.4. Controlled Water Assessment

The PRA identified a moderate / low risk with respect to controlled waters as no significant source of mobile contamination was identified during the previous site investigation and groundwater sampling was only recommended if a significant source of contamination was identified. Furthermore, although a Principal Aquifer is present below the site, no abstractions have been identified within influencing distance and the site is not located in a Source Protection Zone.

No evidence of significant mobile contamination was identified on the site. Although elevated metals and PAHs were identified within the soils, the source is anticipated to be ash and clinker noted within the made ground. Contamination associated with ash and clinker is not anticipated to be mobile due to the residual crystalline nature of the matrix.

The site investigation did not identify any significant sources of likely mobile contamination within the soils. This confirms an unlikely probability of onsite contamination affecting controlled waters. With a medium consequence the risk is anticipated to be low, and no remediation is required.

6.5. Potable Water Supply (Pollutant Linkage 5)

Soil results were compared to United Utilities (UU) guidelines for the selection of potable water pipes in land potentially affected by contamination. Only contaminants of concern, based on the preliminary conceptual model and ground conditions encountered, were analysed.

The probability of organic contaminants affecting potable water pipes is unlikely. Given the consequence is considered to be medium, the risk (Pollutant Linkage 5) is anticipated to be low risk and no remediation is likely to be required.

Once details of the pipeline location and depths are known a UU Water Pipe Risk Assessment in line with the utility provider should be undertaken to confirm the most appropriate pipework for potable water.

6.6. Revised Contamination Conceptual Model

The preliminary contamination conceptual model (Table 2-3) has been revised following the risk assessments undertaken in Sections 6.1-6.4. The revised contamination conceptual model follows the same methodology and guidance used in the preliminary contamination conceptual model. The risk matrix is provided in Appendix A.

The revised contamination conceptual model is presented in Table 6 5.

Where a very low risk or low risk is identified no specific remediation is required.

Where there is a moderate / low risk is identified, some form of remediation may be required depending on the pollutant linkage, the type and concentration of contaminants present and the proposed development.

Where LKC identifies a moderate or higher risk, remediation or further investigation work is recommended.

PL	Contaminants of Concern (source)	Pathway	Receptor	Probability	Consequence	Risk	Assessment and Recommendations
1	PAHs, Heavy Metals, Asbestos (Made Ground, Gas Works, Depots, Demolished Buildings)	Dermal contact. Inhalation of soil, fibres, and dust.	Future site users. Offsite receptors.	Likely	Medium	Moderate	Remediation recommended
	Petroleum Hydrocarbons, creosote, solvents, phenols (Gas Works, Depots)	Ingestion of soils, dust, soil Windblown dust.		Unlikely		Low	No remediation recommended.
2	Petroleum Hydrocarbons, creosote, solvents, phenols, naphthalene (Deep made ground, Gas Works, Depot)	Inhalation of vapours. Migration via permeable strata and preferential pathways.	Future site users. Offsite receptors.	Unlikely	Medium	Low	No remediation recommended.
3	Hazardous gas: methane, carbon dioxide (deep made ground, possible infilled basements)	Migration via permeable strata and preferential pathways. Inhalation of gas. Explosion in confined spaces.	Future site users. Buildings. Offsite receptors.	Unlikely	Severe	Moderate / Low	No remediation recommended. No gas protection required. No radon protection required.
4	PAHs, metals, Petroleum hydrocarbons (gas works, deep made ground, depots)	Migration via permeable strata and preferential pathways. Perched waters migration.	Groundwater	Unlikely	Medium	Low	No remediation recommended.
5	Naphthalene, petroleum hydrocarbons, organic contaminants (gas works, deep made ground, depots)	Permeation of pipes. Ingestion of tainted water supply.	Future site users. Water pipes.	Unlikely	Medium	Low	No remediation recommended. UU risk assessment recommended.

Table 6-3: Revised Contamination Conceptual Model.

7. Summary Conclusions

7.1. Ground Conditions

Ground conditions are summarised in Table 7-1 below.

Made Ground	The made ground within car park area generally comprised very gravelly slightly silty sand with anthropogenic material such as, brick, clinker, ceramic, metal, glass, ash, plastic. Made ground material within the compound was crushed fill material and comprised very sandy gravel with anthropogenic material such as, brick, slate, coal, glass, ash clinker and concrete.
Superficial	Superficial strata comprised stiff to very stiff gravelly sandy silty clay with rare coal fragments, recorded to depths of 21.00mbgl. Possible sandstone boulder encountered at 21.00 – 21.50mbgl. Horizon of clay recorded to a depth of 23.00mbgl with cobly gravelly slightly slightly silty SAND recorded to 26.50mbgl.
Bedrock	Slightly weathered sandstone bedrock was encountered from 26.50-37.00mbgl.
Groundwater	None recorded.
Obstructions	None recorded.
Permeability	Not permeable.
Other Observations	None recorded.

Table 7-1: Summary of Ground Conditions.

7.2. Geotechnical

Geotechnical observations and conclusions are contained in Table 7-2 below, more detailed discussions are contained within Section 5.

Undrained Shear Strength and Allowable Bearing Pressure	Natural cohesive deposits will return an undrained shear strength (s_u) of 141kPa at depths of between 4.00m and 9.00mbgl Sandstone bedrock will offer an Unconfined Compressive Strength of 8MN/m².
Anticipated Foundation Type	A piled foundation solution is considered the most economic and reliable option for the development.
Shallow Groundwater	Shallow groundwater was not recorded during the site works.
Concrete Requirements	Based on BRE Digest 2005 ³⁵ – DS-1 AC-1 recommended.
Services	Services – consideration to the presence of services running through the site. Services may need to be re-routed.
Temporary support of excavation	Will be required due to the nature and depth of the made ground encountered.

Table 7-2: Geotechnical Conclusions Table.

7.3. Contamination Assessment

A revised contamination conceptual model has been produced by LKC which is summarised in Table 7-3 below (more detailed model provided in Section 6).

PL	Contaminant	Risk	Recommendations
1	PAHs, Metals, Asbestos	Moderate	Remediation required.
	Petroleum hydrocarbons	Low	No remediation required.
2	Petroleum Hydrocarbons, creosote, solvents, phenols, naphthalene	Low	No remediation required.
3	Carbon dioxide and methane. Radon	Moderate / Low	No gas protection measures required. No radon protection measures required.
4	Groundwater (mobile contaminants)	Low	No remediation required.
5	Organic contaminants.	Low	Utility provider risk assessment to be completed. No remediation recommended.

Table 7-3: Summary Risk Table.

PL=Pollutant Linkage, see Table 6-5 for details.

8. Outline Remediation Strategy

The recommendations/requirements provided below are considered appropriate for the site based on the site investigation work undertaken. LKC should stress that no remediation, enabling works or designing works should take place until Regulatory approval has been obtained.

The local authority may require a standalone Build-Phase Remediation Strategy and Verification Plan in accordance with LCRM Stage 3 remediation and verification³⁶. This should be produced once details of design, contractors and installation are known.

A summary of remediation requirements is included in Table 8-1.

PL	Recommendation
1	Environmental cover system required in soft landscaping and garden areas.
2	No remediation required.
3	Gas protection and radon protection measures not required.
4	No remediation required.
5	Potable water pipe assessment required. No remediation required.

Table 8-1: Remediation Summary.

8.1. Further Work

Additional drilling is required in the area of the existing building site when access comes available. Following demolition of the disused shop in the south of the site, this area will require investigation and update to the risk assessment.

8.2. Remediation and Validation Recommendations

8.2.1. Environmental Cover System (PL1)

In gardens and soft landscaping areas, an environmental cover system will be required and should comprise 450mm in shared soft landscaping. The environmental cover system should be constructed as shown in Plate 8-1.

Either (physical break layer)		Or (geotextile membrane)	
450mm shared landscaping (minimum)	Chemically validated TOPSOIL ¹	450mm shared landscaping (minimum)	Chemically validated TOPSOIL ¹
	Chemically validated SUBSOIL		Chemically validated SUBSOIL GEOTEXTILE MEMBRANE (at base of subsoil)
	100mm (minimum) PHYSICAL BREAK LAYER ²		
Existing MADE GROUND			

Plate 8-1: Typical Environmental Cover System Construction.

Notes:

Hardstood Areas – No Remediation Required.

¹NHBC recommend 100mm minimum topsoil depth.

²Gravel break layer, minimal fines.

Where there are TPOs in influencing distance of environmental cover systems it is likely the arboriculture officer may only allow a 100mm clean cover system over a geotextile membrane.

Validation of environmental cover soils will be required and should include measuring depth using a staff and providing photographic evidence. Photographic evidence of the granular physical break or geotextile layer should also be collected.

Chemical validation of imported soils is required, details are included in Section 8.3.

8.2.2. Potable Water Pipe Remediation (PL5)

It is recommended that a Water Pipeline Assessment³⁷ is undertaken once the location and depth of potable water pipes are known. It is unlikely that barrier pipe will be required.

8.3. Other Considerations

8.3.1. Unexpected Contamination

The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination (including asbestos containing material) be encountered at the site, LKC and the Local Authority should be informed, and further assessment of the material may be required.

Impacted soils should be placed on an impermeable surface to await further assessment, treatment, or removal from site (this may be subject to chemical testing to confirm suitable waste facility). The work should be done under the supervision and instruction of an environmental consultant.

To determine that significantly impacted soils have been removed, verification samples will be collected from the base and sides of the excavation. If all impacted ground cannot be removed and contamination remains on the ground, further remediation may need to be considered.

Validation requirements should include a log of work undertaken, including photographs and details of any sampling undertaken and validation of any potential additional remedial work.

8.3.2. Grubbing Out of In-ground Structures

Surface hard standing and relict features including former foundations and current foundation can be expected across the site wide. It is recommended that in-ground structures are grubbed out as part of the groundworks.

Hard materials can be used to generate suitable aggregates for re-use on site as part of engineered made ground and/ or construction platforms (subject to geo-environmental testing and client design specifications). Suitable materials derived from grubbing-up should be stored in a location on site, to be agreed with the Engineer, prior to crushing. Any unsuitable materials should be removed to a suitably licensed landfill site.

8.3.3. Re-use of Site Generated Material

To ensure material is compliant with appropriate waste regulations, any site won material re-used onsite should be in recourse to appropriate exemptions. A U1 and T5 exemption should be registered. This will allow the following to be used onsite or brought in for use onsite (refer to guidance for types of waste that can be used³⁸):

- 5,000 tonnes (c. 2,500m³) treatment of crushed concrete / stone.
- 1,000 tonnes (c. 500m³) use of non-hazardous soil.
- 5,000 tonnes (c. 2,500m³) use of clays, sand, gravel, brick, concrete, stone etc.
- 50,000 tonnes (c. 25,000m³) use of bituminous material to be used in roadways.

A Materials Management Plan (MMP) with recourse to the CL:AIRE Code of Practice³⁹ may be required if volumes exceed exemption limits. This must be registered before material movement starts onsite.

If an MMP is required, this needs to be registered by a Qualified Person (QP) and there must be 'certainty of use' for any material re-used onsite or exported to site to ensure there is no 'sham recovery'.

For all the above material will need to be tested at the rate and analytical suites presented in Table 8-2.

8.3.4. Stockpile Management

Stockpiled material should be suitably managed. Material should be segregated by type and source. For example, construction / demolition arisings, site won subsoil. Stockpiles may also require covering to minimise the generation of vapours, fibres, dust, and possible nuisance to adjacent receptors, and to prevent rainwater ingress. The source of each stockpile should be recorded and appropriate validation testing for re-use or potential offsite disposal should be undertaken as required.

8.3.5. Disposal

Material required to be removed from site should be undertaken under an appropriate duty of care and the results of chemical analysis should be provided to a licensed landfill for confirmation of waste classification.

Waste records such as disposal tickets and waste carrier licences should be provided in the Site Completion Report. Photographic evidence of removal and waste removal tickets should be retained and included in the validation report.

8.3.6. Health and Safety Considerations

In working with, removing, or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance⁴⁰) should be adopted by all workers involved with site enabling and construction works.

8.3.7. Piling in Contaminated Land

If a piled foundation is being considered this may provide a preferential pathway for contaminants to the underlying aquifer. A piling risk assessment may be required. Good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency⁴¹.

8.3.8. Asbestos in Soils Management Plan

Due to the presence of asbestos containing material, it is recommended that additional precautions are taken during site clearance, earthworks, and construction in the area of concern. The presence of asbestos in the made ground at the site presents a potential risk of generation of airborne fibres if this material is disturbed, such as for excavations to construct new foundations.

LKC recommend that an appropriate 'Asbestos Management Strategy' is developed in line with CIRIA C733⁴².

8.4. Validation of Imported / Site Won Soils

Chemical validation of all imported and site-won soils to be used on site in soft landscaping areas should be undertaken. Imported soils should be accompanied by a certificate of analysis and source details.

A summary of the required imported material sampling requirements is presented in Table 8-2, based on MCC 'Guidelines to Developer' (2021)⁴³. LKC consider no testing, but proof of provenance is sufficient for natural, virgin, quarried material.

Ideally, the material should be sampled at source to prevent double handling if soil fails, with confirmatory sampling undertaken on importation to site. Where this is not possible then material

imported should be segregated based on source and soil type. Validation samples should be taken prior to placement in gardens / soft landscaping to ensure suitability for use.

Material Type	Source	Suite of Analysis	Sampling Rate (min. 3 per source)		
			Garden	Landscape	Other *
Topsoil / subsoil / Fill material	Greenfield	Suite A	200m ³	200m ³	200m ³
	Remediated / Site-won	Suite A / B dependent upon original SI	100m ³	150m ³	200m ³
	Brownfield / Unknown	Suite B	50m ³	150m ³	200m ³
Quarried Fill	First Generation i.e., quarried sand (subsoil) or stone (break layer)	No testing is required.	Certification of material provenance is required.		

Table 8-2: Sampling Requirements for Imported and Site Won Soils.

Notes:

Suite A - Heavy metals, pH, water soluble sulphate, speciated PAH, soil organic matter and asbestos screen.

Suite B - Heavy metals, pH, water soluble sulphate, speciated PAH, phenol, total and free cyanide, soil organic matter, asbestos screen, banded petroleum hydrocarbons (TPH CWG), BTEX, MTBE.

*Other assumed to be stone / 6F2 / mass fill etc.

Any soil with visual or olfactory evidence of hydrocarbons should be rejected.

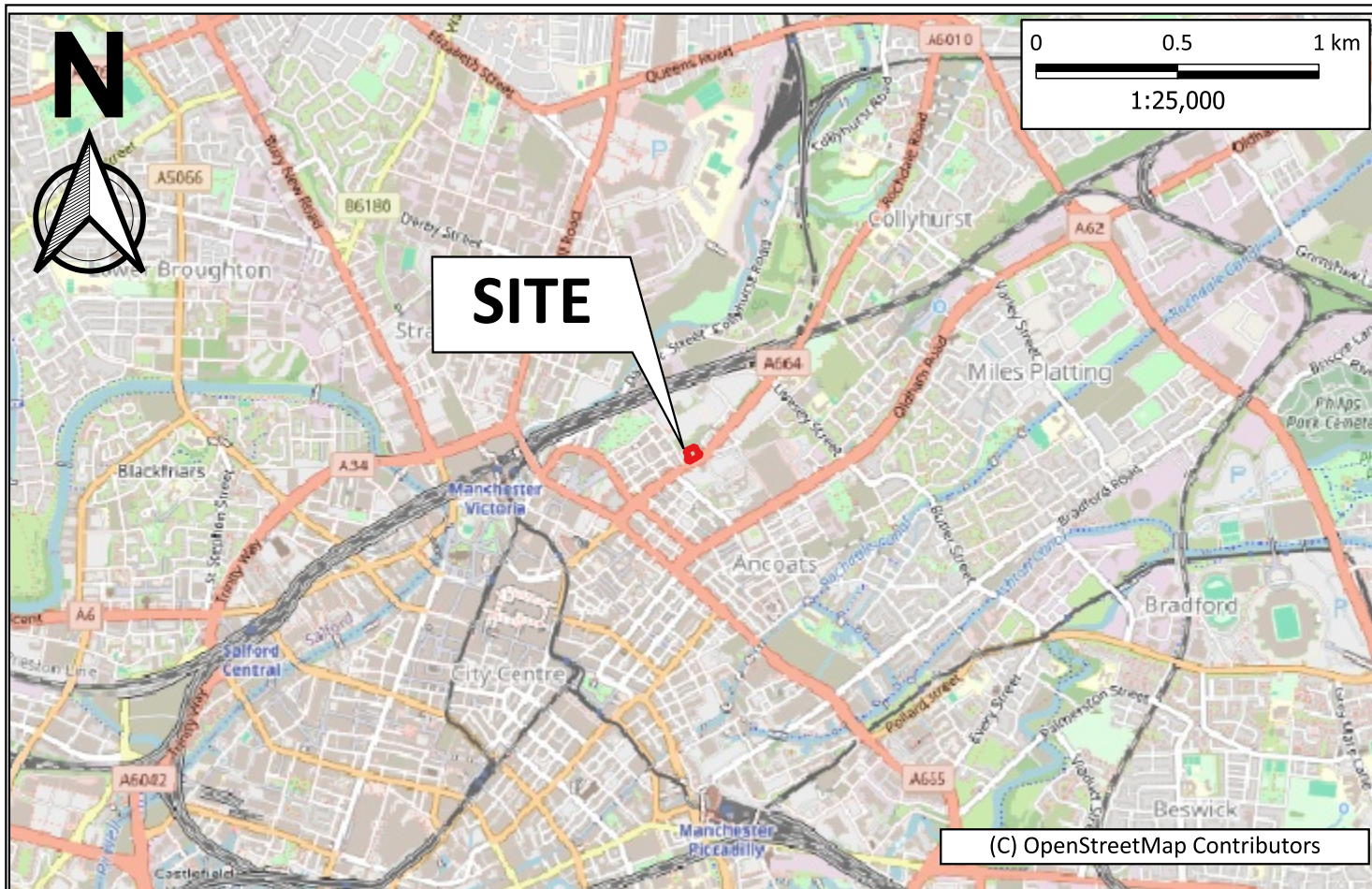
In addition, it should be ensured that the matrix of the topsoil is suitable as a growing medium and no undesirable material is present (in line with BS3882⁴⁴). LKC advise this information is provided by the supplier before material is imported onto site.

Imported material to be used in gardens will be compared against residential with plant uptake criteria (as used in the contamination risk assessment in Section 6).

8.5. Site Completion Report

All remediation and validation work should be documented in a Site Completion Report. The Site Completion Report will allow discharge of relevant planning conditions.

Figures



Client: McGoff Group				Title: Site Location & Boundary Plan			 LK CONSULT	
Site: Rochdale Road, Manchester								
Job No: LKC251336				Scale (see scale bar): 1:25,000 & 1:500 @ A4		Figure: 1		
Drawn By: JW		Checked By: RC		Drawn: Dec 2025				



KEY

Site Boundary

1

 Rochdale Road Phase 1

2

 Marble Arch Inn

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



LK CONSULT

Client:

McGoff Group

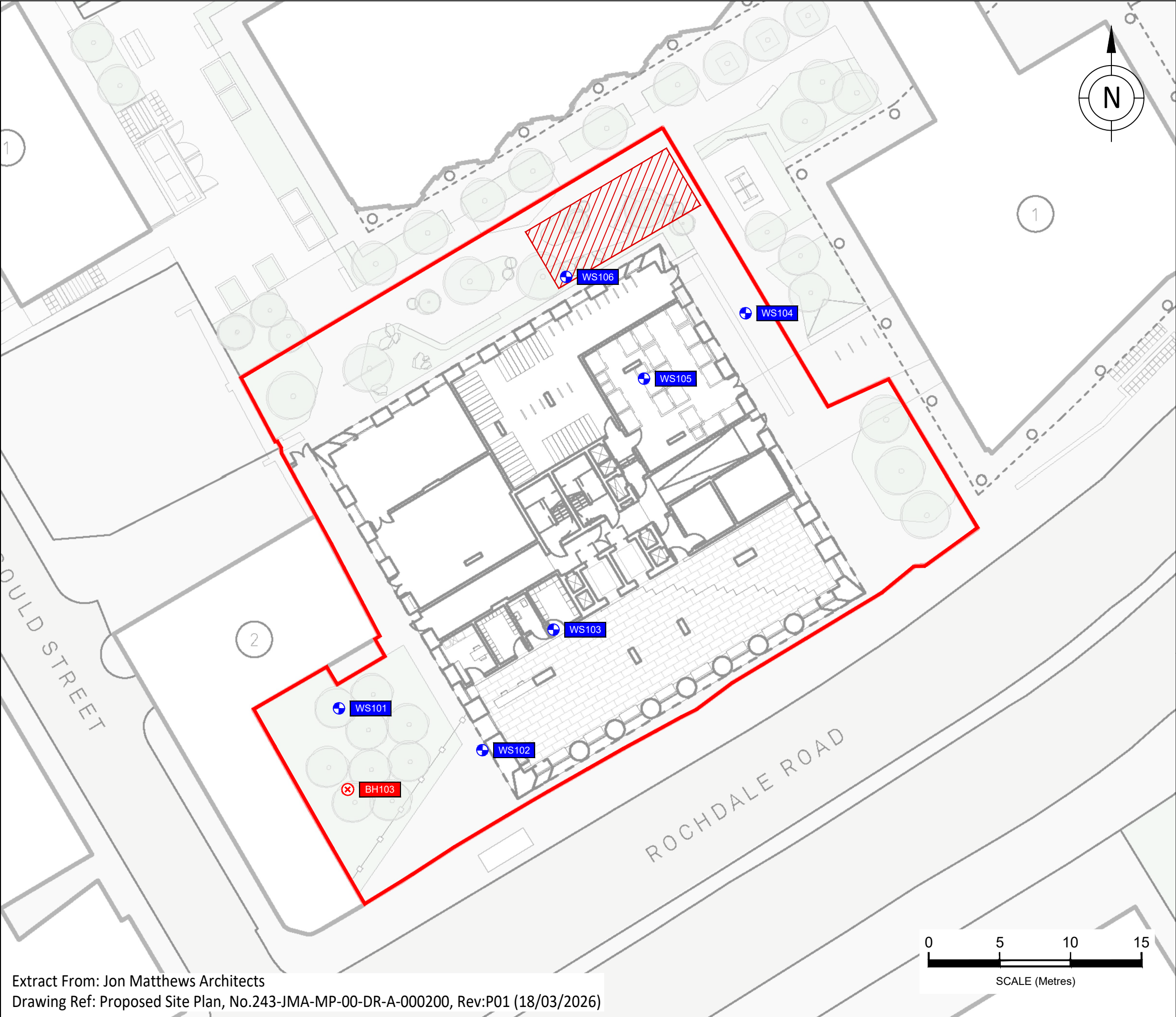
Site:

Rochdale Road, Manchester

Title:

Proposed Development Plan

Job No.:	LKC251336	Scale (See Scale Bar):	See Scale Bar	Figure:	2	Revision:	D
Drawn By:	AC	Checked By:	RC	Drawn:	Mar 2026		



KEY

- Site Boundary
- Window Sample Borehole (WS)
- Cable Percussive Borehole (BH) With Rotary Follow-On
- Approximate Area Required By Cable/Rotary Drilling Rig

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.

Client:

McGoff Group

Site:

Rochdale Road, Manchester

Title:

Sampling Location Plan

Job No.:	LKC251336	Scale (See Scale Bar):	See Scale Bar	Figure:	3	Revision:	E
Drawn By:	AC	Checked By:	RC	Drawn:	Mar 2026		

Appendix A – Risk Matrix

RISK EVALUATION

The method for risk evaluation is a qualitative method of interpreting the output from the risk estimation stage of the assessment, based on CIRIA 552⁴⁵. It involves the classification of the:

- Magnitude of the potential consequence (severity) of the risk occurring (Table A).
- Magnitude of the probability (likelihood) of the risk occurring (Table B).

Consequence (Severity)		
Classification	Definition	Example
Severe	Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution (note: water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/properties. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definition of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	High Concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled waters. Explosion, causing building collapse (can also equate to short term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ('significant harm' as defined in DETR, 2000). Pollution of sensitive water resources (note Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceed generic, or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer (Principal and Secondary). Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures, and services ('significant harm' as defined in DETR, 2000). Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g., foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable damage to buildings, structures, and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

Table A. Classification of Consequence

Probability (Likelihood)	
Classification	Definition
High Likelihood	There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollutant linkage, and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Unlikely	There is a pollutant linkage, but circumstances are such that it is improbable that an event would occur in the very long term.

Table B. Classification of Probability.

These classifications are then compared to indicate the risk presented by each pollutant linkage (Table C). It is important that this classification is only applied where there is a possibility (which can range from high likelihood to unlikely) of a pollutant linkage existing.

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table C. Comparison of Consequence against Probability

Once the risk has been determined the corresponding action can be assessed (Table D).

Risk	Action Required
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not already undertaken) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Table D. Description of the Classification and Likely Action Required.

Where a very low risk is identified no specific remediation is required.

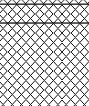
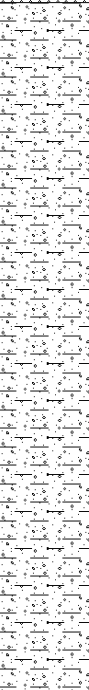
Where a low risk is identified, some form of remediation may be required depending on the pollutant linkage, the type and concentration of contaminants present and the proposed development.

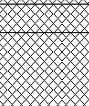
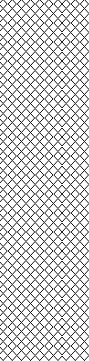
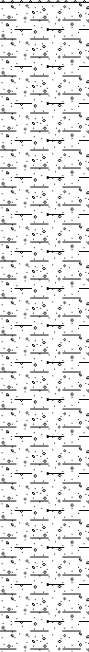
Where there is a moderate/low risk is identified, an assessment will be undertaken to establish what category the pollutant linkage will fall into.

Where LKC identifies a moderate or higher risk, remediation or further investigation work is recommended.

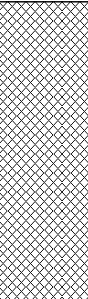
Appendix B – Profile Logs

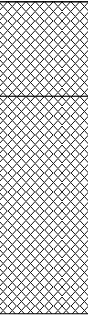
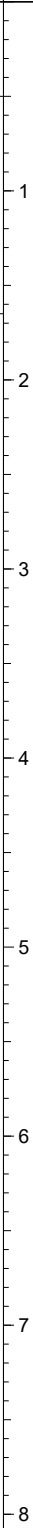
Remarks:
SPT-C undertaken from 3.45mbgl due to instability of borehole.
Borehole refused at 4.94mbgl on assumed very stiff made ground clay.
Borehole dry.

 LK CONSULT		Window Sample Borehole Log				Location Number: WS102		
Project Name: Rochdale Road, Manchester			Client: McGoff Construction Ltd		Date: 24/06/2025			
Project No. : LKC251336			Contractor: D & I Drilling Ltd					
Equipment: Window Sample Rig: Competitor Dart			Level	Logged By EH	Scale 1:40	Page Number Sheet 1 of 1		
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description		Level (m)	Well	
0.15 - 0.50 0.15 - 0.50 0.15 - 0.50	D ES PID=0.2ppm	0.05 0.15		MADE GROUND: TARMACADAM. MADE GROUND: Light brown very gravelly slightly silty SAND with rare brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone (probable sub-base). MADE GROUND: Very loose to loose dark brown very gravelly slightly silty SAND with frequent half brick, brick fragments, rare ceramic fragments, plastic fragments, metal fragments, ash and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.				
1.20 - 1.65 1.20 - 2.00 1.20	ES SPT N=2 (2,2/0,0,1,1)					1		
2.00 - 2.45 2.00	SPT N=8 (3,2/2,2,2,2)					2		
2.30 - 3.00 2.30 - 3.00 2.50	D ES PP=220.7kPa	2.30			Stiff consistency very high to high strength brown with grey mottling gravelly slightly sandy CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. 2.30m to 3.00mbgl - Grey mottling to 3.00mbgl.			
2.90 3.00 - 3.45 3.00	PP=220.7kPa SPT N=35 (6,6/8,8,9,10)					3		
3.50 - 4.00 3.50 3.80	D PP=171.7kPa PP=134.9kPa					4		
4.00 - 4.45 4.00	SPT N=36 (7,7/8,9,9,10)					5		
4.50 - 5.00 4.50 4.80	D PP=110.4kPa PP=122.6kPa					6		
5.00 - 5.45 5.00	SPT N=33 (6,6/7,8,9,9)					7		
5.50 - 5.95 5.50	SPT N=39 (10,8/9,10,10,10)	5.95			End of Borehole at 5.95m	8		
Remarks: Borehole dry and stable. Falling head test completed at 2.00mbgl in made ground for 20 minutes.								

 LK CONSULT		Window Sample Borehole Log				Location Number: WS103		
Project Name: Rochdale Road, Manchester			Client: McGoff Construction Ltd		Date: 24/06/2025			
Project No. : LKC251336			Contractor: D & I Drilling Ltd					
Equipment: Window Sample Rig: Competitor Dart			Level	Logged By EH	Scale 1:40	Page Number Sheet 1 of 1		
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description		Level (m)	Well	
0.20 - 0.80 0.20 - 0.80 0.20 - 0.80	D ES PID=0.3ppm	0.05 0.20		MADE GROUND: TARMACADAM. MADE GROUND: Light brown very gravelly slightly silty SAND with frequent brick fragments and concrete fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone (probable sub-base).. MADE GROUND: Loose to medium dense dark brown very gravelly slightly silty SAND with frequent half brick, brick fragments, rare ceramic fragments, ash and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.	1	1		
1.20 - 1.65 1.20 - 2.00 1.20	ES SPT N=7 (1,0/0,3,2,2)			2.00m to 2.50mbgl - Clayey sand.				2
2.00 - 2.45 2.00 - 2.50 2.00 - 2.50 2.00 - 2.50 2.00 2.50 - 3.00 2.50 - 3.00 2.50 - 3.00 2.70 3.00 - 3.45 3.00	D ES SPT PID=0.0ppm N=14 (3,1/1,2,2,9) D ES PID=0.0ppm PP=196.2kPa SPT N=26 (4,4/5,6,7,8)							Stiff consistency very high to high strength brown with grey mottling gravelly sandy CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone. 2.50m to 3.00mbgl - Grey mottling.
3.50 - 4.00 3.70	D PP=159.4kPa				4.00 - 4.45 4.00	4		
4.00 - 4.45 4.00	SPT N=35 (6,6/8,8,9,10)							
4.50 - 5.00 4.50 4.70	D PP=85.8kPa PP=147.2kPa							
5.00 - 5.45 5.00	SPT N=27 (5,5/6,6,7,8)		5.45 - 5.90 5.50	5				
5.45 - 5.90 5.50	SPT N=40 (8,9/9,10,10,11)							
5.95					End of Borehole at 5.95m	6		
					7			
					8			
Remarks: Borehole dry and stable. Falling head test completed at 2.00mbgl in made ground for 20 minutes.								

		Window Sample Borehole Log				Location Number: WS104				
Project Name: Rochdale Road, Manchester			Client: McGoff Construction Ltd			Date: 27/06/2025				
Project No. : LKC251336			Contractor: D & I Drilling Ltd							
Equipment: Window Sample Rig: Competitor Dart			Level		Logged By EH		Scale 1:40		Page Number Sheet 1 of 1	
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description					Level (m)	
0.00 - 0.40 0.00 - 0.40 0.00 - 0.40	D ES PID=0.0ppm	0.40		MADE GROUND: Brown very sandy GRAVEL with frequent brick fragments, concrete fragments, slate and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.						
				End of Borehole at 0.40m						
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
Remarks: Borehole dry and stable. Borehole refused at 0.40mbgl on concrete.										

		Window Sample Borehole Log				Location Number: WS105					
Project Name: Rochdale Road, Manchester			Client: McGoff Construction Ltd			Date: 27/06/2025					
Project No. : LKC251336			Contractor: D & I Drilling Ltd								
Equipment: Window Sample Rig: Competitor Dart			Level		Logged By EH		Scale 1:40		Page Number Sheet 1 of 1		
Depth (m)		Samples / Tests		Depth (m)	Legend	Stratum Description					Level (m)
0.00 - 0.50 0.00 - 0.50 0.00 - 0.50		D ES PID=0.0ppm				MADE GROUND: Very dense brown very sandy GRAVEL with frequent half brick, brick fragments, concrete fragments, glass fragments, ash, clinker and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.					
0.50 - 1.20 0.50 - 1.20 0.50 - 1.20		D ES PID=0.0ppm				1.10m to 1.20mbgl - Clay inclusion.				1	
1.20 - 1.65 1.20		SPT 50 (8,10/50 for 230mm)		1.58		End of Borehole at 1.58m					
										2	
										3	
										4	
										5	
										6	
										7	
										8	
Remarks: Borehole dry and stable. Borehole refused at 1.58mbgl on concrete.											

		Window Sample Borehole Log			Location Number: WS106	
Project Name: Rochdale Road, Manchester			Client: McGoff Construction Ltd		Date: 27/06/2025	
Project No. : LKC251336			Contractor: D & I Drilling Ltd			
Equipment: Window Sample Rig: Competitor Dart			Level	Logged By EH	Scale 1:40	Page Number Sheet 1 of 1
Depth (m)	Samples / Tests	Depth (m)	Legend	Stratum Description		Level (m)
0.00 - 0.50 0.00 - 0.50 0.00 - 0.50	D ES PID=0.0ppm	0.50		MADE GROUND: Brown very sandy GRAVEL with frequent brick fragments, concrete fragments, ash, clinker, rebar and coal fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.		1
0.50 - 1.20 0.50 - 1.20 0.50 - 1.20	D ES PID=0.0ppm			MADE GROUND: Very dense brown gravelly clayey SAND with frequent brick fragments, concrete fragments, rare coal fragments, ash and clinker. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.		
1.20 - 1.65 1.20	SPT N=50 (8,10/50 for 285mm)			End of Borehole at 1.65m		
		1.65				2
						3
						4
						5
						6
						7
						8
Remarks: Borehole dry and stable. Borehole refused at 1.65mbgl on very stiff made ground clay.						

 LK CONSULT		Cable Percussion and Rotary Core Log					Location Number: BH103				
Project Name: Rochdale Road, Manchester			Client: McGoff Construction Ltd			Date: 24/06/2025					
Project No. : LKC251336			Contractor: VC Drilling Ltd								
Equipment: Cable Percussive Drilling Rig / Shell and Auger Rig			Level	Logged By LGD		Scale 1:40	Page Number Sheet 1 of 6				
Depth (m)	Samples / Tests	Coring			FI	Field Records	Depth (m)	Legend	Stratum Description		Well
		TCR	SCR	RQD							
0.05-0.15 0.05-0.15 0.05-0.15 0.15-0.50 0.15-0.50 0.15-0.50	D ES PID=0.1ppm D ES PID=0.1ppm						0.05 0.15		MADE GROUND: TARMACADAM. MADE GROUND: Light brown very gravelly slightly silty SAND with rare brick fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.		
1.00-2.00 1.00-2.00 1.00-2.00 1.20-1.65 1.20-1.65 1.20	D ES PID=0.0ppm B SPT N=11 (2,2/2,2,3,4)								MADE GROUND: Dark brown very gravelly slightly silty SAND with frequent half brick, brick fragments, rare ash, clinker, slate fragments and ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone.	1	
2.00-2.45 2.00-2.45 2.00	B SPT N=29 (5,6/6,7,8,8)									2	
2.60-3.00 2.60-3.50 2.60-3.50 2.60-3.50 3.00-3.45 3.00	B D ES PID=0.0ppm SPT N=11 (2,3/2,2,3,4)						2.60		MADE GROUND: Firm to stiff consistency dark brown gravelly slightly sandy silty CLAY with occasional brick fragment, rare coal fragments, ceramic fragments. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded comprising sandstone and mudstone.	3	
4.00-4.45 4.00-4.45	U PID=0.0ppm						4.00		Stiff to very stiff consistency dark brown slightly gravelly slightly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to subrounded comprising sandstone and mudstone.	4	
4.50	B										
5.00-5.45 5.00	SPT N=22 (3,4/5,5,6,6)									5	
6.00-6.45	U									6	
6.50	D										
7.00	D									7	
Hole Diameter		Casing Diameter		Chiselling Details			Water Strike Details				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Depth Strike (m)	Time Elapsed (min)	Depth Water (m)		
27.00	94	27.00	94	21.00	21.50	01:00					
27.00	150	27.00	150	26.50	27.00	01:00					
		12.00	200								
Remarks:											
Broke out tarmacadam to 0.05mbgl, hand excavated trial pit to 1.20mbgl, cable percussive to rock head with follow on rotary core to 37.50mbgl.											
Borehole dry and stable.											
NR = No Recovery.											
							Key: FI = Fracture Index TCR = Total Core Recovery SCR = Solid Core Recovery RQD = Rock Quality Designation NR = No Recovery NI = Non-Intact AZCL = Assumed Zone of Core Loss				

 LK CONSULT		Cable Percussion and Rotary Core Log						Location Number: BH103			
Project Name: Rochdale Road, Manchester				Client: McGoff Construction Ltd			Date: 24/06/2025				
Project No. : LKC251336				Contractor: VC Drilling Ltd							
Equipment: Cable Percussive Drilling Rig / Shell and Auger Rig				Level		Logged By LGD		Scale 1:40		Page Number Sheet 2 of 6	
Depth (m)	Samples / Tests	Coring			FI	Field Records	Depth (m)	Legend	Stratum Description		Well
		TCR	SCR	RQD							
7.50-7.95 7.50	SPT N=20 (3,3/4,5,5,6)								Stiff to very stiff consistency dark brown slightly gravelly slightly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to subrounded comprising sandstone and mudstone.	8	
8.50	D										
9.00-9.45	U									9	
9.50	D										
10.00	D									10	
10.50-10.95 10.50	SPT N=29 (3,4/5,5,8,11)									11	
11.50	D										
12.00-12.45	U									12	
12.50	D										
13.00	D									13	
13.50-13.95 13.50-13.95 13.50	B SPT N=33 (4,4/6,6,9,12)										
14.00	D									14	
Hole Diameter		Casing Diameter		Chiselling Details			Water Strike Details				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Depth Strike (m)	Time Elapsed (min)	Depth Water (m)		
27.00	94	27.00	94	21.00	21.50	01:00					
27.00	150	27.00	150	26.50	27.00	01:00					
		12.00	200								
Remarks: Broke out tarmacadam to 0.05mbgl, hand excavated trial pit to 1.20mbgl, cable percussive to rock head with follow on rotary core to 37.50mbgl. Borehole dry and stable. NR = No Recovery.										Key: FI = Fracture Index TCR = Total Core Recovery SCR = Solid Core Recovery RQD = Rock Quality Designation NR = No Recovery NI = Non-Intact AZCL = Assumed Zone of Core Loss	

 LK CONSULT		Cable Percussion and Rotary Core Log						Location Number: BH103			
Project Name: Rochdale Road, Manchester				Client: McGoff Construction Ltd			Date: 24/06/2025				
Project No. : LKC251336				Contractor: VC Drilling Ltd							
Equipment: Cable Percussive Drilling Rig / Shell and Auger Rig				Level		Logged By LGD		Scale 1:40		Page Number Sheet 3 of 6	
Depth (m)	Samples / Tests	Coring			FI	Field Records	Depth (m)	Legend	Stratum Description		Well
		TCR	SCR	RQD							
14.80	D								Stiff to very stiff consistency dark brown slightly gravelly slightly sandy silty CLAY with rare coal fragments. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to subrounded comprising sandstone and mudstone.	15	
15.00-15.45	B										
15.00-15.45	SPT										
15.00	N=37 (8,7/9,9,11,8)										
16.00	D									16	
16.50-16.95	B									17	
16.50-16.95	SPT										
16.50	N=50 (9,9/50 for 275mm)										
17.00	D										
18.00-18.45	B									18	
18.00-18.45	SPT										
18.00	N=28 (5,6/6,7,7,8)										
19.00	D										
19.50-19.95	B									19	
19.50-19.95	SPT										
19.50	50 (8,12/50 for 200mm)										
20.50	D										
21.00-21.45	B						21.00		Very dense dark brown very cobbly bouldery SAND. Sand is fine to coarse. 21.00m to 21.50mbgl - Probable sandstone boulder encountered.	21	
21.00-21.45	SPT						21.60				
21.00	50 (25 for 20mm/50 for 30mm)										
21.50	D										
Hole Diameter		Casing Diameter		Chiselling Details			Water Strike Details				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Depth Strike (m)	Time Elapsed (min)	Depth Water (m)		
27.00	94	27.00	94	21.00	21.50	01:00					
27.00	150	27.00	150	26.50	27.00	01:00					
		12.00	200								
Remarks:											
Broke out tarmacadam to 0.05mbgl, hand excavated trial pit to 1.20mbgl, cable percussive to rock head with follow on rotary core to 37.50mbgl.											
Borehole dry and stable.											
NR = No Recovery.											
							Key: FI = Fracture Index TCR = Total Core Recovery SCR = Solid Core Recovery RQD = Rock Quality Designation NR = No Recovery NI = Non-Intact AZCL = Assumed Zone of Core Loss				

 LK CONSULT		Cable Percussion and Rotary Core Log						Location Number: BH103			
Project Name: Rochdale Road, Manchester				Client: McGoff Construction Ltd			Date: 24/06/2025				
Project No. : LKC251336				Contractor: VC Drilling Ltd							
Equipment: Cable Percussive Drilling Rig / Shell and Auger Rig				Level		Logged By LGD		Scale 1:40		Page Number Sheet 4 of 6	
Depth (m)	Samples / Tests	Coring			FI	Field Records	Depth (m)	Legend	Stratum Description		Well
		TCR	SCR	RQD							
22.50-22.95 22.50-22.95 22.50	B SPT 50 (25 for 20mm/50 for 50mm)								Stiff to very stiff consistency dark brown gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded comprising sandstone and mudstone.	22	
23.00-23.45	B						23.00		Very dense dark brown cobbly gravelly slightly silty SAND. Sand is fine to coarse. Gravel is fine to coarse, subangular to rounded comprising sandstone and mudstone.	23	
24.00-24.45 24.00	B 50 (25 for 30mm/50 for 40mm)									24	
										25	
25.50-25.95 25.50	B 50 (25 for 35mm/50 for 35mm)									26	
26.50 26.50-26.60 26.50	D SPT 50 (25 for 30mm/50 for 40mm)						26.50		Red medium strong to strong slightly weathered SANDSTONE.	27	
27.00-27.10 27.00	SPT 50 (25 for 30mm/50 for 25mm)					Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Sand is fine to medium.				28	
		100	80	67	17						
						Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Sand is fine to medium.					
						Aperture changes to open 30.12 to 30.16mbgl.					
Hole Diameter		Casing Diameter		Chiselling Details			Water Strike Details				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Depth Strike (m)	Time Elapsed (min)	Depth Water (m)		
27.00	94	27.00	94	21.00	21.50	01:00					
27.00	150	27.00	150	26.50	27.00	01:00					
		12.00	200								
Remarks: Broke out tarmacadam to 0.05mbgl, hand excavated trial pit to 1.20mbgl, cable percussive to rock head with follow on rotary core to 37.50mbgl. Borehole dry and stable. NR = No Recovery.							Key: FI = Fracture Index TCR = Total Core Recovery SCR = Solid Core Recovery RQD = Rock Quality Designation NR = No Recovery NI = Non-Intact AZCL = Assumed Zone of Core Loss				

 LK CONSULT		Cable Percussion and Rotary Core Log						Location Number: BH103					
Project Name: Rochdale Road, Manchester				Client: McGoff Construction Ltd			Date: 24/06/2025						
Project No. : LKC251336				Contractor: VC Drilling Ltd									
Equipment: Cable Percussive Drilling Rig / Shell and Auger Rig				Level		Logged By LGD		Scale 1:40		Page Number Sheet 5 of 6			
Depth (m)	Samples / Tests		Coring		FI	Field Records		Depth (m)	Legend	Stratum Description			Well
			TCR	SCR	RQD								
			95	85	71	15	Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Sand is fine to medium. Aperture changes to open 30.12 to 30.16mbgl.			Red medium strong to strong slightly weathered SANDSTONE.	29		
			91	87	67	9	Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Sand is fine to medium.				30		
											31		
			98	94	69	15	Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Sand is fine to medium. Silt infilling at 31.00 to 32.50mbgl.				32		
			100	95	77	12	Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Sand is fine to medium. Silt infilling at 33.75mbgl.				33		
											34		
			100	97	81	18	Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling. Orange staining at 35.00mbgl. Aperture is open at 35.70mbgl.			35			
											36		
Hole Diameter			Casing Diameter			Chiselling Details			Water Strike Details				
Depth Base (m)	Diameter (mm)		Depth Base (m)	Diameter (mm)		Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Depth Strike (m)	Time Elapsed (min)	Depth Water (m)		
27.00	94		27.00	94		21.00	21.50	01:00					
27.00	150		27.00	150		26.50	27.00	01:00					
			12.00	200									
Remarks:										Key: FI = Fracture Index TCR = Total Core Recovery SCR = Solid Core Recovery RQD = Rock Quality Designation NR = No Recovery NI = Non-Intact AZCL = Assumed Zone of Core Loss			
Broke out tarmacadam to 0.05mbgl, hand excavated trial pit to 1.20mbgl, cable percussive to rock head with follow on rotary core to 37.50mbgl. Borehole dry and stable. NR = No Recovery.													

 LK CONSULT		Cable Percussion and Rotary Core Log						Location Number: BH103			
Project Name: Rochdale Road, Manchester				Client: McGoff Construction Ltd			Date: 24/06/2025				
Project No. : LKC251336				Contractor: VC Drilling Ltd							
Equipment: Cable Percussive Drilling Rig / Shell and Auger Rig				Level		Logged By LGD		Scale 1:40		Page Number Sheet 6 of 6	
Depth (m)	Samples / Tests	Coring			FI	Field Records	Depth (m)	Legend	Stratum Description		Well
		TCR	SCR	RQD							
					12	Fractures are horizontal to sub-horizontal serrated rough and planar rough tight to partly open with sand infilling.			Red medium strong to strong slightly weathered SANDSTONE.		
		76	75	62			37.00		No recovery.		37
					NR	No recovery.					
							37.50		End of Borehole at 37.50m		
											38
											39
											40
											41
											42
											43
Hole Diameter		Casing Diameter		Chiselling Details			Water Strike Details				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Depth Strike (m)	Time Elapsed (min)	Depth Water (m)		
27.00	94	27.00	94	21.00	21.50	01:00					
27.00	150	27.00	150	26.50	27.00	01:00					
		12.00	200								
Remarks:											
Broke out tarmacadam to 0.05mbgl, hand excavated trial pit to 1.20mbgl, cable percussive to rock head with follow on rotary core to 37.50mbgl.											
Borehole dry and stable.											
NR = No Recovery.											
							Key: FI = Fracture Index TCR = Total Core Recovery SCR = Solid Core Recovery RQD = Rock Quality Designation NR = No Recovery NI = Non-Intact AZCL = Assumed Zone of Core Loss				

Appendix C – Certificates of Analysis (Soil)

Rosie Cummings
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 25-06133

Site Reference: Rochdale Road, Manchester

Project / Job Ref: LKC251336

Order No: PO-C001508

Sample Receipt Date: 27/06/2025

Sample Scheduled Date: 30/06/2025

Report Issue Number: 1

Reporting Date: 04/07/2025

Authorised by:



Steve Knight
Customer Support Manager

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

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

Soil Analysis Certificate						
DETS Report No: 25-06133	~Date Sampled	24/06/25	24/06/25	24/06/25	24/06/25	24/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	BH103	WS101	WS101	WS101
~Project / Job Ref: LKC251336	~Additional Refs	ES	ES	ES	ES	ES
~Order No: PO-C001508	~Depth (m)	0.05 - 0.15	0.15 - 0.50	0.05 - 0.10	0.10 - 0.50	1.20 - 2.00
Reporting Date: 04/07/2025	DETS Sample No	781246	781247	781248	781249	781250

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025	Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.7		9.0	8.5
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	13		108	28
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01		0.11	0.03
Organic Matter (SOM)	%	< 0.1	MCERTS	1.7	3.2	0.9	8.4
Arsenic (As)	mg/kg	< 2	MCERTS	< 2		< 2	35
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1.1		1	0.9
Chromium (Cr)	mg/kg	< 2	MCERTS	27		13	17
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	9		6	96
Lead (Pb)	mg/kg	< 3	MCERTS	13		14	423
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1	1.5
Nickel (Ni)	mg/kg	< 3	MCERTS	12		7	21
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	10		5	40
Zinc (Zn)	mg/kg	< 3	MCERTS	24		23	241

Soil Analysis Certificate						
DETS Report No: 25-06133	~Date Sampled	24/06/25	24/06/25	24/06/25	24/06/25	24/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	WS101	WS102	WS102	WS102	WS103
~Project / Job Ref: LKC251336	~Additional Refs	ES	ES	ES	ES	ES
~Order No: PO-C001508	~Depth (m)	2.00 - 3.00	0.15 - 0.50	1.20 - 2.00	2.30 - 3.00	0.20 - 0.80
Reporting Date: 04/07/2025	DETS Sample No	781251	781252	781253	781254	781255

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)
Asbestos Screen ⁽⁵⁾	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.4	8.8	8.4
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	46	93	106
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.05	0.09	0.11
Organic Matter (SOM)	%	< 0.1	MCERTS	3.6	3.9	1.7
Arsenic (As)	mg/kg	< 2	MCERTS	16	5	8
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.4	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	21	25	24
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	46	15	27
Lead (Pb)	mg/kg	< 3	MCERTS	127	164	13
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	28	14	33
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	27	12	24
Zinc (Zn)	mg/kg	< 3	MCERTS	77	44	52

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 25-06133	~Date Sampled	24/06/25	24/06/25	24/06/25	24/06/25	24/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	WS101	WS101	WS101	WS102
~Project / Job Ref: LKC251336	~Additional Refs	ES	ES	ES	ES	ES
~Order No: PO-C001508	~Depth (m)	0.05 - 0.15	0.05 - 0.10	0.10 - 0.50	2.00 - 3.00	1.20 - 2.00
Reporting Date: 04/07/2025	DETS Sample No	781246	781248	781249	781251	781253

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.57	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.32	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	5.68	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	0.10	< 0.1	5.27	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.45	< 0.1	3.01	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	0.31	< 0.1	2.45	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.13	< 0.1	2.08	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.79	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	2.19	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.04	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.26	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.11	< 0.1	0.78	< 0.1
**Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	24.4	< 1.6

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 25-06133	~Date Sampled	24/06/25				
LK Consult Limited	~Time Sampled	None Supplied				
~Site Reference: Rochdale Road, Manchester	~TP / BH No	WS102				
~Project / Job Ref: LKC251336	~Additional Refs	ES				
~Order No: PO-C001508	~Depth (m)	2.30 - 3.00				
Reporting Date: 04/07/2025	DETS Sample No	781254				

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1			
**Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6			

Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 25-06133	~Date Sampled	24/06/25	24/06/25	24/06/25	24/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	WS101	WS102	WS103
~Project / Job Ref: LKC251336	~Additional Refs	ES	ES	ES	ES
~Order No: PO-C001508	~Depth (m)	0.15 - 0.50	1.20 - 2.00	0.15 - 0.50	0.20 - 0.80
Reporting Date: 04/07/2025	DETS Sample No	781247	781250	781252	781255

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	3	< 3	< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	24	20	16	36
Aliphatic >C34 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	24	24	< 21	36
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	24	24	< 21	36
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	8	4	< 3	8
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	26	< 10	20	24
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	34	< 21	< 21	32
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	34	< 21	< 21	32
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	58	< 42	< 42	68
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	58	< 42	< 42	68

Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 25-06133	~Date Sampled	24/06/25	24/06/25	24/06/25	24/06/25	
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	WS101	WS102	WS103	
~Project / Job Ref: LKC251336	~Additional Refs	ES	ES	ES	ES	
~Order No: PO-C001508	~Depth (m)	0.15 - 0.50	1.20 - 2.00	0.15 - 0.50	0.20 - 0.80	
Reporting Date: 04/07/2025	DETS Sample No	781247	781250	781252	781255	

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

Soil Analysis Certificate - Sample Descriptions

DETS Report No: 25-06133

LK Consult Limited

~Site Reference: Rochdale Road, Manchester

~Project / Job Ref: LKC251336

~Order No: PO-C001508

Reporting Date: 04/07/2025

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
781246	BH103	ES	0.05 - 0.15	2.2	Brown sandy gravel with stones
781247	BH103	ES	0.15 - 0.50	9.1	Brown sandy gravel with stones and concrete
781248	WS101	ES	0.05 - 0.10	4.9	Brown sandy gravel with stones
781249	WS101	ES	0.10 - 0.50	16.3	Brown sandy gravel with stones and concrete
781250	WS101	ES	1.20 - 2.00	16.2	Brown sandy clay with stones and brick
781251	WS101	ES	2.00 - 3.00	18.9	Brown clay
781252	WS102	ES	0.15 - 0.50	11.8	Brown sandy gravel with stones and concrete
781253	WS102	ES	1.20 - 2.00	6.4	Brown sandy gravel with stones and concrete
781254	WS102	ES	2.30 - 3.00	13.5	Light brown clay
781255	WS103	ES	0.20 - 0.80	13.6	Brown sandy gravel with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 25-06133
LK Consult Limited
~Site Reference: Rochdale Road, Manchester
~Project / Job Ref: LKC251336
~Order No: PO-C001508
Reporting Date: 04/07/2025

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

List of HWOL Acronyms and Operators	
DETS Report No: 25-06133	
LK Consult Limited	
~Site Reference: Rochdale Road, Manchester	
~Project / Job Ref: LKC251336	
~Order No: PO-C001508	
Reporting Date: 04/07/2025	

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

Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH - Aliphatic >C34 - C44 - raw data - EH_CU_1D_AL
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C34 - C44 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C35 - C44 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Normec DETS Limited
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Certificate Key

Symbol	Description
F	Filtered sample
UF	Unfiltered sample
D	Dried sample
AR	As received sample
RL	Reporting limit
~	Sample details provided by customer and can affect the validity of results
M/S	Missing Sample
*	The Dutch 10 PAH compounds consist of Naphthalene, Anthracene, Phenanthrene, Fluoranthene, Benz(a)anthracene, Chrysene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, and Indeno(1,2,3-cd)pyrene
**	Total EPA-16 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(ghi)perylene.
***	Total WAC-17 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene and Coronene.
n	Please note that we are MCERTS soil accredited (UK soils only) for sand, loam, and clay, and UKAS accredited for groundwater, tap water, surface water, and generated leachates. Other matrices are outside our scope of accreditation.
S	Subcontracted analysis
M	MCERTS accredited test
U	UKAS accredited test

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DETS Report No: 25-06155

Site Reference: Rochdale Road, Manchester

Project / Job Ref: LKC251336

Order No: C001508

Sample Receipt Date: 01/07/2025

Sample Scheduled Date: 01/07/2025

Report Issue Number: 1

Reporting Date: 07/07/2025

Authorised by:



Steve Knight
Customer Support Manager

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

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

Soil Analysis Certificate						
DETS Report No: 25-06155	~Date Sampled	24/06/25	27/06/25	27/06/25	27/06/25	27/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	WS103	WS104	WS105	WS106
~Project / Job Ref: LKC251336	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: C001508	~Depth (m)	2.60-3.50	2.00-2.50	0.00-0.40	0.50-1.20	0.50-1.20
Reporting Date: 07/07/2025	DETS Sample No	781380	781381	781382	781383	781384

Determinand	Unit	RL	Accreditation	(n)		(n)	
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Detected	Detected
Sample Matrix ^(S)	Material Type	N/a	NONE			Crocidolite & Chrysotile present as fibre bundles	Chrysotile present as fibre bundles
Asbestos Type ^(S)	PLM Result	N/a	ISO17025			Crocidolite Chrysotile	Chrysotile
Asbestos Quantification ^(S)	%	< 0.001	ISO17025			0.003	0.002
pH	pH Units	N/a	MCERTS	8.3	8.7	9.1	8.6
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	64	125	405	430
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06	0.12	0.41	0.43
Organic Matter (SOM)	%	< 0.1	MCERTS	3.5	14.9	9.9	16.7
Arsenic (As)	mg/kg	< 2	MCERTS	11	14	14	11
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2	0.7	0.6	0.3
Chromium (Cr)	mg/kg	< 2	MCERTS	29	31	32	34
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	38	52	46	40
Lead (Pb)	mg/kg	< 3	MCERTS	60	169	157	77
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	33	28	26	20
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	30	26	23	18
Zinc (Zn)	mg/kg	< 3	MCERTS	64	108	103	82

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 25-06155	~Date Sampled	24/06/25	27/06/25	27/06/25	27/06/25	27/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	WS103	WS104	WS105	WS106
~Project / Job Ref: LKC251336	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: C001508	~Depth (m)	2.60-3.50	2.00-2.50	0.00-0.40	0.50-1.20	0.50-1.20
Reporting Date: 07/07/2025	DETS Sample No	781380	781381	781382	781383	781384

Determinand	Unit	RL	Accreditation	(n)			(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.26	2.75
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.40	0.55
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.95	0.99
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.09	1.26
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.43	7.28	6.94
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	2.25	1.97
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.65	15.90	8.67
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.63	15.60	8.24
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.26	5.69	3.30
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.25	5.11	3.02
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.30	6.27	3.03
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	1.84	1.20
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	5.49	2.81
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	2.13	1.11
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.56	0.25
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	2.01	1.04
**Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	3	73.8	47.1

Soil Analysis Certificate - Sample Descriptions

DETS Report No: 25-06155	
LK Consult Limited	
~Site Reference: Rochdale Road, Manchester	
~Project / Job Ref: LKC251336	
~Order No: C001508	
Reporting Date: 07/07/2025	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
781380	BH103	None Supplied	2.60-3.50	19.8	Brown clay
781381	WS103	None Supplied	2.00-2.50	20.2	Brown sandy clay with stones and concrete
781382	WS104	None Supplied	0.00-0.40	10.3	Brown sandy gravel with stones and concrete
781383	WS105	None Supplied	0.50-1.20	9.5	Brown sandy loam with stones and concrete
781384	WS106	None Supplied	0.50-1.20	12.2	Brown sandy gravel with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 25-06155
LK Consult Limited
~Site Reference: Rochdale Road, Manchester
~Project / Job Ref: LKC251336
~Order No: C001508
Reporting Date: 07/07/2025

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

List of HWOL Acronyms and Operators	
DETS Report No: 25-06155	
LK Consult Limited	
~Site Reference: Rochdale Road, Manchester	
~Project / Job Ref: LKC251336	
~Order No: C001508	
Reporting Date: 07/07/2025	

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

Det - Acronym

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

Certificate Key

Symbol	Description
F	Filtered sample
UF	Unfiltered sample
D	Dried sample
AR	As received sample
RL	Reporting limit
~	Sample details provided by customer and can affect the validity of results
M/S	Missing Sample
*	The Dutch 10 PAH compounds consist of Naphthalene, Anthracene, Phenanthrene, Fluoranthene, Benz(a)anthracene, Chrysene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, and Indeno(1,2,3-cd)pyrene
**	Total EPA-16 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(ghi)perylene.
***	Total WAC-17 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene and Coronene.
n	Please note that we are MCERTS soil accredited (UK soils only) for sand, loam, and clay, and UKAS accredited for groundwater, tap water, surface water, and generated leachates. Other matrices are outside our scope of accreditation.
S	Subcontracted analysis
M	MCERTS accredited test
U	UKAS accredited test

Peter Dunn
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 25-06414

Site Reference: Rochdale Road, Manchester

Project / Job Ref: LKC251336

Order No: None Supplied

Sample Receipt Date: 08/07/2025

Sample Scheduled Date: 08/07/2025

Report Issue Number: 1

Reporting Date: 14/07/2025

Authorised by:



Steve Knight
Customer Support Manager

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

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

Soil Analysis Certificate						
DETS Report No: 25-06414	~Date Sampled	24/06/25	24/06/25	24/06/25	24/06/25	24/06/25
LK Consult Limited	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	BH103	BH103	BH103	BH103
~Project / Job Ref: LKC251336	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: None Supplied	~Depth (m)	0.15 - 0.50	2.60 - 3.00	4.00 - 4.45	21.00 - 21.45	22.50 - 22.95
Reporting Date: 14/07/2025	DETS Sample No	782243	782244	782245	782246	782247

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
pH	pH Units	N/a	MCERTS	8.4	8.2	8.4	8.5	8.4
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	301	138	88	56	24
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.30	0.14	0.09	0.06	0.02
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	23	25	79	9	5
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	11.4	12.6	39.6	4.5	2.5
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS	26	< 3	71	< 3	< 3
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS	12.8	< 1.5	35.5	< 1.5	< 1.5
W/S Magnesium	mg/l	< 0.1	NONE	1.1	5	16	5.9	3.7

Soil Analysis Certificate						
DETS Report No: 25-06414	~Date Sampled	24/06/25	24/06/25			
LK Consult Limited	~Time Sampled	None Supplied	None Supplied			
~Site Reference: Rochdale Road, Manchester	~TP / BH No	BH103	BH103			
~Project / Job Ref: LKC251336	~Additional Refs	None Supplied	None Supplied			
~Order No: None Supplied	~Depth (m)	24.00 - 24.45	26.50 - 27.00			
Reporting Date: 14/07/2025	DETS Sample No	782248	782249			

Determinand	Unit	RL	Accreditation	(n)	(n)		
pH	pH Units	N/a	MCERTS	8.2	8.1		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	34	23		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.03	0.02		
W/S Chloride (2:1)	mg/kg	< 1	MCERTS	12	10		
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS	6	4.8		
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS	< 3	< 3		
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS	< 1.5	< 1.5		
W/S Magnesium	mg/l	< 0.1	NONE	5.3	2.7		

Soil Analysis Certificate - Sample Descriptions

DETS Report No: 25-06414

LK Consult Limited

~Site Reference: Rochdale Road, Manchester

~Project / Job Ref: LKC251336

~Order No: None Supplied

Reporting Date: 14/07/2025

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
\$ 782243	BH103	None Supplied	0.15 - 0.50	12	Brown sandy gravel with stones and concrete
\$ 782244	BH103	None Supplied	2.60 - 3.00	16	Light brown clay with brick
\$ 782245	BH103	None Supplied	4.00 - 4.45	14.1	Light brown clay
\$ 782246	BH103	None Supplied	21.00 - 21.45	7.4	Light brown sandy clay
\$ 782247	BH103	None Supplied	22.50 - 22.95	6.5	Brown sandy clay with stones
\$ 782248	BH103	None Supplied	24.00 - 24.45	7	Brown sandy gravel with stones
\$ 782249	BH103	None Supplied	26.50 - 27.00	12.2	Red sandy gravel with stones

Moisture content is part of procedure E003 & is not an accredited test

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 25-06414
LK Consult Limited
~Site Reference: Rochdale Road, Manchester
~Project / Job Ref: LKC251336
~Order No: None Supplied
Reporting Date: 14/07/2025

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

List of HWOL Acronyms and Operators	
DETS Report No: 25-06414	
LK Consult Limited	
~Site Reference: Rochdale Road, Manchester	
~Project / Job Ref: LKC251336	
~Order No: None Supplied	
Reporting Date: 14/07/2025	

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

Det - Acronym

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

Certificate Key

Symbol	Description
F	Filtered sample
UF	Unfiltered sample
D	Dried sample
AR	As received sample
RL	Reporting limit
~	Sample details provided by customer and can affect the validity of results
M/S	Missing Sample
*	The Dutch 10 PAH compounds consist of Naphthalene, Anthracene, Phenanthrene, Fluoranthene, Benz(a)anthracene, Chrysene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, and Indeno(1,2,3-cd)pyrene
**	Total EPA-16 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(ghi)perylene.
***	Total WAC-17 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene and Coronene.
n	Please note that we are MCERTS soil accredited (UK soils only) for sand, loam, and clay, and UKAS accredited for groundwater, tap water, surface water, and generated leachates. Other matrices are outside our scope of accreditation.
M	MCERTS accredited test
U	UKAS accredited test

Certificate of Analysis

Certificate Number 25-14810

Issued: 11-Jul-25

Client DETS South
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone, Kent
ME17 2JN

Our Reference 25-14810

Client Reference ~ LKC251336

Order No ~ PO-C001508

Contract Title ~ Rochdale Road, Manchester

Description 3 Soil samples, 3 Leachate prepared by DETS samples.

Date Received 01-Jul-25

Date Started 01-Jul-25

Date Completed 11-Jul-25

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By



Louise Cook
Contracts Manager



Sample Deviations present. See Deviation Table Section for details.

Normec DETS Limited

Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info-dets@normecgroup.com • normecdets.com

Summary of Chemical Analysis

Soil Samples

Our Ref 25-14810

Client Ref ~ LKC251336

Contract Title ~ Rochdale Road, Manchester

Lab No	2531173	2531174	2531175
Sample ID ~	BH103	WS102	WS103
Depth ~	0.05-0.15	1.20-2.00	0.20-0.80
Other ID ~	781256	781257	781258
Sample Type ~	ES	ES	ES
Sampling Date ~	24/06/2025	24/06/2025	24/06/2025
Sampling Time ~	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
Moisture Content	DETSC 1004	0.1	%	2.8	14	14
Metals						
Antimony	DETSC 2301*	1	mg/kg	< 1.0	1.8	2.2
Arsenic	DETSC 2301#	0.2	mg/kg	1.2	6.1	11
Barium	DETSC 2301#	1.5	mg/kg	50	140	330
Cadmium	DETSC 2301#	0.1	mg/kg	0.8	0.2	0.3
Chromium	DETSC 2301#	0.15	mg/kg	6.4	55	24
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	11	19	33
Lead	DETSC 2301#	0.3	mg/kg	19	130	400
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.08	0.24
Nickel	DETSC 2301#	1	mg/kg	6.9	9.7	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	85	37	97
Inorganics						
pH	DETSC 2008#		pH	11.6	8.9	9.9
Petroleum Hydrocarbons						
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	12	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	170	< 3.4	< 3.4
Aliphatic C35-C40: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	19	< 3.4	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	210	< 10	< 10
Aliphatic C5-C40: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	210	< 10	< 10
Aliphatic C5-C44: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	210	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	2.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	26	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	470	< 1.4	< 1.4
Aromatic C35-C40: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	100	< 1.4	< 1.4
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	670	< 10	< 10
Aromatic C5-C40: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	600	< 10	< 10
Aromatic C5-C44: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	670	< 10	< 10
TPH Ali/Aro C5-C40: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	800	< 10	< 10
TPH Ali/Aro C5-C44: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	890	< 10	< 10

Summary of Chemical Analysis Soil Samples

Our Ref 25-14810

Client Ref ~ LKC251336

Contract Title ~ Rochdale Road, Manchester

Lab No	2531173	2531174	2531175
Sample ID ~	BH103	WS102	WS103
Depth ~	0.05-0.15	1.20-2.00	0.20-0.80
Other ID ~	781256	781257	781258
Sample Type ~	ES	ES	ES
Sampling Date ~	24/06/2025	24/06/2025	24/06/2025
Sampling Time ~	n/s	n/s	n/s

Test	Method	LOD	Units			
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	890	< 10	< 10
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.12
Fluorene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.18
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.10	0.10	0.76
Anthracene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.22
Fluoranthene	DETSC 3301	0.1	mg/kg	0.12	0.20	1.6
Pyrene	DETSC 3301	0.1	mg/kg	< 0.10	0.13	1.7
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.12	< 0.10	0.91
Chrysene	DETSC 3301	0.1	mg/kg	0.27	< 0.10	1.0
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.85
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.42
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	1.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.80
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.15
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	0.69
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	11

WASTE ACCEPTANCE CRITERIA TESTING v20.25.02.03

Our Ref 25-14810

Client Ref LKC251336

Contract Title Rochdale Road, Manchester

Sample Id BH103 781256 0.05-0.15

Sample Numbers 2531173 2531176

Date Analysed 11/07/2025

Test Results On Waste			WAC Limit Values		
Determinand and Method Reference	Units	Result	Inert Waste	SNRHW	Hazardous Waste
DETS 2084# Total Organic Carbon	%	8.2	3	5	6
DETS 2003# Loss On Ignition	%	1.9	n/a	n/a	10
DETS 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETS 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETS 3311* Mineral Oil (C10 - C40)	mg/kg	490.0	500	n/a	n/a
DETS 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETS 2008# pH	pH Units	11.6	n/a	>6	n/a
DETS 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETS 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate			WAC Limit Values		
Determinand and Method Reference	Conc in Eluate ug/l	Amount Leached mg/kg	Limit values for LS10 Leachate		
	10:1	LS10	Inert Waste	SNRHW	Hazardous Waste
DETS 2306 Arsenic as As	0.18	< 0.01	0.5	2	25
DETS 2306 Barium as Ba	41	0.4	20	100	300
DETS 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETS 2306 Chromium as Cr	0.61	< 0.1	0.5	10	70
DETS 2306 Copper as Cu	< 0.40	< 0.02	2	50	100
DETS 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETS 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETS 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETS 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETS 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETS 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETS 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETS 2055 Chloride as Cl	1500	< 100	800	15,000	25,000
DETS 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETS 2055 Sulphate as SO4	3100	< 100	1000	20,000	50,000
DETS 2009* Total Dissolved Solids	130000	1300	4000	60,000	100,000
DETS 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETS 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

Additional Information	
DETS 2008 pH	9.3
DETS 2009 Conductivity uS/cm	186.0
* Temperature*	19.0
Mass of Sample Kg	0.093
Mass of dry Sample Kg	0.090
Stage 1	
Volume of Leachant L2	0.897
Volume of Eluate VE1	0.8

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive
Hazardous Waste

Disclaimer: The WAC limit values are provided for guidance only. Normec DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.

WASTE ACCEPTANCE CRITERIA TESTING v20.25.02.03

Our Ref 25-14810

Client Ref LKC251336

Contract Title Rochdale Road, Manchester

Sample Id WS102 781257 1.20-2.00

Sample Numbers 2531174 2531177

Date Analysed 11/07/2025

Test Results On Waste			WAC Limit Values		
Determinand and Method Reference	Units	Result	Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.0	3	5	6
DETSC 2003# Loss On Ignition	%	1.4	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311* Mineral Oil (C10 - C40)	mg/kg	57.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate			WAC Limit Values		
Determinand and Method Reference	Conc in Eluate ug/l	Amount Leached mg/kg	Limit values for LS10 Leachate		
	10:1	LS10	Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	2	0.02	0.5	2	25
DETSC 2306 Barium as Ba	15	0.2	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	1.3	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.72	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.32	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1300	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	3100	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	150000	1500	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

Additional Information	
DETSC 2008 pH	9.4
DETSC 2009 Conductivity uS/cm	215.0
* Temperature*	19.0

Mass of Sample Kg	0.104
Mass of dry Sample Kg	0.090

Stage 1

Volume of Leachant L2	0.886
Volume of Eluate VE1	0.8

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive
Hazardous Waste

Disclaimer: The WAC limit values are provided for guidance only. Normec DETS does not accept responsibility for errors or omissions.
Values are correct at time of issue.

WASTE ACCEPTANCE CRITERIA TESTING v20.25.02.03

Our Ref 25-14810

Client Ref LKC251336

Contract Title Rochdale Road, Manchester

Sample Id WS103 781258 0.20-0.80

Sample Numbers 2531175 2531178

Date Analysed 11/07/2025

Test Results On Waste			WAC Limit Values		
Determinand and Method Reference	Units	Result	Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	3.2	3	5	6
DETSC 2003# Loss On Ignition	%	3.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311* Mineral Oil (C10 - C40)	mg/kg	200.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	11.0	100	n/a	n/a
DETSC 2008# pH	pH Units	9.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate			WAC Limit Values		
Determinand and Method Reference	Conc in Eluate ug/l	Amount Leached mg/kg	Limit values for LS10 Leachate		
	10:1	LS10	Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	7	0.07	0.5	2	25
DETSC 2306 Barium as Ba	13	0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	20	0.2	0.5	10	70
DETSC 2306 Copper as Cu	2.1	0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.2	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	2.6	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.43	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	2500	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	150	1.5	10	150	500
DETSC 2055 Sulphate as SO4	30000	300	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	98000	980	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

Additional Information	
DETSC 2008 pH	9.6
DETSC 2009 Conductivity uS/cm	140.0
* Temperature*	19.0

Mass of Sample Kg	0.105
Mass of dry Sample Kg	0.090

Stage 1

Volume of Leachant L2	0.885
Volume of Eluate VE1	0.8

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive
Hazardous Waste

Disclaimer: The WAC limit values are provided for guidance only. Normec DETS does not accept responsibility for errors or omissions.
Values are correct at time of issue.

Summary of Asbestos Analysis Soil Samples

Our Ref 25-14810

Client Ref ~ LKC251336

Contract Title ~ Rochdale Road, Manchester

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2531173	BH103 781256 0.05-0.15	SOIL	NAD	none	Pierce Booth
2531174	WS102 781257 1.20-2.00	SOIL	NAD	none	Pierce Booth
2531175	WS103 781258 0.20-0.80	SOIL	NAD	none	Pierce Booth

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 25-14810
 Client Ref ~ LKC251336
 Contract ~ Rochdale Road, Manchester

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Incorrect container for tests
2531173	BH103 0.05-0.15 SOIL	24/06/25	PG		Aliphatics/Aromatics, BTEX / C5-C10, Naphthalene, PAH FID, PCB, EPH/TPH Cleanup
2531174	WS102 1.20-2.00 SOIL	24/06/25	PG		Aliphatics/Aromatics, BTEX / C5-C10, Naphthalene, PAH FID, PCB, EPH/TPH Cleanup
2531175	WS103 0.20-0.80 SOIL	24/06/25	PG		Aliphatics/Aromatics, BTEX / C5-C10, Naphthalene, PAH FID, PCB, EPH/TPH Cleanup
2531176	BH103 0.05-0.15 LEACHATE	24/06/25	PG		Metals (Soluble) ICPMS
2531177	WS102 1.20-2.00 LEACHATE	24/06/25	PG		Metals (Soluble) ICPMS
2531178	WS103 0.20-0.80 LEACHATE	24/06/25	PG		Metals (Soluble) ICPMS

Lab No	Sample ID	Comments
2531176	BH103 0.05-0.15	Insufficient sample 1236g (<2kg) Sample received
2531177	WS102 1.20-2.00	Insufficient sample 978.5g (<2kg) Sample received
2531178	WS103 0.20-0.80	Insufficient sample 1008g (<2kg) Sample received

Key: P-Plastic G-Bag

Normec DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 250µm sieve
 Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
 The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
 Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

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

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C40	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aliphatic C5-C40	EH_CU+HS_1D_AL
Aliphatic C5-C44	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C40	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Aromatic C5-C40	EH_CU+HS_1D_AR
Aromatic C5-C44	EH_CU+HS_1D_AR
TPH Ali/Aro C5-C40	EH_CU+HS_1D_Total
TPH Ali/Aro C5-C44	EH_CU+HS_1D_Total
Ali/Aro C10-C44	EH_CU_1D_Total
Mineral Oil (C10-C40) + Clean Up	EH_CU_1D_Total

Key:

~ Sample details are provided by the client and can affect the validity of the results

* -not accredited.

-MCERTS (accreditation only applies if report carries the MCERTS logo).

\$ -subcontracted.

n/s -not supplied.

I/S -insufficient sample.

U/S -unsuitable sample.

t/f -to follow.

nd -not detected.

End of Report Ver 25.03.07

Appendix D – Certificates of Analysis (Geotechnical)

TEST REPORT

Client LK Consult Ltd

Address Unit 29 Eton Business Park
Eton Hill Road
Radcliffe
Greater Manchester
M26 2ZS

Contract LKC 25 1336 -
Rochdale Road, Manchester

Job Number MRN 25007/93

Date of Issue 05 August 2025

Page 1 of 7

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
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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

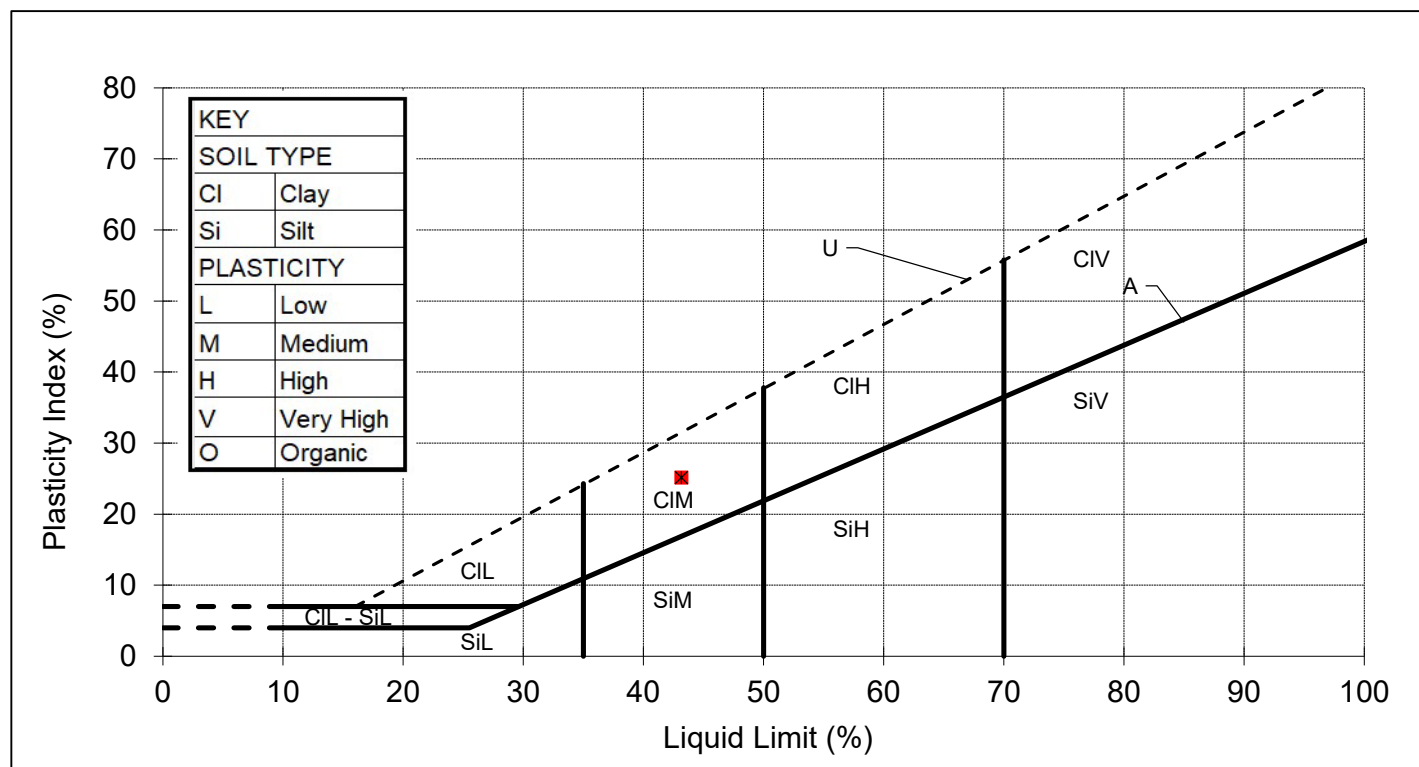
CLIENT	LK Consult Ltd
SITE	LKC 25 1336 - Rochdale Road, Manchester
JOB NUMBER	MRN 25007/93

SAMPLE LABEL	BH103 2.0-2.45 D	DATE SAMPLED	25-Jun-25
SAMPLE No.	5125701	DATE RECEIVED	10-Jul-25
DATE TESTED	17-Jul-25	SAMPLED BY	Client

MATERIAL	Dark brown silty sandy very 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)	21.2	43.8	0.986	
Determination 2 (avg)	20.5	43.7		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.1	43	18	25	62



REMARKS

SIGNED

NAME

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

DATE

05-Aug-25

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

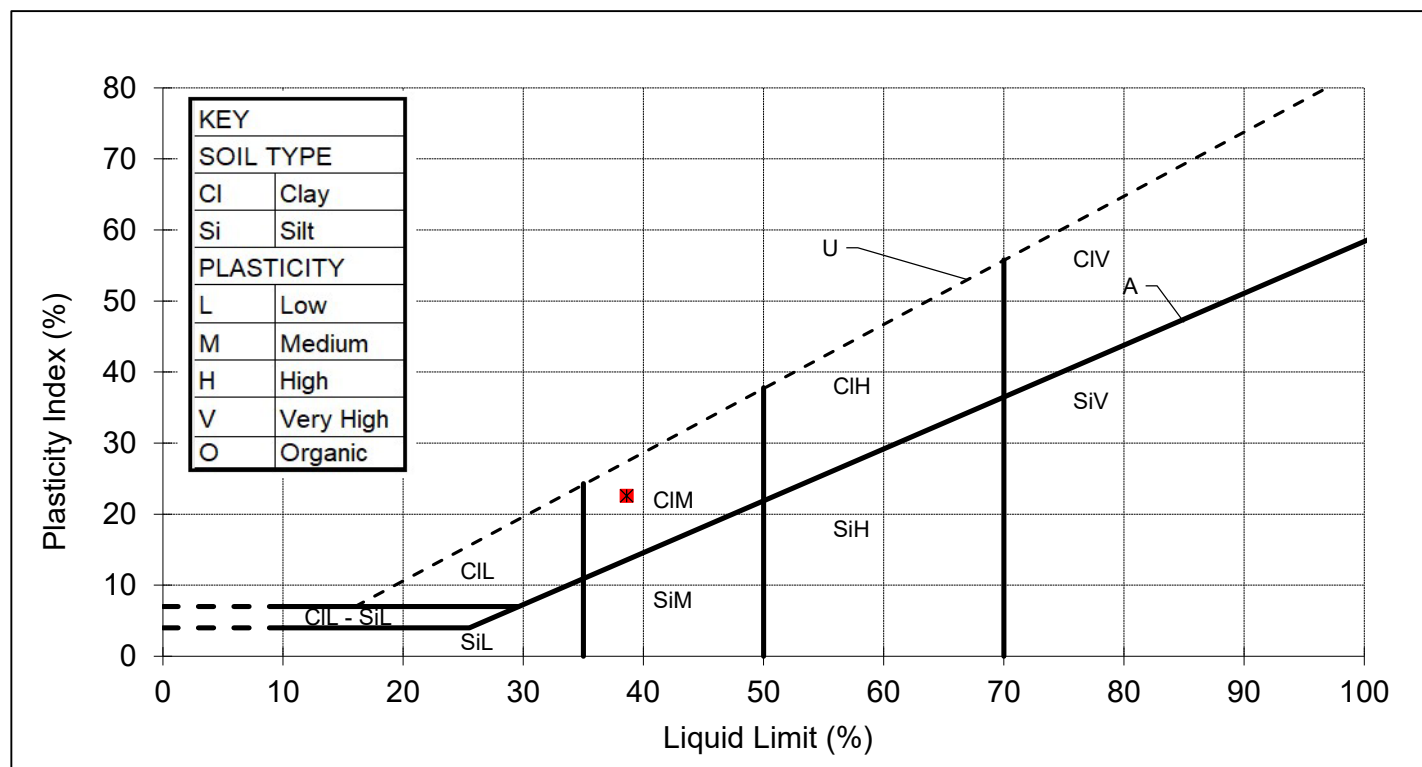
CLIENT	LK Consult Ltd
SITE	LKC 25 1336 - Rochdale Road, Manchester
JOB NUMBER	MRN 25007/93

SAMPLE LABEL	BH103 5.0-5.45 D	DATE SAMPLED	25-Jun-25
SAMPLE No.	5125702	DATE RECEIVED	10-Jul-25
DATE TESTED	17-Jul-25	SAMPLED BY	Client

MATERIAL	Brown silty 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	38.6	
Determination 2 (avg)	19.9	38.5	

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
18.0	39	16	23	79



REMARKS

SIGNED

NAME

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

DATE

05-Aug-25

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

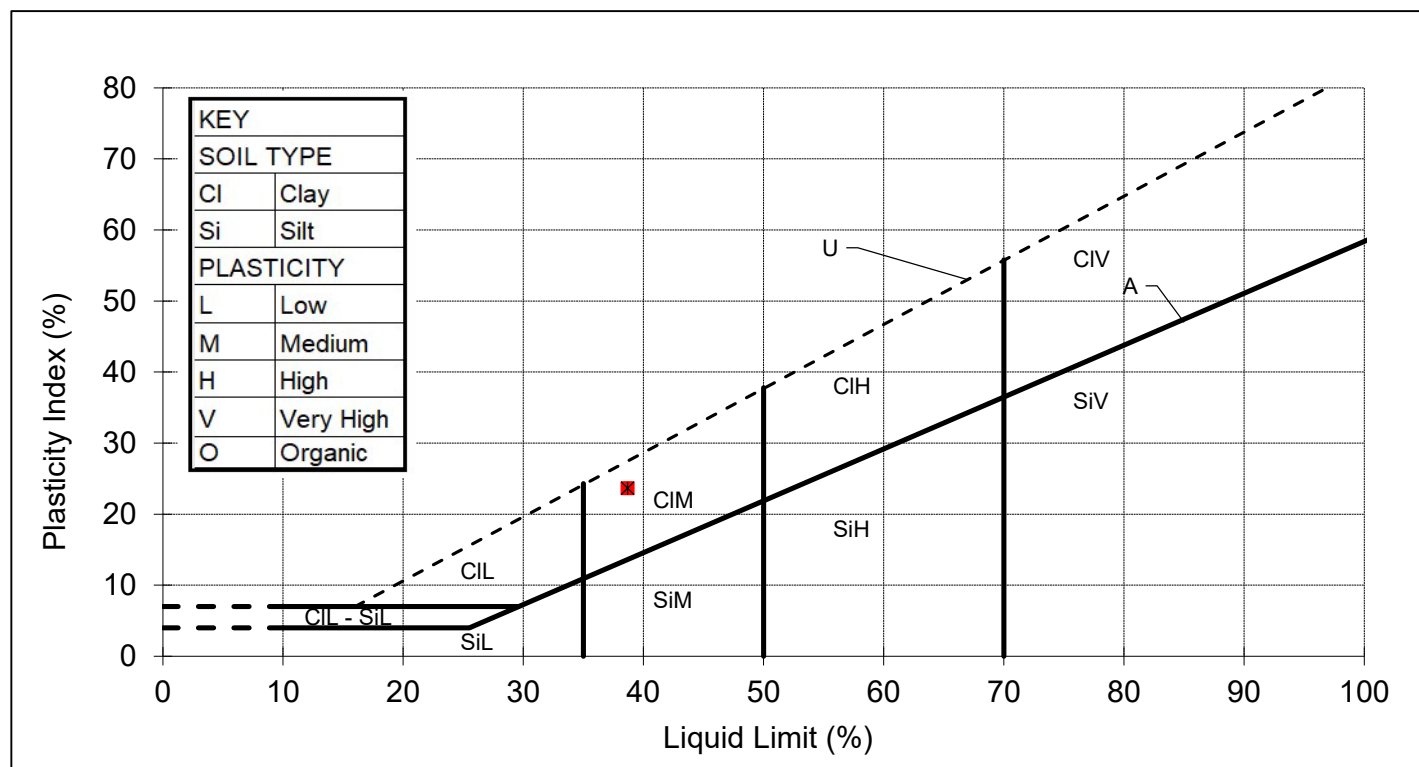
CLIENT	LK Consult Ltd
SITE	LKC 25 1336 - Rochdale Road, Manchester
JOB NUMBER	MRN 25007/93

SAMPLE LABEL	BH103 7.0 D	DATE SAMPLED	25-Jun-25
SAMPLE No.	5125703	DATE RECEIVED	10-Jul-25
DATE TESTED	17-Jul-25	SAMPLED BY	Client

MATERIAL	Brown silty 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)	18.9	37.9	1.019	
Determination 2 (avg)	19.2	38.0		

Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
17.7	39	15	24	76



REMARKS

SIGNED

NAME

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

DATE

05-Aug-25

MURRAY RIX

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



TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS EN ISO 17892-8:2018

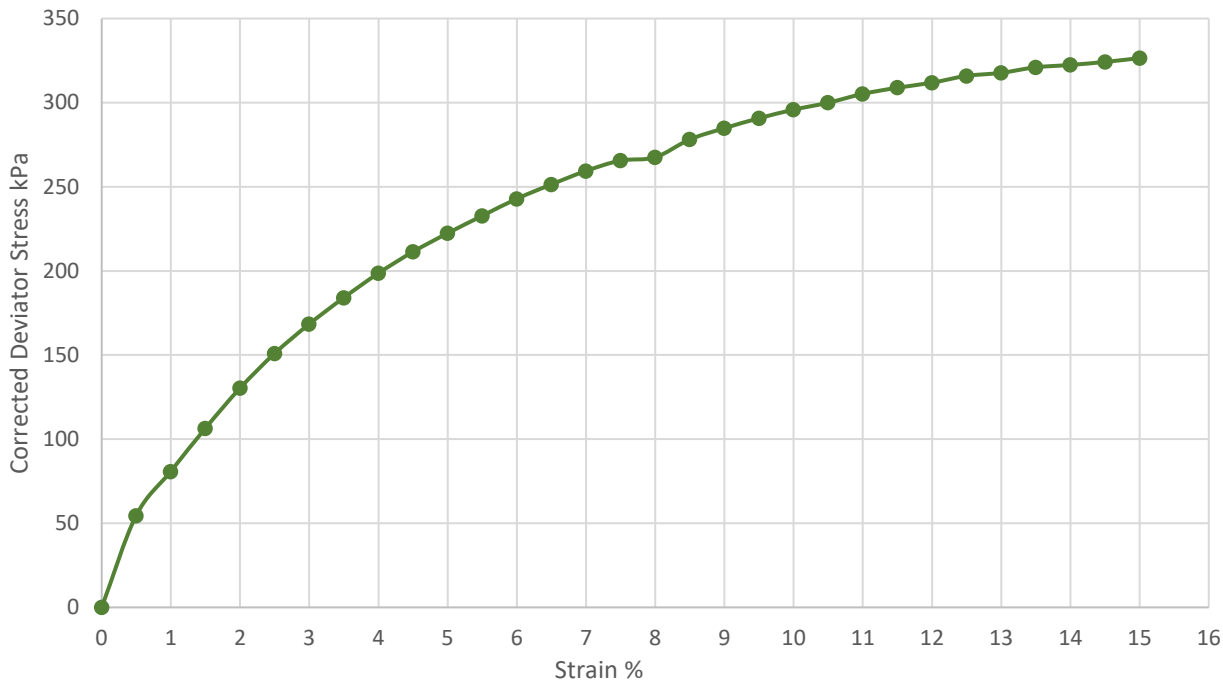
CLIENT	LK Consult Ltd
SITE	LKC 25 1336 - Rochdale Road, Manchester
JOB NUMBER	MRN 25007/93

SAMPLE LABEL	BH103 6.0-6.45 U	DATE SAMPLED	25-Jun-25
LAB SAMPLE No.	5125704	DATE RECEIVED	10-Jul-25
DATE TESTED	17-Jul-25	SAMPLED BY	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

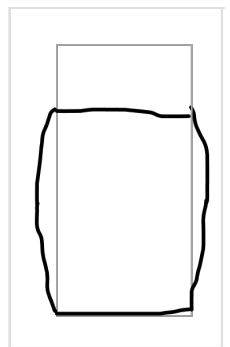
Specimen Location		Sample Length (mm)	450	Specimen depth from top of Sample (mm)	15
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	203	Specimen Water Content (%)	19.8
		Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.18
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.82
		Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF
SPECIMEN AT
FAILURE



PLASTIC

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
120	15.0	2.0	326	163

Remarks/Abnormalities

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

Signed

Date 05 August 2025

MURRAY RIX

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



TEST CERTIFICATE

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS EN ISO 17892-8:2018

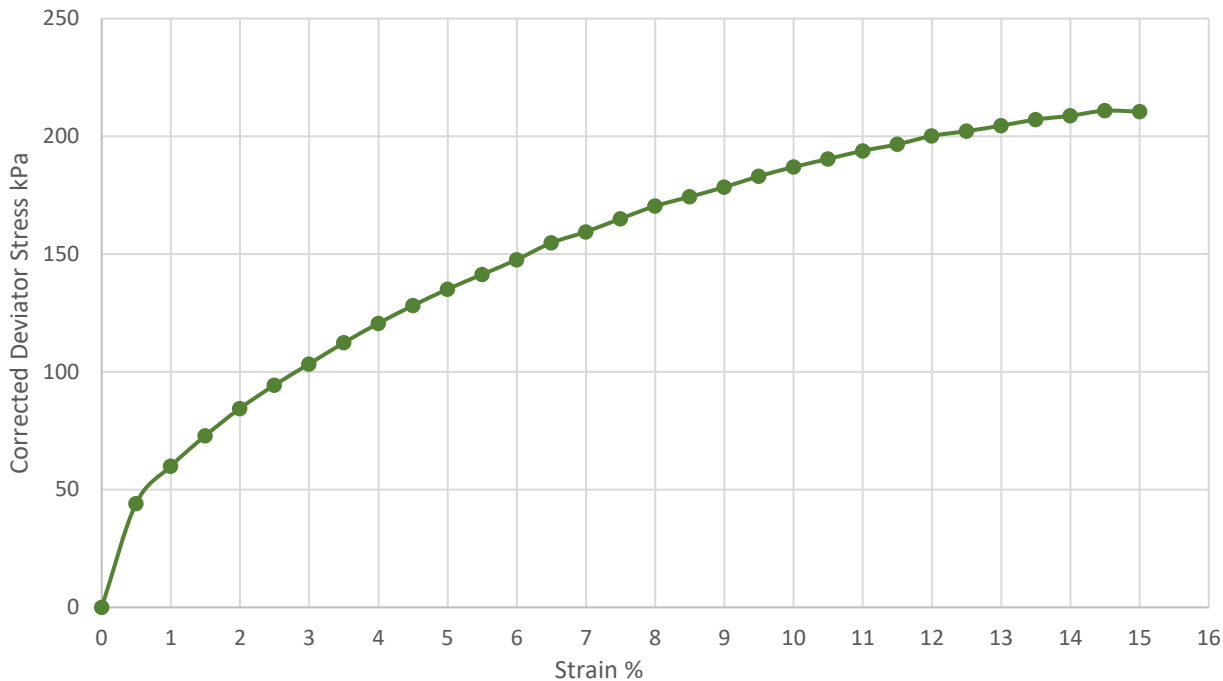
CLIENT	LK Consult Ltd
SITE	LKC 25 1336 - Rochdale Road, Manchester
JOB NUMBER	MRN 25007/93

SAMPLE LABEL	BH103 12.0-12.45 U	DATE SAMPLED	25-Jun-25
LAB SAMPLE No.	5125705	DATE RECEIVED	10-Jul-25
DATE TESTED	17-Jul-25	SAMPLED BY	Client
MATERIAL	Brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample		

INITIAL CONDITIONS

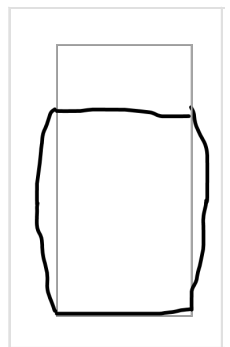
Specimen Location		Sample Length (mm)	390	Specimen depth from top of Sample (mm)	20
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	200	Specimen Water Content (%)	20.9
		Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m3)	2.13
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.76
		Membrane Correction	3.39		

CORRECTED DEVIATOR STRESS vs AXIAL STRAIN



TEST TYPE
SINGLE STAGE

SKETCH OF
SPECIMEN AT
FAILURE



PLASTIC

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
240	14.5	2.0	211	105

Remarks/Abnormalities

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

Signed

Date 05 August 2025

MURRAY RIX

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS

ASTM D7012 - 14 Method C

CLIENT	LK Consult Ltd
SITE	LKC 25 1336 - Rochdale Road, Manchester
JOB NUMBER	MRN 25007/93

DATE RECEIVED	25-Jun-25	DATE SAMPLED	10-Jul-25
DATE TESTED	17-Jul-25	SAMPLED BY	Client
MATERIAL TESTED	Rock Core		

Sample Number	B/H No.	Sample Depth	Tested By	Diameter (mm)	Length* (mm)	L/D Ratio	Method of Preparation	Load at Failure (kN)	Compressive Strength (N/mm ²)	Description after Test
5125706	BH103	27.8-28.09	M.R.	88	175	1.99	Saw / Grinding	57.4	9.4	Split vertically top to bottom with no visible end defects
5125707	BH103	30.18-30.52	M.R.	88	176	2.00	Saw / Grinding	60.3	9.9	Split vertically top to bottom with no visible end defects
5125708	BH103	33.36-33.76	M.R.	88	175	1.99	Saw / Grinding	49.1	8.1	Split vertically top to bottom with no visible end defects
5125709	BH103	36.41-36.76	M.R.	88	177	2.01	Saw / Grinding	48.5	8.0	Split vertically top to bottom with no visible end defects

Comments / Deviation from standard method / Abnormalities noted during visual inspection.

*Length after sample preparation

NAME

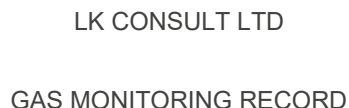
O.P. Davies BA (Hons)
(Director / Head of Laboratory)

SIGNED



DATE 05-Aug-25

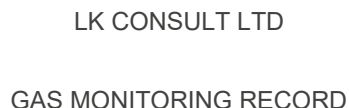
Appendix E – Gas Monitoring Results



Site Monitoring	BH Ref.	BH103	WS101	WS102	WS103											
	Time	14:00:00	14:21:37	14:34:05	14:51:36											
	Barometric Pressure (mb)	NR	1003	1004	1005											
	Relative Pressure (mb)	NR	-0.05	-0.16	0.05											
Gas and Groundwater Monitoring Data	Internal Flow ³ (l/hr)	NR	<0.1	<0.1	<0.1											
	Peak Flow (l/hr)	NR	<0.1	<0.1	<0.1											
	Steady CH ₄ (%v/v)	NR	<0.1	<0.1	<0.1											
	Peak CH ₄ (%v/v)	NR	<0.1	<0.1	<0.1											
	% LEL ²	NR	0	0	0											
	Steady CO ₂ (%v/v)	NR	0.5	0.9	2.2											
	Peak CO ₂ (%v/v)	NR	0.5	0.9	2.2											
	Steady O2 (%v/v)	NR	19.6	19.1	17.8											
	Min O ₂ (%v/v)	NR	19.6	19.1	17.8											
	Balance (%)	NR	80	80	80.1											
	Steady CO (ppm)	NR	0	0	1											
	Peak CO (ppm)	NR	18	22	19											
	Steady H ₂ S (ppm)	NR	1	1	1											
	Peak H ₂ S (ppm)	NR	1	1	1											
	Steady PID (ppm)	NR	0.2	0	0											
	Max PID (ppm)	NR	0.5	0.4	0.6											
	Standing Water Level (mbgl)	3.91	Dry	Dry	Dry											
	Installation Base Depth (mbgl)	3.93	1.93	1.82	1.06											
	Response Zone/Strata															
	Comments	Well developed. Base of well afterwards was 3.95.														
Equipment							ABBREVIATIONS						NOTES			
Gas Machine	Gas Analyser GA5000					ND	Not detected		ppm	Parts per million		All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665. ¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.				
	G507783					NR	Not recorded		mb	Millibars						
Dipmeter	Geotech Oil-in-Water Interface Meter					UR	Unable to record		l/hr	Litres per hour		² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4. ³ Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).				
	1-800-833-7958					OS	Off recordable scale		mbgl	Metres below ground level						
PID	Mini Rae Lite+ PGM7300					N/A	Not applicable		LEL	Lower explosive limit in air						
	590-913892															

 LK CONSULT	LK CONSULT LTD	Site Details		Monitoring Visit Conditions		Visit No.
	GAS MONITORING RECORD	Site Name	Rochdale Road, Manchester	Recent Weather	Overcast, dry, humid	2
		Job Number	LKC251336	Ground Conditions	Dry	of
		Engineer	EH	Approx. Air temperature (°C)	20°C	6
		Date	28/07/2025	Atmospheric Pressure (Prev. 24 hrs)	Falling	

Site Monitoring	BH Ref.	BH103	WS101	WS102	WS103													
	Time	15:06:04	15:14:37	14:57:29	14:48:03													
	Barometric Pressure (mb)	1015	1015	1015	1013													
	Relative Pressure (mb)	-0.07	0.04	-0.07	0													
Gas and Groundwater Monitoring Data	Internal Flow ³ (l/hr)	<0.1	<0.1	<0.1	<0.1													
	Peak Flow (l/hr)	<0.1	<0.1	<0.1	<0.1													
	Steady CH ₄ (%v/v)	<0.1	<0.1	<0.1	<0.1													
	Peak CH ₄ (%v/v)	<0.1	<0.1	<0.1	<0.1													
	% LEL ²	0	0	0	0													
	Steady CO ₂ (%v/v)	0.7	0.6	0.5	2.5													
	Peak CO ₂ (%v/v)	0.7	0.6	0.6	2.5													
	Steady O2 (%v/v)	19.4	19.6	19.2	16.2													
	Min O ₂ (%v/v)	19.3	19.5	18.9	16.2													
	Balance (%)	79.9	79.8	80.3	81.2													
	Steady CO (ppm)	0	1	0	0													
	Peak CO (ppm)	41	9	9	14													
	Steady H ₂ S (ppm)	1	1	1	1													
	Peak H ₂ S (ppm)	1	1	1	1													
	Steady PID (ppm)	N/A	N/A	N/A	N/A													
	Max PID (ppm)	N/A	N/A	N/A	N/A													
	Standing Water Level (mbgl)	3.85	Dry	Dry	Dry													
	Installation Base Depth (mbgl)	3.87	1.86	1.75	1.01													
	Response Zone/Strata																	
	Comments																	
	Equipment							ABBREVIATIONS							NOTES			
	Gas Machine	Gas Analyser GA5000					ND	Not detected			ppm	Parts per million		All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.				
G507783					NR	Not recorded			mb	Millibars								
Dipmeter	HydroTechnik					UR	Unable to record			l/hr	Litres per hour		Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.					
	HT-02					OS	Off recordable scale			mbgl	Metres below ground level							
PID	-					N/A	Not applicable			LEL	Lower explosive limit in air		² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4. ³ Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).					
	-																	



Site Monitoring	BH Ref.	BH103	WS101	WS102	WS103												
	Time	15:43:50	15:51:10	15:59:23	16:06:09												
	Barometric Pressure (mb)	1007	1008	1008	1008												
	Relative Pressure (mb)	-0.51	-0.02	-0.05	-0.07												
Gas and Groundwater Monitoring Data	Internal Flow ³ (l/hr)	<0.1	<0.1	<0.1	<0.1												
	Peak Flow (l/hr)	<0.1	<0.1	<0.1	<0.1												
	Steady CH ₄ (%v/v)	<0.1	<0.1	<0.1	<0.1												
	Peak CH ₄ (%v/v)	<0.1	<0.1	<0.1	<0.1												
	% LEL ²	0	0	0	0												
	Steady CO ₂ (%v/v)	0.6	0.6	1.1	2.2												
	Peak CO ₂ (%v/v)	0.7	0.6	1.1	2.2												
	Steady O2 (%v/v)	19.4	19.2	18.8	15.8												
	Min O ₂ (%v/v)	19.4	19.2	18.6	15.8												
	Balance (%)	80	80.2	80.1	82												
	Steady CO (ppm)	0	0	0	1												
	Peak CO (ppm)	12	8	7	17												
	Steady H ₂ S (ppm)	1	1	1	2												
	Peak H ₂ S (ppm)	1	1	1	2												
	Steady PID (ppm)	-	-	-	-												
	Max PID (ppm)	-	-	-	-												
	Standing Water Level (mbgl)	Dry	Dry	Dry	Dry												
	Installation Base Depth (mbgl)	3.84	1.86	1.75	1.01												
	Response Zone/Strata																
	Comments																
Equipment							ABBREVIATIONS						NOTES				
Gas Machine	Gas Analyser GA5000					ND	Not detected		ppm	Parts per million		All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665. ¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.					
	G507783					NR	Not recorded		mb	Millibars							
Dipmeter	HydroTechnik					UR	Unable to record		l/hr	Litres per hour		² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4. ³ Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).					
	HT-02					OS	Off recordable scale		mbgl	Metres below ground level							
PID	-					N/A	Not applicable		LEL	Lower explosive limit in air							

	LK CONSULT LTD		Site Details		Monitoring Visit Conditions		Visit No. 4 of 6
	GAS MONITORING RECORD		Site Name	Rochdale Road, Manchester	Recent Weather	Sunny, dry	
			Job Number	LKC251336	Ground Conditions	Dry	
			Engineer	EH	Approx. Air temperature (°C)	23°C	
			Date	26/08/2025	Atmospheric Pressure (Prev. 24 hrs)	Falling	

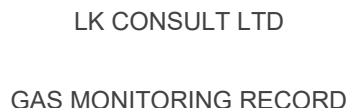
Site Monitoring	BH Ref.	WS101	WS102	WS103												
	Time	14:52:45	15:01:47	15:11:30												
	Barometric Pressure (mb)	997	998	999												
	Relative Pressure (mb)	0.02	0.14	0.12												
Gas and Groundwater Monitoring Data	Internal Flow ³ (l/hr)	0	0	0												
	Peak Flow (l/hr)	0	0	-0.1												
	Steady CH ₄ (%v/v)	0	0	0												
	Peak CH ₄ (%v/v)	0	0	0												
	% LEL ²	0	0	0												
	Steady CO ₂ (%v/v)	0.7	0.2	1.8												
	Peak CO ₂ (%v/v)	0.7	0.2	1.8												
	Steady O2 (%v/v)	18.1	19.9	18.5												
	Min O ₂ (%v/v)	18.1	19.9	18.5												
	Balance (%)	81.1	79.9	79.7												
	Steady CO (ppm)	0	0	1												
	Peak CO (ppm)	4	3	9												
	Steady H ₂ S (ppm)	0	0	0												
	Peak H ₂ S (ppm)	0	0	1												
	Steady PID (ppm)	N/A	N/A	N/A												
	Max PID (ppm)	N/A	N/A	N/A												
	Standing Water Level (mbgl)	Dry	Dry	Dry												
	Installation Base Depth (mbgl)	1.94	1.82	1.08												
	Response Zone/Strata															
	Comments															

Equipment					ABBREVIATIONS						NOTES				
Gas Machine	Gas Analyser GA5000				ND	Not detected		ppm	Parts per million		All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665.				
	G507783				NR	Not recorded		mb	Millibars						
Dipmeter	Geotech Oil-in-Water Interface Meter				UR	Unable to record		l/hr	Litres per hour		¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.				
	1-800-833-7958				OS	Off recordable scale		mbgl	Metres below ground level						
PID	-				N/A	Not applicable		LEL	Lower explosive limit in air		² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4. ³ Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).				
	-														

³Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).

	LK CONSULT LTD GAS MONITORING RECORD	Site Details		Monitoring Visit Conditions		Visit No. 5 of 6
		Site Name	Rochdale Road, Manchester	Recent Weather	Sunny, gentle breeze	
		Job Number	LKC251336	Ground Conditions	Dry	
		Engineer	CK	Approx. Air temperature (°C)	20°C	
		Date	26/08/2025	Atmospheric Pressure (Prev. 24 hrs)	Rising	

Site Monitoring Visit Details	BH Ref.	WS101	WS102	WS103														
	Time	15:14:51	15:05:46	14:50:02														
	Barometric Pressure (mb)	1006	1006	1005														
	Relative Pressure (mb)	0.48	-0.18	-0.86														
Gas and Groundwater Monitoring Data	Internal Flow ³ (l/hr)	-0.1	0	0														
	Peak Flow (l/hr)	-0.1	0	0														
	Steady CH ₄ (%v/v)	0	0	0														
	Peak CH ₄ (%v/v)	0	0	0														
	% LEL ²	0	0	0														
	Steady CO ₂ (%v/v)	0.6	2	1.3														
	Peak CO ₂ (%v/v)	0.6	2	1.3														
	Steady O2 (%v/v)	19.5	17	18.9														
	Min O ₂ (%v/v)	19.5	17	18.9														
	Balance (%)	79.9	81	79.8														
	Steady CO (ppm)	0	0	0														
	Peak CO (ppm)	2	1	2														
	Steady H ₂ S (ppm)	1	1	0														
	Peak H ₂ S (ppm)	1	1	0														
	Steady PID (ppm)	N/A	N/A	N/A														
	Max PID (ppm)	N/A	N/A	N/A														
	Standing Water Level (mbgl)	Dry	Dry	Dry														
	Installation Base Depth (mbgl)	1.87	1.74	1.01														
	Response Zone/Strata																	
	Comments																	
Equipment							ABBREVIATIONS						NOTES					
Gas Machine	Gas Analyser GA5000					ND	Not detected		ppm	Parts per million		All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665. ¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates. ² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4. ³ Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).						
	G507783					NR	Not recorded		mb	Millibars								
Dipmeter	HydroTechnik					UR	Unable to record		l/hr	Litres per hour								
	HT-04					OS	Off recordable scale		mbgl	Metres below ground level								
PID	-					N/A	Not applicable		LEL	Lower explosive limit in air								
	-																	



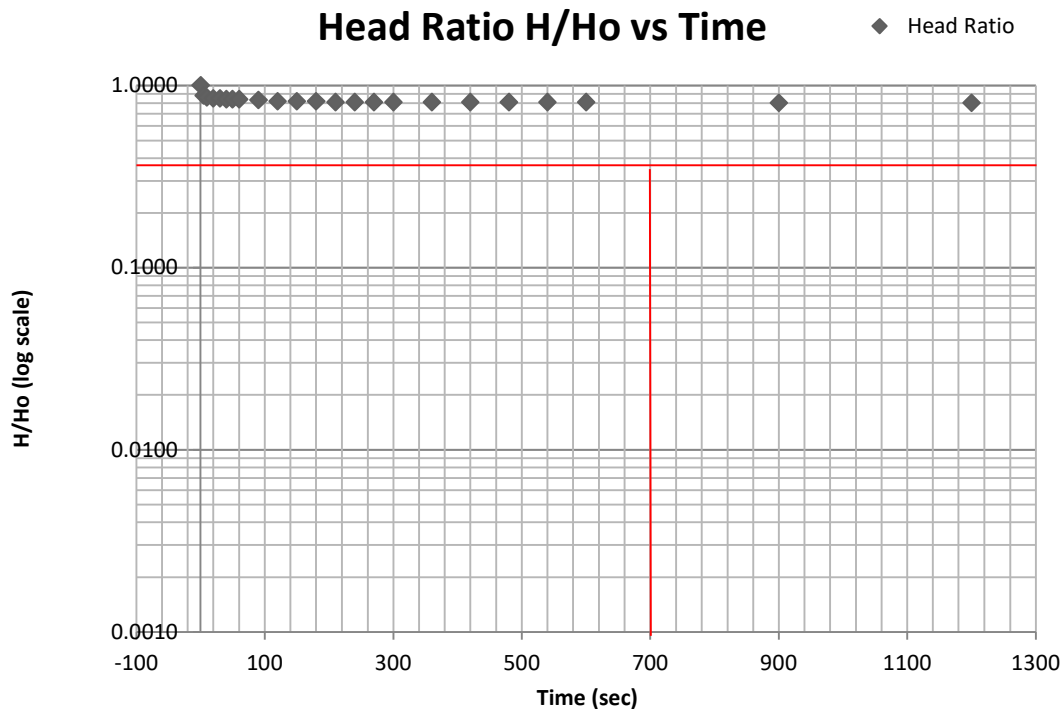
Site Monitoring	BH Ref.	WS101	WS102	WS103												
	Time	14:38:17	14:47:12	14:57:33												
	Barometric Pressure (mb)	1020	1021	1021												
	Relative Pressure (mb)	0.02	0.11	-0.16												
Gas and Groundwater Monitoring Data	Internal Flow ³ (l/hr)	0	0	0												
	Peak Flow (l/hr)	0	0	-0.1												
	Steady CH ₄ (%v/v)	0	0	0												
	Peak CH ₄ (%v/v)	0	0	0												
	% LEL ²	0	0	0												
	Steady CO ₂ (%v/v)	0.7	1.5	1.1												
	Peak CO ₂ (%v/v)	0.7	1.5	1.1												
	Steady O ₂ (%v/v)	20.1	19	18.3												
	Min O ₂ (%v/v)	20.1	18.9	18.3												
	Balance (%)	79.2	79.5	80.6												
	Steady CO (ppm)	0	0	0												
	Peak CO (ppm)	1	1	17												
	Steady H ₂ S (ppm)	0	0	0												
	Peak H ₂ S (ppm)	0	0	0												
	Steady PID (ppm)	N/A	N/A	N/A												
	Max PID (ppm)	N/A	N/A	N/A												
	Standing Water Level (mbgl)	Dry	Dry	Dry												
	Installation Base Depth (mbgl)	1.93	1.82	1.08												
	Response Zone/Strata															
	Comments															
Equipment							ABBREVIATIONS					NOTES				
Gas Machine	Gas Analyser GA5000						ND	Not detected		ppm	Parts per million		All monitoring is carried out in line with LK Consult Ltd procedures, with reference to CIRIA C665. ¹ Equipment is serviced and checked as recommended by the manufacturer. Refer to calibration records and service certificates.			
	G502417						NR	Not recorded		mb	Millibars					
Dipmeter	Geotech Oil-in-Water Interface Meter						UR	Unable to record		l/hr	Litres per hour		² CH4 is explosive between the range of 5-15%v/v. 100% lower explosive limit is equal to 5%v/v CH4. ³ Flow readings are based on steady 1 minute value where flow is detected (equipment range of +/- 12 ltr/hr).			
	1-800-833-7958						OS	Off recordable scale		mbgl	Metres below ground level					
PID	-						N/A	Not applicable		LEL	Lower explosive limit in air					
	-															

Appendix F – Falling Head Tests

VARIABLE HEAD PERMEABILITY TEST



Site Name		FIELD MEASUREMENTS			
Job Number		Time	Depth	Head H	Head Ratio
Location		seconds	mbgl	m	H/Ho
Rochdale Road, Manchester		0	2	1.000	1.0000
LKC251336		5	2.12	0.880	0.8800
WS102		10	2.14	0.860	0.8600
		20	2.15	0.850	0.8500
Type of test		30	2.15	0.850	0.8500
FALLING HEAD		40	2.16	0.840	0.8400
Strata		50	2.16	0.840	0.8400
Made Ground to 2.30m, clay to 5.95m		60	2.16	0.840	0.8400
Date of Test		90	2.17	0.830	0.8300
25/06/2025		120	2.18	0.820	0.8200
Staff		150	2.18	0.820	0.8200
EH		180	2.18	0.820	0.8200
		210	2.19	0.810	0.8100
CONDITIONS OF TEST ZONE (BS5930:1999 Figure 6)		240	2.19	0.810	0.8100
		270	2.19	0.810	0.8100
D		300	2.19	0.810	0.8100
		360	2.19	0.810	0.8100
Diameter of Borehole (D)		420	2.19	0.810	0.8100
100 mm		480	2.19	0.810	0.8100
L (see BS5930:1999 Figure 6)		540	2.19	0.810	0.8100
1000 mm		600	2.19	0.810	0.8100
Intake Factor (F)		900	2.20	0.800	0.8000
2.0956		1200	2.20	0.800	0.8000
Initial GW Depth					
None					
Base of Installation					
3 mbgl					
Standpipe Diameter					
100 mm					
Standpipe X sec Area (A)					
7.88E-03 m2					
Depth to response zone					
2 m					
BASIC TIME LAG (T) (from Plot)					
80 seconds					
CALCULATED VALUES					
Permeability $k = A/F \times T$					
k = 4.7E-05 m/sec Failed					

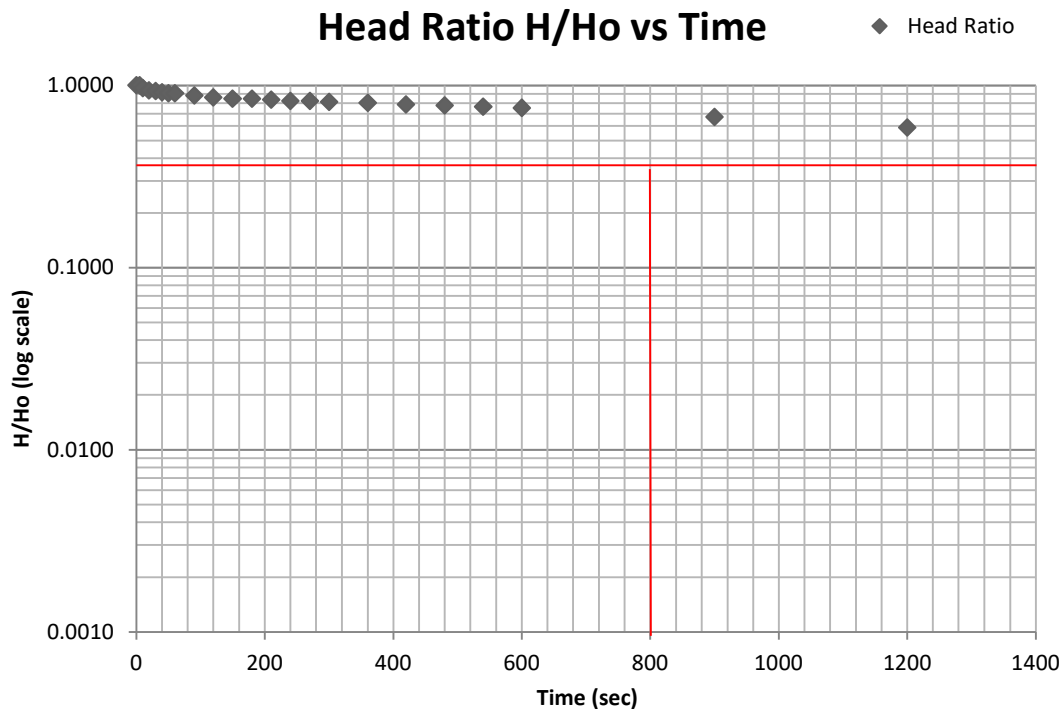


VARIABLE HEAD PERMEABILITY TEST



Site Name	Rochdale Road, Manchester			FIELD MEASUREMENTS			
Job Number				Time	Depth	Head H	Head Ratio
Location	WS103	seconds	mbgl	m	H/Ho		
		0	2.15	0.850	1.0000		
Type of test	FALLING HEAD	5	2.15	0.850	1.0000		
Strata	Made Ground to 2.50m, clay to 5.95m	10	2.18	0.820	0.9647		
		20	2.2	0.800	0.9412		
Date of Test	27/06/2025	30	2.21	0.790	0.9294		
Staff	EH	40	2.22	0.780	0.9176		
		50	2.23	0.770	0.9059		
CONDITIONS OF TEST ZONE (BS5930:1999 Figure 6)		60	2.23	0.770	0.9059		
		90	2.25	0.750	0.8824		
D		120	2.27	0.730	0.8588		
		150	2.28	0.720	0.8471		
Diameter of Borehole (D)	100 mm	180	2.28	0.720	0.8471		
L (see BS5930:1999 Figure 6)	1000 mm	210	2.29	0.710	0.8353		
Intake Factor (F)	2.0956	240	2.3	0.700	0.8235		
		270	2.3	0.700	0.8235		
Initial GW Depth	None	300	2.31	0.690	0.8118		
Base of Installation	3	360	2.32	0.680	0.8000		
Standpipe Diameter	100 mm	420	2.33	0.670	0.7882		
Standpipe X sec Area (A)	7.88E-03 m2	480	2.34	0.660	0.7765		
Depth to response zone	2 m	540	2.35	0.650	0.7647		
BASIC TIME LAG (T) (from Plot)	80 seconds	600	2.36	0.640	0.7529		
		900	2.43	0.570	0.6706		
CALCULATED VALUES		1200	2.5	0.500	0.5882		
Permeability k = A/F x T							
k =		4.7E-05 m/sec Failed					

4.7E-05 m/sec Failed



Appendix G – Generic Assessment Criteria Values

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS ^{resi}	POS ^{park}	Source
Metals	Inorganic Arsenic	N/A	37	40	49	640	79	168	DEFRA C4SL
	Beryllium	N/A	1.7	1.7	35	12	2.2	63	LQM S4UL
	Boron	N/A	290	11,000	45	240,000	21,000	46,000	LQM S4UL
	Cadmium	N/A	26	149	4.9	410	220	880	DEFRA C4SL
	Chromium (III)	N/A	910	910	18,000	8,600	1,500	33,000	LQM S4UL
	Chromium (VI)	N/A	21.0	21.0	170.0	49	23.0	250	DEFRA C4SL
	Copper	N/A	2,400	7,100	520	68,000	12,000	44,000	LQM S4UL
	Lead	N/A	200	310	80	2,330	630	1,300	DEFRA C4SL
	Elemental Mercury	N/A	1.2	1.2	21	58 (25.8) ^{vap}	16	30 (25.8) ^{vap}	LQM S4UL
	Inorganic Mercury	N/A	40	56	19	1,100	120	240	LQM S4UL
	Methylmercury	N/A	11	15	6.0	320	40	68	LQM S4UL
	Nickel (2015 update)	N/A	130	180	53	980	230	800	LQM S4UL
	Selenium	N/A	250	430	88	12,000	1,100	1,800	LQM S4UL
	Vanadium	N/A	410	1,200	91	9,000	2,000	5,000	LQM S4UL
Zinc	N/A	3,700	40,000	620	730,000	81,000	170,000	LQM S4UL	
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene	1%	210	3,000 (57.1) ^{sol}	34	84,000 (57.0) ^{sol}	15,000	29,000	LQM S4UL
		2.5%	510	4,700 (141) ^{sol}	85	97,000 (141) ^{sol}	15,000	30,000	LQM S4UL
		6%	1,100	6,000 (336) ^{sol}	200	100,000	15,000	30,000	LQM S4UL
	Acenaphthylene	1%	170	2,900 (86.1) ^{sol}	28	83,000 (86.1) ^{sol}	15,000	29,000	LQM S4UL
		2.5%	420	4,600 (212) ^{sol}	69	97,000 (212) ^{sol}	15,000	30,000	LQM S4UL
		6%	920	6,000 (506) ^{sol}	160	100,000	15,000	30,000	LQM S4UL
	Anthracene	1%	2,400	31,000 (1.17) ^{vap}	380	520,000	74,000	150,000	LQM S4UL
		2.5%	5,400	35,000	950	540,000	74,000	150,000	LQM S4UL
		6%	11,000	37,000	2,200	540,000	74,000	150,000	LQM S4UL
	Benz(a)anthracene	1%	7.2	11	2.9	170	29	49	LQM S4UL
		2.5%	11	14	6.5	170	29	56	LQM S4UL
		6%	13	15	13	180	29	62	LQM S4UL
	Benzo(a)pyrene (only)	1%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		2.5%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		6%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
	Benzo(a)pyrene (surrogate marker Coal Tar)	1%	0.8	1.2	0.32	15	2.2	4	LQM S4UL
		2.5%	1.0	1.2	0.67	15	2.2	5	LQM S4UL
		6%	1.1	1.2	1.20	15	2.2	5	LQM S4UL
	Benzo(b)fluoranthene	1%	2.6	3.9	0.99	44	7.1	13	LQM S4UL
		2.5%	3.3	4.0	2.1	44	7.2	15	LQM S4UL
		6%	3.7	4.0	3.9	45	7.2	16	LQM S4UL
	Benzo(ghi)perylene	1%	320	360	290	3,900	640	1,400	LQM S4UL
		2.5%	340	360	470	4,000	640	1,500	LQM S4UL
		6%	350	360	640	4,000	640	1,600	LQM S4UL
	Benzo(k)fluoranthene	1%	77	110	37	1,200	190	370	LQM S4UL
		2.5%	93	110	75	1,200	190	410	LQM S4UL
		6%	100	110	130	1,200	190	440	LQM S4UL
	Chrysene	1%	15	30	4.1	350	57	93	LQM S4UL
		2.5%	22	31	9.4	350	57	110	LQM S4UL
		6%	27	32	19	350	57	120	LQM S4UL
	Dibenzo(ah)anthracene	1%	0.24	0.31	0.14	3.5	0.57	1.1	LQM S4UL
		2.5%	0.28	0.32	0.27	3.6	0.58	1.3	LQM S4UL
		6%	0.3	0.32	0.43	3.6	0.58	1.4	LQM S4UL
	Fluoranthene	1%	280	1,500	52	23,000	3,100	6,300	LQM S4UL
		2.5%	560	1,600	130	23,000	3,100	6,300	LQM S4UL
		6%	890	1,600	290	23,000	3,100	6,400	LQM S4UL
	Fluorene	1%	170	2,800 (36.0) ^{sol}	27	63,000 (30.9) ^{sol}	9,900	20,000	LQM S4UL
		2.5%	400	3,800 (76.5) ^{sol}	67	68,000	9,900	20,000	LQM S4UL
		6%	860	4,500 (183) ^{sol}	160	71,000	9,900	20,000	LQM S4UL
	Indeno(123-cd)pyrene	1%	27	45	9.5	500	82	150	LQM S4UL
		2.5%	36	46	21	510	82	170	LQM S4UL
		6%	41	46	39	510	82	180	LQM S4UL
	Naphthalene	1%	15	15	65	1,600*	11,000*	8,400*	DEFRA C4SL
		2.5%	36	36	130	3,700*	15,000*	17,000*	DEFRA C4SL
		6%	85	85	200	8,400*	1,200*	1,900*	DEFRA C4SL
	Phenanthrene	1%	95	1,300 (36.0) ^{sol}	15	22,000	3,100	6,200	LQM S4UL
		2.5%	220	1,500	38	22,000	3,100	6,200	LQM S4UL
		6%	440	1,500	90	22,000	3,100	6,300	LQM S4UL
	Pyrene	1%	620	3,700	110	54,000	7,400	15,000	LQM S4UL
		2.5%	1,200	3,800	270	54,000	7,400	15,000	LQM S4UL
		6%	2,000	3,800	620	54,000	7,400	15,000	LQM S4UL
	Coal Tar (B(a)P as surrogate marker)	1%	0.79	1.2	0.32	15	2.2	4.4	LQM S4UL
		2.5%	0.98	1.2	0.67	15	2.2	4.7	LQM S4UL
		6%	1.1	1.2	1.2	15	2.2	4.8	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS ^{res} i	POS ^{park}	Source
BTEX Compounds	Benzene	1%	0.87	0.38	0.017	27	72	90	LQM S4UL
		2.5%	0.17	0.70	0.034	47	72	100	LQM S4UL
		6%	0.37	1.4	0.075	90	73	110	LQM S4UL
	Toluene	1%	130	880 (869) vap	22	56,000 (869) vap	56,000	87,000 (869) vap	LQM S4UL
		2.5%	290	1,900	51	110,000 (1,920) vap	56,000	95,000 (1,920) vap	LQM S4UL
		6%	660	3,900	120	180,000 (4,360) vap	56,000	100,000 (4,360) vap	LQM S4UL
	Ethylbenzene	1%	47	83	16	5,700 (518) vap	24,000	17,000 (518) vap	LQM S4UL
		2.5%	110	190	39	13,000 (1,220) vap	24,000	22,000 (1,220) vap	LQM S4UL
		6%	260	440	91	27,000 (2,840) vap	25,000	27,000 (2,840) vap	LQM S4UL
	o-xylene	1%	60	88	28	6,600 (478) sol	41,000	17,000 (478) sol	LQM S4UL
		2.5%	140	210	67	15,000 (1,120) sol	42,000	24,000 (1,120) sol	LQM S4UL
		6%	330	480	160	33,000 (2,620) sol	43,000	33,000 (2,620) sol	LQM S4UL
	m-xylene	1%	59	82	31	6,200 (625) vap	41,000	17,000 (625) vap	LQM S4UL
		2.5%	140	190	74	14,000 (1,470) vap	42,000	24,000 (1,470) vap	LQM S4UL
		6%	320	450	170	31,000 (3,460) vap	43,000	32,000 (3,460) vap	LQM S4UL
	p-xylene	1%	56	79	29	5,900 (576) sol	41,000	17,000 (576) sol	LQM S4UL
		2.5%	130	180	69	14,000 (1,350) sol	42,000	23,000 (1,350) sol	LQM S4UL
		6%	310	430	160	30,000 (3,170) sol	43,000	31,000 (3,170) sol	LQM S4UL
Petroleum Hydroc	Aliphatic								
	EC 5-6	1%	42	42	730	3,200 (304) sol	570,000(304)sol	95,000 (304) sol	LQM S4UL
	EC>6-8	1%	100	100	2,300	7,800 (144) sol	600,000	150,000 (144) sol	LQM S4UL
	EC>8-10	1%	27	27	320	2,000 (78) sol	13,000	14,000 (78) vap	LQM S4UL
	EC>10-12	1%	130 (48) vap	130 (48) vap	2,200	9,700 (48) sol	13,000	21,000 (48) vap	LQM S4UL
	EC>12-16	1%	1,100 (24) sol	1,100 (24) sol	11,000	59,000 (24) sol	13,000	25,000 (24) sol	LQM S4UL
	EC>16-35	1%	65,000 (8.48)	65,000 (8.48) f, sol	260,000 f	160,000 f	250,000 f	450,000 f	LQM S4UL
	EC>35-44	1%	65,000 (8.48)	65,000 (8.48) f, sol	260,000 f	160,000 f	250,000 f	450,000 f	LQM S4UL
	Aliphatic								
	EC 5-6	2.5%	78	78	1,700	5,900 (558) sol	590,000	130,000 (558) sol	LQM S4UL
	EC>6-8	2.5%	230	230	5,600	17,000 (322) sol	610,000	220,000 (322) sol	LQM S4UL
	EC>8-10	2.5%	65	65	770	4,800 (190) vap	13,000	18,000 (190) vap	LQM S4UL
	EC>10-12	2.5%	330 (118) vap	330 (118) vap	4,400	23,000 (118) vap	13,000	23,000 (118) vap	LQM S4UL
	EC>12-16	2.5%	2,400 (59) sol	2,400 (59) sol	13,000	82,000 (59) sol	13,000	25,000 (59) sol	LQM S4UL
	EC>16-35	2.5%	92,000 (21)	92,000 (21) f, sol	270,000 f	1,700,000 f	250,000 f	480,000 f	LQM S4UL
	EC>35-44	2.5%	92,000 (21)	92,000 (21) f, sol	270,000 f	1,700,000 f	250,000 f	480,000 f	LQM S4UL
	Aliphatic								
	EC 5-6	6%	160	160	3,900	12,000 (1,150) sol	600,000	180,000 (1,150)	LQM S4UL
	EC>6-8	6%	530	530	13,000	40,000 (736) sol	620,000	320,000 (736) sol	LQM S4UL
	EC>8-10	6%	150	150	1,700	11,000 (451) vap	13,000	21,000 (451) vap	LQM S4UL
	EC>10-12	6%	760 (283) vap	760 (283) vap	7,300	47,000 (283) vap	13,000	24,000 (283) vap	LQM S4UL
	EC>12-16	6%	4,300 (142) sol	4,400 (142) sol	13,000	90,000 (142) sol	13,000	26,000 (142) sol	LQM S4UL
	EC>16-35	6%	110,000 f	110,000 f	270,000 f	1,800,000 f	250,000 f	490,000 f	LQM S4UL
	EC>35-44	6%	110,000 f	110,000 f	270,000 f	1,800,000 f	250,000 f	490,000 f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	1%	70	370	13	26,000 (1,220) sol	56,000	76,000 (1,220) sol	LQM S4UL
	EC>7-8(toluene)	1%	130	860	22	56,000 (869) vap	56,000	87,000 (869) vap	LQM S4UL
	EC>8-10	1%	34	47	8.6	3,500 (613) vap	5,000	7,200 (613) vap	LQM S4UL
	EC>10-12	1%	74	250	13	16,000 (364) sol	5,000	9,200 (364) sol	LQM S4UL
	EC>12-16	1%	140	1,800	23	36,000 (169) sol	5,100	10,000	LQM S4UL
	EC>16-21	1%	260 f	1,900 f	46 f	28,000 f	3,800 f	7,600 f	LQM S4UL
	EC>21-35	1%	1,100 f	1,900 f	370 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	EC>35-44	1%	1,100 f	1,900 f	370 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	2.5%	140	690	27	46,000 (2,260) sol	56,000	84,000 (2,260) sol	LQM S4UL
	EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) sol	56,000	95,000 (1,920) sol	LQM S4UL
	EC>8-10	2.5%	83	110	21	8,100 (1,500) vap	5,000	8,500 (1,500) vap	LQM S4UL
	EC>10-12	2.5%	180	590	31	28,000 (899) sol	5,000	9,700 (899) sol	LQM S4UL
	EC>12-16	2.5%	330	2,300 (419) sol	57	37,000	5,100	10,000	LQM S4UL
	EC>16-21	2.5%	540 f	1,900 f	110 f	28,000 f	3,800 f	7,700 f	LQM S4UL
	EC>21-35	2.5%	1,500 f	1,900 f	820 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	EC>35-44	2.5%	1,500 f	1,900 f	820 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	6%	300	1,400	57	86,000 (4,710) sol	56,000	92,000 (4,710) sol	LQM S4UL
	EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360) vap	56,000	100,000 (4,360)	LQM S4UL
	EC>8-10	6%	190	270	51	17,000 (3,580) vap	5,000	9,300 (3,580) vap	LQM S4UL
	EC>10-12	6%	380	1,200	4	34,000 (2,150) sol	5,000	10,000	LQM S4UL
	EC>12-16	6%	660	2,500	130	38,000	5,100	10,000	LQM S4UL
	EC>16-21	6%	930 f	1,900 f	260 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	EC>21-35	6%	1,700 f	1,900 f	1,600 f	28,000 f	3,800 f	7,900 f	LQM S4UL
	EC>35-44	6%	1,700 f	1,900 f	1,600 f	28,000 f	3,800 f	7,900 f	LQM S4UL
	Aliphatic +Aromatic >EC44	1%	1,600 f	1,900 f	1,200 f	28,000 f	3,800 f	7,800 f	LQM S4UL
		2.5%	1,800 f	1,900 f	2,100 f	28,000 f	3,800 f	7,800 f	LQM S4UL
		6%	1,900 f	1,900 f	3,000 f	28,000 f	3,800 f	7,900 f	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POS ^{res} i	POS ^{park}	Source
Chloroalkanes and Alkenes & Explosives	1,2 Dichloroethane (DCA)	1%	0.0071	0.0092	0.0046	0.67	29	21	LQM S4UL
		2.5%	0.0110	0.0130	0.0083	0.97	29	24	LQM S4UL
		6%	0.0190	0.0230	0.0160	1.7	29	28	LQM S4UL
	1,1,1 Trichloroethane (TCA)	1%	8.8	9.0	48	660	140,000	57,000 (1,425) ^{vap}	LQM S4UL
		2.5%	18	18	110	1,300	140,000	76,000 (2,915) ^{vap}	LQM S4UL
		6%	39	40	240	3,000	140,000	100,000 (6,392)	LQM S4UL
	1,1,2,2-Tetrachloroethanes (PCA)	1%	1.6	3.9	0.41	270	1,400	1,800	LQM S4UL
		2.5%	3.4	8.0	0.89	550	1,400	2,100	LQM S4UL
		6%	7.5	17	2.0	1,100	1,400	2,300	LQM S4UL
	1,1,1,2-Tetrachloroethanes (PCA)	1%	1.2	1.5	0.79	110	1,400	1,500	LQM S4UL
		2.5%	2.8	3.5	1.9	250	1,400	1,800	LQM S4UL
		6%	6.4	8.2	4.4	560	1,400	2,100	LQM S4UL
	Tetrachloroethene (PCE)	1%	0.31	0.32	2.00	24	3,200	1400	DEFRA C4SL
		2.5%	0.70	0.71	4.8	55	3,300	1900	DEFRA C4SL
		6%	1.60	1.60	11.0	130	3,400	2,500	DEFRA C4SL
	Tetrachloromethane (carbon tetrachloride)	1%	0.03	0.03	0.45	2.9	890	190	LQM S4UL
		2.5%	0.06	0.06	1.0	6.3	920	270	LQM S4UL
		6%	0.13	0.13	2.4	14	950	400	LQM S4UL
	Trichloroethene (TCE)	1%	0.009	0.010	0.032	0.7	76.0	41.0	DEFRA C4SL
		2.5%	0.020	0.020	0.072	1.5	78.0	51.0	DEFRA C4SL
		6%	0.043	0.045	0.160	3.4	79.0	69.0	DEFRA C4SL
	cis 1,2-dichloroethene	1%	0.46	0.50	0.890	38	3,800	2,000	DEFRA C4SL
		2.5%	0.78	0.84	1.70	64	3,800	2,400	DEFRA C4SL
		6%	1.50	1.60	3.60	120	3,900	3,100	DEFRA C4SL
	Trichloromethane (chloroform)	1%	0.91	1.2	0.42	99	2,500	2,600	LQM S4UL
		2.5%	1.7	2.1	0.83	170	2,500	2,800	LQM S4UL
		6%	3.4	4.2	1.7	350	2,500	3,100	LQM S4UL
	Trans-1,2 Dichloroethene	1%	0.9	0.9	3.7	69	13,000	5,600	DEFRA C4SL
		2.5%	1.6	1.7	7.5	120	13,000	7,000	DEFRA C4SL
		6%	3.3	3.4	16.0	260	13,000	9,100	DEFRA C4SL
	Chloroethene (vinyl chloride)	1%	0.006	0.015	0.0017	1.1E+00	7.8	18.0	DEFRA C4SL
		2.5%	0.010	0.019	0.0031	1.4E+00	7.8	19.0	DEFRA C4SL
		6%	0.017	0.029	0.0058	2.20	7.8	19.0	DEFRA C4SL
	2,4,6-Trinitrotoluene (TNT)	1%	1.6	65	0.24	1,000	130	260	LQM S4UL
		2.5%	3.7	66	0.58	1,000	130	270	LQM S4UL
		6%	8.1	66	1.4	1,000	130	270	LQM S4UL
	RDX	1%	120	13,000	17	210,000	26,000	49,000 (18.7) ^{sol}	LQM S4UL
		2.5%	250	13,000	38	210,000	26,000	51,000	LQM S4UL
		6%	540	13,000	85	210,000	27,000	53,000	LQM S4UL
	HMX	1%	5.7	6,700	0.86	110,000	13,000	23,000 (0.35) ^{vap}	LQM S4UL
		2.5%	13	6,700	1.9	110,000	13,000	23,000 (0.39) ^{vap}	LQM S4UL
		6%	26	6,700	3.9	110,000	13,000	24,000 (0.48) ^{vap}	LQM S4UL
Pesticides	Aldrin	1%	5.7	7.3	3.2	170	18	30	LQM S4UL
		2.5%	6.6	7.4	6.1	170	18	31	LQM S4UL
		6%	7.1	7.5	9.8	170	18	31	LQM S4UL
	Dieldrin	1%	0.97	7.0	0.17	170	18	30	LQM S4UL
		2.5%	2.0	7.3	0.41	170	18	30	LQM S4UL
		6%	3.5	7.4	0.96	170	18	31	LQM S4UL
	Atrazine	1%	3.3	610	0.5	9,300	1,200	2,300	LQM S4UL
		2.5%	7.8	620	1.2	9,400	1,200	2,400	LQM S4UL
		6%	17.4	620	2.7	9,400	1,200	2,400	LQM S4UL
	Dichlorvos	1%	3.2E-02	6.4	4.9E-03	140	16	26	LQM S4UL
		2.5%	6.6E-02	6.5	1.0E-02	140	16	26	LQM S4UL
		6%	0.14	6.6	2.2E-02	140	16	27	LQM S4UL
	Endosulfans (2 isomers)	1%	7.4	160 (3.0E-03) ^{vap}	1.2	5,600 (3.0E-03) ^{vap}	1,200	2,300	LQM S4UL
		2.5%	18	280 (7.0E-03) ^{vap}	2.9	7,400 (7.0E-03) ^{vap}	1,200	2,400	LQM S4UL
		6%	41	410 (1.6E-02) ^{vap}	6.8	8,400 (1.6E-02) ^{vap}	1,200	2,500	LQM S4UL
	Hexachlorocyclohexane (3 isomers), inc Lindane	1%	8.5E-02	3.7	1.3E-02	65	8.1	15	LQM S4UL
		2.5%	0.2	3.8	3.2E-02	65	8.1	15	LQM S4UL
		6%	0.46	3.8	7.7E-02	65	8.1	16	LQM S4UL
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) ^{sol}	LQM S4UL
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) ^{sol}	LQM S4UL
		6%	2.4	2.4	32	290	14,000	2,900	LQM S4UL
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) ^{sol}	90,000	24,000 (571) ^{sol}	LQM S4UL
		2.5%	55	57	230	4,800 (1,370) ^{sol}	95,000	36,000 (1,370) ^{sol}	LQM S4UL
		6%	130	130	540	11,000 (3,240) ^{sol}	98,000	51,000 (3,270) ^{sol}	LQM S4UL
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) ^{vap}	LQM S4UL
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) ^{vap}	LQM S4UL
		6%	15	15	320	1,300	19,000	4,000 (1,880) ^{vap}	LQM S4UL
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) ^{vap}	78	110 (39) ^{vap}	LQM S4UL
		2.5%	1.6	1.9	0.90	120 (98.1) ^{vap}	79	120	LQM S4UL
		6%	3.7	4.3	2.2	240 (235) ^{vap}	79	130	LQM S4UL
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) ^{sol}	100	190	LQM S4UL
		2.5%	12	30	3.1	770 (107) ^{sol}	100	190	LQM S4UL
		6%	22	38	7.0	830	100	190	LQM S4UL
	Hexachlorobenzene	1%	1.8 (0.20) ^{vap}	4.1 (0.20) ^{vap}	0.47	110 (0.20) ^{vap}	16	30	LQM S4UL
		2.5%	3.3 (0.50) ^{vap}	5.7 (0.50) ^{vap}	1.1	120	16	30	LQM S4UL
		6%	4.9	6.7 (1.2) ^{vap}	2.5	120	16	30	LQM S4UL

Generic Assessment Criteria Values

Contaminant		SOM	Res +	Res -	Allot.	Comm.	POSresi	POSpark	Source
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 ^g	94	0.13 ^g	3,500	620	1,100	LQM S4UL
		2.5%	2.0	150	0.30	4,000	620	1,100	LQM S4UL
		6%	4.5	210	0.70	4,300	620	1,100	LQM S4UL
	Pentachlorophenol	1%	0.22	27 (16.4) ^{vap}	3.0E-02	400	60	110	LQM S4UL
		2.5%	0.52	29	8.0E-02	400	60	120	LQM S4UL
		6%	1.2	31	0.19	400	60	120	LQM S4UL
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300	LQM S4UL
		2.5%	0.29	0.29	10	22	11,000	1,900	LQM S4UL
		6%	0.62	0.62	23	47	11,000	2,700	LQM S4UL
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48	LQM S4UL
		2.5%	0.7	0.78	0.61	66	25	50	LQM S4UL
		6%	1.6	1.8	1.4	120	25	51	LQM S4UL
	Phenol	1%	120	440 (460)	23	440 ^{dir} (26,000)	440 ^{dir} (10,000)	440 ^{dir} (7,600)	LQM S4UL
		2.5%	200	690	42	690 ^{dir} (30,000)	690 ^{dir} (10,000)	690 ^{dir} (8,300)	LQM S4UL
		6%	380	1,200	83	1,300 ^{dir} (34,000)	1,300 ^{dir} (10,000)	1,300 ^{dir} (9,300)	LQM S4UL
sol/vap = solubility/vapour limit (potentially use if free product identified, although highly conservative)									
* = naphthalene C4SL exceeds the CLEA calculated soil saturation concentration (76 mg kg-1 for 1% SOM, 183 mg kg-1 for 2.5% SOM and 432 mg kg-1 for 6% SOM)									
f = oral, dermal and inhalation exposures compared to oral HCV									
dir = S4ULs based on threshold protective of direct skin contact with phenol)brackets long term exposure for illustration purposes)									
g = derived based on 2,3,4-tetrachlorophenol									

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